

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 12/019,318
Applicant: YEAGER, C. Douglas
Filing Date: 01/24/2008
Confirmation No.: 9759
Title: SELF-AUTHORIZING DEVICES
Examiner: SONG, Hee K.
Group Art Unit: 2433

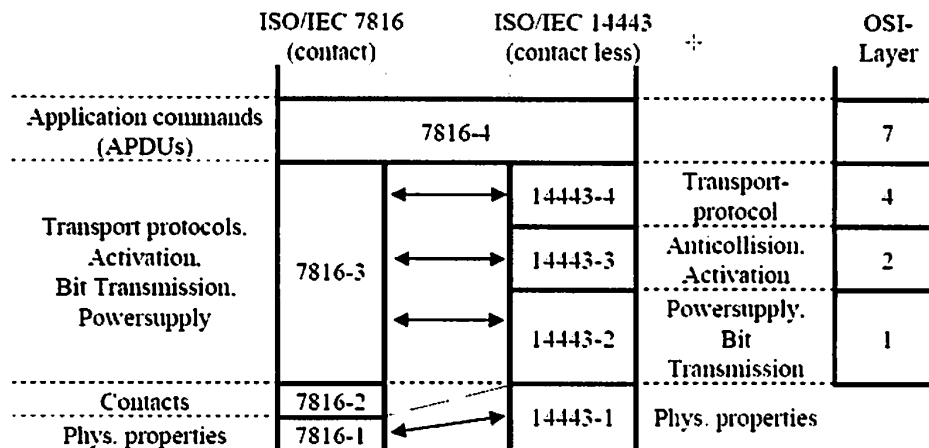
DECLARATION OF Brian Charles Murray
under 37 CFR 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

1. I, Brian Charles Murray declare as follows:
2. I live in San Diego, California United States of America.
3. I have no current or prospective inventorship or ownership interest in U.S. Patent Application Serial Number 12/019,318.
4. I have extensive knowledge and experience in payment card technologies and standards
5. I am recognized as an expert in the field of payment card technology. My curriculum vitae is appended hereto as Exhibit A.
6. I have reviewed and evaluated Claims 1, 15, and 25 as amended by an Amendment submitted concurrently with this Declaration. I have also reviewed originally-filed Claims 1, 15, and 24 and I have reviewed and evaluated the

Examiner's rejections of originally-filed Claims 1, 15, and 24 as being unpatentable over US Patent 7,213,766 (Ryan) in view of US Pre-grant Pub. 2007/0208949 (Lu) and further in view of US Pre-grant Publication 2007/0262138 (Somers).

7. Claim 1 as originally-filed (and as currently amended) specifies "a secure element reader affixed to the mounting structure and configured to interrogate the secure element by executing file system functions according to ISO 7816-4." The Examiner refers to Ryan's translation module as disclosing this limitation. However that conclusion is inconsistent with the details of Ryan's document.
8. ISO 7816 is a broad specification with different sections directed toward different "layers" of communication protocols, as seen in the following diagram:



Among the various sections of 7816, system developers freely pick and choose what layer's of communication will be implemented in a particular device. Ryan does not disclose which portions of 7816 are to be implemented. However, in Figures 1A, 1B and 1C Ryan refers to elements 104, 124 and 144 as a translation module. Those designations are confirmed at various places in the specification. Then at Column 18, lines 12 – 17, Ryan states

The translation module 104 is for going (moving signals) from USB (the exemplary interface with the computer) to a smart card interface format, such as ISO 7816, and vice-versa. The translation module may comprise a Philips TDA8030 USB/7816. (ISO 7816 is a smart card contact interface.)

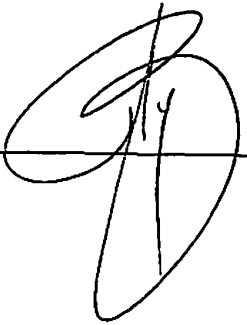
Based on Ryan's explicit statement that the translation module 104 is for "moving signals" it is clear that Ryan's translation modules are directed at protocols well below OSI layer 7 to which ISO 7816-4 applies. This is further emphasized from the example provided by Ryan, "a Philips TDA8030 USB/7816." A copy of the data sheet for the TDA8030 and an Application Note for that device are attached as Appendix A and Appendix B respectively. The data sheet states that "The TDA8030; TDA8031 is a bus powered full-speed USB device. All analog and digital functions for an EMV compliant Smart Card Reader are built-in."

9. It is important to note that a "smart card reader" is not equivalent to a "a secure element reader . . . configured to interrogate the secure element by executing file system functions according to ISO 7816-4." A "smart card reader" is a device that provides low-level communications capability with a smart card. As evidence of that, Exhibit C presents a summary page for Smart Card Reader distributed by Athena Smartcard Products. That document states that the reader supports "ISO7816 T=0; T=1." T=0 and T=1 are two transmission protocols: character protocol (T=0) or block protocol (T=1). These are low level communications protocols that are specified in ISO 7816-3. There are no "smarts" built in to a Smart Card Reader that would conform to OSI Layer 7 / ISO 7816-4.
10. Commands executed by a secure element reader may be further defined by specific payment card standards or other proprietary card applications. Consequently, a "secure element reader affixed to the mounting structure and configured to interrogate the secure element by executing file system functions comprising a command to select a payment card application according to ISO 7816-4" is further distinguished over a "smart card reader." A "smart card

reader” would **only** execute such functions if/when commanded to do so by an **external device** such as a host computer.

11. In standard smart card systems that were publicly known in January 2008 (i.e., at the filing date of the present application) the “smarts” for interrogating the secure element by executing file system functions according to ISO 7816-4 were resident in a host computer. A Smart Card Reader was used provide communication between the secure element and the host computer. It is unexpected that a secure element reader would be affixed to the mounting structure of a smart token and configured to interrogate the secure element by executing file system functions according to ISO 7816-4.
12. Regarding Claim 15, USB Human Interface Devices (HIDs) are defined by an industry standards organization (USB Implementers Forum (USB-IF)). The USB HID class specifications allow for myriad of user/computer interface devices including various input devices such as keyboards, mice, track balls, game controllers, as well as output devices such as CRT/LCD displays and audio speakers. The use of the USB HID class specifications has been extended even beyond computer input/output devices to include such wide-ranging applications as simulation controllers, exercise machines, telephony devices, thermometers, medical instruments and uninterruptible power supplies. Any device can be a USB HID class device as long as a designer meets the USB HID class logical specifications. It is unexpected that a smart card would be specifically configured as a keyboard interface device.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

A handwritten signature, possibly reading "J. H. Y.", is written over a horizontal line.

May 1st 2011.
Date ✓

Brian C. Murray
Founder and Chief Executive Officer U.S. Encode Corporation.

U.S. Encode is a payment technology provider positioned in online authentication addressing consumer payments. The company has headquarters at 12707 High Bluff Drive, San Diego, California.

Brian Murray has over 20 years of international experience as a Senior Officer and Director of companies in Banking, Card Processing and Payment Technology, including Barclays International, where he was located in London, Italy, Germany and France; First National Bank and The NedCor Banking Group. He relocated to the USA in 1999 where he was CEO and a Director of TradeRoot California, a start-up Information Technology Company involved in Internet Payment Processing. During 2002 Bob Eprile and Brian Murray founded U.S. Encode® Corporation.

Mr. Murray's expertise in the payments industry has led to him presenting at numerous payment and fraud forums.

Brian was educated at The College for Advanced Technical Education Business School in Port Elizabeth South Africa, Barclays School of Management and Oxford Brookes University in the United Kingdom.

Brian served in the South African Armed Forces and was awarded the Pro Patria Medal. He is an avid sportsman, played Division One Rugby and served as President of The Transvaal Union Rugby Football Club and as Chairman of the Barclays Transvaal Rugby Football Club. He has also completed a number of marathons and ultra marathons.

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		SELF-AUTHORIZING TOKEN		
First Named Inventor/Applicant Name:		C. Douglas Yeager		
Filer:		James Roy Palmer/Jennifer McDonald		
Attorney Docket Number:		63766.C1		
Filed as Small Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Utility filing Fee (Electronic filing)	4011	1	95	95
Utility Search Fee	2111	1	310	310
Utility Examination Fee	2311	1	125	125
Pages:				
Claims:				
Claims in excess of 20	2202	11	30	330
Independent claims in excess of 3	2201	3	125	375
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1235

Electronic Acknowledgement Receipt	
EFS ID:	12141260
Application Number:	13403141
International Application Number:	
Confirmation Number:	6813
Title of Invention:	SELF-AUTHORIZING TOKEN
First Named Inventor/Applicant Name:	C. Douglas Yeager
Customer Number:	408
Filer:	James Roy Palmer/Jennifer McDonald
Filer Authorized By:	James Roy Palmer
Attorney Docket Number:	63766.C1
Receipt Date:	23-FEB-2012
Filing Date:	
Time Stamp:	12:49:55
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$1235
RAM confirmation Number	11736
Deposit Account	122355
Authorized User	
<p>The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:</p> <p>Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)</p> <p>Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)</p>	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)					
Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)					
Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)					
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	63766c1-topto-20120116-ADS.pdf	1023249 d2cc2bf6dbf640c8784be09d3ff169455da30810	no	4
Warnings:					
Information:					
2		63766c1-topto-20120221-ContinuationPatentApplication.pdf	201549 690e9da4b2b78f29e3005fe172eded1683523796	yes	44
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	37	
	Claims		38	43	
	Abstract		44	44	
Warnings:					
Information:					
3	Drawings-only black and white line drawings	63766c1-topto-20120221-FormalDrawings.pdf	1228347 6891287b503893559a08ffb3868a71ddd64bab8b	no	19
Warnings:					
Information:					
4	Oath or Declaration filed	63766c1-topto-20120221-Declaration.pdf	1617867 f9eed2f463945f52c99299e49a9e0b1e0410e33f	no	2
Warnings:					
Information:					
5	Rule 130, 131 or 132 Affidavits	63766us-topto-20120221-132DeclarationWithAttachedBio.pdf	187457 bed6da34ec22a269dc8e3764e67ed54a21f937f1	no	6
Warnings:					
Information:					
6	Fee Worksheet (SB06)	fee-info.pdf	37918 64039861f31f88470753f4b033bf3d7f205fa70	no	2
Warnings:					

Information:	
Total Files Size (in bytes):	4296387
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>	

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	63766.C1
		Application Number	
Title of Invention	SELF-AUTHORIZING TOKEN		
<p>The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.</p> <p>This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.</p>			

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Applicant Information:

Applicant 1					Remove
Applicant Authority		☒ Inventor		☐ Legal Representative under 35 U.S.C. 117	☐ Party of Interest under 35 U.S.C. 118
Prefix	Given Name	Middle Name	Family Name	Suffix	
	C.	Douglas	Yeager		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	Austin	State/Province	TX	Country of Residence i	US
Citizenship under 37 CFR 1.41(b) i		US			
Mailing Address of Applicant:					
Address 1					
Address 2					
City	Austin	State/Province	TX		
Postal Code	78731	Country i	US		
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.					Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
☐ An Address is being provided for the correspondence Information of this application.			
Customer Number	00408		
Email Address	JPalmer@LNG-Patent.com	Add Email	Remove Email

Application Information:

Title of the Invention	SELF-AUTHORIZING TOKEN		
Attorney Docket Number	63766.C1	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)		Suggested Figure for Publication (if any)	

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	63766.C1
		Application Number	
Title of Invention	SELF-AUTHORIZING TOKEN		

Publication Information:

☐	Request Early Publication (Fee required at time of Request 37 CFR 1.219)
☐	Request Not to Publish. I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.			
Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	00408		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.			
Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Continuation of	12019318	2008-01-24
Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
12019318	non provisional of	60897110	2007-01-25
Prior Application Status		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
12019318	non provisional of	60932704	2007-06-01
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			Add

Foreign Priority Information:

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).			
			Remove
Application Number	Country ⁱ	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
			☒ Yes ☐ No

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	63766.C1
		Application Number	
Title of Invention	SELF-AUTHORIZING TOKEN		

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Add

Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.

Assignee 1

Remove

If the Assignee is an Organization check here. ☐

Prefix	Given Name	Middle Name	Family Name	Suffix

Mailing Address Information:

Address 1			
Address 2			
City		State/Province	
Country ⁱ		Postal Code	
Phone Number		Fax Number	
Email Address			

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Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.

Signature	/James R. Palmer/		Date (YYYY-MM-DD)	2012-02-23
First Name	James	Last Name	Palmer	Registration Number
				48633

This collection of information is required by 37 CFR 1.76. 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 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet 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.**

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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 the Freedom of Information Act requires disclosure of these records.
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 inspections 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.

APPLICATION
OF
C. DOUGLAS YEAGER
FOR
LETTERS PATENT OF THE UNITED STATES
FOR
SELF-AUTHORIZING TOKEN
[ELEMENTAL KNOWLEDGE INC.]

Name C. Douglas Yeager
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Attorney Docket: 63766.C1

COVER SHEET

SELF-AUTHORIZING TOKEN

CROSS REFERENCES TO RELATED APPLICATIONS

[0001] This application is a **Continuation** of currently pending and allowed U.S. Patent Application Serial No. 12/019,318 filed 01/24/2008, entitled “Self-Authorizing Devices.” This Application and U.S. Patent Application Serial No. 12/019,318 claim priority from and are related to U.S. Provisional Patent Application Serial No. 60/897,110 filed 01/25/2007, entitled: “Method and Apparatus for Self-swiping Smartcard Payments,” and this patent application and U.S. Patent Application Serial No. 12/019,318 claim priority from and are related to U.S. Provisional Patent Application Serial No. 60/932,704 filed 06/01/2007, entitled: “Method and Apparatus for a Self-swiping Smartcard.” Provisional Patent Applications Serial Nos. 60/897,110 and 60/932,704 are incorporated by reference in their entirety herein.

FIELD

[0002] This invention relates to the field of devices configured to authorize transactions using secure element microchips. More particularly, this invention relates to tokens that contain secure element microchips and are configured to authorize financial transactions over the internet.

BACKGROUND

[0003] In some payment technologies such as smartcards, a microchip referred to as a “Secure Element” (SE) is embedded into the payment card, the payment fob, or another other device that may be used for making payments. In order to extract information from the SE, an interrogator, also referred to herein as a “reader”, is required to interact electrically with the SE. The reader typically follows standards set forth by the International Organization for Standardization (ISO) or proprietary standards established by financial institutions or other application providers. In addition to making payments such devices may be used for other purposes such as controlling access to networks and databases and verifying identity. Such devices typically employ sophisticated technologies for enhancing the security of these transactions and preventing fraud. However, the use of the internet is becoming more popular for such purposes. What are needed therefore are devices and methods that adapt the enhanced security and fraud prevention techniques used in smartcard systems for use in internet-based transactions.

SUMMARY

[0004] The present disclosure provides, in one embodiment, a token that has a mounting structure having a communication connector configured to connect to a computer terminal. In this embodiment a secure element is affixed to the mounting structure, and the secure element includes a data file. This embodiment further includes a secure element interrogator that is affixed to the mounting structure and that is configured to interrogate the secure element to acquire transaction information from the data file by exchanging a plurality of transaction data communications only between the secure element and the secure element interrogator. This embodiment further includes a communications controller that is affixed to the mounting structure and that is configured to receive the data from the secure element interrogator and to transmit the transaction information as a single data communication to the computer terminal through the communications connector.

[0005] Another embodiment provides a token that has a mounting structure having a communication connector configured to connect to a computer terminal. This embodiment further includes a secure element that is affixed to the mounting structure, and the secure element has a payment card application and a data file. Further, this embodiment includes a secure element interrogator that is affixed to the mounting structure and that is configured to interrogate the secure element to acquire transaction information from the data file by exchanging a plurality of transaction data communications only between the secure element and the secure element interrogator. The embodiment also includes a communications controller that is affixed to the mounting structure and that is configured to receive the data from the secure element interrogator and to transmit the transaction information as track data to the computer terminal through the communications connector.

[0006] A further embodiment provides a token that has a mounting structure having a communication connector configured to connect to a computer terminal. There is a secure element that is affixed to the mounting structure, and the secure element has a data file. In this embodiment a secure element interrogator is affixed to the mounting structure and the secure element interrogator is configured to interrogate the secure element to acquire

transaction information from the data file by exchanging a plurality of transaction data communications only between the secure element and the secure element interrogator. This embodiment further provides a communications controller that is affixed to the mounting structure and that is configured to receive the data from the secure element interrogator and that is configured to transmit the transaction information to the computer terminal through the communications connector.

[0007] A further embodiment provides a token that has a mounting structure having a communication connector configured to connect to a computer terminal. This embodiment includes a secure element that is affixed to the mounting structure, and the secure element has a data file. There is a secure element interrogator that is affixed to the mounting structure and that is configured to interrogate the secure element to acquire transaction information from the data file by exchanging at least one transaction data communication only between the secure element and the secure element interrogator. Further included in this embodiment is a communications controller that is affixed to the mounting structure and that is configured to receive the data from the secure element interrogator and to transmit the transaction information as a single data communication to the computer terminal through the communications connector.

[0008] In another embodiment a token has a mounting structure that has a communication connector configured to connect to a computer terminal. There is a secure element that is affixed to the mounting structure, and the secure element includes a payment card application and a data file. There is a secure element interrogator that is affixed to the mounting structure and that is configured to interrogate the secure element to acquire transaction information from the data file by exchanging at least one transaction data communication only between the secure element and the secure element interrogator. Further provided in this embodiment is a communications controller that is affixed to the mounting structure and that is configured to receive the data from the secure element interrogator and to transmit the transaction information as track data to the computer terminal through the communications connector.

[0009] Another embodiment provides a token that has a mounting structure having a communication connector configured to connect to a computer terminal. There is a secure element affixed to the mounting structure, and the secure element includes a data file. There is a secure element interrogator affixed to the mounting structure and the secure element interrogator is configured to interrogate the secure element to acquire transaction information from the data file by exchanging at least one transaction data communications only between the secure element and the secure element interrogator. Further provided is a communications controller that is affixed to the mounting structure and that is configured to receive the data from the secure element interrogator and that is configured to transmit the transaction information to the computer terminal through the communications connector.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Various advantages are apparent by reference to the detailed description in conjunction with the figures, wherein elements are not to scale so as to more clearly show the details, wherein like reference numbers indicate like elements throughout the several views, and wherein:

[0011] Fig. 1 is a drawing of one embodiment of a self-swiping card with a USB interface.

[0012] Fig. 2 is a drawing of a close up view of the USB interface connector on one embodiment of a self-swiping card.

[0013] Fig. 3 is a drawing of the internals of one embodiment of a self-swiping card.

[0014] Fig. 4 illustrates a circuit board schematic according to one embodiment.

[0015] Fig. 5 illustrates a system where a self-swiping card is used to deliver track 1 and track 2 data to a merchant remotely via the internet.

[0016] Figs. 5.1 and 5.2 illustrate interaction and data exchange between an interrogator chip and an SE.

[0017] Fig. 5.3 illustrates a method of encrypting data.

[0018] Fig. 6 illustrates one embodiment of an online web form with an auto-populating field for a self-swiping card.

[0019] Fig. 7 illustrates the decrypted track data that was encoded within the information that came from the auto-populating field from Fig. 6.

[0020] Fig. 8 illustrates an embodiment of a self-swiping card with a USB interface.

[0021] Fig. 9 illustrates a further embodiment of a self-swiping card with a USB interface.

[0022] Fig. 10 illustrates an embodiment of the smart card module embedded in the card.

[0023] Figs. 11A and 11B illustrates embodiments of a self-swiping card in a mini-SD and an SD form factor.

[0024] Fig. 12 illustrates a system where track 1 and track 2 data with an encrypted PAN (Personal Account Number) data are delivered via the world-wide web.

[0025] Fig. 13 illustrates a method of encrypting PAN digits that maintains the original bank routing code.

[0026] Figs. 13.1 – 13.4 illustrate elements of an encryption algorithm.

[0027] Fig. 14 illustrates a system where a reader on card is queried as an alternative to keyboard input.

[0028] Figs. 15 and 15.1 illustrate an embodiment of an online web form with an auto-populating field.

[0029] Figs. 16 and 16.1 illustrate a mobile phone embodiment.

[0030] Fig. 16.2 illustrates an encryption technique.

DETAILED DESCRIPTION

[0031] In the following detailed description of the preferred embodiments, reference is made to the accompanying drawings, which form a part hereof, and within which are shown by way of illustration the practice of specific embodiments of self-authorizing smart tokens and embodiments of self-authorizing cellular network adapters. It is to be understood that other embodiments may be utilized, and that structural changes may be made and processes may vary in other embodiments.

[0032] For the purpose of simplifying language and providing a convenient example, the device that houses a secure element (SE) microchip is typically referred to herein as a “card” or “card device.” It is important to note that the “card” or “card device” may not physically resemble the shape or size of a typical payment card and may come in various alternate form factors such as fobs, cartridges, or dongles, or form factors that resemble removable digital memory media such as secure digital (SD) chips. The term “token” is used to encompass all of these form factors and the term “smart token” refers to a token that includes an SE. Each token has a mounting structure such as substrate (for card devices) or a packaging case (for fobs, cartridges, and dongles or SD chips).

[0033] In many embodiments described herein a card is configured to interact with a computer terminal. As used herein a computer terminal refers to a personal computer or a special-purpose terminal provided at a point of sale or public kiosk. For the purpose of simplifying language and providing a convenient example the term “PC” (referring to a personal computer) will be used as an example of a computer terminal. Typically the PC has access to an internet. As used herein the term internet includes the world-wide web as well as any other public or proprietary network that may be used for authorizing transactions.

[0034] In addition to applications involving computer terminals, embodiments are provided for mobile phones and personal digital assistants (PDAs) that communicate over a cellular network. Such mobile phones and PDAs are referred to herein as cellular network devices. The term “cellular network adapter” is used herein to describe a system that includes in a secure element (SE) microchip for use in a cellular network device. Of particular interest are

cellular network devices that are configured for authorization of financial transactions over a network. Typically the cellular network device includes a web browser that is configured for authorization of a financial transaction over the world-wide-web. However in some embodiments the browser may connect to a different public network or to a proprietary network. In some embodiments the cellular network device may connect to a dialup voice network and the cellular network device may be configured for authorization of a financial transaction over the voice network, such as by transmission of DTMF tones or by other encoding.

[0035] As previously indicated, in order to extract information from an SE, an interrogator or “reader” is used to interact electrically with the SE. Because readers are not typically part of most PCs, it is very beneficial to place the reader functionality on the card device and translate information from the SE into a data stream format such as a USB (Universal Serial Bus) that PCs are generally capable of processing. Other convenient translated formats include software application output, text messaging (e.g., short message service (SMS)), and email messaging. It is particularly advantageous to configure the card devices for HID (Human Interface Device) keyboard emulation for inputting a form field or fields on an application running on the PC. It is also very beneficial to place the reader functionality in the cellular network adapter and translate information into a data stream that may be sent over the cellular network by the cellular network device.

[0036] As used herein the term “host device” is used to refer to either (a) the computer terminal that receives the information from a card device or (b) the cellular network device that receives the information from the cellular network adapter.

[0037] A significant advantage of extracting and delivering the data within a card device or cellular network adapter is the ability to know beyond reasonable doubt that the data string being delivered over the internet indeed came from a particular SE. This knowledge creates a more secure transaction with lower risk to the merchant, card issuing bank, and card associations.

[0038] Heretofore the most secure methods for assuring the validity of an electronic transaction has involved extracting information from a banking card by of swiping the magnetic stripe through a magnetic stripe reader, or extracting the information from a smartcard with a separate contact or contactless reader connected to a point of sale terminal (POS). These methods are known as “card-present transactions.” Because of their enhanced level of confidence in validity these methods allow a merchant to receive a discounted transaction fee for that particular transaction. An example of a less secure transaction is reading or entering account numbers, expiration dates, and card verification codes from a card in a phone call or with on-line internet ordering. These transactions are known as “card not present transactions” and incur a full transaction fee.

[0039] Preferred embodiments provided herein provide for incorporating a reader on a card device or within a cellular network adapter to extract and deliver banking track data that were generally not previously possible because of the inability to extract information from the SE or from a magnetic stripe at a computer terminal without a reader or to extract information from an SE in a cellular network adapter without a reader. Such embodiments add value in a mobile commerce or e-commerce environment by enabling more secure transactions over a voice network or an internet.

[0040] To prevent fraud, electronic transaction systems typically attempt to verify one or more of the following characteristics of a requestor:

- 1) Something the requestor knows (a password, answer to a question, etc.)
- 2) Something the requestor has (a physical token, such may be confirmed by embodiments herein)
- 3) Something the requestor is (such as a physical trait established by a fingerprint or other biometric identifier)

[0041] “2-factor authentication” is defined as an authentication where the requestor (the entity to be authenticated) successfully provides two of the above three different types of verifications. If two of these verifications have been provided the authentication is

considered “strong.” One important advantage of many embodiments described herein is the ability to confirm that a card is present and authentic. This by itself provides a basis for 2-factor authentication over a public or private network using currently ubiquitous access hardware such as a computer terminal or a cellular network device.

[0042] Described herein are configurations of a “Reader On Card” (ROC) or “self-swiping” card, or “self-authorizing” card. The terms “ROC,” “self-swiping” and “self-authorizing” are synonymous and refer a configuration wherein the card device or cellular network adapter contains both an SE and SE reader functionality. Configurations for a dynamic or encrypted PAN (Personal Account Number) are also described. This refers to configurations where the “Reader On Card” further encrypts the track data in order to securely transport the data packet over a public network. Neither of these concepts is limited to one particular form factor or embodiment. Some examples of devices that may employ these elements include a USB device or a token or a mobile phone that is enabled with contactless (13.56 MHz radio frequency) or NFC (Near Field Communication) RFID technology.

[0043] An SE typically contains a microprocessor, random access memory (RAM) that stores a data file, read-only memory (ROM), flash memory (EEPROM), encryption engine(s), and one or more methods of interfacing the SE. Executable applications such as the MasterCard, PayPass, VISA, Contactless, and AMEX Express Pay may be compiled and placed on an SE. Personalization information that is unique to the specific card holder is generally also placed on an SE. The applications for an SE are typically specified by application providers such as MasterCard, VISA, or AMEX among others. The applications may be created using any number of software development tools and then compiled to run on any number of SE architectures.

[0044] The applications running on the SE are typically provisioned with card holder specific information prior to being delivered to the card holder. The provisioning entities such as First Data Corp. must follow strict guidelines set forth by card associations such as VISA, MasterCard, AMEX, and others that keep the provisioning process secure and ensure that customer data is protected inside the SE and that only the card issuing banks or their agents are able to verify the information that is extracted from the SE. It is important that this

process is not disrupted and abided by while including the advantages of the present invention.

[0045] In order to extract information from the application(s) on an SE, an interrogator, also referred to as a “reader”, is required to interact electrically with an SE. The interrogator software may be provided in many different forms such as a software module or a pre-programmed microchip. The hardware that the interrogator runs on may also come in different forms such as an ARM processor, or a small M8 processor. The hardware that encompasses a SE and or an interrogator may be referred to as a chip or die. A die is the raw silicon that is packaged during the chip manufacturing process.

[0046] The applications on an SE are accessed by a reader with specific query/response calls defined by the application provider as mentioned above. These applications are generally designed to protect the data on a SE via encryption engines in the SE. The protocols used by a reader to pass data to and from a SE are typically defined in the ISO 7816 or ISO 14443 specifications. These protocols are referred to as query/response protocols. An interrogator sends a query and a SE sends a response.

[0047] In many embodiments the physical interface between a reader and an SE conforms to standards defined in the ISO 7816 and ISO 14443 specifications. The ISO 7816 specification defines a “Contact” interface to a SE in which the SE is powered by DC voltage and ground electrical connections from an interrogator. The data transfer during the interrogation is managed by an interrogator providing a clock signal connection and data line connection to an SE. The ISO 14433 specification defines a “Contactless” interface to an SE in which the SE is powered by an inductive field produced by an interrogator during the interrogation. The data transfer during the interrogation is managed over a 13.56 MHz carrier signal provided by an interrogator. The physical interface that the interrogator uses to connect to the SE may also be provided in different forms such as UART, or an NXP proprietary S2C interface. It is also possible that the interrogator shares the same silicon chip as the SE and the interface between them is provided by internal memory or physical traces in the silicon.

[0048] The “Universal Serial Bus” USB interface is a standard interface to laptop computers and personal computers or other form of computer terminal as a means of expanding the capabilities of the computer terminal or transferring information between the computer terminal and another device. More information about the USB interface may be obtained at www.usb.org.

[0049] The “Human Interface Device” HID interface is a class of USB interface which is a universal standard for a USB host to connect to USB client device. Within the HID class, there are several defined types of devices, including a “keyboard” type. By the USB device interfacing the USB host with the “keyboard” type of HID class interface, the standards require that the USB host recognize the device as a standard device (e.g., a keyboard) and accept input as such without requiring that the computer have any special drivers or operating system updates installed. By configuring a card device as an HID keyboard the card device emulates a keyboard attached to the computer terminal. The computer terminal will recognize and accept the card device as a keyboard input device. This is a very useful feature in many applications for enabling a more user friendly “self-swiping” functionality in the card device.

[0050] Included in most embodiments is a “communications controller.” The communications controller provides the interface for data exchange between the reader and a communications connector (in the case of a card device) or the interface for data exchange between the interrogator and a cellular network application interface (in the case of a cellular network adapter). The communications connector may be provided in different forms such as USB, USB connection with HID class keyboard type or USB connection with mass storage class, among many others. The interface may be established using other hardware interface standards as well such as SDIO, mini-SD. In many card device embodiments the communications connector is an integral part of the card device, meaning that the communications connector is formed on an edge portion of the card. The cellular network application interface may, for example, be provided as a baseband input/output port for a web browser running on the cellular network device. The physical connection may be provided

by a communication bus or by micro-circuitry in common processor and memory areas in the baseband portion of the cellular network device.

[0051] In either card device embodiments or in cellular network adapter embodiments, the communications controller may be physically incorporated into the reader or may be physically incorporated into the secure element or the communications controller may be a physically separate electronic element. In some embodiments the capabilities defined herein for the communications controller may physically be performed in the chip that is primarily the SE and/or the interrogator, or the capabilities of the interrogator may physically be performed in the chip that is primarily the SE and/or the communications controller., or the capabilities of the SE may be physically performed in the chip that is primarily the communications controller and/or the interrogator, or the capabilities of the interrogator and the SE and the communications controller may all be performed in a single chip. In any case, the capabilities of the communications controller, the SE and the interrogator are still considered to be performed by the “communications controller,” the “SE” and the “interrogator” respectfully. Furthermore, in some embodiments the PDA or phone processor may be connected directly to the SE. In such embodiments the phone processor interrogates the SE to achieve valid transaction data from the SE. The PDA or phone processor may deliver this data to a form field or directly over the cellular network. In such embodiments the communications controller and the interrogator of the SE are now a portion of the PDA or phone processor itself instead of either of communications controller or the interrogator being a separate hardware chip.

[0052] In some embodiments of a self-swiping “Reader On Card” (ROC) device the interrogator and SE are integrated together on the same medium, device or circuit. It is important to note that in contactless implementations the interrogator portion of the ROC device may not be able to function from power harvested from the contactless inductive antenna, and therefore may require power from an external source, such as the communication connector to the computer terminal (in the case of a card device) or the cellular network device battery (in the case of a cellular network adapter).

[0053] The data that are automatically delivered to the host device may represent bank account information in the form of “Track 1” and/or “Track 2” data. Track 1 and Track 2 data are commonly-used representations of bank account information that is specific to a card holder. These data generally have a very specific industry standard format in order to be properly processed through transaction processing systems. The Track 1 data format was developed by International Air Transportation Association (IATA). The Track 2 data format was developed by the American Banker Association (ABA). In some embodiments the Track 1 data that are generated as file information from the SE data file and converted into transaction information by the communication controller and transmitted to the host device may comprise only a portion of the Track 1 data content specified in a standard published by the IATA. In some embodiments the transaction information may be the entire Track 1 data content specified in an IATA standard. In some embodiments the Track 2 data that are generated as file information from the SE data file and converted into transaction information by the communication controller and transmitted to the host device may comprise only a portion of the Track 2 data content specified in a standard published by the ABA. In some embodiments the transaction information may be the entire Track 2 data content specified in an ABA standard. However, it is important to note that in some embodiments the transaction data delivered to the host device may not be standard Track 1 or Track 2 data. It is possible that this data may be in another standard or proprietary format. In any case, the transaction data may or may not be an encrypted cipher text in whole or part upon delivery to the host device.

[0054] Typically a card device transaction authorization process begins when a user is instructed by a web browser-based application program on a computer terminal to insert a self-authorizing smartcard into a USB port on a computer terminal. When the smartcard is inserted, if the self-authorizing smart card is a USB HID keyboard class card device, the smartcard typically self-initializes with the operating system of the PC and begins to automatically input the relative card data into the appropriate field in the browser form. Many embodiments automate the input of card information such as PAN, expiration date, and security code. The USB HID keyboard class card device may use access keys or “hot keys” to navigate the form that has the current focus for input in the computing device. The

card device may also automatically remove any information that may have been inadvertently typed prior to card device insertion. The card device may also automatically “submit” the online form using access keys or “hot keys”.

[0055] An example where the HID keyboard device of the card automatically inputs a sequence of key presses of the device using “hot keys” is as follows.

- a. [alt] + ‘,’ (This makes the cursor take focus on form element that has a designated access key of ‘,’ – the comma key)
- b. [ctrl] + ‘a’ (This makes the cursor select all the text that is existing in the current field of focus)
- c. [Backspace] (This makes the cursor erase all the currently selected text)
- d. [alt] + ‘.’ (This makes the cursor take focus on the form element that has a designed access key of ‘.’ – the period key....this could be set to a “submit” button for example)

[0056] A benefit of many embodiments is delivery of the information on the SE to the form that has the current focus for input in the host device. A self-authorizing smart token or a self-authorizing cellular network adapter the may deliver this information in a manner of emulating keystrokes from a keyboard device to the host device. For security reasons the application program that has the current focus on the host device (and is collecting this input) may take precaution inside its programming logic to require that the keystrokes being input into a particular form field are keystrokes and not simply a “paste” keystroke from an electronic “clipboard.” Alternately, the application program may require that the keystrokes being input into the form field are fast keystrokes resembling the pattern that only an automated keystroke emulation input device could provide, and not a slower pattern of input that would resemble a manual input of keystrokes. Knowing these requirements, the communications controller element of the card device or the cellular network adapter may be programmed to provide the transaction information to the host device in a prescribed cadence for an application running on the host device.

[0057] For security reasons the form that has the current focus on the host device and is collecting this input may take precaution inside the programming logic that various pattern of “hot key” presses([alt] + ‘some key’) may be used to identify the input device as a secure input device. It is important to note the “hot key” keystrokes cannot be duplicated with the traditional “copy”, ”cut”, or “paste” to the clipboard that some operating environments provide. However, such hot key keystrokes may be provided by various embodiments of communication controllers in self-authorizing devices defined herein.

[0058] Many embodiments deliver Track 1 and/or Track 2 data to a merchant from the SE of a payment card using the USB interface of a remote customer’s PC in a simple, customer friendly manner. The consumer typically only has to insert the card device into a USB port on his/her computing device and the keystroke data will automatically input into the form that has the current focus on the computing device via keyboard emulation from the card device.

[0059] Many embodiments deliver Track 1 and/or Track 2 data that contain a dynamic card verification number from the SE of a payment card device, using the USB interface on a PC of a remote customer.

[0060] Many embodiments deliver Track 1 and/or Track 2 data that contain an incrementing transaction counter from the SE of a payment card device, using the USB interface on a PC of a remote customer.

[0061] Many embodiments use a “unique number” that is stored in the SE and delivered from the card device as further access control security that must be provided to in order to protected content such as recorded music, recorded video, live media, photos, documents and other similar media. An example of this is that the data file of sensitive or licensed content may be encrypted with a key or a diversified key based on the key within the SE. This would allow only the card holder of the SE to successfully “unlock” and view or listen to the protected content.

[0062] Many embodiments use a transaction counter that is stored and updated in the SE to uniquely identify a card holder as well as uniquely identify each given transaction or “swipe”

from the card device. Remote transaction approval software may check that the Track 1 and Track 2 data from an SE is what is expected for the current transaction, and may update the transaction counter for the next transaction.

[0063] In many embodiments the card device is configured to resemble the physical form factor of typical payment cards as closely as possible with the exception of adding a region of the card that is meant to be inserted into the USB port of a computing device. This facilitates carrying the card device in an ordinary wallet or purse.

[0064] In many embodiments the smart token is configured to resemble the physical form factor of a “fob” that may be placed on a consumer key ring.

[0065] In many embodiments the card device is configured to limit the height of the USB connector so that the device is thin enough to still be carried in an ordinary wallet or purse.

[0066] In many embodiments the self-authorizing smart token or the self-authorizing cellular network adapter is designed to minimize part count and assembly costs so that it can be manufactured at a very low price for high volume, low cost uses.

[0067] Referring now to Fig. 1, the face and back of the self-swiping card medium 10 are shown. The dimensions of this embodiment are roughly 2 1/8 x 3 1/8 inches, with a preferred maximum thickness of 0.09 in. The nominal thickness of the card is a maximum of 1/32 in. Looking at the left side of the figure, there is a diagonal protrusion 12 that contains the connector 14 for a USB connection of a mating PC. The four contacts visible in the figure are the power, ground, D+, and D- signals that are defined in the USB specification at www.usb.org. The diagonal of the USB connector protrusion 12 is approximately 45 degrees and allows the protrusion approximately 5/8 in. clearance for insertion into a USB connector on a PC. The boundary of the card has been adjusted from its typical rectangular shape to account for this connection area. The diagonal protrusion has a clearance gap 16 between itself and the lower boundary of the card as seen in the figure. This gap 16 is for the purpose of allowing clearance of the “thicker” USB connection protrusion into some forms of “insertion” type magnetic stripe card readers. The face of the card also shows the PAN (portrayed as 0000 0000 0000 0000), expiration date, and card holder name in similar

location to a typical rectangular banking card. The back of the card includes a magnetic stripe 18 that is disposed in a location similar to that of a typical rectangular banking card.

[0068] Referring to Fig. 2, the close view of the USB connection protrusion of the self-swiping card medium as shown. Note the change in this thickness of the card from region 30, where the card is approximately 1/32 inch thick to zone 32 where the maximum thickness of the protrusion is approximately 0.09 in. where the USB contracts 34 are located. The protrusion of the male USB connection is approximately 15/32 in. wide in order to fit into the standard USB female connection on a PC as defined at www.usb.org. Approximately 3/16 in. in back of the leading edge of the protrusion there is a notch 36 that changes the thickness of the protrusion. This thickness change is for accommodating the “snap fit” of the USB female connector on the PC as defined at www.usb.org. The clearance between the leading edge of the protrusion and the bulk of the card medium is approximately 5/8 in. The style of this particular type of USB connection is not a standard male USB connection. It has been altered to be much thinner than the typical male connection. As a result, it is susceptible to “upside down” insertion into the female USB connection.

[0069] Referring to Fig. 3, the profile of a self-swiping card 50 with inside components exposed is shown. An antenna 52 is a printed or wire wound antenna that creates an inductive coil that provides power and transmits data to and from a secure element 54. The number of turns in the antenna 52 is dependant on the properties of the SE as well as the size of surface area the perimeter of the antenna covers. The antenna 52 is embedded inside the card medium and may or may not be congruent with the card medium perimeter. In some embodiments it may be desirable to shrink the area of the antenna 52 for manufacturing reasons such as card embossing. The secure element 54 shown in Fig. 3 is a microchip die that is wire bound to the module face plate through manufacturing methods. The secure element microchip die is typically then coated with epoxy for protection. In the embodiment of Fig. 3 the secure element 54 is a dual interface device that is accessible through the contactless antenna interface or through the contact 7816 style interface. When not plugged into the USB connection on a PC, the antenna serves as the sole power supply, data transmitter, and data receiver for the SE 54. When plugged into the USB connection on a

PC, the antenna 52 is not intended to be used as a power supply or to transmit or receive data. Instead a combined interrogator / communications controller reads information from the SE 54 and transmits information to the PC through a USB connector on the protrusion of self-swiping card 50.

[0070] The protocols that define the communication to the SE are defined in ISO 14443 (contactless) and ISO 7816 (contact). The commands to communicate to the applications that are running on the SE are typically designed to interrogate the secure element and execute file system functions according to ISO 7816-4 in order to generate file information from SE data file. However, in some embodiments the commands to communicate to the applications that are running on the SE are provide by the application providers. In any case, the commands are generally the same regardless of the interface method (contact or contactless).

[0071] The SE is generally a secure microchip that has built in encryption engines, RAM, micro-processor, EEPROM, and communication interfaces. The interrogator and the communication controller (USB interface) chip shown in Fig. 3 is a chip that contains a microprocessor, RAM, EEPROM, and built in USB interface engine. The chip is programmed to describe itself to the host PC as a HID class “keyboard” device upon connection to the PC. The chip then communicates to the SE via ISO 7816 (contact) interface protocols to acquire and build Track 1 and Track 2 data. After track data are acquired from a successful “read” of the SE, the data is then delivered to the PC’s USB bus through the communications connector protrusion shown in the Fig. 3. It is important to note that it is possible for both the SE and the interrogator/USB interface chip die to be mounted and wire bound together on the same module medium. It is also important to note that these two chips could also be contained in one piece of silicon sharing the same RAM and/or EEPROM memory space.

[0072] Fig. 4 illustrates a circuit board schematic 60 according to one embodiment. This shows a more detailed layout of the components described in Fig. 3 as well as the supporting components of typical embodiments. In this particular embodiment, the interrogator/USB bridge chip/die is a chip made by cypress semiconductor with a part number of CY7C3. The

SE used in this particular embodiment is a chip/die with a standard ISO 7816 contact type interface in combination with a standard ISO 14443 contactless interface.

[0073] Fig. 5 illustrates a flow diagram that describes one method embodiment. After the card device is plugged into the USB connector on the customer computing device, the card device powers up and begins to interrogate the SE on the card device. The interaction and data exchange between the interrogator chip and the on the SE could look something like the diagram in Fig. 5.1. In preferred embodiments the interrogation process conforms to application level protocols (APIs) established by ISO 7816-4. ISO 7816-4 defines two such application-level protocols:

- (a) File system API providing a set of functions to manipulate files (e.g. read, write, select etc.)
- (b) Security service API allowing the smart card and the reader to mutually authenticate themselves and also to encrypt data to be exchanged between the card and the reader.

In preferred embodiments the interrogation process conforms to protocol message structures also defined in 7816-4 to support the APIs. This message structure consists of application protocol data units (APDUs) which are exchanged between the reader application and the smart card application by the link level protocol. There are two types of messages used to support the ISO 7816-4 application protocols: the *command* Application Protocol Data Units *APDU* (sent from the reader to the card) and the *response APDU* (sent from the card to the reader).

[0074] After the interrogator has received the all the data from the interrogation of the banking application on the SE, the interrogator can then build the data string that is to be sent to the computing device as keystrokes. It is important to know that the SE can run multiple applications from different application providers. It is possible, and is one embodiment of this invention, for the interrogator to deliver the information that was acquired during interrogation of the banking application on the SE to a second application that resides on the

same SE so that the second application can process, build, and possibly encrypt the data that will be delivered to the computing device as keystrokes.

[0075] An example of this embodiment that contains the interrogation of two applications on the SE may look something like the diagram in Fig. 5.2. The dotted lines in the figure represent the times during the entire interrogation of the SE that the interrogator selects different applications to use. The interrogator or the interrogator application on the SE may or may not encrypt the final Track 1 and/or Track 2 data.

[0076] Fig. 5.3 shows one embodiment of a method of encrypting this data. After the interrogator has acquired or built the data to be sent to the computing device as keystrokes, the USB interface enumeration begins. During the enumeration process, the card device, which is the client device, exchanges information with the USB host device. The information exchange is defined in the USB specifications and can be obtained at www.usb.org. As part of the exchange, the card device will send “descriptors” that tell the host device about the drivers that are required to run the client card device. The descriptors that the card device sends to the host include a HID (Human Interface Device) descriptor. The card device sends another descriptor that further defines the type of HID device to be a “keyboard” type of device. The USB host will now recognize the card device as a keyboard and expect that the card device will deliver “key codes” that represent keystrokes as input data. After enumeration has occurred and the host USB device recognizes the card device as a keyboard, the card device begins to deliver data to the current form that has the focus on the computing device. The data that are delivered may consist of:

- a. Identification of the entity to which the data must be passed to for further processing.
- b. Identification number of the particular card device that is delivering the data.
- c. Identification number of the cryptographic key to be used for decrypting the data that is delivered from the card device.

[0077] The application, such as an internet browser, that is running on the computing device that has collected this information is then responsible for passing the information to the entity identified by the data above for processing. One embodiment of this invention involves passing this information in an online setting by one internet server passing this information string to another internet server. In this embodiment, the entity that controls the internet server that receives this information can then process the information along with the identity of the owner of the requesting internet server as they see fit. The entity that received the data can then return resultant data back to the requesting party. Also, in this embodiment, the information that is passed back to the requesting party is Track 1 and/or Track 2 data that is used to process typical card payment transactions by merchants.

[0078] Referring to Fig. 6 the internet browser form that receives the information from the card device as shown. This form represents one example of how a card device may be used. In this example an application running on a PC includes one specific field 100 on a form that is designated as the field that the card device will automatically populate when the card device is plugged into the PC that is displaying this form. In this example, the application has been programmed so that the form field 100 can be addressed using an access key or “hotkey” of ‘,’ (the comma key). That is, when the card device issues this “hot key” keystroke (by use of keyboard emulation), the cursor will automatically move its focus to the field 100. The HTML (hypertext markup language) code that is used to create the self populating field may have this syntax:

```
<input type="text" name="data" size="" access key="," />
```

The card device then populates the form field 100 with data. Then the auto-populating field 100 may be further checked by the application program for the authenticity of the keystrokes by the internet browser using “Java-Script” code that may be embedded into the HTML code. Also, the internet browser may check that each key was actually typed into the field by keystrokes rather than the use of “copy”, “cut”, and “paste” commands that may be provided some operating environments. The internet browser may also check that each keystroke was typed very fast resembling an automated input rather than a slower manner that would

resemble manual input. The internet browser may check other aspects of the input data for its validity as it sees fit.

[0079] Referring to Fig. 7, an internet browser screen displays decrypted data 110 that may be provided to a merchant transaction authorization system. The track information shown here is acquired using a Reader On Card (ROC) system. After the card reader extracts information from the SE and builds the track data containing the DVCC from the SE on the card, the track data are then delivered to the appropriate field in the transaction requester's browser as encrypted data via a USB HID keyboard interface. The information that is auto-populated on the requester's screen is not the Track data that is depicted in Fig. 7 because the ROC system encrypts the track data on the card device before the field on the requestor's browser is populated and the encrypted data are transmitted. The data on Fig. 7 is a decryption of the data that appears on the requester's screen. If the process is repeated by the requester the DVCC data and the transaction counter will change, in accordance with specifications for secure transaction encryption. In a typical application a merchant that is processing the information would not expose the clear text track information portrayed on the browser screen of Fig. 7. This figure is merely showing it as an example of the decrypted data. It should also be noted that in many embodiments the SE on the requester's card device may be used to make contactless transactions at in-store POS terminals by holding the card device up to a contactless reader.

[0080] Referring to Fig. 8, the face of one embodiment of a self-swiping card 120 is depicted. The placement of the protrusion that exposes the USB connection, relative to the card boundary 122, is important. The USB connector 124 may be manufactured in a similar fashion to a typical ISO 7816 smart card module. The typical ISO 7816 module is then seated into the card medium during an assembly process. The exact placement of the module relative to the card boundary is defined in the ISO 7816 specification and many of the assembly machines used to place this module inside the card medium is set to place the module in a specific location as shown in the figure.

[0081] Referring to Fig. 9, one embodiment of an alternate form-factor self-swiping card 140 is shown. This embodiment includes a USB connector 142 but has a form factor that lends

itself to placing the card device on a key ring through a hole 144. The purpose of this figure is to illustrate some of the wide variations that can encompass various potential embodiments.

[0082] Referring to Fig. 10, components of a smartcard module 150 are depicted. On the left is the connector plate (module top) and on the right is the module bottom of the smartcard module 150. Looking at the right side of the figure, the bottom of the module exposes how the die from both the SE 160 and the interrogator 156 may be mounted. Also shown in the right portion of this figure, are the mounting pads 158 that may be connected to the inductive coil antenna for the contactless interface of the SE. The inductive coil antenna is typically assembled into the card medium prior to placement of the smart card module. The mounting pads are designed to make contact with the exposed ends of the inductive coil antenna. Looking at the left side of the figure, the connector plate is carved or scored in such a way that the connection pads 154 align themselves with the standard female USB connections of DC voltage, ground, D+, and D- that are defined in the USB specification at www.usb.org.

[0083] Two embodiments of a self-swiping card medium are shown in Figs. 11A and 11B. Figure 11A depicts a standard “miniSD” 180 that is a common form factors for expansion memory or IO functionality. The miniSD 180 has a width 184 that is approximately 20mm and a height 184 that is approximately 21.5 mm. Figure 11B depicts a standard secured device (“SD”) 190. The standard SD has a width 192 that is approximately 24mm and a height 194 that is approximately 32 mm. These form factors 180 and 182 are fairly ubiquitous in mobile phones and personal digital assistants (PDAs) and therefore are convenient for use in various embodiments of a cellular network adapter. The SE and other electronics to interrogate the SE may be contained within these form factors. Additional features may be added such as additional expansion memory for the mobile device or PDA to access. Further detailed specifications for the SD 190 and the miniSD 180 form factor may be obtained at www.sdcard.org.

[0084] Fig. 12 illustrates a flow diagram that describes one method and use embodiment. After the card device is plugged into the USB connector on the customer computing device, the card device powers up and begins to interrogate the SE on the card device. The

interaction and data exchange between the interrogator chip and the on the SE could look something like the diagram in Fig. 5.1. After the interrogator has received the all the data from the interrogation of the banking application on the SE, the interrogator can then build the data string that is to be sent to the computing device as keystrokes. It is important to know that the SE can run multiple applications from different application providers. In some embodiments the interrogator delivers the information that was acquired during interrogation of the banking application on the SE to a second application that resides on the same SE so that the second application can process, build, and possibly encrypt the data that will be delivered to the computing device as keystrokes.

[0085] An example of an embodiment that contains the interrogation of two applications on the SE typically looks something like the diagram in Fig. 5.2. The dotted lines in the figure represent the times during the entire interrogation of the SE that the interrogator selects different applications to use. The interrogator or the interrogator application on the SE may or may not encrypt the final Track 1 and/or Track 2 data. Specifically, in the embodiment reflected in Fig. 12 the PAN or Personal Account Number is encrypted within the final Track 1 and/or Track 2 data, or possibly by itself only. The encryption is handled in such a way as to not disturb the bank routing code within the PAN. This is typically the first 6 digits of the PAN. The final digit of the PAN is also adjusted as to equal the proper check digit for the new PAN. Once the new PAN is created from encrypting the original PAN, it is substituted in the place of the original PAN. Using this method, the merchant is able to receive the PAN and verify that it is a valid credit card number by checking the digits and calculating the proper check digit. After the PAN is submitted to the merchant for processing via HID keyboard buffer which prints the PAN and possibly other data into a “web form,” the information is submitted by the user for processing. The merchant would be able to authorize the transaction as it would any other credit card transaction over the internet. When the encrypted PAN is submitted to the processor for authorization, the processor is able to send the encrypted PAN to a decryption device that will properly decrypt the PAN and build the original PAN to check for authorization. The advantage of using a method like this is that valid Personal Account Numbers are never transmitted from the user’s computer over the internet.

[0086] To add further protection to the encrypted PAN, there is a transaction counter that can be factored into the encryption algorithm. This allows for a unique card number for each transaction that is processed. The encryption algorithm, encryption key, and transaction counter may be contained within the SE of the card. The encryption of the PAN may take place with every transaction and to take place within the SE. This type of encryption of the PAN may be used with several embodiments of the present invention including mobile phones containing a SE. In the case of the mobile phone, the interrogation of the secure element is very similar to the interrogation depicted in Fig. 5.2. The mobile phone may not deliver the final data to a “web form”, however, by auto populating a field, but instead it may receive the encrypted PAN and other data within its own memory structure and then pass the data to the merchant for processing either via internet or its own phone connection. In any case, this method of PAN encryption helps to protect the original PAN data that is needed to authorize a transaction. Because the PAN data is encrypted on the card itself, it may be considered safe to transmit over a network in clear text to the decryption device.

[0087] Fig. 13 presents a representation of a Personal Account Number or PAN 200 that is found on the face of a credit card and within the Track 1 and Track 2 data that is stored on the magnetic stripe or SE of a credit card. The first set of digits 202, usually ranging from the first 3 to the first 6 digits, is referred to as the Bank Code. This code is designated as a routing number for the many card association networks that describes which bank or “issuer” the PAN belongs to. The second set of digits 204 shown in Fig. 13 indicates the personal account number of the card holder at the issuer. The last digit 206 of the PAN is usually considered a “check byte” that is used to calculate if the complete PAN is indeed a valid PAN number. The algorithm normally used for the “check byte” is called the Luhn algorithm. The algorithm uses the digits in the PAN itself to make the proper calculation of the check byte. For this reason, if any digit in the PAN is changed, it is likely that the check byte will also need to be adjusted in order to make the new PAN considered valid. When encrypting the PAN, it is important not to change the bank code. The bank code may remain the original bank code in order for the encrypted PAN data to be routed to the appropriate bank and then to the decryption device that will replace the encrypted PAN digits with the original PAN digits.

[0088] In Fig. 13.1, and Fig. 13.2, one embodiment of an encryption algorithm is shown. This embodiment used DES in OFB mode as described in FIPS 81 as defined by NIST. A known initialization vector is XOR with a transaction counter that is maintained by the reader-on-card. Every transaction that is committed to, the counter increases. This will effectively change the initialization vector for encrypting the PAN digits. In a separate embodiment, it is also possible to incorporate a timestamp into the randomization processes of the initialization vector. This may not be possible in embodiments that do not have access to an accurate clock. After the initialization vector is XORed with the transaction counter, or other information, DES encryption is performed on the 64 bit, value using the DES key that is has been previously loaded into the interrogator application that is stored on the SE. This produces a 64 bit output value.

[0089] Fig. 13.2 shows the 64 bit output value from Fig. 13.1. The original account number from the PAN is also shown. The digits that will be changed within this account number are typically the middle 5 digits '6784'. The leading three digits '0' are generally reserved as placeholders for passing the transaction counter to the decryption device. The final two digits '80' are generally used to mark a DES key ID for the decryption device. The DES key ID may or may not be included in some embodiments. The purpose is to allow many different DES keys to be used by many different interrogators. Further on this subject, it is possible to create greater randomization of DES key by including a diversification process of the DES key in the interrogator application. A diversification process takes a master key and applies an algorithm to the key based on known data to produce a further randomized key to be used in the actual transaction. The two-digit key ID may actually be used to diversify a master DES key instead of identify a separate key.

[0090] The middle 4 digits to be encrypted may be represented in 14 bits. The 14 bits to be encrypted of the original account number are also shown at the bottom of Fig. 13.2. According to FIPS 81, using DES in OFB mode, the number of bits to encrypt can range from one to sixty-four during each iteration of the algorithm.

[0091] In this particular embodiment one iteration is shown, resulting in fourteen bits of encrypted cipher text. In order achieve the final cipher text; the first fourteen bits of the DES

encrypted output text are XORed with the fourteen account bits that are to be encrypted. The resultant output is the fourteen bit cipher text to be placed back into the PAN, creating an encrypted PAN. Figure 13.3 shows the conversion of the fourteen bit output from Fig. 13.2 into a four digit decimal. The four digit number is then placed into the issuer account number along with the transaction counter as shown in Fig. 13.3.

[0092] Fig. 13.4 shows the total encrypted PAN 250 with the bank code 252, the account number 254 and the updated check digit 256 that reflects the new PAN digits. Now, it is possible for this number to be processed in the exact same manner as a legitimate card PAN. The decryption device must be used to replace the encrypted PAN with the original PAN, but it is important to note that all the information for how to do so, including the transaction counter and DES key ID are included in the encrypted PAN.

[0093] The number of digits used for the DES key ID, transaction counter, and encrypted digits may vary depending on implementation of this method and the particular embodiment. It is also possible to share a single digit to represent parts of two different data elements. One example of this would be to divide a digit by 2 and discard the remainder to represent 0-4 for one data element (transaction counter, DES key ID, or encrypted digits), and then to divide the same digit by 2 and only use the remainder to represent 0-1 for separate data element (transaction counter, DES key ID, or encrypted digits).

[0094] Referring to Fig. 15, the internet browser form that receives the information from the card device as shown. This form is shown after the field 300 has been self-populated. The content in the form that is shown is an example of an encrypted PAN which is digits in this case and has a bank routing code of '541312'. The transaction counter is populated backwards over the next 3 digits '101'. The third digit, in this example, is used to share with the encrypted digits data element as described in the previous paragraph. So, the transaction counter is actually showing '001' when reversed. Including the shared digit, the next 5 digits represent the encrypted digits of the account number '14194'. The following two digits, '80', represent the DES key ID. And the final digit of '1' represents the check byte.

[0095] Looking at Fig. 15.1, the same “web form” as shown in Fig. 15 is shown with a field 302 auto populated with a second transaction from the same card device. When comparing the encrypted PAN’s from Fig. 15 and Fig. 15.1, the differences are seen here:

1st Transaction – Fig. 15: **5413 1210 1419 4801** (encrypted PAN)

2nd Transaction – Fig. 15.1: **5413 1220 1176 280** (encrypted PAN)

When these transactions are received by the decryption device the original PAN may be decrypted and created. In this particular example shown in these figures, the original or valid PAN is:

Original PAN: **5413 1200 0763 2801** (valid PAN)

[0096] Fig. 14 illustrates a flow diagram that describes one method embodiment. This particular embodiment is generally not appropriate for use with the HID keyboard emulation class of a USB device. This embodiment shows a 2-way form of communication from the base band device or host PC to the card device. The HID keyboard emulation class of a USB device is typically a 1-way device upon which the HID keyboard USB device communicates to the host PC via an “in” endpoint only. This allows data to move from the keyboard emulation device to the PC only. In such a case the interrogation most likely starts at the time the USB device is plugged into the computer and cannot be initialized by the PC.

[0097] The 2-way device as shown in Fig. 14, offers some added features to the system. In a case like this, the interrogation of the SE may be controlled by the base band device or by the host PC. Data such as an unpredictable number (UN), a timestamp, or some other type of deterministic data may be used during the interrogation of the SE, or may be sent to the card device to initiate an interrogation. An unpredictable number refers a number that may be used in algorithms of certain financial transaction authorization systems, such as VISA® or MASTERCARD®, in the encryption phase of a dynamic card verification code (DCVC). A DCVC is a 3 digit encrypted number that changes for each transaction (the dynamic aspect of the track data). The algorithm to create a DCVC typically uses a UN, a transaction counter, and DES key to derive a DCVC for each transaction. In some embodiments the financial

transaction authorization system instructs a reader to create an unpredictable number. In some embodiments the communications controller may be configured to create a random UN and send it to the secure element during a transaction. The UN may be constructed as a hash of a timestamp, for example, and such a UN would ensure the authorization system that the SE made and returned its encrypted DCVC and that it was constructed at a certain (recent) time. This also adds another layer of security by establishing a basis for a precise expiration time for a particular transaction.

[0098] After the interrogation is complete, the resultant data string may be sent back to the base band device or host PC. There are many ways this system can be implemented. One example of an implementation would be using a generic HID class that allows both an “in” endpoint and an “out” endpoint to the USB card device. Both the “in” and “out” endpoints of a USB device are described by documentation that may be obtained at the www.usb.org website. The HID class driver is packaged and available on most host PC’s. In order to use this HID class driver on a host PC, a client application must be resident and running on the host PC that identifies the proper HID device when it is connected to the host PC. The client application that is using the HID class driver may then issue command packets to the USB card device using the HID class interface and receive response packets from the USB card device using the HID class interface. Although using the HID class interface is not quite as ubiquitous to the system as using the HID keyboard class interface, it is still more ubiquitous than communicating to the USB device using a custom driver implantation. The HID class interface is possible to implement in PC side applications without creating a hardware driver 5 that runs on the host PC. The HID class interface can be created and used as a plug-in to internet web browsers and other PC applications. The HID class interface can also be built into simple executable programs that are allowed to communicate directly to a USB card.

[0099] In a similar embodiment it is possible to create a dual-purpose USB device that has both a HID class driver that allows an “out” endpoint to communicate to the USB card device from the host PC, and also uses the HID keyboard class interface with an “in” endpoint to send data back to the host PC via keyboard emulation. Another implementation of this system could be entirely contained inside a mobile phone. A 2-way data channel is used to

initiate an interrogation with a secure element as well as receive the resultant data string after the interrogation is completed. It is important to note that there is a dashed line that encompasses a rectangle on Fig. 14 that contains both the “initiator” and the “interrogator” entities. These two entities may be handled and running within the same base band processor in the mobile phone. In this case they may exchange information within libraries or memory space only. The mobile phone may receive the resultant data via a keyboard buffer that can then auto-populate a form field, for example, in a mobile web browser. In any case, the 2-way data channel can be used to give more control as well as possibly more security to the system. By passing the unpredictable number, that is used in the dynamic Card Validation Code (CVC) generation within the SE, timestamp, or some other type of deterministic information, the baseband portion of the mobile phone or the host PC may validate and timestamp any transaction that it requests by linking a timestamp to a particular unpredictable number.

[00100] Also, the 2-way data channel represented in Fig. 14 allows for the entire transaction to be triggered by the base band device or host PC. The act of sending data to the card device can signal a start to the interrogation process.

[00101] Referring to Fig. 16, a diagram of a mobile phone with contactless or NFC functionality is displayed. One purpose of a mobile phone or like device with NFC technology is to enable the mobile phone itself to act as a payment card in order to make payments at a contactless terminal that may be located at a retailer location. In this embodiment the SE is embedded in a Secure IC within the phone. The SE on the phone may contain multiple bank accounts and may be controlled by the user interface of the phone. The diagram depicts the phone itself (baseband portion), the cellular network adapter 320 that includes a reader, the SE, and a processor in one of potentially multiple form factors (here either within the SIM or a Secure IC), the NFC bridge chip that is used to convert an electronic data signal to an RF data signal for an external reader, and the external reader that may also be used to interact with the SE in order to retrieve banking information. The reader in the cellular network adapter 320 may communicate to the using a number of different methods. For example, the reader in the cellular network adapter may communicate directly

to the SE using ISO 7816-3 and 7816-4 protocols. An external reader may also communicate to the SE through an NFC bridge controller. The NFC controller controls the data paths to the RF interface as well as the data path to the SE. It is important to note that the interrogation of the SE can be initiated and carried out by either the reader in the cellular network adapter 320 or an external reader as shown in the diagram in Fig. 16.

[00102] Fig. 16.1 shows the same hardware device depicted in Fig. 16 being used for a different application. The application in Fig. 16.1 relates to using the same banking information stored on the SE for making a mobile payment transaction over the wireless network. A transaction like this is usually performed using a mobile phone connecting to a remote merchant over a wireless network (such as a cellular network) that may also be using the public internet and a mobile web browser on the phone itself. In order to deliver the transaction data from the SE to the web browser by the interrogator, keyboard emulation or software plug-in may be used to populate the web browser with the appropriate data. In the case where the transaction is not performed using a mobile web browser, the transaction information may pass to the merchant using other methods such as email, SMS, or other proprietary or standardized communication methods. The cellular network adapter 430 (the interrogator and the communications controller and the secure element), in this case, may be contained as an element 420 inside the mobile phone and exist as a software module running on the baseband of the phone. The interrogator essentially serves the same purpose as the contactless reader shown in Fig. 16. Its job is to interrogate the SE inside the phone and build a communication data package 400 that typically includes an encrypted pan and optionally Track 1 and/or Track 2 data. In order to do this, a “Reader On Card” mechanism may be used in order to further encrypt the PAN or full Track 1 and Track 2 data for transportation over a public network using the antenna 410 of a mobile phone.

[00103] After the interrogator has completed an interrogation process that is typically similar to the interrogation routine in Fig. 14 or Fig. 5.2, the data packet to be issued for authorization is sent to the “online merchant” over a wireless network. This data packet may contain full Track 1 and/or Track 2 information that has been encrypted or may contain only an encrypted PAN with an expiration date. The encrypted PAN is encrypted using the same

method as described in Fig. 13, Fig. 13.1, Fig. 13.2, Fig. 13.3, and Fig. 13.4. After the encrypted data is passed to the “online merchant” the merchant may further submit the data just as it would a traditional card transaction to the processing network for authorization. The processing network then routes the data to the appropriate bank for authorization as shown in Fig. 16.1. Prior to the authorization of the data packet a “Decryption Device” interprets the data packet, decrypts the PAN or full track data, and replaces it with the original and legitimate PAN or track data. The decryption device may also perform other statistical checks on the PAN or track data such as verifying the transaction counter or timestamp is not repeated.

[00104] Fig. 16.2 shows a similar encryption technique for encrypting the card PAN. In this case, it is possible to add a timestamp factor into the encryption of the PAN. Because a mobile phone is an electronic device that can keep accurate time, the interrogator would be able to use a timestamp to further randomize the initialization vector that is used to encrypt the PAN data. When this transaction data reaches the decryption device on the other side of the network, the decryption device can then use a timestamp in a similar manner to decrypt the PAN data. It may not be possible to use a timestamp in all embodiments if the interrogator does not have access to an accurate clock.

[00105] As previously indicated, various embodiments may include embedding the SE within a mobile phone or PDA. Such embodiments may use portions of the baseband processor of the mobile phone or PDA as a communications controller and an interrogator. The combination of the SE, the communications controller and the interrogator then provide the principal components of a typical cellular network adapter. Software within the mobile phone may run the interrogation routines while interacting with the SE. The software may then perform communication controller functions by inserting the data extracted from the SE into appropriate areas such as SMS or email message, or form field. The insertion into these areas may include the keyboard emulation tactics previously described herein. The insertion into these areas may include automatic SMS or email message building and sending by software running on the mobile phone. The automatically built SMS or email message typically includes the extracted data from the interrogator.

[00106] In summary, embodiments disclosed herein describe various systems and methods for providing self-authorizing tokens and self-authorizing cellular network adapters. The foregoing descriptions of embodiments have been presented for purposes of illustration and exposition. They are not intended to be exhaustive or to limit the embodiments to the precise forms disclosed. Obvious modifications or variations are possible in light of the above teachings. The embodiments are chosen and described in an effort to provide the best illustrations of principles and practical applications, and to thereby enable one of ordinary skill in the art to utilize the various embodiments as described and with various modifications as are suited to the particular use contemplated. All such modifications and variations are within the scope of the appended claims when interpreted in accordance with the breadth to which they are fairly, legally, and equitably entitled.

CLAIMS

What is claimed is:

1. A token comprising:
 - a mounting structure having a communication connector configured to connect to a computer terminal;
 - a secure element affixed to the mounting structure, the secure element comprising a data file,
 - a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire transaction information from the data file by exchanging a plurality of transaction data communications only between the secure element and the secure element interrogator; and
 - a communications controller affixed to the mounting structure and configured to receive the data from the secure element interrogator and to transmit the transaction information as a single data communication to the computer terminal through the communications connector.
2. The token of Claim 1 wherein the plurality of transaction data communications comprises communications formatted according to ISO 7816-4.
3. The token of Claim 1 wherein the secure element comprises personalization information that is unique to a specific holder to whom the token is issued.
4. The token of Claim 1 wherein the secure element interrogator exchanges the plurality of transaction data communications with the secure element only within libraries or memory space residing on the mounting structure.

5. The token of Claim 1 wherein the secure element comprises a payment card application and the single data communication to the computer terminal comprises track data.
6. A token comprising:
 - a mounting structure having a communication connector configured to connect to a computer terminal;
 - a secure element affixed to the mounting structure, the secure element comprising a payment card application and a data file,
 - a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire transaction information from the data file by exchanging a plurality of transaction data communications only between the secure element and the secure element interrogator; and
 - a communications controller affixed to the mounting structure and configured to receive the data from the secure element interrogator and to transmit the transaction information as track data to the computer terminal through the communications connector.
7. The token of Claim 6 wherein the plurality of transaction data communications comprises communications formatted according to ISO 7816-4.
8. The token of Claim 6 wherein the secure element comprises personalization information that is unique to a specific holder to whom the token is issued.
9. The token of Claim 6 wherein the secure element interrogator exchanges the plurality of transaction data communications with the secure element only within libraries or memory space residing on the mounting structure.
10. The token of Claim 6 wherein the track data is transmitted as a single data communication to the computer terminal.
11. The token of Claim 6 wherein the track data comprises full Track 1 and Track 2 data.

12. A token comprising:

a mounting structure having a communication connector configured to connect to a computer terminal;

a secure element affixed to the mounting structure, the secure element comprising a data file,

a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire transaction information from the data file by exchanging a plurality of transaction data communications only between the secure element and the secure element interrogator; and

a communications controller affixed to the mounting structure and configured to receive the data from the secure element interrogator and to transmit the transaction information to the computer terminal through the communications connector.

13. The token of Claim 12 wherein the plurality of transaction data communications comprises communications formatted according to ISO 7816-4.

14. The token of Claim 12 wherein the secure element comprises personalization information that is unique to a specific holder to whom the token is issued.

15. The token of Claim 12 wherein the secure element interrogator exchanges the plurality of transaction data communications with the secure element only within libraries or memory space residing on the mounting structure.

16. The token of Claim 12 wherein the secure element comprises a payment card application and the single data communication to the computer terminal comprises track data.

17. A token comprising:

a mounting structure having a communication connector configured to connect to a computer terminal;

a secure element affixed to the mounting structure, the secure element comprising a data file,

a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire transaction information from the data file by exchanging at least one transaction data communication only between the secure element and the secure element interrogator; and

a communications controller affixed to the mounting structure and configured to receive the data from the secure element interrogator and to transmit the transaction information as a single data communication to the computer terminal through the communications connector.

18. The token of Claim 17 wherein the at least one transaction data communication comprises communications formatted according to ISO 7816-4.
19. The token of Claim 17 wherein the secure element comprises personalization information that is unique to a specific holder to whom the token is issued.
20. The token of Claim 17 wherein the secure element interrogator exchanges the at least one transaction data communication with the secure element only within libraries or memory space residing on the mounting structure.
21. The token of Claim 17 wherein the secure element comprises a payment card application and the single data communication to the computer terminal comprises track data.
22. A token comprising:

a mounting structure having a communication connector configured to connect to a computer terminal;

a secure element affixed to the mounting structure, the secure element comprising a payment card application and a data file,

a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire transaction information from the data file by exchanging at least one transaction data communication only between the secure element and the secure element interrogator; and

a communications controller affixed to the mounting structure and configured to receive the data from the secure element interrogator and to transmit the transaction information as track data to the computer terminal through the communications connector.

23. The token of Claim 22 wherein the at least one transaction data communication comprises communications formatted according to ISO 7816-4.
24. The token of Claim 22 wherein the secure element comprises personalization information that is unique to a specific holder to whom the token is issued.
25. The token of Claim 22 wherein the secure element interrogator exchanges the at least one transaction data communication with the secure element only within libraries or memory space residing on the mounting structure.
26. The token of Claim 22 wherein the track data is transmitted as a single data communication to the computer terminal.
27. The token of Claim 22 wherein the track data comprises full Track 1 and Track 2 data.
28. A token comprising:

a mounting structure having a communication connector configured to connect to a computer terminal;

a secure element affixed to the mounting structure, the secure element comprising a data file,

a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire transaction information from the data file by

exchanging at least one transaction data communications only between the secure element and the secure element interrogator; and

a communications controller affixed to the mounting structure and configured to receive the data from the secure element interrogator and to transmit the transaction information to the computer terminal through the communications connector.

29. The token of Claim 28 wherein the at least one transaction data communication comprises communications formatted according to ISO 7816-4.
30. The token of Claim 28 wherein the secure element comprises personalization information that is unique to a specific holder to whom the token is issued.
31. The token of Claim 28 wherein the secure element interrogator exchanges the at least one transaction data communication with the secure element only within libraries or memory space residing on the mounting structure.

ABSTRACT

Self-authorizing tokens are disclosed. Typical embodiments employ a secure element and a secure element interrogator. Such tokens may be used for authorization of financial payments and other secure transactions. In some embodiments the secure element is provisioned with information about a particular payment card holder account. A secure element reader interrogates the smart element and derives information needed to authorize a transaction. In some embodiments the secure element and the secure element interrogator communicate using communications formatted according to ISO 7816-4.

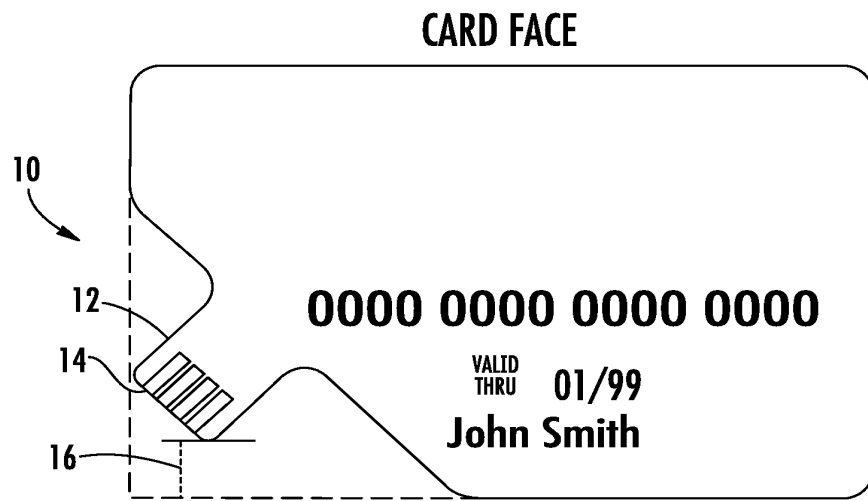
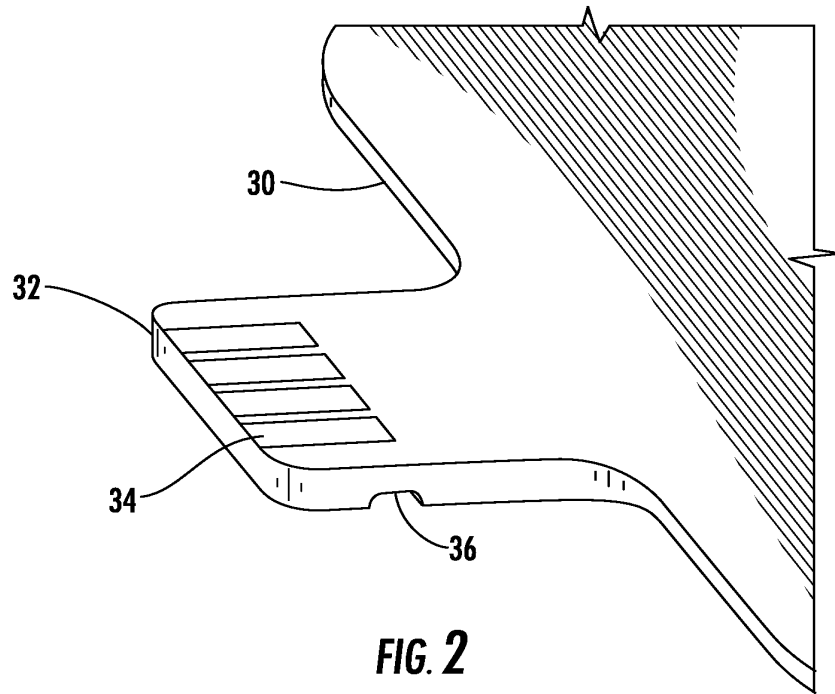
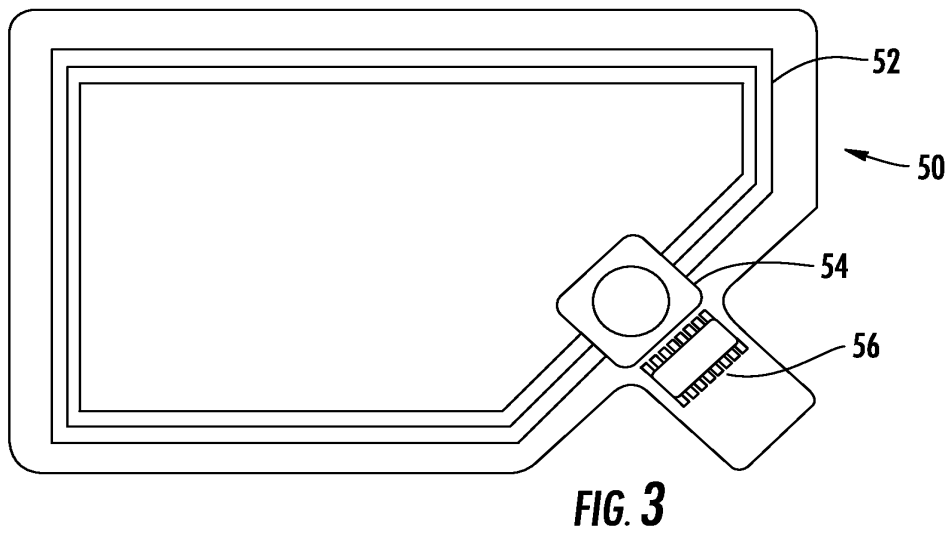


FIG. 1



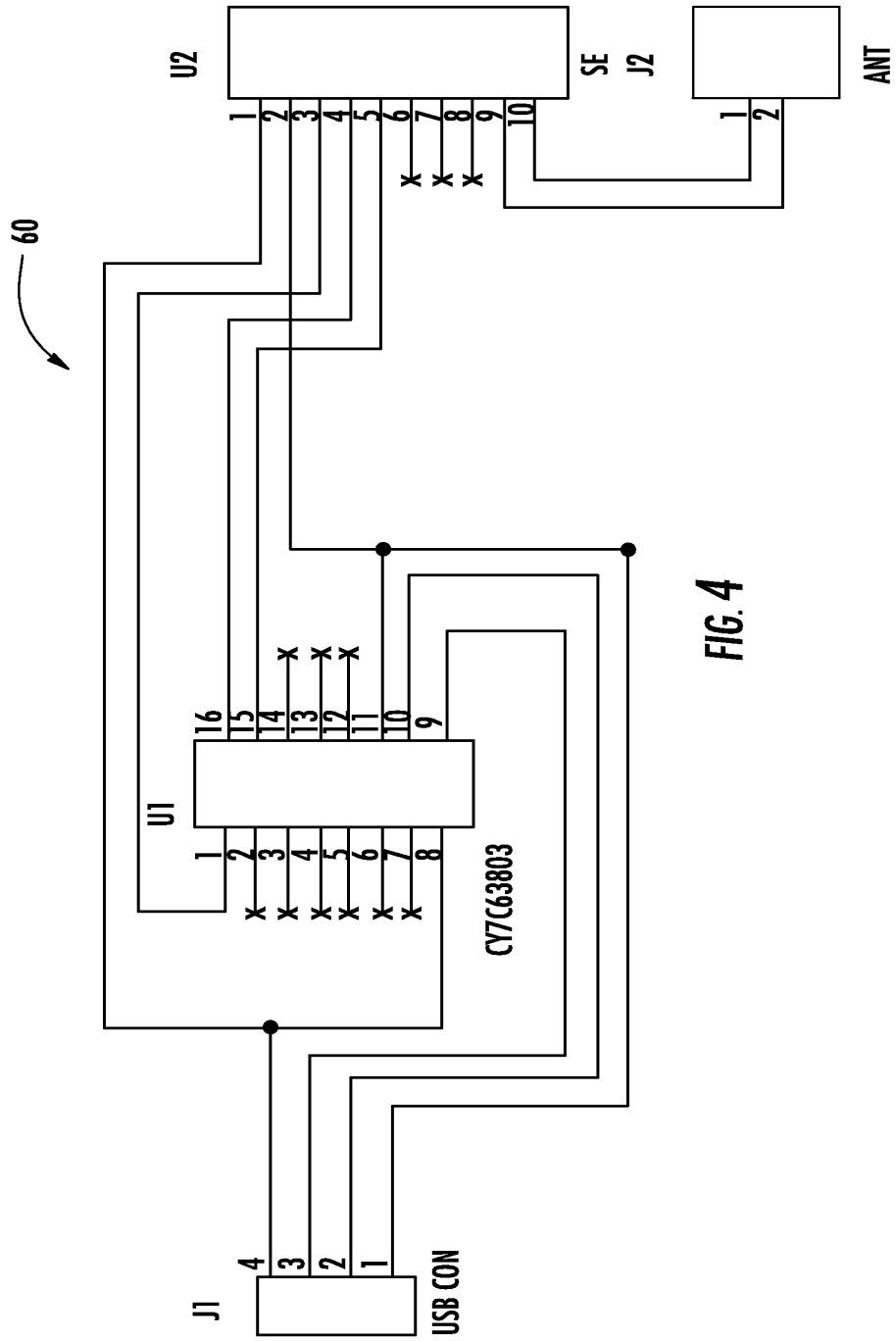


FIG. 4

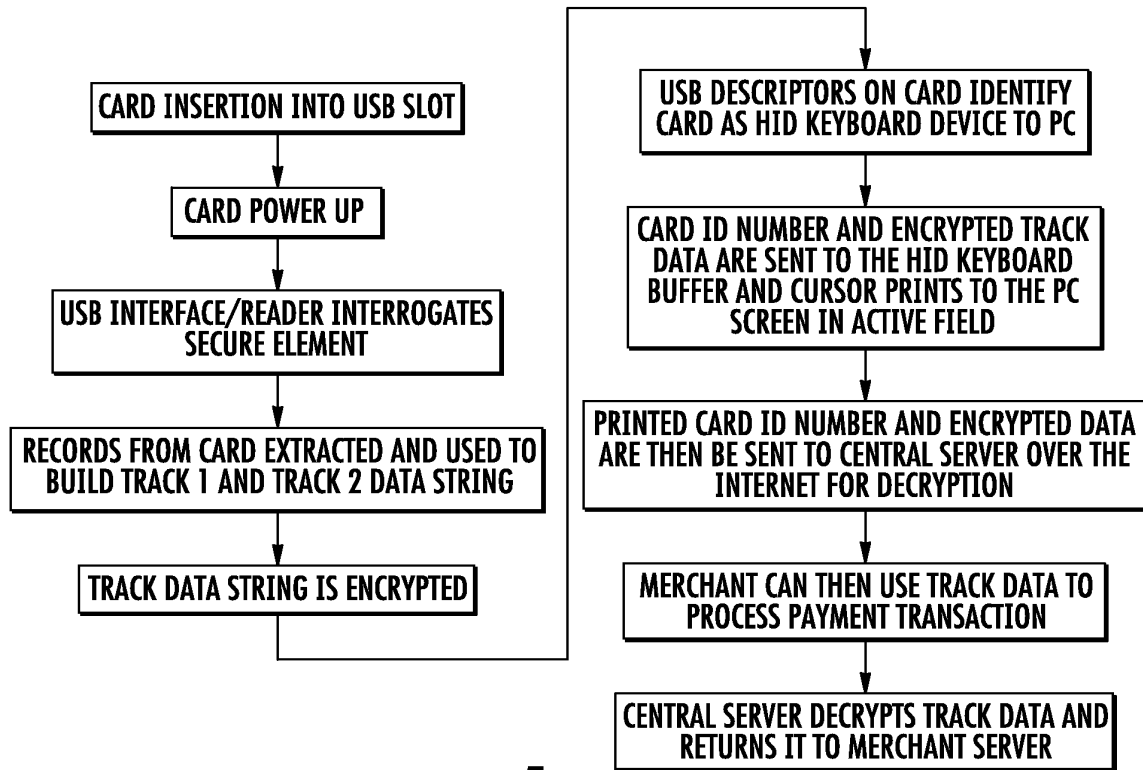


FIG. 5

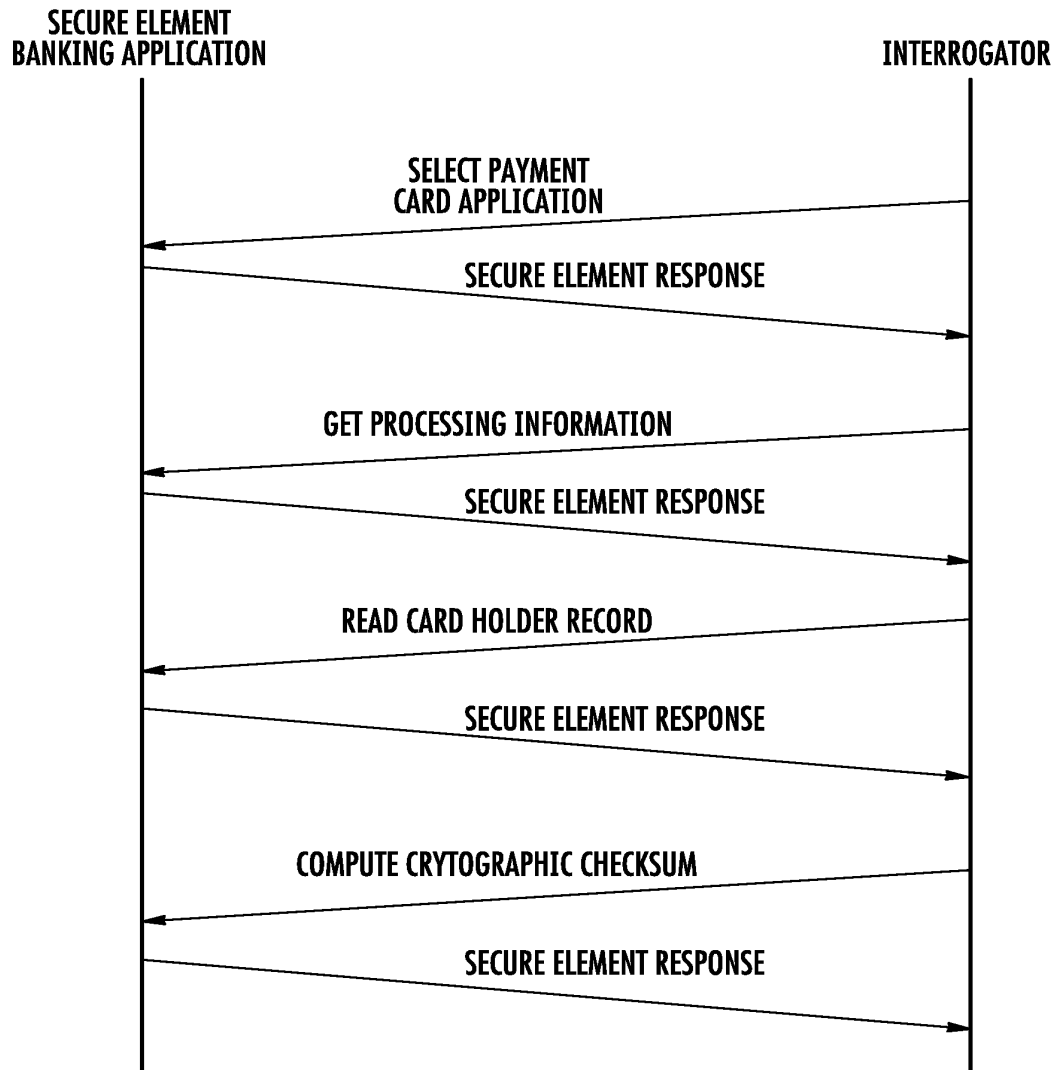
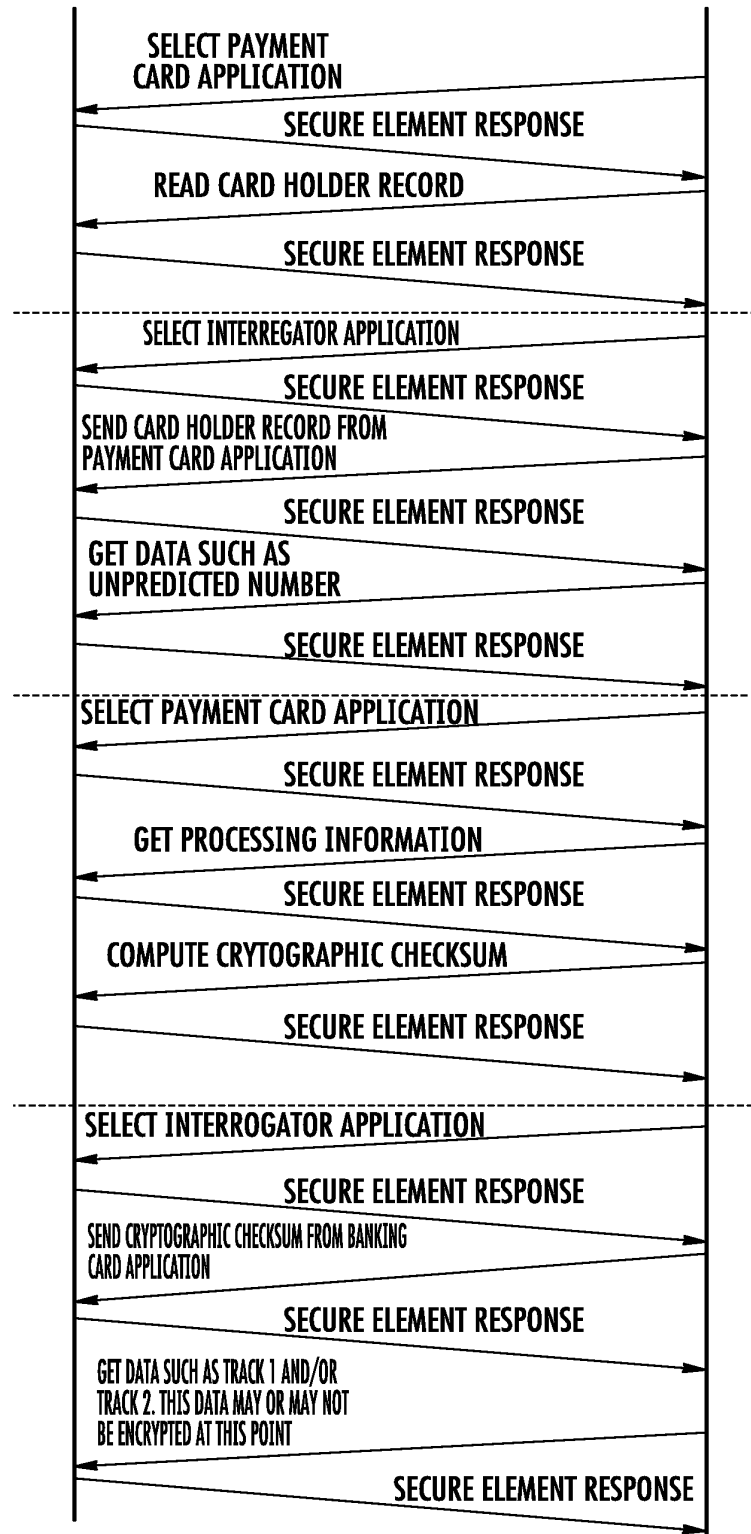


FIG. 5.1

**SECURE ELEMENT
BANKING AND INTERROGATOR
APPLICATIONS****INTERROGATOR****FIG. 5.2**

7/19

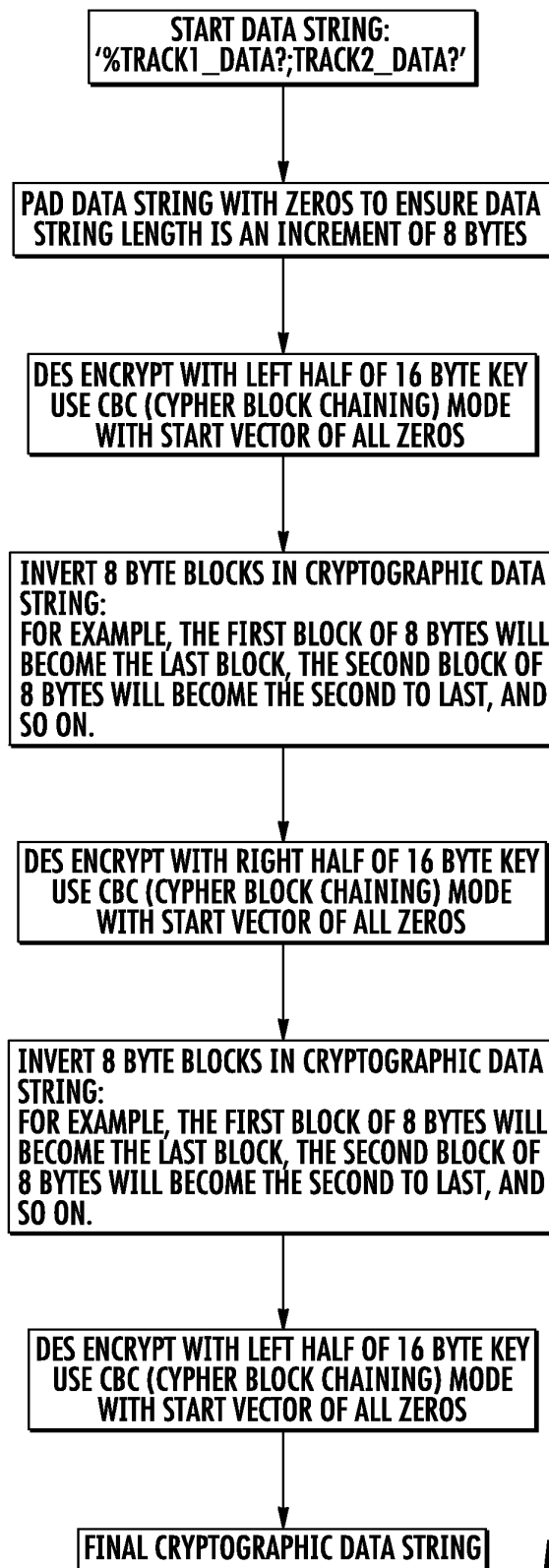


FIG. 5.3

http://www.XYZWEBMERCHANT.com/ - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites

Address http://www.XYZWEBMERCHANT.com/ Go Links

CART

WIDGET.....\$15.99

TAX: \$0.00

SHIPPING: \$3.00

TOTAL: \$18.99

SHIP TO

FIRST: JOHN LAST: SMITH

ADDRESS: 426 WILCREST LN

CITY: KNOXVILLE TENNESSEE ZIP: 37934

CARD INFORMATION

INSERT PAYMENT CARD IN USB PORT: DF4B154C6C5CED5817

(Wait a few seconds after inserting card, field will self-populate)

SUBMIT

COPYRIGHT 2007 ELEMENTAL KNOWLEDGE LLC

FIG. 6

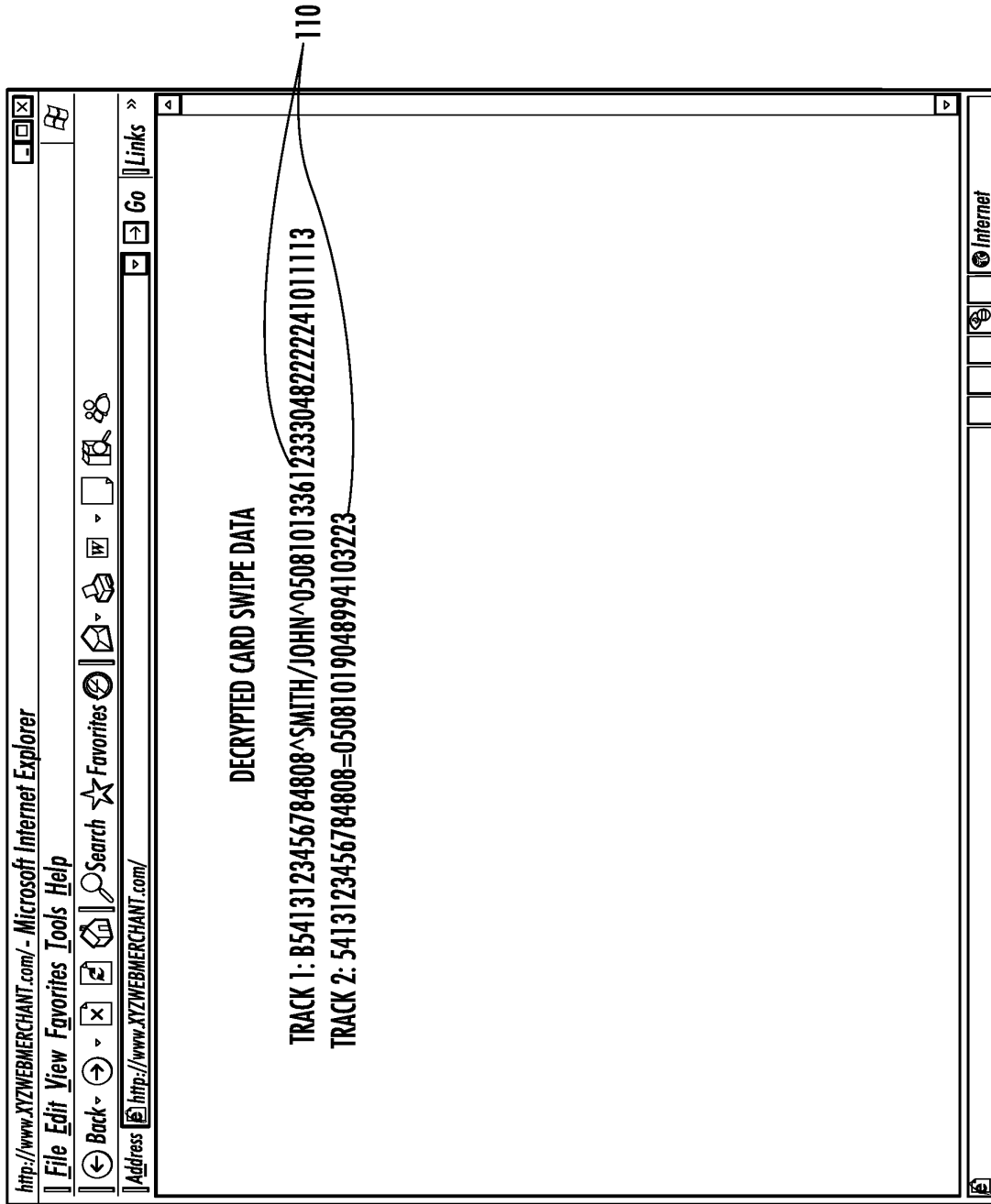


FIG. 7

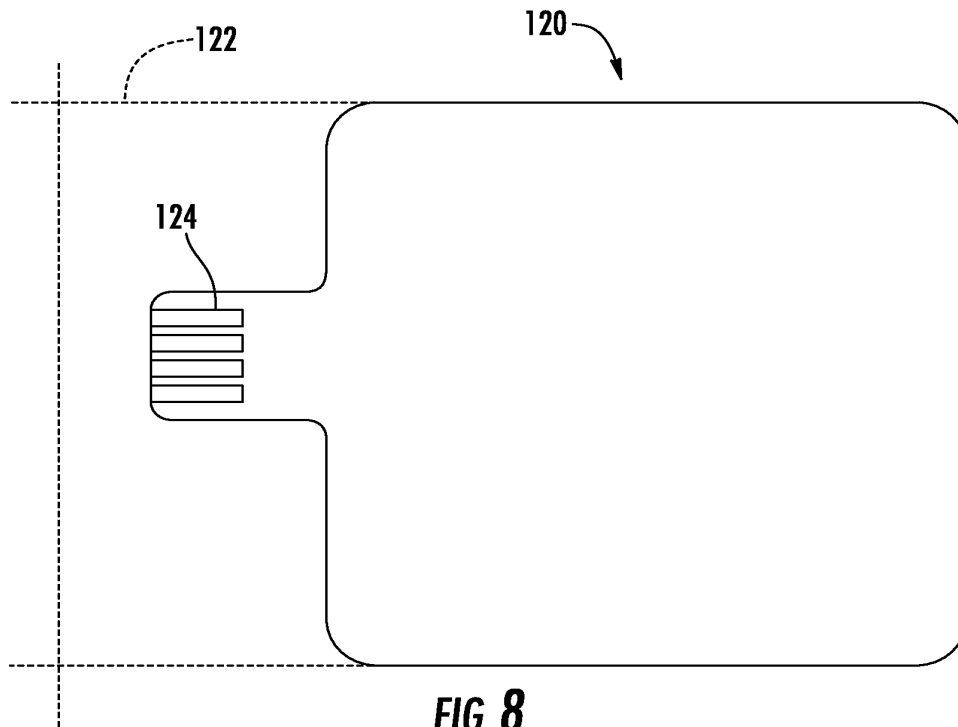


FIG. 8

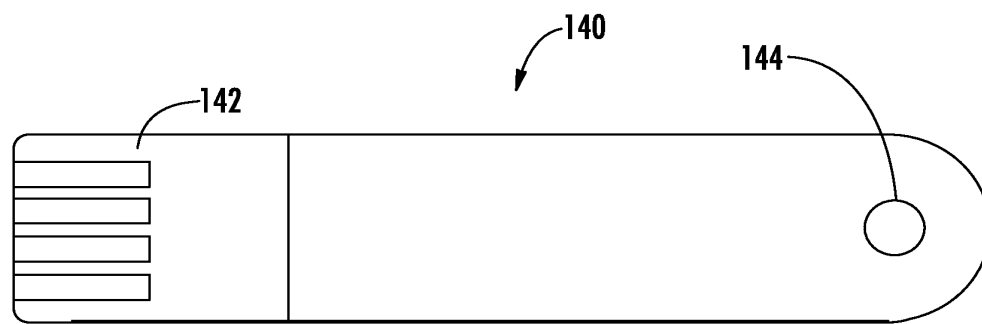


FIG. 9

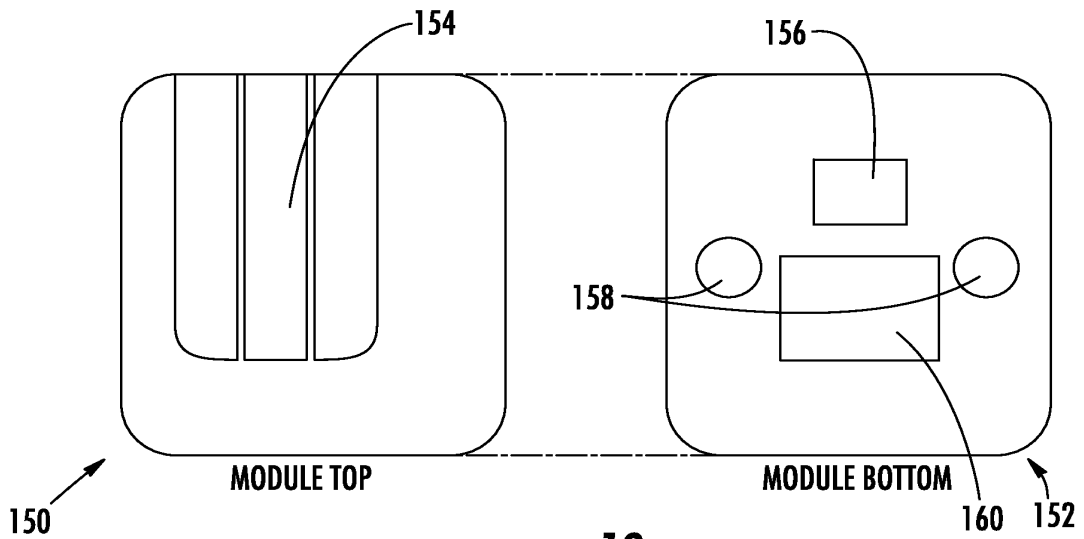


FIG. 10

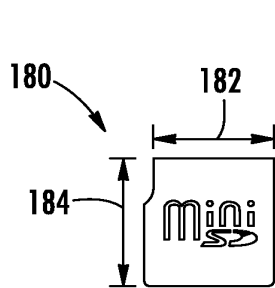


FIG. 11A

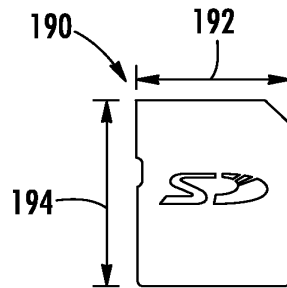


FIG. 11B

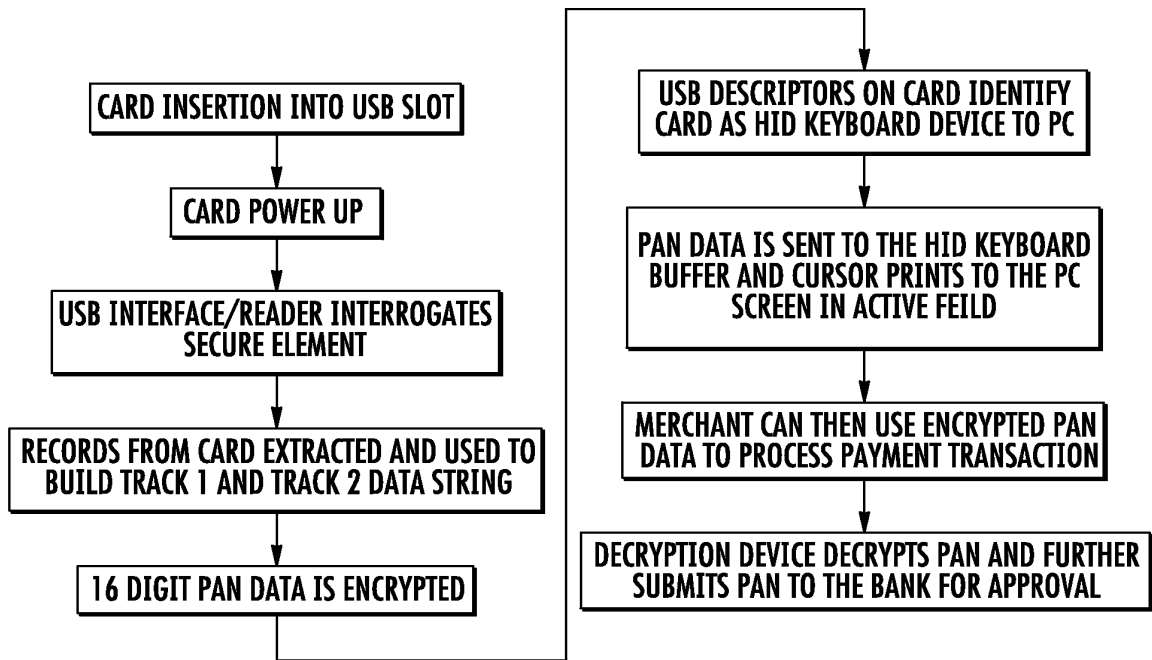


FIG. 12

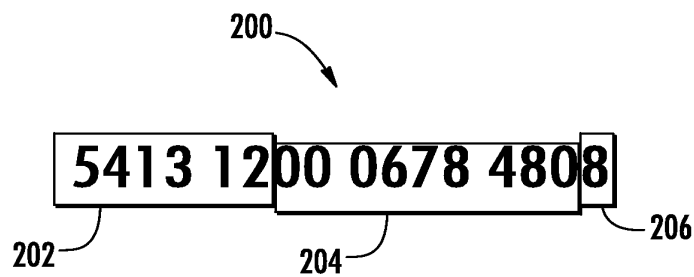


FIG. 13

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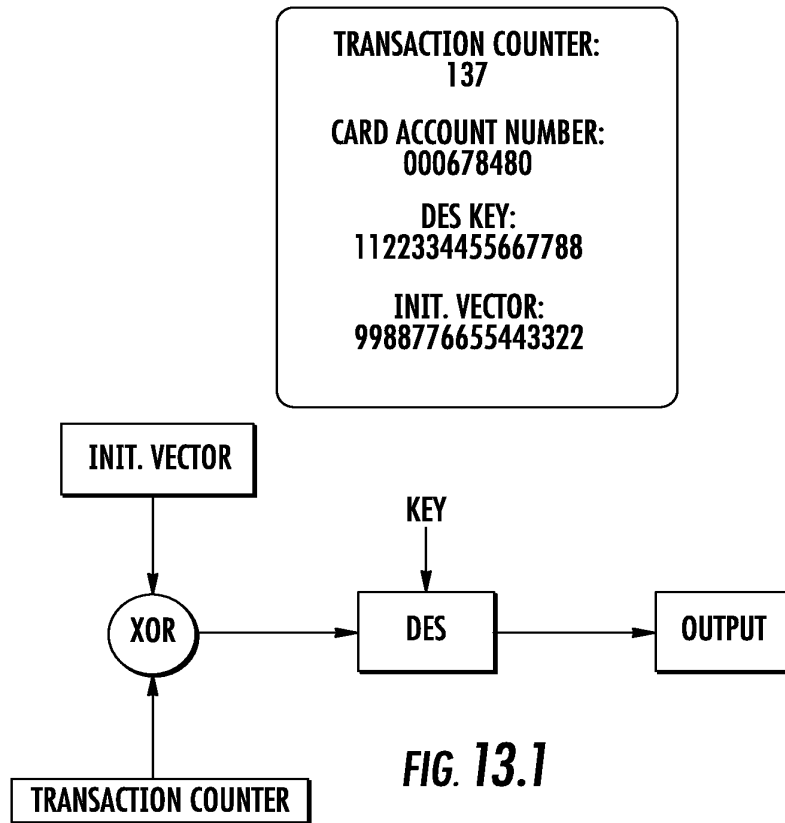


FIG. 13.1

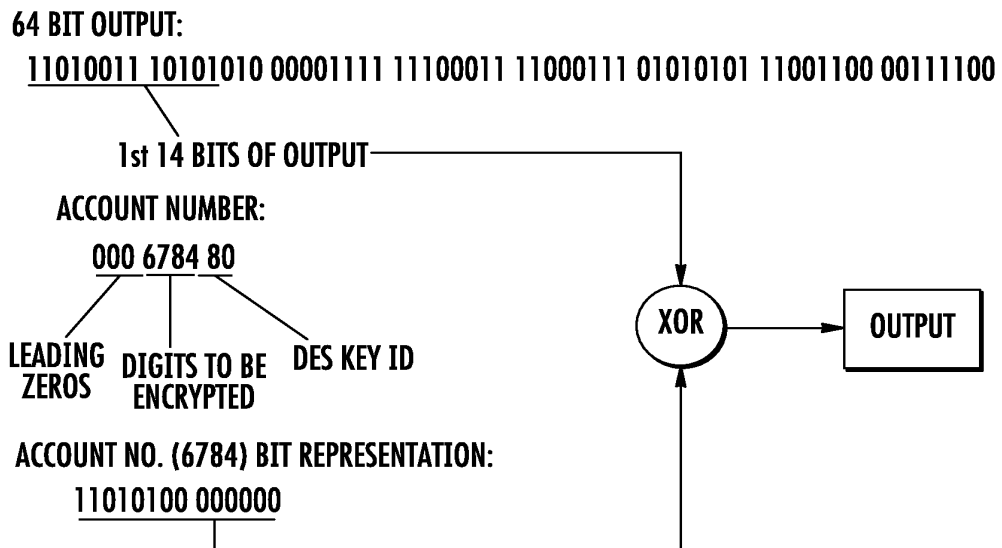


FIG. 13.2

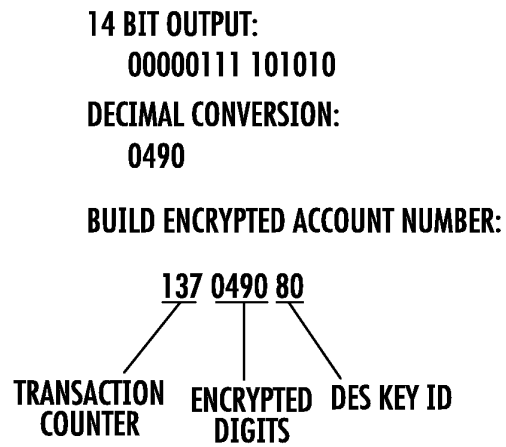


FIG. 13.3

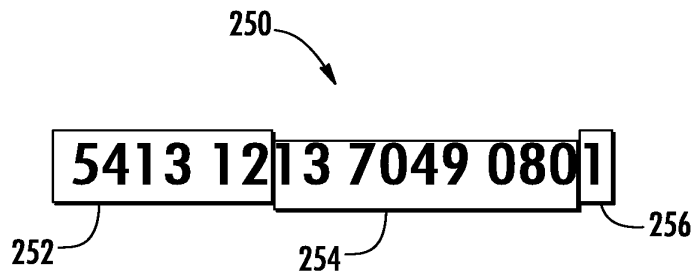


FIG. 13.4

**SECURE ELEMENT
BANKING AND INTERROGATOR
APPLICATIONS**

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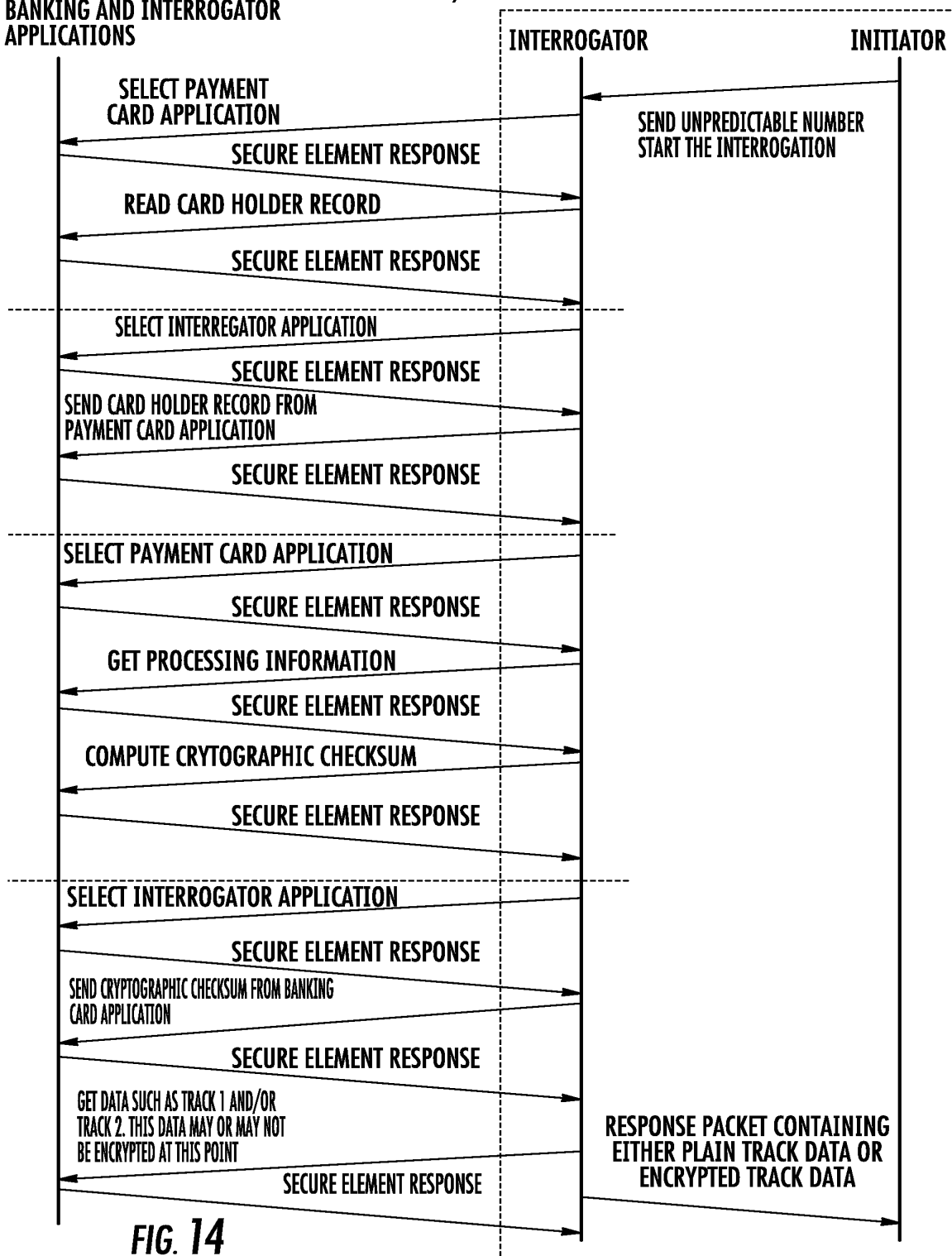


FIG. 14

C:\EX1\----- /PLAIN_PAN.HTML - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Links Go

Address C:\EX1\----- /PLAIN_PAN.HTML

CHECKOUT FORM

CART
WIDGET..... \$15.99
TAX: \$0.00
SHIPPING: \$3.00
SHIPPING: \$18.99

SHIP TO
FIRST: LAST:
ADDRESS:
CITY: SELECT STATE ZIP:

CARD INFORMATION
CARD NUMBER: 5413121014184801
EXP. DATE (mm/yyyy):
INSERT PAYMENT CARD IN USB PORT=>
(Wait a few seconds after inserting card, field will self-populate)

300

FIG. 15

C:\EX1\... - /PLAIN_PAN.HTML - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Links Go

Address C:\EX1\... - /PLAIN_PAN.HTML

CHECKOUT FORM

CART

WIDGET.....\$15.99
TAX: \$0.00
SHIPPING: \$3.00
SHIPPING: \$18.99

SHIP TO

FIRST: LAST:
ADDRESS:
CITY: SELECT STATE ZIP:

CARD INFORMATION

CARD NUMBER: 5413122011762806
EXP. DATE (mm/yyyy):
INSERT PAYMENT CARD IN USB PORT=>
(Wait a few seconds after inserting card, field will self-populate)

SUBMIT

302

FIG. 15.1

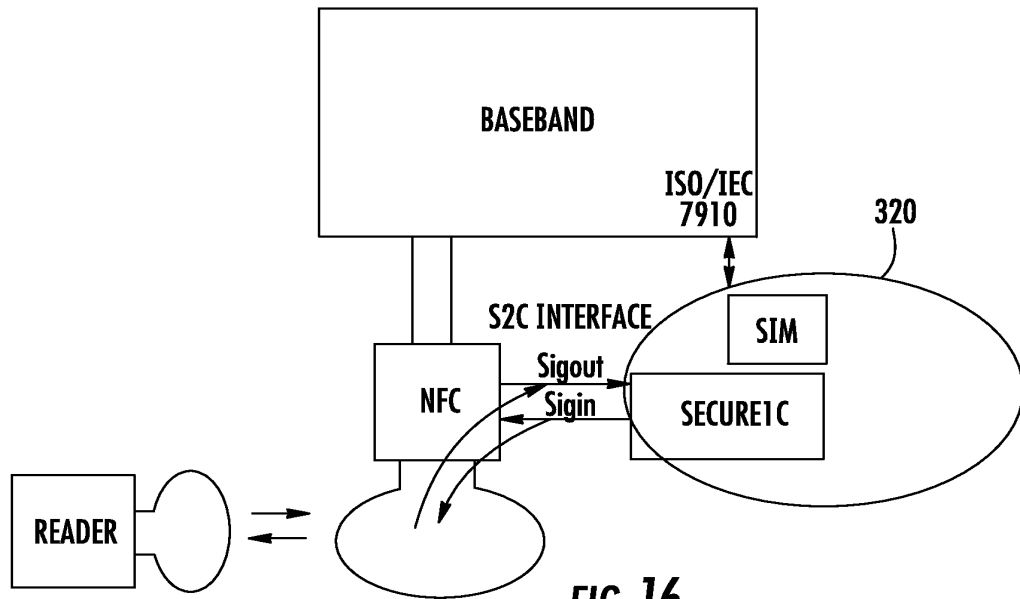


FIG. 16

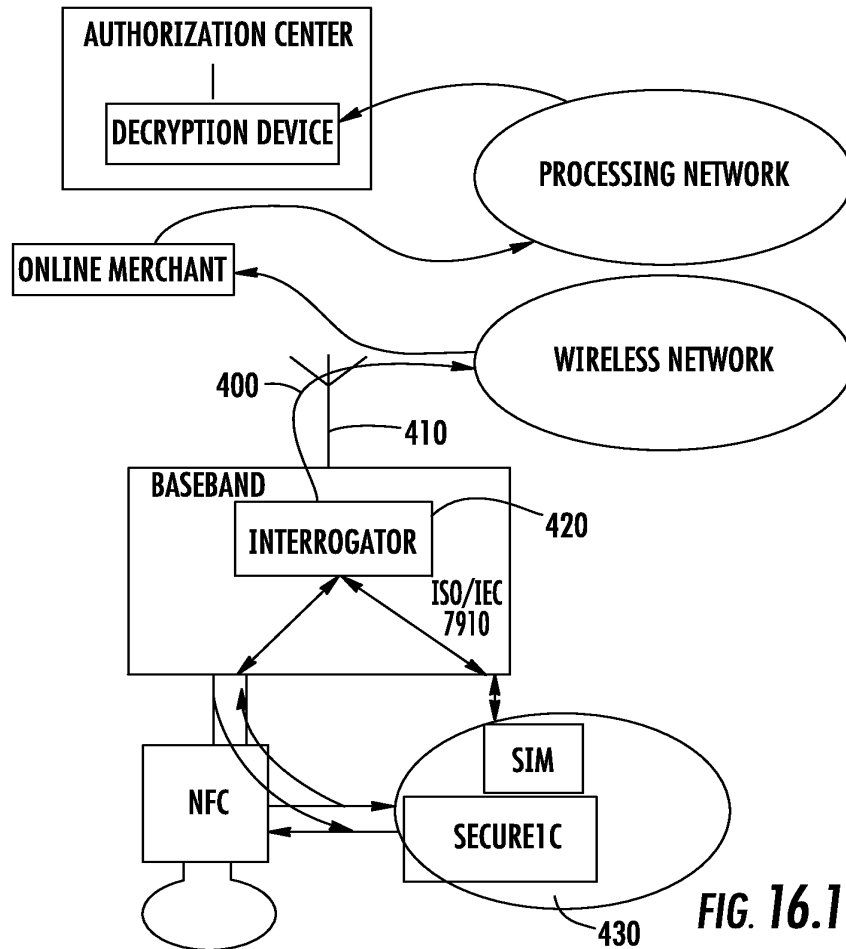
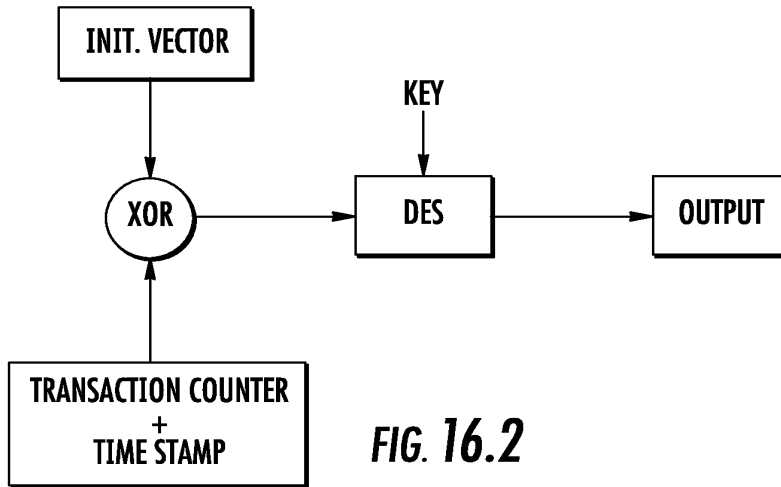


FIG. 16.1



DECLARATION FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

SELF-AUTHORIZING DEVICES

the specification of which is attached hereto unless the following box is checked:

☐	was filed on	as U.S. Application No.
or	PCT International Application No.	and was amended on (if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Applications	Application No.	Country	Day/month/year filed	Priority Not Claimed:

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application listed below.

Application No. 60/897,110	Filing Date: 01/25/2007
Application No. 60/932,704	Filing Date: 06/01/2007

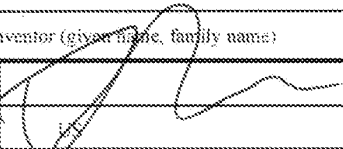
I hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

Application No.	Filing Date:	Status: (suspended, pending, abandoned)
Application No.	Filing Date:	Status: (suspended, pending, abandoned)

I hereby appoint the attorneys associated with **Customer No. 000408** (Luedeka, Neely & Graham, P.C.) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

Address all telephone calls to **James R. Palmer** at telephone number (865) 546-4305, and all correspondence to the address of **Customer No. 000408**.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first inventor (given name, family name)		C. Douglas YEAGER
Inventor's Signature		Date: <u>1/23/2008</u>
Citizenship	USA	
Residence	426 Willowcrest Lane, Knoxville, TN 37934	
Post Office Address	426 Willowcrest Lane, Knoxville, TN 37934	

63766.US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 12/019,318
Applicant: YEAGER, C. Douglas
Filing Date: 01/24/2008
Confirmation No.: 9759
Title: SELF-AUTHORIZING DEVICES
Examiner: SONG, Hee K.
Group Art Unit: 2433

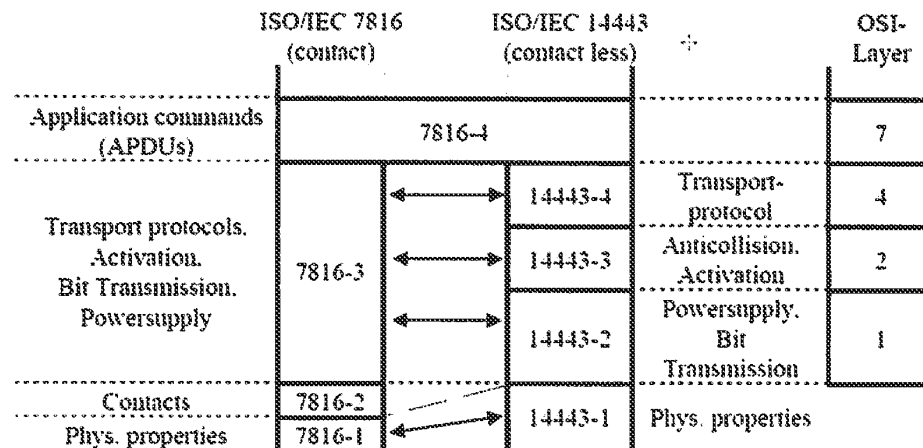
DECLARATION OF Brian Charles Murray
under 37 CFR 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

1. I, Brian Charles Murray declare as follows:
2. I live in San Diego, California United States of America.
3. I have no current or prospective inventorship or ownership interest in U.S. Patent Application Serial Number 12/019,318.
4. I have extensive knowledge and experience in payment card technologies and standards
5. I am recognized as an expert in the field of payment card technology. My curriculum vitae is appended hereto as Exhibit A.
6. I have reviewed and evaluated Claims 1, 15, and 25 as amended by an Amendment submitted concurrently with this Declaration. I have also reviewed originally-filed Claims 1, 15, and 24 and I have reviewed and evaluated the

Examiner's rejections of originally-filed Claims 1, 15, and 24 as being unpatentable over US Patent 7,213,766 (Ryan) in view of US Pre-grant Pub. 2007/0208949 (Lu) and further in view of US Pre-grant Publication 2007/0262138 (Somers).

7. Claim 1 as originally-filed (and as currently amended) specifies "a secure element reader affixed to the mounting structure and configured to interrogate the secure element by executing file system functions according to ISO 7816-4." The Examiner refers to Ryan's translation module as disclosing this limitation. However that conclusion is inconsistent with the details of Ryan's document.
8. ISO 7816 is a broad specification with different sections directed toward different "layers" of communication protocols, as seen in the following diagram:



Among the various sections of 7816, system developers freely pick and choose what layer's of communication will be implemented in a particular device. Ryan does not disclose which portions of 7816 are to be implemented. However, in Figures 1A, 1B and 1C Ryan refers to elements 104, 124 and 144 as a translation module. Those designations are confirmed at various places in the specification. Then at Column 18, lines 12 – 17, Ryan states

The translation module 104 is for going (moving signals) from USB (the exemplary interface with the computer) to a smart card interface format, such as ISO 7816, and vice-versa. The translation module may comprise a Philips TDA8030 USB/7816. (ISO 7816 is a smart card contact interface.)

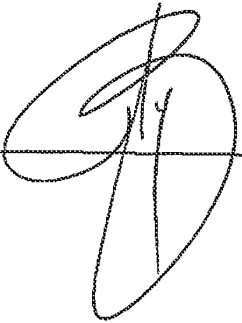
Based on Ryan's explicit statement that the translation module 104 is for "moving signals" it is clear that Ryan's translation modules are directed a protocols well below OSI layer 7 to which ISO 7816-4 applies. This is further emphasized from the example provided by Ryan, "a Philips TDA8030 USB/7816." A copy of the data sheet for the TDA8030 and an Application Note for that device are attached as Appendix A and Appendix B respectively. The data sheet states that "The TDA8030; TDA8031 is a bus powered full-speed USB device. All analog and digital functions for an EMV compliant Smart Card Reader are built-in."

9. It is important to note that a "smart card reader" is not equivalent to a "a secure element reader . . . configured to interrogate the secure element by executing file system functions according to ISO 7816-4." A "smart card reader" is a device that provides low-level communications capability with a smart card. As evidence of that, Exhibit C presents a summary page for Smart Card Reader distributed by Athena Smartcard Products. That document states that the reader supports "ISO7816 T=0; T=1." T=0 and T=1 are two transmission protocols: character protocol (T=0) or block protocol (T=1). These are low level communications protocols that are specified in ISO 7816-3. There are no "smarts" built in to a Smart Card Reader that would conform to OSI Layer 7 / ISO 7816-4.
10. Commands executed by a secure element reader may be further defined by specific payment card standards or other proprietary card applications. Consequently, a "secure element reader affixed to the mounting structure and configured to interrogate the secure element by executing file system functions comprising a command to select a payment card application according to ISO 7816-4" is further distinguished over a "smart card reader." A "smart card

reader” would **only** execute such functions if/when commanded to do so by an **external device** such as a host computer.

11. In standard smart card systems that were publicly known in January 2008 (i.e., at the filing date of the present application) the “smarts” for interrogating the secure element by executing file system functions according to ISO 7816-4 were resident in a host computer. A Smart Card Reader was used provide communication between the secure element and the host computer. It is unexpected that a secure element reader would be affixed to the mounting structure of a smart token and configured to interrogate the secure element by executing file system functions according to ISO 7816-4.
12. Regarding Claim 15, USB Human Interface Devices (HIDs) are defined by an industry standards organization (USB Implementers Forum (USB-IF)). The USB HID class specifications allow for myriad of user/computer interface devices including various input devices such as keyboards, mice, track balls, game controllers, as well as output devices such as CRT/LCD displays and audio speakers. The use of the USB HID class specifications has been extended even beyond computer input/output devices to include such wide-ranging applications as simulation controllers, exercise machines, telephony devices, thermometers, medical instruments and uninterruptible power supplies. Any device can be a USB HID class device as long as a designer meets the USB HID class logical specifications. It is unexpected that a smart card would be specifically configured as a keyboard interface device.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

A handwritten signature, possibly reading "G. H.", is written over a horizontal line.

May 1st 2011.
Date

Exhibit A

Brian C. Murray

Founder and Chief Executive Officer U.S. Encode Corporation.

U.S. Encode is a payment technology provider positioned in online authentication addressing consumer payments. The company has headquarters at 12707 High Bluff Drive, San Diego, California.

Brian Murray has over 20 years of international experience as a Senior Officer and Director of companies in Banking, Card Processing and Payment Technology, including Barclays International, where he was located in London, Italy, Germany and France; First National Bank and The NedCor Banking Group. He relocated to the USA in 1999 where he was CEO and a Director of TradeRoot California, a start-up Information Technology Company involved in Internet Payment Processing. During 2002 Bob Eprile and Brian Murray founded U.S. Encode® Corporation.

Mr. Murray's expertise in the payments industry has led to him presenting at numerous payment and fraud forums.

Brian was educated at The College for Advanced Technical Education Business School in Port Elizabeth South Africa, Barclays School of Management and Oxford Brookes University in the United Kingdom.

Brian served in the South African Armed Forces and was awarded the Pro Patria Medal. He is an avid sportsman, played Division One Rugby and served as President of The Transvaal Union Rugby Football Club and as Chairman of the Barclays Transvaal Rugby Football Club. He has also completed a number of marathons and ultra marathons.

DATA SHEET



TDA8030; TDA8031 USB smart card reader (OTP or ROM)

Product specification

2003 Jul 04

USB smart card reader (OTP or ROM)**TDA8030; TDA8031****CONTENTS**

1	FEATURES	8.5	USB INTERFACE
2	APPLICATIONS	8.5.1	End-points
3	GENERAL DESCRIPTION	8.5.2	Phase-locked loop
4	ORDERING INFORMATION	8.5.3	Bit clock recovery
5	QUICK REFERENCE DATA	8.5.4	Interface signals with the microcontroller
6	BLOCK DIAGRAM	8.5.5	Block diagram
7	PINNING	8.5.6	USB registers
7.1	TDA8030	8.5.7	Instruction set
7.2	TDA8031	8.5.8	Analog interface
8	FUNCTIONAL DESCRIPTION	8.5.9	Suspend mode
8.1	ISO7816 UART AND ASSOCIATED LOGIC	9	LIMITING VALUES
8.1.1	Interface control	10	THERMAL CHARACTERISTICS
8.1.2	Control registers	11	CHARACTERISTICS
8.1.3	General registers	12	APPLICATION INFORMATION
8.1.4	ISO UART REGISTERS	13	PACKAGE OUTLINE
8.1.5	CARDS REGISTERS	14	SOLDERING
8.1.6	Registers summary	14.1	Introduction to soldering surface mount packages
8.2	SUPPLY	14.2	Reflow soldering
8.2.1	Power switch control	14.3	Wave soldering
8.2.2	3.3 V regulator	14.4	Manual soldering
8.2.3	DC-to-DC converter	14.5	Suitability of surface mount IC packages for wave and reflow soldering methods
8.2.4	Supply supervisor	15	DATA SHEET STATUS
8.3	ISO7816 SECURITY	16	DEFINITIONS
8.3.1	Introduction	17	DISCLAIMERS
8.3.2	Protections and limitations		
8.3.3	Activation sequence		
8.3.4	Deactivation sequence		
8.4	MICROCONTROLLER		
8.4.1	Low power modes		

USB smart card reader (OTP or ROM)

TDA8030; TDA8031

1 FEATURES

- 83C51 core with 16 kbytes EPROM (ROM); 256 bytes RAM; 512 bytes AUXRAM; Timer 0,1, 2 and enhanced UART
- Full speed USB interface device which complies with USB 1.1 specification; accessible with MOVX instructions
- Control input and output; 1 generic input and output and 2 generic input end-points
- Compatible with bus powered and suspend mode supply current requirements
- Specific ISO7816 UART; accessible with MOVX instructions for automatic convention processing; variable baud rate through frequency or division ratio programming; error management at character level for T = 0 protocol; extra guard time register
- V_{CC} generation (5 or 3 V maximum current 55 mA or 1.8 V maximum current 35 mA) with controlled rise and fall times; current limitation and overload detection at 100 mA
- Cards clock generation with three times synchronous frequency doubling (12, 6, 3 and 1.5 MHz)
- Cards clock STOP HIGH or LOW or 1.25 MHz (from an integrated oscillator) for cards power reduction mode
- Automatic activation and deactivation sequences through an independent sequencer
- Supports the asynchronous protocols T = 0 and T = 1 in accordance with ISO7816 and EMV
- Versatile 24-bit time-out counter for Answer To Reset (ATR) and waiting times processing
- Supports synchronous cards
- Specific Elementary Time Unit (ETU) counter for Block Guard Time (BGT)
- Current limitations on cards contacts and emergency deactivation in case of over consumption or overheating
- Special circuitry for killing spikes during power-on or power-off
- Supply supervisor for power-on or power-off reset
- High efficiency inductive DC-to-DC converter for V_{CC} generation
- Soft switch on for avoiding current inrush at plug in
- Enhanced ESD protections on cards contacts (6 kV minimum)
- Software library for easy integration within the application.

**2 APPLICATIONS**

- Smart card readers for PC's or Set Top Boxes.

3 GENERAL DESCRIPTION

The TDA8030; TDA8031 is a bus powered full-speed USB device. All analog and digital functions for an EMV compliant Smart Card Reader are built-in. The embedded 83C51 microcontroller has 16 kbytes EPROM (ROM for TDA8031), 256 bytes RAM and 512 bytes of AUXRAM.

4 ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
TDA8030HL	LQFP64	plastic low profile quad flat package; 64 leads; body 10 × 10 × 1.4 mm	SOT314-2
TDA8031HL			

USB smart card reader (OTP or ROM)

TDA8030; TDA8031

5 QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{DDU}	bus supply voltage		4.2	—	5.5	V
I_{DDU}	bus supply current	$V_{CC} = 5\text{ V}$; $I_{CC} = 40\text{ mA}$; $f_{clk} = 6\text{ MHz}$	—	—	100	mA
I_{sus}	suspend current	card inactive; microcontroller in Power-down mode	—	—	500	μA
V_{CC}	card supply voltage	including static load; 5 V card	4.75	5	5.25	V
		with dynamic loads on 200 nF	4.60	—	5.40	V
		including static loads; 3 V card	2.85	3	3.15	V
		with dynamic loads on 200 nF	2.75	—	3.25	V
		including static loads; 1.8 V card	1.64	1.8	1.96	V
		with dynamic loads on 200 nF	1.62	—	1.98	V
I_{CC}	card supply current	5 V card	—	—	—55	mA
		3 V card	—	—	—55	mA
		1.8 V card	—	—	—35	mA
I_{lim}	current limit on V_{CC}		—	—	100	mA
I_{od}	overload detection on V_{CC}		—	—	100	mA
T_{amb}	ambient temperature		—25	—	+85	$^{\circ}\text{C}$

USB smart card reader (OTP or ROM)

TDA8030; TDA8031

6 BLOCK DIAGRAM

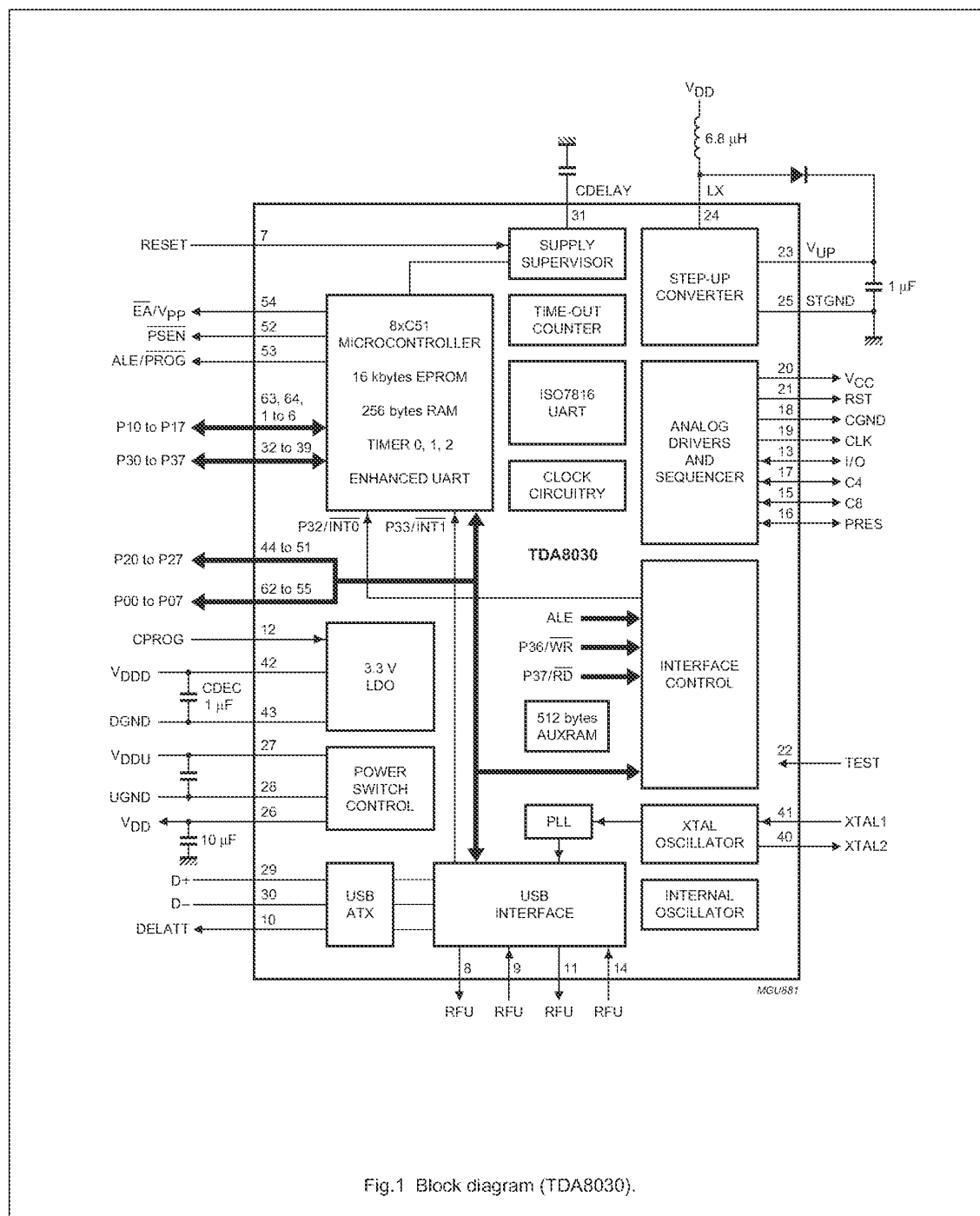


Fig.1 Block diagram (TDA8030).

USB smart card reader (OTP or ROM)

TDA8030; TDA8031

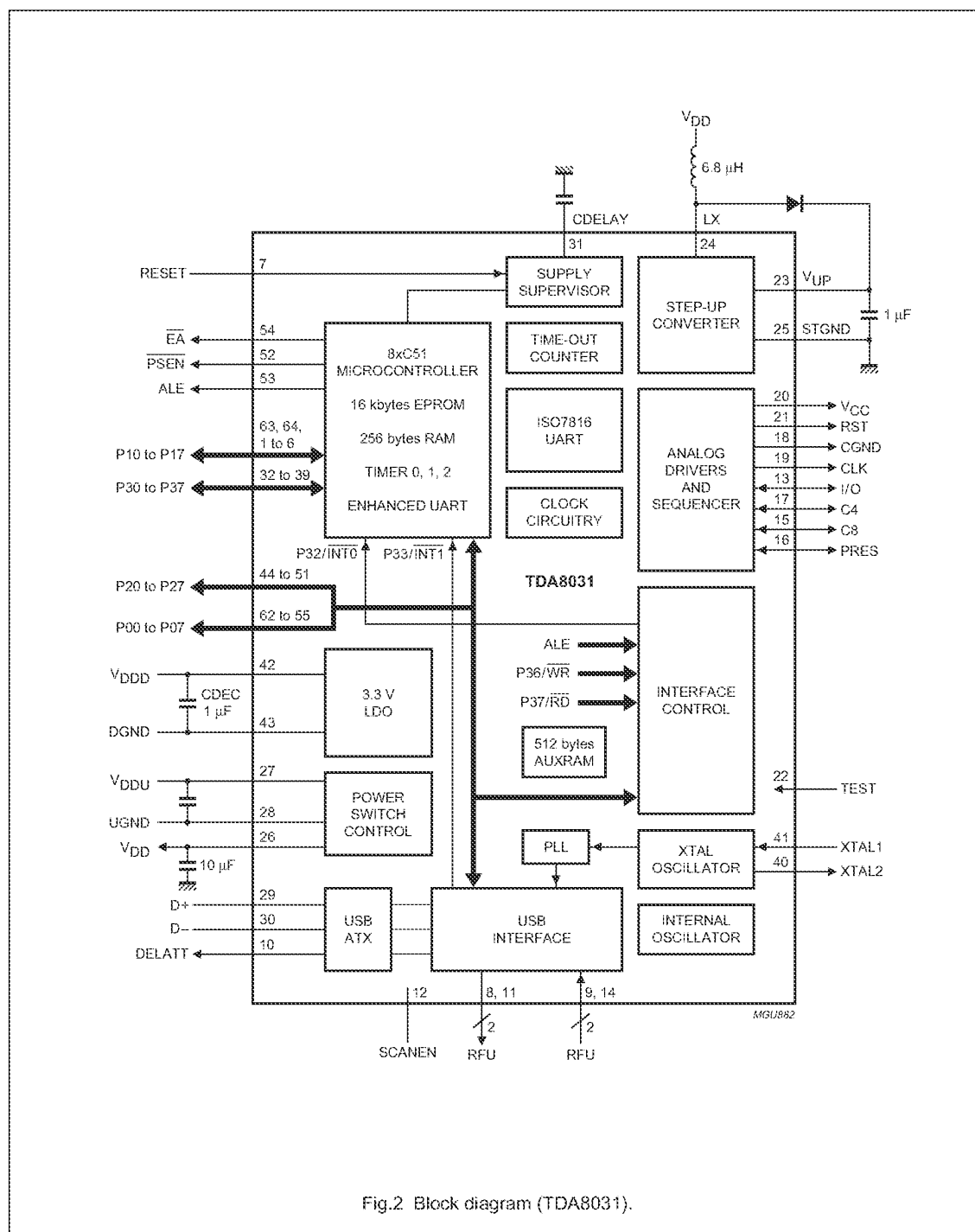


Fig.2 Block diagram (TDA8031).

USB smart card reader (OTP or ROM)

TDA8030; TDA8031

7 PINNING

7.1 TDA8030

SYMBOL	PIN	DESCRIPTION
P12	1	8xC51 general purpose I/O port (USB_MC_READY)
P13	2	8xC51 general purpose I/O port (USB_CLK_EN_N)
P14	3	8xC51 general purpose I/O port (USB_RESET_N)
P15	4	8xC51 general purpose I/O port (USB_SOFTCONNECT_EXT)
P16	5	8xC51 general purpose I/O port (available for the application)
P17	6	8xC51 general purpose I/O port (available for the application)
RESET	7	reset input (active HIGH, integrated pull-down resistor to ground)
RFU	8	test pin; leave open-circuit in the application
RFU	9	test pin; leave open-circuit in the application
DELATT	10	delayed attachment reference signal output for external pull-up resistor on pin D+ (an internal 1.5 k Ω pull-up resistor is already embedded on-chip)
RFU	11	test pin; leave open-circuit in the application
CPROG	12	connect to GND within the application; for programming the EPROM connect to V _{DD} as well as pin TEST (pin 22); also used for test purposes
I/O	13	data input/output from the card (C7); 14 k Ω integrated pull-up resistor connected to V _{CC}
RFU	14	test pin; leave open-circuit in the application
C8	15	auxiliary I/O for C8 contact; 14 k Ω integrated pull-up resistor connected to V _{CC}
PRES	16	card presence detection input (active HIGH; no need for external pull-up)
C4	17	auxiliary I/O for C4 contact; 14 k Ω integrated pull-up resistor connected to V _{CC}
CGND	18	cards ground (C5) Must be connected to GND
CLK	19	clock output (C30)
V _{CC}	20	card supply output voltage (ISO C1 contact); must be decoupled with two 100 nF low ESR ceramic capacitors to CGND
RST	21	cards reset output (C2)
TEST	22	test pin input
V _{UP}	23	output of the DC-to-DC converter (decouple with a 1 μ F capacitor to STGND)
LX	24	DC-to-DC converter inductor connection (a Schottky diode should be tied to V _{UP})
STGND	25	DC-to-DC converter ground connection
V _{DD}	26	soft switched positive supply voltage (decouple with 10 μ F capacitor to GND)
V _{DDU}	27	positive supply voltage for the bus (4.2 to 5.5 V)
UGND	28	bus ground
D+	29	USB D+ data line
D-	30	USB D- data line
CDELAY	31	connection for an external capacitor to ground determining the Power-on reset pulse width (typ 1 ms per 2 nF)
P30/RxD	32	8xC51 general purpose I/O port/serial input port (available for the application)
P31/TxD	33	8xC51 general purpose I/O port/serial output port (available for the application)
P32/INT0	34	8xC51 general purpose I/O port/external interrupt 0 (used by the ISO UART)
P33/INT1	35	8xC51 general purpose I/O port/external interrupt 1 (used by the USB interface)

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SYMBOL	PIN	DESCRIPTION
P34	36	8xC51 general purpose I/O port (USB_SUSPEND in TDA8030)
P35	37	8xC51 general purpose I/O port (USB_WAKEUP_N in TDA8031)
P36/WR	38	external data memory write strobe
P37/RD	39	external data memory read strobe
XTAL2	40	12 MHz crystal output; leave open-circuit if an external clock is used
XTAL1	41	external 12 MHz crystal connection or input for an external clock signal
V _{DD}	42	3.3 V regulated digital supply voltage output (decouple with 1 µF ceramic capacitor)
DGND	43	Digital ground
P20/A8	44	8xC51 general purpose I/O port/address 8 (available for the application)
P21/A9	45	8xC51 general purpose I/O port/address 9 (available for the application)
P22/A10	46	8xC51 general purpose I/O port/address 10 (available for the application)
P23/A11	47	8xC51 general purpose I/O port/address 11 (available for the application)
P24/A12	48	8xC51 general purpose I/O port/address 12 (available for the application)
P25/A13	49	8xC51 general purpose I/O port/address 13 (USB_MP_C)
P26/A14	50	8xC51 general purpose I/O port/address 14 (USB_MP_SEL)
P27/A15	51	8xC51 general purpose I/O port/address 15 (ISO_UART_CS)
PSEN	52	Program Store Enable: read strobe to external program memory when executing code from the external program memory; PSEN is activated twice each machine cycle except when two PSEN activations are skipped during each access to external data memory. PSEN is not activated during fetches from internal program memory.
ALE/PROG	53	Address Latch Enable/Program Pulse: output pulse for latching the low byte of the address during an access to external memory. In normal operation ALE is emitted at a constant rate of 1/6 the oscillator frequency and can be used for external timing or clocking. It should be noted that one ALE pulse is skipped during each access to external data memory. This pin is also the program pulse input (PROG) during EPROM programming. ALE can be disabled by setting SFR Auxiliary0. With this bit set ALE will be active only during a MOVX instruction.
EA/V _{pp}	54	External Access Enable/Programming Supply Voltage: EA must be externally held LOW to enable the device to fetch code from external program memory locations starting with 0000H. If EA is held HIGH the device executes from internal program memory unless the program counter contains an address greater than 3FFFFH (16 kbytes boundary). This pin also receives the 12.75 V programming supply voltage (V _{pp}) during EPROM programming. If security bit 1 is programmed EA will be internally latched on reset.
P07/AD7	55	8xC51 general purpose I/O port/address/data 7
P06/AD6	56	8xC51 general purpose I/O port/address/data 6
P05/AD5	57	8xC51 general purpose I/O port/address/data 5
P04/AD4	58	8xC51 general purpose I/O port/address/data 4
P03/AD3	59	8xC51 general purpose I/O port/address/data 3
P02/AD2	60	8xC51 general purpose I/O port/address/data 2
P01/AD1	61	8xC51 general purpose I/O port/address/data 1
P00/AD0	62	8xC51 general purpose I/O port/address/data 0
P10	63	8xC51 general purpose I/O port (USB_INT_MASK)
P11	64	8xC51 general purpose I/O port (USB_SOFTCONNECT_INT)

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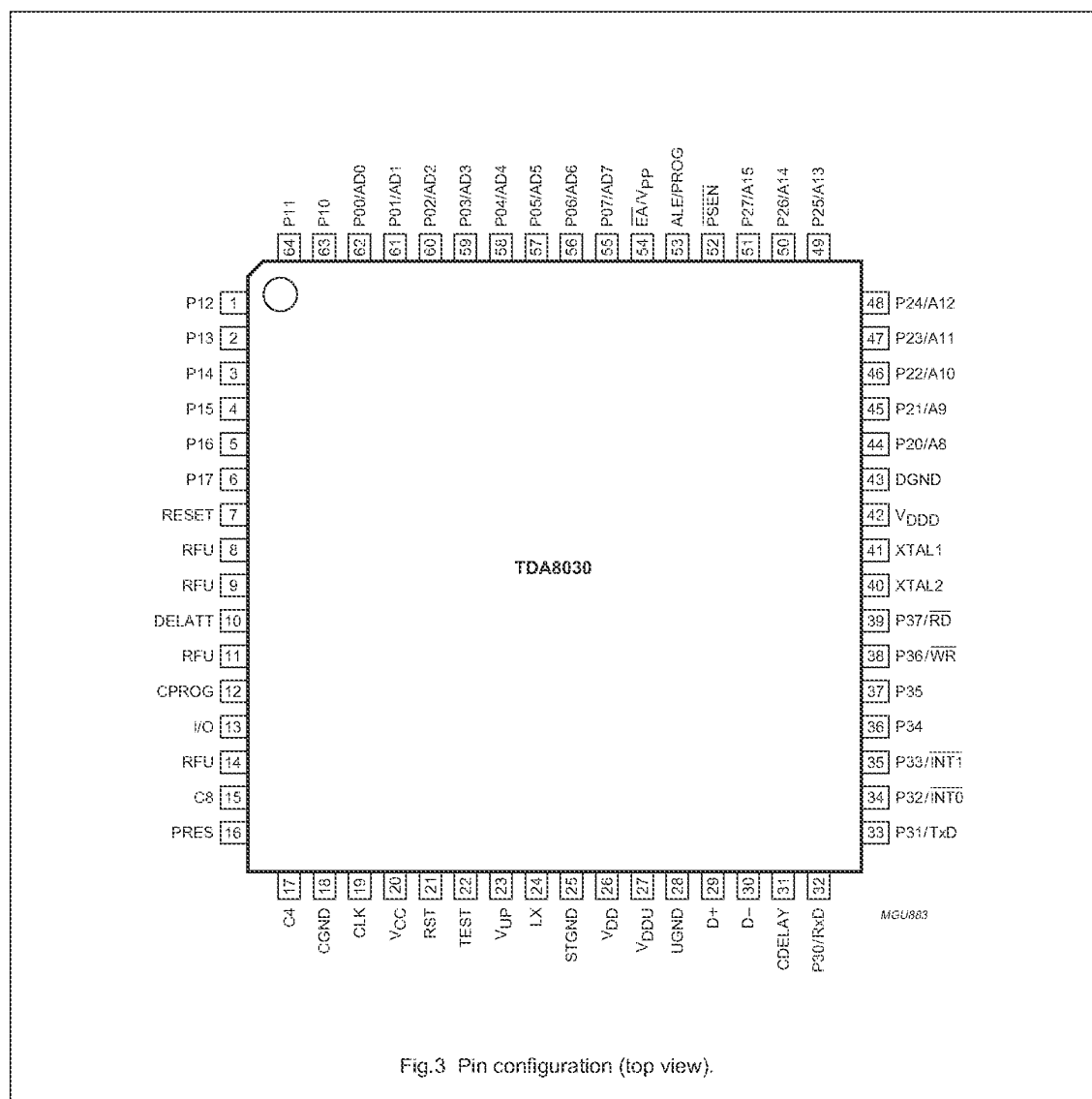


Fig.3 Pin configuration (top view).

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7.2 TDA8031

SYMBOL	PIN	DESCRIPTION
P12	1	8xC51 general purpose I/O port (USB_MC_READY)
P13	2	8xC51 general purpose I/O port (USB_CLK_EN_N)
P14	3	8xC51 general purpose I/O port (USB_RESET_N)
P15	4	8xC51 general purpose I/O port (USB_SOFTCONNECT_EXT)
P16	5	8xC51 general purpose I/O port (available for the application)
P17	6	8xC51 general purpose I/O port (available for the application)
RESET	7	reset input (active HIGH, integrated pull-down resistor to ground)
RFU	8	test pin; leave open-circuit in the application
RFU	9	test pin; leave open-circuit in the application
DELATT	10	delayed attachment reference signal output for external pull-up resistor on pin D+ (an internal 1.5 k Ω pull-up resistor is already embedded in the chip)
RFU	11	test pin; leave open-circuit in the application
SCANEN	12	connect to GND within the application; for programming the EPROM connect to V _{DD} as well as pin TEST (pin 22); also used for test purposes
I/O	13	data input/output from the card (C7); 14 k Ω integrated pull-up resistor connected to V _{CC}
RFU	14	test pin; leave open-circuit in the application
C8	15	auxiliary I/O for C8 contact; 14 k Ω integrated pull-up resistor connected to V _{CC}
PRES	16	card presence detection input (active HIGH; no need for external pull-up)
C4	17	auxiliary I/O for C4 contact; 14 k Ω integrated pull-up resistor connected to V _{CC}
CGND	18	cards ground (C5) Must be connected to GND
CLK	19	clock output (C30)
V _{CC}	20	card supply output voltage (ISO C1 contact); must be decoupled with two 100 nF low ESR ceramic capacitors to CGND
RST	21	cards reset output (C2)
TEST	22	test pin input
V _{UP}	23	output of the DC-to-DC converter (decouple with a 1 μ F capacitor to STGND)
LX	24	DC-to-DC converter inductor connection (a Schottky diode should be tied to V _{UP})
STGND	25	DC-to-DC converter ground connection
V _{DD}	26	soft switched positive supply voltage (decouple with 10 μ F capacitor to GND)
V _{DDU}	27	positive supply voltage for the bus (4.2 to 5.5 V)
UGND	28	bus ground
D+	29	USB D+ data line
D-	30	USB D- data line
CDELAY	31	connection for an external capacitor to ground determining the Power-on reset pulse width (typ 1 ms per 2 nF)
P30/RxD	32	8xC51 general purpose I/O port/serial input port (available for the application)
P31/TxD	33	8xC51 general purpose I/O port/serial output port (available for the application)
P32/INT0	34	8xC51 general purpose I/O port/external interrupt 0 (used by the ISO UART)
P33/INT1	35	8xC51 general purpose I/O port/external interrupt 1 (used by the USB interface)
P34	36	8xC51 general purpose I/O port (USB_SUSPEND in TDA8030)

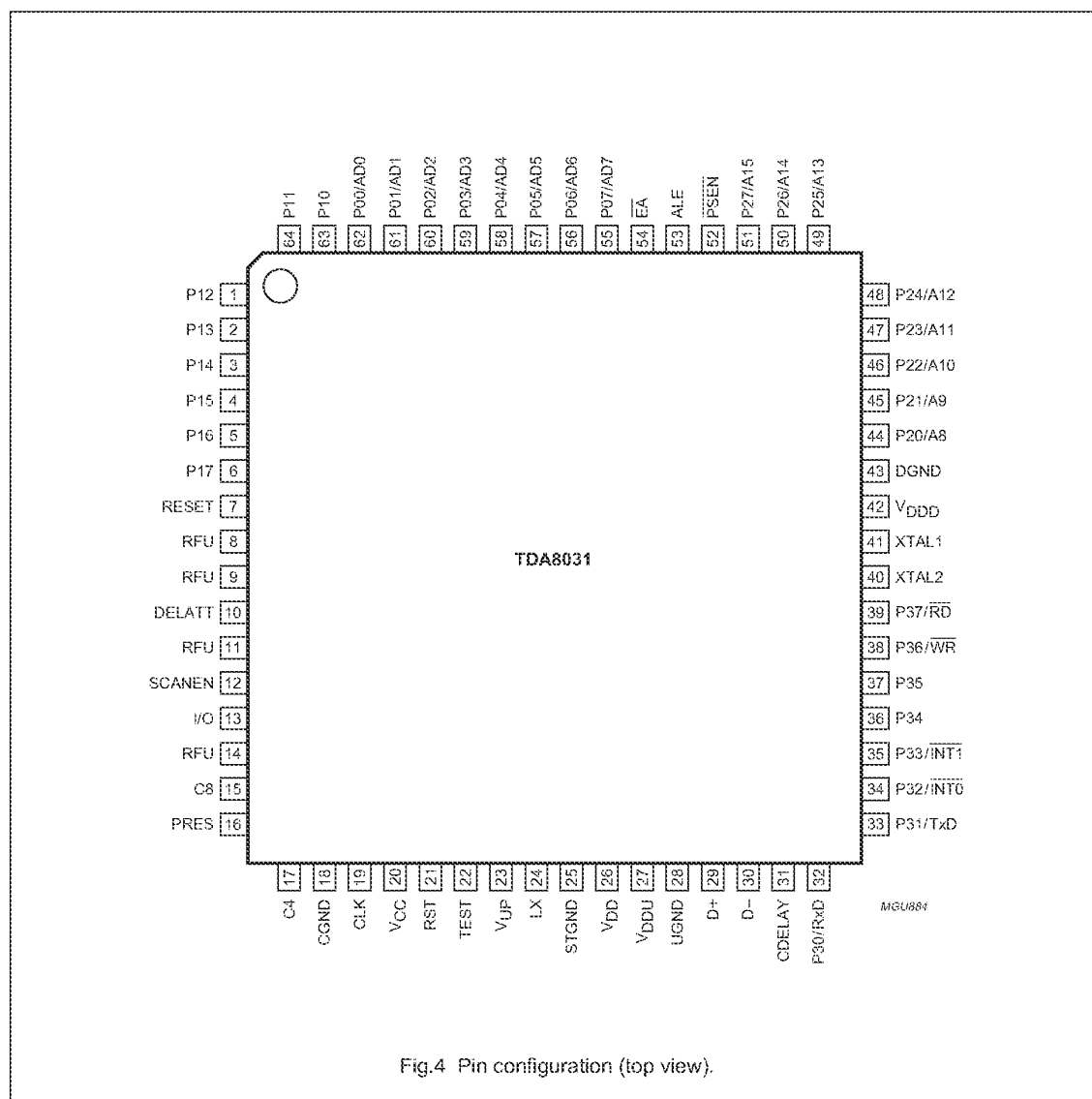
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SYMBOL	PIN	DESCRIPTION
P35	37	8xC51 general purpose I/O port (USB_WAKEUP_N in TDA8030)
P36/WR	38	external data memory write strobe
P37/RD	39	external data memory read strobe
XTAL2	40	12 MHz crystal output; leave open-circuit if an external clock is used
XTAL1	41	external 12 MHz crystal connection or input for an external clock signal
V _{DDD}	42	3.3 V regulated digital supply voltage output (decouple with 1 μ F ceramic capacitor)
DGND	43	Digital ground
P20/A8	44	8xC51 general purpose I/O port/address 8 (available for the application)
P21/A9	45	8xC51 general purpose I/O port/address 9 (available for the application)
P22/A10	46	8xC51 general purpose I/O port/address 10 (available for the application)
P23/A11	47	8xC51 general purpose I/O port/address 11 (available for the application)
P24/A12	48	8xC51 general purpose I/O port/address 12 (available for the application)
P25/A13	49	8xC51 general purpose I/O port/address 13 (USB_MP_C)
P26/A14	50	8xC51 general purpose I/O port/address 14 (USB_MP_SEL)
P27/A15	51	8xC51 general purpose I/O port/address 15 (ISO_UART_CS)
PSEN	52	Program Store Enable: read strobe to external program memory when executing code from the external program memory; $\overline{\text{PSEN}}$ is activated twice each machine cycle except when two $\overline{\text{PSEN}}$ activations are skipped during each access to external data memory. $\overline{\text{PSEN}}$ is not activated during fetches from internal program memory.
ALE	53	Address Latch Enable/Program Pulse: output pulse for latching the low byte of the address during an access to external memory. In normal operation ALE is emitted at a constant rate of 1/6 the oscillator frequency and can be used for external timing or clocking. It should be noted that one ALE pulse is skipped during each access to external data memory. This pin is also the program pulse input (PROG) during EPROM programming. ALE can be disabled by setting SFR Auxiliary0. With this bit set ALE will be active only during a MOVX instruction.
EA	54	External Access Enable/Programming Supply Voltage: EA must be externally held LOW to enable the device to fetch code from external program memory locations starting with 0000H. If EA is held HIGH the device executes from internal program memory unless the program counter contains an address greater than 3FFFH (16 kbytes boundary). This pin also receives the 12.75 V programming supply voltage (V _{PP}) during EPROM programming. If security bit 1 is programmed EA will be internally latched on reset.
P07/AD7	55	8xC51 general purpose I/O port/address/data 7
P06/AD6	56	8xC51 general purpose I/O port/address/data 6
P05/AD5	57	8xC51 general purpose I/O port/address/data 5
P04/AD4	58	8xC51 general purpose I/O port/address/data 4
P03/AD3	59	8xC51 general purpose I/O port/address/data 3
P02/AD2	60	8xC51 general purpose I/O port/address/data 2
P01/AD1	61	8xC51 general purpose I/O port/address/data 1
P00/AD0	62	8xC51 general purpose I/O port/address/data 0
P10	63	8xC51 general purpose I/O port (USB_INT_MASK)
P11	64	8xC51 general purpose I/O port (USB_SOFTCONNECT_INT)

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8 FUNCTIONAL DESCRIPTION

Throughout this specification, it is assumed that the reader is aware of ISO7816 and USB norms terminology.

8.1 ISO7816 UART AND ASSOCIATED LOGIC

This section describes how the integrated ISO7816 UART operates, how it can be programmed by means of its control registers and how it is internally interfaced to the embedded microcontroller.

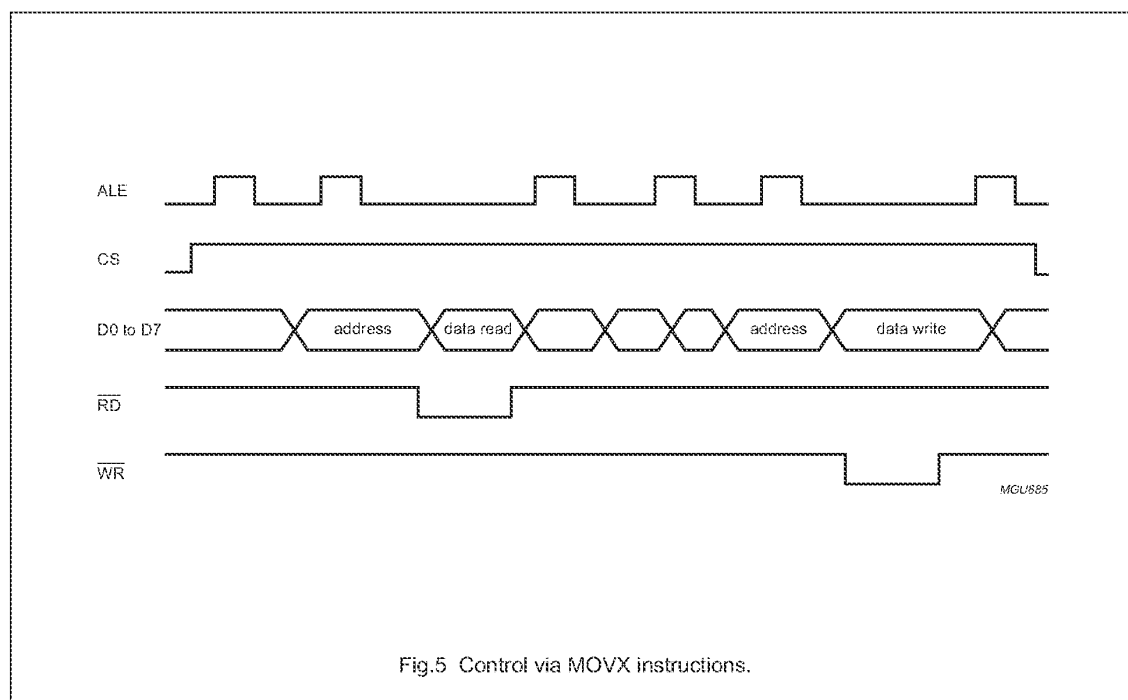
8.1.1 INTERFACE CONTROL

The ISO7816 UART can be controlled via an 8-bit parallel bus. This bus is directly (internally) connected to Port 0 (P07 to P00) of the embedded 83C51 microcontroller.

The registers within the ISO7816 UART may be written to or read from by using the standard 83C51 MOVX instructions. It should be noted, that only if pin P27/A15 is HIGH, can the UART be accessed.

When pin P27/A15 is HIGH, the demultiplexing of address and data is done internally by means of the ALE signal. A LOW pulse on pin P37/ $\overline{RD}$ enables the selected register to be read, a LOW pulse on pin P36/ $\overline{WR}$ enables the selected register to be written to.

The ISO UART interrupt line is directly connected to the microcontrollers External Interrupt 0 input, pin P32/INT0. For that reason, the External Interrupt 0 of the 83C51 microcontroller must be enabled to ensure a proper function.



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8.1.2 CONTROL REGISTERS

The TDA8030; TDA8031 has 1 analog interface for 7 contacts cards. The data to and from the cards is fed into an ISO UART.

The Card Select Register (CSR) contains one bit for resetting the ISO UART ($\overline{\text{RIU}}$, active LOW). This bit is reset after power-on and must be set HIGH before starting any operation. It may be reset by software when necessary.

The following dedicated registers enable the parameters of the ISO UART and the ETU counters to be set:

- Programmable Divider Register (PDR)
- Guard Time Register (GTR)
- Two UART Control Registers (UCR1 and UCR2)
- Clock Configuration Register (CCR)
- Time-Out Configuration Register (TOCR)
- Three Time-Out Registers (TOR1, TOR2 and TOR3).

There is also a dedicated Power Control Register (PCR) for controlling the power to the card.

When the specific parameters of the card have been programmed, the UART may be used with the following registers:

- UART Receive Register (URR)
- UART Transmit Register (UTR)
- UART Status Register (USR)
- Mixed Status Register (MSR).

In the reception mode, a FIFO of 1 to 8 characters may be used and is configured with the FIFO Control Register (FCR). This register may also be used for programming an automatic repetition of NAKed characters in the transmission mode.

The Hardware Status Register (HSR) gives the status of the supply voltage, of the hardware protections and of the card movements.

The USR and HSR give interrupts on pins INT when some of their bits have been changed.

The MSR does not give interrupts and may be used in the polling mode for some operations; when this is the case, the bit Transmit Buffer Empty/Receive Buffer Full (TBE/RBF) within the USR may be masked.

A 24-bit time-out counter may be started to provide an interrupt after a number of ETUs programmed in time-out registers TOR1, TOR2 and TOR3. This will help the microcontroller when processing different real-time tasks (ATR, WWT and BWT etc.), mainly if the microcontrollers and cards clock are asynchronous.

This counter is configured with a Time-Out Counter Configuration register (TOCC) and may be used as a 24-bit or as a 16 + 8-bit counter. Each counter may be set to start counting once data has been written, or on detection of a start bit on the I/O or as autoreload.

8.1.3 GENERAL REGISTERS

8.1.3.1 Card select register

The Card Select Register (CSR) is used for resetting the ISO UART.

The bit Reset ISO UART ($\overline{\text{RIU}}$) must be set to logic 1 by software before any action on the UART. When set to logic 0, this bit resets a large part of the UART registers to their default value; see Table 1. A minimum pulse of 10 ns is needed on $\overline{\text{RIU}}$. This bit must be reset before any new activation.

Table 1 Card select register (address 00H; write and read); note 1

7	6	5	4	3	2	1	0
—	—	—	—	$\overline{\text{RIU}}$	—	—	—

Note

1. All bits are cleared after reset.

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8.1.3.2 Hardware status register

The Hardware Status Register (HSR) gives the status of the chip after a hardware problem has been detected.

Table 2 Hardware Status Register (address 0FH; read only); note 1

7	6	5	4	3	2	1	0
—	—	PRTL	SUPL	—	PRL	—	PTL

Note

1. All bits are cleared after reset.

Table 3 Description of the HSR bits

BIT	SYMBOL	DESCRIPTION
7 and 6	—	not used
5	PRTL	Protection 1: Bit PRTL = 1 when a default has been detected on card reader. Bit PRTL is the OR function of the protection on pins V _{CC} and RST.
4	SUPL	Supervisor Latch: Bit SUPL = 1 when the supervisor has been activated.
3	—	not used
2	PRL	Presence Latch: Bit PRL = 1 when a change has occurred on pin PRES.
1	—	not used
0	PTL	Overheating: Bit PTL = 1 if overheating has occurred.

When either bits PRTL, PRL or PTL is logic 1, then pin $\overline{\text{INT0}}$ is LOW. The bits having caused the interrupt are cleared when the HSR has been readout ($2 \times f_{\text{int}}$ cycles after the rising edge of RD).

At power-on, or after a supply voltage drop-out, SUPL is set and $\overline{\text{INT0}}$ is LOW. $\overline{\text{INT0}}$ will return HIGH at the end of the internal Power-on reset pulse defined by the value of the capacitor connected to pin CDELAY. SUPL will be reset only after a status register readout outside the Power-on reset pulse; see Fig.8.

In the event of emergency deactivation (by PRTL, SUPL, PRL and PTL), bit START will be automatically reset by hardware.

8.1.3.3 Time-out registers

The three Time-Out Registers TOR1, TOR2 and TOR3 form a programmable 24-bit ETU counter, or two independant counters (one 16-bit and one 8-bit).

The value to load in TOR1, TOR2 and TOR3 is the number of ETUs to count.

Table 4 Time-out register 1 (address 09H; write only); note 1

7	6	5	4	3	2	1	0
TOL7	TOL6	TOL5	TOL4	TOL3	TOL2	TOL1	TOL0

Note

1. All bits are cleared after reset.

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Table 5 Time-out register 2 (address 0AH; write only); note 1

7	6	5	4	3	2	1	0
TOL15	TOL14	TOL13	TOL12	TOL11	TOL10	TOL9	TOL8

Note

1. All bits are cleared after reset.

Table 6 Time-out register 3 (address 0BH; write only); note 1

7	6	5	4	3	2	1	0
TOL23	TOL22	TOL21	TOL20	TOL19	TOL18	TOL17	TOL16

Note

1. All bits are cleared after reset.

8.1.3.4 Time-out configuration register

The Time-Out Configuration register (TOCR) is used for setting different configurations of the time-out counter according to Table 8; all other configurations are undefined.

The timers can operate in 3 modes:

1. Software triggered
2. Start bit triggered
3. Autoreload.

Table 7 Time-out configuration register (address 08H; read and write); note 1

7	6	5	4	3	2	1	0
TOC7	TOC6	TOC5	TOC4	TOC3	TOC2	TOC1	TOC0

Note

1. All bits are cleared after reset.

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Table 8 Time-out counter configuration

TOC VALUE	OPERATING MODE
00H	All counters are stopped.
05H	Counters 2 and 3 are stopped; counter 1 continues to operate in autoreload mode.
61H	Counter 1 is stopped and counters 3 and 2 form a 16-bit counter. Counting the value stored in TOR3 and TOR2 is started after 6H is written in the TOCR. An interrupt is given and bit TO3 is set within the USR when the terminal count is reached. The counter is stopped by writing 00H in the TOCR and will be stopped before reloading a new value in TOR2 and TOR3.
65H	Counter 1 is an 8-bit autoreload counter and counters 3 and 2 form a 16-bit counter. Counter 1 starts counting the content of TOR1 on the first START bit (reception or transmission) detected on I/O after 65H is written in the TOCR. When Counter 1 reaches its terminal count, an interrupt is given, bit TO1 in the USR is set and the counter automatically restarts the same count until it is stopped. It is not allowed to change the content of TOR1 during a count. Counters 3 and 2 are wired as a single 16-bit counter and starts counting the value TOR3 and TOR2 when 65H is written in the TOCR. When the counter reaches its terminal count, an interrupt is given and bit TO3 is set within the USR. Both counters are stopped when 00H is written in the TOCR. Counters 3 and 2 will be stopped by writing 05H in the TOCR before reloading a new value in TOR2 and TOR3.
68H	Counters 3, 2 and 1 are wired as a single 24-bit counter. Counting the value stored in TOR3, TOR2 and TOR1 is started after 68H is written in the TOCR. The counter is stopped by writing 00H in the TOCR. It is not allowed to change the content of TOR3, TOR2 and TOR1 within a count.
7CH	Counters 3, 2 and 1 are wired as a single 24-bit counter. Counting the value stored in TOR3, TOR2 and TOR1 on the first start bit detected on I/O (reception or transmission) after the value has been written. It is possible to change the content of TOR3, TOR2 and TOR1 during a count; the current count will not be affected and the new count value will be taken into account at the next start bit. The counter is stopped by writing 00H in the TOCR. In this configuration TOR3, TOR2 and TOR1 must not be all zero.
85H	Same as 05H, except that all the counters will be stopped at the end of the 12th ETU following the first received start bit detected after 85H has been written in the TOCR.
E5H	Same configuration as TOCR = 65H, except that Counter 1 will be stopped at the end of the 12th ETU following the first start bit detected after E5H has been written in the TOCR.

The time-out counter is very useful for processing the clock counting during ATR, the Work Waiting Time (WWT) or the waiting times defined in T = 1 protocol. The 200 and 384 clock counter used during ATR is done by hardware when Start Session is set, a specific hardware takes care of BGT in T = 1 protocol and a specific register is present for processing the extra guard time.

It is not allowed to change the content of the TOR registers whilst a counter is in software triggered mode, or in autoreload mode. In these modes, it is mandatory to stop the counters (TOCR = 00H or 05H) before updating the count value in the TOR registers. In start bit triggered mode, the value may be changed at any time; the new count value will be taken into account on the next start bit.

The minimum time interval between 2 successive write operations in TOCR is $\frac{2}{31}$ or $\frac{2}{32}$ ETU.

It is obvious that the counters may only be used once the card has been activated.

Detailed examples of how to use these specific timers can be found in Application Note "AN01012".

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8.1.4 ISO UART REGISTERS

8.1.4.1 UART transmit register

When the microcontroller wants to transmit a character to the card, it writes the data in direct convention in this register.

The transmission:

- Starts at the end of this writing (2 clock cycles after the rising edge of WR) if the previous character has been transmitted and if the extra guard time has expired
- Starts at the end of the extra guard time if this one has not expired
- Starts at 13.5 ETU in manual mode and 15 ETU in automatic mode if the previous character has been NAKed by the card; see Section 8.1.4.4

- Does not start if the transmission of the previous character is not completed.

When the transmission is completed:

- In T = 0, bit TBE is set at 11.5 ETU, and bit PE in the event of parity error
- In T = 1, bit TBE is set at 10.5 ETU.

In the event of synchronous cards (bit SAN set within UCR2), UT0 is only relevant and is copied on the I/O of the card. It is possible to write within the UTR before setting the transmission mode, which may be useful in some cases.

Table 9 UART transmit register (address 0DH; write only); note 1

7	6	5	4	3	2	1	0
UT7	UT6	UT5	UT4	UT3	UT2	UT1	UT0

Note

1. All bits are cleared after reset.

8.1.4.2 UART receive register

When the microcontroller wants to read data from the card, it reads it from this register in direct convention.

In the event of synchronous cards, only UR0 is relevant and is a copy of the state of the card I/O.

In the event of parity error:

- The bit PE in the status register USR is set at 10.5 ETU and INT0 falls LOW
- In protocol T = 0, the received byte is not stored in URR; In protocol T = 1, the received byte is stored.

In both protocols, when a character has been stored, then the bit RBF in the status register USR is set at 10.5 ETU. This bit is reset when the character has been read from the URR.

When the URR is empty, then bit FE (in the MSR) is set as long as no character has been received.

Table 10 UART receive register (address 0DH; read only); note 1

7	6	5	4	3	2	1	0
UR7	UR6	UR5	UR4	UR3	UR2	UR1	UR0

Note

1. All bits are cleared after reset.

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8.1.4.3 Mixed status register

The Mixed Status Register (MSR) relates the status of the cards presence contact PRES, the BGT counter, the FIFO empty indication, the transmit/receive ready indicator TBE/RBF and the completion of clock switching to or from $\frac{1}{2}f_{int}$.

Table 11 Mixed status register (address 0CH; read only); note 1

7	6	5	4	3	2	1	0
CLKSW	FE	BGT	–	–	PR	–	TBE/RBF

Note

1. Bits TBE/RBF are cleared after reset; bit FE is set after reset.

Table 12 Description of the MSR bits; note 1

BIT	SYMBOL	DESCRIPTION
7	CLKSW	Clock switch: Bit CLKSW = 1 when the TDA8030; TDA8031 has performed a required clock switch from $\frac{1}{n}f_{xtal}$ to $\frac{1}{2}f_{int}$ and is reset when the TDA8030; TDA8031 has performed a required clock switch from $\frac{1}{2}f_{int}$ to $\frac{1}{n}f_{xtal}$; the application will wait until this bit has been set or reset before setting the microcontroller in power-down mode or restarting sending commands after leaving power-down mode (only needed when the clock is not stopped). This bit is also reset by $\overline{RI\overline{U}}$ and at power-on.
6	FE	FIFO Empty: Bit FE = 1 when the reception FIFO is empty; it is reset when at least one character has been loaded in the FIFO.
5	BGT	Block Guard Time: In T = 1 protocol, the bit BGT is linked with a 22 ETU counter, which is started at every start bit on the I/O. If the count is finished before the next start bit, then bit BGT is set. This helps to ensure that the card has not answered before 22 ETU after the last transmitted character, or that the reader is not transmitting a character before 22 ETU after the last received character. In T = 0 protocol, the bit BGT is linked to a 16 ETU counter, which is started at every start bit on the I/O. If the count is finished before the next start bit, then the bit BGT is set. This helps to ensure that the reader is not transmitting too early after the last received character.
4 and 3		not used
2	PR	Presence: Bit PR = 1 when the card is present.
1	–	not used
0	TBE/RBF	Transmit Buffer Empty/Receive Buffer Full: Bit TBE/RBF = 1 when: <ul style="list-style-type: none"> • Changing from reception mode to transmission mode • A character has been transmitted by the UART (except when a character has been transmitted free of parity error while LCT = 1) • The reception buffer is full. Bit TBE/RBF = 0 after power-on, or after one of the following: <ul style="list-style-type: none"> • When the bit $\overline{RI\overline{U}}$ is reset • When a character has been written into register UTR • When the character has been read in register URR • When changing from transmission mode to reception mode.

Note

1. No bits within the MSR have an effect on $\overline{INT\overline{O}}$.

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8.1.4.4 FIFO control register

The FIFO Control Register (FCR) relates the parity error count and the FIFO length.

Table 13 FIFO control register (address 0CH; write only); note 1

7	6	5	4	3	2	1	0
—	PEC2	PEC1	PEC0	—	FL2	FL1	FL0

Note

1. All bits are cleared after reset.

Table 14 Description of the FCR bits

BIT	SYMBOL	DESCRIPTION
7	—	not used
6 to 4	PEC2 to PEC0	<p>Parity Error Count: PEC2, PEC1 and PEC0 determine the number of parity errors before setting the bit PE within the USR and pulling INTO LOW; 000 means that only one parity error has occurred and bit PE is set.</p> <p>The value 000 indicates that if only one parity error has occurred bit PE is set; the value 111 indicates that PE will be set after 8 parity errors.</p> <p>In protocol T = 0:</p> <ul style="list-style-type: none"> • If a correct character is received before the programmed error number is reached the error counter will be reset • If the programmed number of allowed parity errors is reached, bit PE in the USR will be set as long as the USR has not been read • If a transmitted character has NAKed by the card, then the TDA8030; TDA8031 will automatically re-transmit it a number of times equal to the value programmed in PEC2, PEC1 and PEC0. The character will be resent at 15 ETU • In transmission mode, if bits PEC2, PEC1 and PEC0 are at logic 0, then the automatic re-transmission is invalidated; the character manually rewritten in the UTR will start at 13.5 ETU. <p>In protocol T = 1:</p> <ul style="list-style-type: none"> • The error counter has no action; bit PE is set at the first incorrectly received character.
3	—	not used
2 to 0	FL2 to FL0	<p>FIFO Length: Bits FL2, FL1 and FL0 determine the depth of the FIFO:</p> <ul style="list-style-type: none"> • 000 = length 1 • 111 = length 8

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8.1.4.5 UART status register

The UART Status Register (USR) is used by the microcontroller to monitor the activity of the ISO UART and of the time-out counter.

Table 15 UART status register (address 0EH; read only); note 1

7	6	5	4	3	2	1	0
TO3	–	TO1	EA	PE	OVR	FER	TBE/RBF

Note

1. All bits are cleared after reset.

Table 16 Description of the USR bits

BIT	SYMBOL	DESCRIPTION
7	TO3	Time-Out counter 3: Bit TO3 = 1 when counter 3, or counters 3 + 2 or counters 3 + 2 + 1 have reached their terminal count.
6	–	not used
5	TO1	Time-Out counter 1: Bit TO1 = 1 when counter 1 has reached its terminal count.
4	EA	Early Answer: When bit RST is LOW, EA is HIGH if the first start bit on the I/O during ATR has been detected between 200 and 384 clock pulses (all activities on the I/O during the first 200 clock pulses with RST LOW are not taken into account). When RST is HIGH, EA is HIGH if a start bit has been detected before the 384th clock pulse. These two features are reinitialized at each toggling of RST.
3	PE	Parity Error: In T = 0 protocol, PE = 1 if the UART has detected a number of received characters with parity error equal to the number written in PEC2, PEC1 and PEC0 or if a transmitted character has been NAKed by the card a number of times equal to the value programmed in PEC2, 1 and 0. It is set at 10.5 ETU in reception mode and at 11.5 ETU in transmission mode. In T = 0 protocol, a character received with a parity error is not stored in the FIFO, the card is supposed to repeat this character. In T = 1 protocol, a character with a parity error is stored in the FIFO and the parity error counter is not operating.
2	OVR	Overrun: Bit OVR = 1 if the UART has received a new character while the URR was full. In this case, at least one character has been lost. OVR is set at 10.5 ETU.
1	FER	Framing Error: Bit FER = 1 when the I/O was not in high-impedance state at 10.25 ETU after a start bit. It is reset when the USR has been read-out.
0	TBE/RBF	Transmission Buffer Empty/Reception Buffer Full: Bits TBE and RBF share the same bit within the USR. When in transmission mode the relevant bit is TBE; when in reception mode it is RBF. Bit TBE = 1 when the UART is in transmission mode and when the microcontroller may write the next character to transmit in the UTR. It is reset when the microcontroller has written data in the Transmit Register, or when the bit T/R within UCR1 has been reset either automatically or by software. TBE is set at 11.5 ETU in T = 0 protocol and at 10.5 ETU in T = 1 protocol. Bit RBF = 1 when the FIFO is full. The microcontroller may read some of the characters in the URR, which clears the bit RBF. Bit RBF is also reset when entering the reception mode and is set at 10.5 ETU.

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If any of the status bits FER, OVR, PE, EA, TO1 or TO3 are set, then $\overline{\text{INT0}}$ is LOW. The bit having caused the interrupt is reset $2 \times f_{\text{int}}$ cycles after the rising edge of $\overline{\text{RD}}$ during a read operation of the USR. If TBE/RBF is set and if the mask bit DISTBE/RBF within UCR2 is not set, then $\overline{\text{INT0}}$ is also LOW. TBE/RBF is reset 2 clock cycles after data has been written into the UTR, or 2 clock cycles after data has been read from the URR, or when changing from transmission mode to reception mode if the FIFO had not been left full when going to transmission mode. If the Last Character to Transmit (LCT) is used for transmitting the last character, then TBE will not be set at the end of the transmission.

8.1.5 CARDS REGISTERS

When working with a card, the following registers may be used for programming some specific parameters:

8.1.5.1 Programmable divider register

The Programmable Divider Register (PDR) is used for counting the cards clock cycles which form the ETU. It is an autoreload 8-bit counter decoupling from the programmed value down to 0.

Table 17 Programmable divider register (address 02H; read and write); note 1

7	6	5	4	3	2	1	0
PD7	PD6	PD5	PD4	PD3	PD2	PD1	PD0

Note

1. All bits are cleared after reset.

8.1.5.2 UART configuration register 2

Table 18 UART configuration register 2 (address 03H; read and write); note 1

27	26	25	24	23	22	21	20
ENINT1	DISTBE/ RBF	–	–	SAN	AUTOCONV	CKU	PSC

Note

1. All bits are cleared after reset.

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Table 19 Description of the UCR2 bits

BIT	SYMBOL	DESCRIPTION
27	ENINT1	Enable Interrupt 1: If bit ENINT1 = 1, then a HIGH-to-LOW transition on INT1 will wake-up the microcontroller from power-down mode. When not in power-down mode, bit ENINT1 has no effect.
26	DISTBE/ RBF	Disable TBE/RBF interrupts: If bit DISTBE/RBF = 1, then reception or transmission of a character will not generate an interrupt. This feature is useful for increasing communication speed with the card; in this case, the copy of TBE/RBF bit within the MSR must be polled and not the original, in order not to loose priority interrupts which can occur in the USR.
25	—	not used
24	—	not used
23	SAN	Synchronous/Asynchronous: Bit SAN is set by software if a synchronous card is expected. Then, the UART is bypassed and only bit 0 in the URR and UTR is connected to the I/O. In this case, the clock is controlled by bit SC in the CCR.
22	AUTOCONV	Auto convention: If bit AUTOCONV = 1, then the convention is set by software with bit CONV in the UART Configuration Register. If it is reset, then the configuration is automatically detected on the first received character while the bit SS (Start Session) is set.
21	CKU	Clock UART: Bit CKU is used to clock the UART at twice the clock frequency of the card. An ETU will last $31 \times \text{PDR}$ clock pulses if CKU = 0 and half if CKU = 1. It should be noted that when CKU = 1 it has no effect if $f_{\text{CLK}} = f_{\text{XTAL1}}$. This means, for example, that a baud rate of 76800 is not possible when the card is clocked with the frequency on XTAL1.
20	PSC	Prescaler: If bit PSC = 1, then the prescaler value is 32. If PSC = 0, then the prescaler value is 31. One ETU will last a number of cards clock cycles equal to $\text{PSC} \times \text{PDR}$. All baud rates specified in "ISO7816" norm are achievable with this configuration.

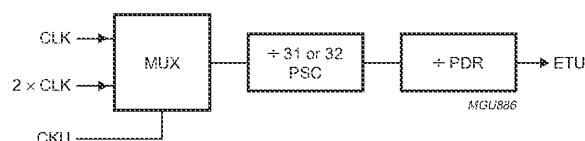


Fig.6 ETU generation.

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8.1.5.3 Baud rate selection using F and D; card clock frequency $f_{CLK} = 3.58$ MHz for PSC = 31 and 4.92 MHz for PSC = 32 (31;12 means prescaler set to 31 and PDR set to 12)

D	F											
	0	1	2	3	4	5	6	9	10	11	12	13
1	31;12 9600	31;12 9600	31;18 6400	31;24 4800	31;36 3200	31;48 2400	31;60 1920	32;16 9600	32;24 6400	32;32 4800	32;48 3200	32;64 2400
2	31;6 19200	31;6 19200	31;9 12800	31;12 9600	31;18 6400	31;24 4800	31;30 3840	32;8 19200	32;12 12800	32;16 9600	32;24 6400	32;32 4800
3	31;3 38400	31;3 38400		31;6 19200	31;9 12800	31;12 9600	31;15 7680	32;4 38400	32;6 25600	32;8 19200	32;12 12800	32;16 9600
4				31;3 38400		31;6 19200		32;2 76800	32;3 51300	32;4 38400	32;6 25600	32;8 19200
5						31;3 38400		32;1 153600		32;2 76800	32;3 51300	32;4 38400
6										32;1 153600		32;2 76800
8	31;1 115200	31;1 115200		31;2 57600	31;3 38400	31;4 28800	31;5 23040		32;2 76800		32;4 38400	
9							31;3 38400					

8.1.5.4 Guard time register

The Guard Time Register (GTR) is used for storing the number of guard ETUs given by the card during ATR. In transmission mode, the UART will wait this number of ETU + 0.5 before transmitting the character stored in UTR. In T = 1 protocol, GTR = FFH means operation at 11.5 ETU. In T = 0 protocol and GTR = FFH means operation at 12.5 ETU.

Table 20 Guard time register (address 05H; read and write); note 1

7	6	5	4	3	2	1	0
GT7	GT6	GT5	GT4	GT3	GT2	GT1	GT0

Note

- All bits are cleared after reset.

8.1.5.5 UART configuration register 1

The UART Configuration Register 1 (UCR1) is used for setting the parameters of the ISO UART.

Table 21 UART configuration register 1 (address 06H; read and write); note 1

7	6	5	4	3	2	1	0
—	FIP	FC	PROT	T/R	LCT	SS	CONV

Note

- All bits are cleared after reset.

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Table 22 Description of the UCR1 bits

BIT	SYMBOL	DESCRIPTION
7	–	not used
6	FIP	Force Inverse Parity: If FIP = 1, then the UART will NAK a correct received character and will transmit characters with wrong parity bit.
5	FC	Bit FC is a test bit and must be left at logic 0.
4	PROT	Protocol: Bit PROT = 1 if the protocol type is asynchronous T = 1. If PROT = 0, the protocol is T = 0.
3	T/R	Transmit/Receive: Bit T/R is set by software for transmission mode. A change from 0 to 1 will set bit TBE in the USR. T/R is automatically reset by hardware if LCT has been used before transmitting the last character.
2	LCT	Last Character to Transmit: Bit LCT is set by software before writing the last character to transmit into the UTR. It allows automatic change to reception mode when reset by hardware at the end of a successful transmission ($11 + 28/31$ or $28/32$ ETU in T = 0 and $10 + 28/31$ or $28/32$ ETU in T = 1). When LCT is being reset, the bit T/R is also reset and the UART is then ready for receiving a character.
1	SS	Start Session: Bit SS is set by software before ATR for automatic convention detection and early answer detection. It is automatically reset by hardware at 10.5 ETU after reception of the initial character.
0	CONV	Convention: Bit CONV = 1 if the convention is direct. CONV is either automatically written to by hardware, according to the convention detected during ATR, or by software if bit AUTOCONV is set.

8.1.5.6 Clock configuration register

The Clock Configuration Register (CCR) defines the clock to the card and the clock to the ISO UART. If bit CKU in the Prescaler Register (UCR2) of the card is set, then the ISO UART is clocked at twice the frequency to the card, this allows higher baud rates to be reached than foreseen in the ISO7816 norm.

Table 23 Clock configuration register (address 01H; read and write); note 1

7	6	5	4	3	2	1	0
–	–	SHL	CST	SC	AC2	AC1	AC0

Note

1. All bits are cleared after reset.

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Table 24 Description of the CCR bits

BIT	SYMBOL	DESCRIPTION
7	–	not used
6	–	not used
5	SHL	Stop HIGH or LOW: If bit CST = 1, then the clock is stopped at LOW level if SHL = 0 and at HIGH level if SHL = 1. In these modes, the bias current in the card drivers is reduced; the current drawn by the card (I_{CC}) should be less than 10 mA at all V_{CC} voltages.
4	CST	Clock stop: In case of asynchronous cards, bit CST defines whether the clock to the card is stopped or not. If bit CST is reset, then the clock is determined by bits AC0, AC1 and AC2; see Table 25. All frequency changes are synchronous, thus ensuring that no spike or unwanted pulse widths occurs during changes.
3	SC	Synchronous Clock: In the event of synchronous cards, the clock contact is a copy of the value written in SC. In reception mode, the data from the card is available in bit UR0 after a read operation of the URR register. In transmission mode, bit UT0 is written on the I/O line of the card when UTR register has been written.
2 to 0	AC2 to AC0	When switching from $\frac{1}{n}f_{xtal}$ to $\frac{1}{2}f_{int}$ or vice versa, only bit AC2 must be changed; AC1 and AC0 must remain the same. When switching from $\frac{1}{n}f_{xtal}$ or $\frac{1}{2}f_{int}$ to CLK STOP or vice versa, only bits CST and SHL must be changed. When switching from $\frac{1}{n}f_{xtal}$ to $\frac{1}{2}f_{int}$ or vice versa, a maximum delay of 200 μ s can occur between the command and the effective frequency change on pin CLK. The fastest switch is from $\frac{1}{2}f_{xtal}$ to $\frac{1}{2}f_{int}$ or vice versa, the best duty cycle is from $\frac{1}{8}f_{xtal}$ to $\frac{1}{2}f_{int}$ or vice versa. The status bit CLKSW within the MSR gives the effective switch moment.

Table 25 CLK value for an asynchronous card

AC2	AC1	AC0	CLK ⁽¹⁾
0	0	0	f_{xtal}
0	0	1	$\frac{1}{2}f_{xtal}$
0	1	0	$\frac{1}{4}f_{xtal}$
0	1	1	$\frac{1}{8}f_{xtal}$
1	0	0	$\frac{1}{2}f_{int}$
1	0	1	$\frac{1}{2}f_{int}$
1	1	0	$\frac{1}{2}f_{int}$
1	1	1	$\frac{1}{2}f_{int}$

Note

1. If $f_{CLK} = f_{XTAL}$, the duty cycle must be ensured by the incoming clock signal on XTAL1.

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8.1.5.7 Power control register

The Power Control Register (PCR) performs two tasks:

1. Starts or stops card sessions
2. Reads from or writes to auxiliary card contacts C4 and C8.

Table 26 Power control register (address 07H; read and write); note 1

7	6	5	4	3	2	1	0
—	—	C8	C4	1.8V	RSTIN	3/5V	START

Note

1. All bits are cleared after reset.

Table 27 Description of the PCR bits

BIT	SYMBOL	DESCRIPTION
7	—	not used
6	—	not used
5	C8	Contact 8: When writing to the PCR bit C8 will output the value of bit C8. When reading from the PCR, bit C8 will store the value on pin C8.
4	C4	Contact 4: When writing to the PCR bit C4 will output the value written of bit C4. When reading from the PCR bit C4 will store the value on pin C4.
3	1.8V	1.8 V cards: if bit 1.8V is set, then $V_{CC} = 1.8\text{ V}$.
2	RSTIN	Reset bit: When the card is activated, pin RST is the copy of the value written in RSTIN.
1	3/5V	3 or 5 V cards: If bit 3/5V is set to logic 1, then V_{CC} is 3 V; If bit 3/5V is set to logic 0, then V_{CC} is 5 V.
0	START	Start: If the microcontroller sets bit START to logic 1, then the selected card is activated; see Section 8.3.3. If the microcontroller resets START to logic 0, then the card is deactivated; see Section 8.3.4. START is automatically reset in the event of emergency deactivation. For deactivating the card, only bit START should be reset.

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8.1.6 REGISTERS SUMMARY

NAME	ADDR	R/W	7	6	5	4	3	2	1	0	VALUE AT RESET	VALUE WHEN RIU = 0
CSR	00H	R/W	-	-	-	-	RIU	-	-	-	XXXX0XXX	XXXX0XXX
CCR	01H	R/W	-	-	SHL	CST	SC	AC2	AC1	AC0	XX000000	XX000000
PDR	02H	R/W	PD7	PD6	PD5	PD4	PD3	PD2	PD1	PD0	00000000	00000000
UCR2	03H	R/W	ENINT1	DISTBE/ RBF	-	-	SAN	AUTOC0 NV	CKU	PSC	00XX0000	00XX0000
GTR	05H	R/W	GT7	GT6	GT5	GT4	GT3	GT2	GT1	GT0	00000000	00000000
UCR1	06H	R/W	-	FIP	FC	PROT	T/R	LCT	SS	CONV	X0000000	X0000000
PCR	07H	R/W	-	-	C8	C4	1.8 V	RSTIN	3/5 V	START	XX110000	XX110000
TOC	08H	R/W	TOC7	TOC6	TOC5	TOC4	TOC3	TOC2	TOC1	TOC0	00000000	00000000
TOR1	09H	W	TOL7	TOL6	TOL5	TOL4	TOL3	TOL2	TOL1	TOL0	00000000	00000000
TOR2	0AH	W	TOL15	TOL14	TOL13	TOL12	TOL11	TOL10	TOL9	TOL8	00000000	00000000
TOR3	0BH	W	TOL23	TOL22	TOL21	TOL20	TOL19	TOL18	TOL17	TOL16	00000000	00000000
MSR	0CH	R	CLKSW	FE	BGT	-	-	PR	-	TBE/RBF	010XXXX0	010XXXX0
FCR	0CH	W	-	PEC2	PEC1	PEC0	-	FL2	FL1	FL0	X000X000	X000X000
UTR	0DH	W	UT7	UT6	UT5	UT4	UT3	UT2	UT1	UT0	00000000	00000000
URR	0DH	R	UR7	UR6	UR5	UR4	UR3	UR2	UR1	UR0	00000000	00000000
USR	0EH	R	TO3	-	TO1	EA	PE	OVR	FER	TBE/RBF	0X000000	00000000
HSR	0FH	R	-	-	PRTL	SUPL	-	PRL	-	PTL	XX01X0X0	XX01X0X0

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8.2 SUPPLY

The supply to the chip is delivered by the USB-bus (pins V_{DDU} and $UGND$).

8.2.1 POWER SWITCH CONTROL

A power switch control is used in order to limit the inrush current when plugging the reader into the bus. The main decoupling capacitor is connected to the output of this power switch control (pin V_{DD}).

8.2.2 3.3 V REGULATOR

The output voltage of the 3.3 V linear regulator is used for:

- Powering-up the microcontroller and the ISO7816 UART
- It is the reference voltage for the signalling pull-up resistor connected to pin $D+$.

If this voltage is used within the application, the current should not exceed 10 mA.

For stability reasons, a 1 μ F low ESR decoupling capacitor is needed between the output of the regulator (V_{DDU}) and the specific regulator ground ($DGND$).

For programming the EPROM of the TDA8030; TDA8031, by applying a logic 1 to pin $CPROG$ it will disable the regulator, so that the microcontroller will be powered-up at 5 V.

8.2.3 DC-TO-DC CONVERTER

In case of a 5 V card, the card buffers are supplied by an inductive DC-to-DC converter.

In case of a 3 or 1.8 V card, the DC-to-DC converter is transparent and the card buffers are then supplied directly by V_{DD} .

The external components for the DC-to-DC converter should be an inductance of 6.8 μ H, a low ESR capacitor of 1 μ F and a Schottky diode (type BAT54).

The power efficiency is approximately 85% up to $I_{CC} = 55$ mA. The current is limited at 100 mA during the start-up phase to avoid spurious supply drop-outs.

The DC-to-DC converter is transparent for a 3 V card.

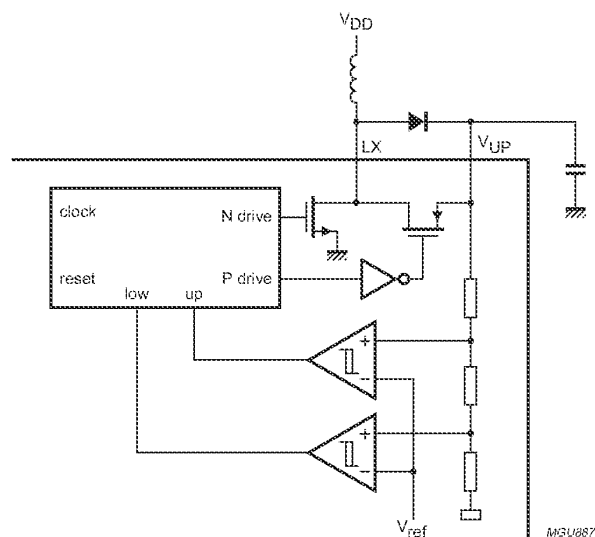


Fig.7 DC-to-DC converter.

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8.2.4 SUPPLY SUPERVISOR

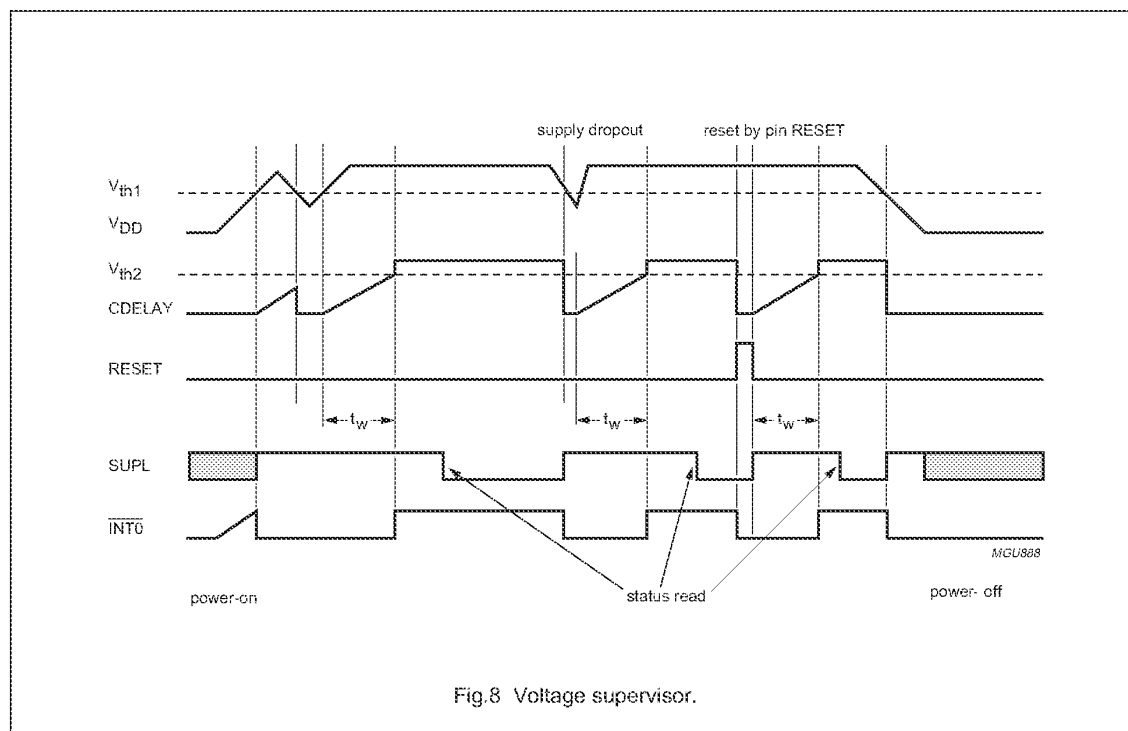
The switched supply voltage (V_{DD}) is surveyed by a voltage supervisor, to ensure proper Power-on reset when the reader is plugged into the USB-bus, to maintain all cards contacts inactive during power-on and also to enforce an emergency deactivation sequence in case of V_{DD} drop-out or when the reader is unplugged from the USB-bus.

The voltage supervisor generates an alarm pulse, whose length is defined by an external capacitor tied to the CDELAY pin, when V_{DD} is too low to ensure proper operation (1 ms per 2 nF typical).

This pulse is used as a Power-on reset pulse and also to either block any spurious spikes on card contacts during microcontrollers reset, or to force an automatic deactivation of the contacts in the event of supply drop-out; see Sections 8.3.3 and 8.3.4.

After power-on, or after a voltage drop, bit SUPL is set within the Hardware Status Register (HSR) and remains set until HSR is readout outside the alarm pulse. As long as the Power-on reset is active, $\overline{INT0}$ is LOW.

The same events occurs when the RESET pin has been set active; the RESET pin should be set HIGH for a minimum of 100 μ s for a proper reset.



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8.3 ISO7816 SECURITY**8.3.1 INTRODUCTION**

The correct sequence during activation and deactivation of the cards is ensured through a specific sequencer, clocked by a division ratio of the internal oscillator.

Activation (START bit HIGH in the Power Control Register) is only possible if the card is present (PRES active HIGH) and if the supply voltage is correct (supervisor not active).

The presence of the card is signalled to the microcontroller by the Hardware Status Register (HSR).

Bit PRL in the HSR is set if the card is present. Bit PRL in the HSR is set if bit PRL has toggled.

During a session, the sequencer performs an automatic emergency deactivation on the card in the event of card take off, a short-circuit, a supply drop-out or overheating. When the HSR register is updated and the $\overline{\text{INT0}}$ line goes LOW, the microcontroller will also be updated.

8.3.2 PROTECTIONS AND LIMITATIONS

The TDA8030; TDA8031 features the following protections and limitations:

1. I_{CC} limited to 100 mA, deactivated when this limit is reached
2. Current to and from RST is limited to 20 mA, deactivated when this limit is reached
3. Deactivation when the temperature of the die exceeds 150 °C
4. Current to and from the I/O is limited to 10 mA
5. Current to and from pin CLK is limited to 70 mA (not in current reduction modes, when clock is stopped)
6. ESD protection on all cards contacts + PRES at 6 kV (min.), thus no need of extra components for protection against ESD flash caused by a charged card being introduced in the slot
7. Short-circuit between any cards contacts can last any duration without any damage.

8.3.3 ACTIVATION SEQUENCE

When the card is inactive, V_{CC} , CLK, RST, I/O, C4 and C8 are LOW, with low-impedance with referenced to CGND. The DC-to-DC converter is stopped.

When everything is in normal conditions (no error flag set), the microcontroller will initiate an activation sequence of the card.

After leaving the UART reset mode and then configuring the necessary parameters for the UART, the START bit in the PCR (t_0) will be activated. The following sequence then occurs:

1. The DC-to-DC converter is started (t_1)
2. V_{CC} starts rising from 0 to 5 V or 3 or 1.8 V with a controlled rise time of 0.17 V/ μ s typically (t_2)
3. I/O, C4 and C8 rise to V_{CC} (t_3); integrated 10 k Ω pull-up resistors connected to V_{CC}
4. Clock pulses are sent to the card and RST is enabled (t_4).

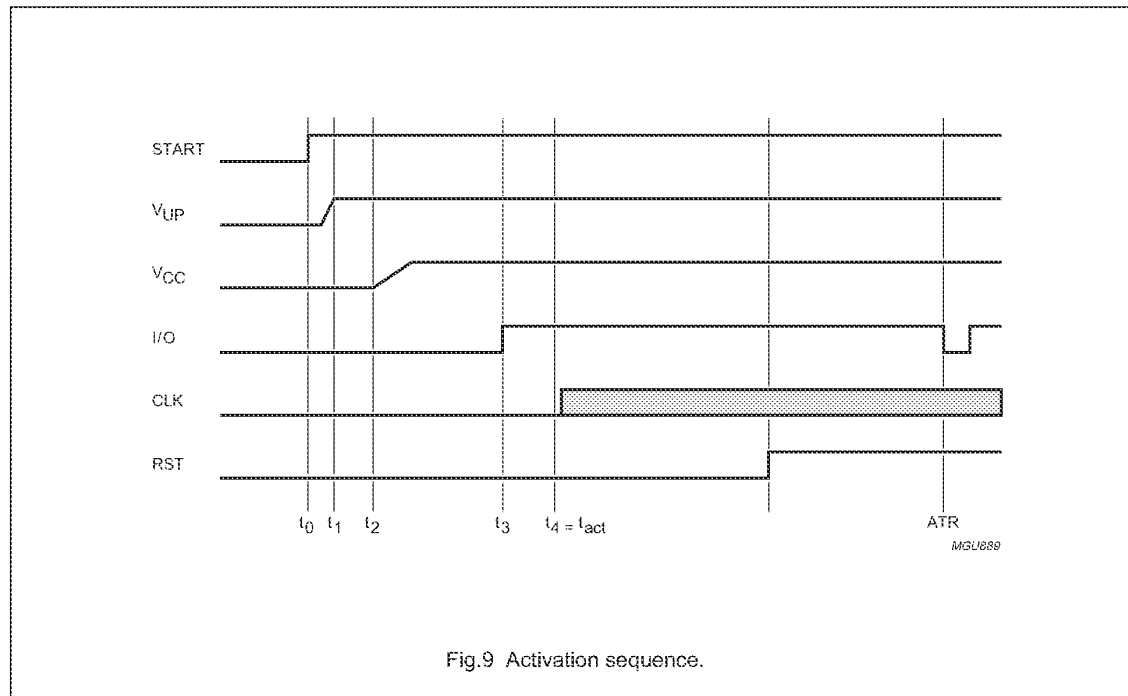
After a number of clock pulses that can be counted with the Time-Out Counter, the bit RSTIN may be set by software and RST will rise to V_{CC} .

The sequencer is clocked by $\frac{1}{64}f_{int}$ which leads to a time interval of $t = 25 \mu$ s typical.

Thus $t_1 = 0$ to $\frac{3}{64}t$, $t_2 = t_1 + \frac{5}{2}t$, $t_3 = t_1 + \frac{9}{2}t$ and $t_4 = t_1 + 5t$.

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8.3.4 DEACTIVATION SEQUENCE

When the session is completed, the microcontroller resets START (t_{10}). The circuit then executes an automatic deactivation sequence as follows:

1. Card reset (RST falls LOW; t_{11})
2. Clock (CLK) is stopped LOW (t_{12})
3. I/O, C4 and C8 fall to 0 V (t_{13})
4. V_{CC} falls to 0 V with typical 0.17 V/ μ s slew rate (t_{14})
5. The DC-to-DC converter is stopped and CLK, RST, V_{CC} , I/O, C4 and C8 become low-impedance to CGND (t_{15}).

Thus:

$$t_{11} = t_{10} + \frac{1}{64}t$$

$$t_{12} = t_{11} + \frac{1}{2}t$$

$$t_{13} = t_{11} + t$$

$$t_{14} = t_{11} + \frac{3}{2}t$$

$$t_{15} = t_{11} + \frac{7}{2}t$$

$$t_{de} = \text{time that } V_{CC} \text{ needs to decrease to less than 0.3 V.}$$

Automatic emergency deactivation is performed in the following cases:

1. Withdrawal of the card (PRES LOW)
2. Overcurrent detection on V_{CC} (bit PRTL set)
3. Overcurrent detection on RST (bit PRTL set)
4. Overheating (bit PTL set)
5. Supply too low (bit SUPL set)
6. RESET pin active HIGH.

In all of these cases, the deactivation sequence as described above occurs.

If the reason for the deactivation is a card take-off, an overcurrent or overheating, then $\overline{\text{INT0}}$ will be LOW and the corresponding bit in the Hardware Status Register will be set. The START bit is automatically reset.

If the reason is a supply drop-out, then the deactivation sequence occurs and a complete reset of the chip is performed. When the supply recovers, then the SUPL bit will be set in the HSR.

USB smart card reader (OTP or ROM)

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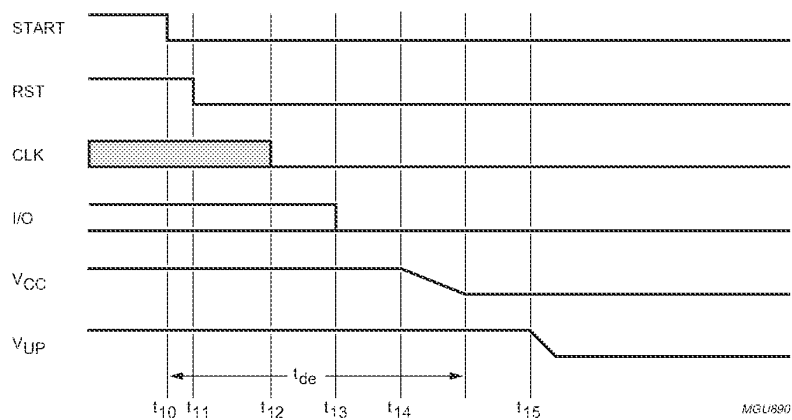


Fig.10 Deactivation sequence.

USB smart card reader (OTP or ROM)

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8.4 MICROCONTROLLER

The embedded microcontroller is an 80C51RB+ with an internal 16 kbyte EPROM (80C51FB with 16 kbyte ROM for the TDA8031), 256 RAM and 512 AUXRAM. It has the same instruction set as the 80C51.

The embedded microcontroller is clocked by the frequency present on pin XTAL1.

The embedded microcontroller may be reset by an active HIGH signal on pin RESET, but it is also reset by the Power-on reset signal generated by the voltage supervisor.

The external interrupt $\overline{\text{INT0}}$ is used by the ISO UART, by the analog drivers and by the ETU counters. It must be left open-circuit in the application.

The external interrupt $\overline{\text{INT1}}$ is used by the USB interface. It must be left open-circuit in the application.

A general description, together with the added features, is described below.

The added features to the 80C51 microcontroller are similar to the 8XC51FB/RB+ microcontrollers, except for the wake-up from power-down mode, which is enabled by a falling edge on pin $\overline{\text{INT0}}$ (card reader event) or on pin $\overline{\text{INT1}}$ due to the addition of an extra delay counter and enable configuration bits within the UCR2 register; see Section 8.4.1. For further information please refer to the published specification of the 8xC51RB + /FB in "Data Handbook IC20; 80C51-Based 8-bit Microcontrollers".

The 80C51 microcontroller has four 8-bit I/O ports, three 16-bit timer/event counters, a multi-source, 4-level priority nested interrupt structure, an enhanced UART and on-chip oscillator and timing circuits. For systems that require extra memory capability up to 64 kbytes, it can be expanded by using standard TTL compatible memories and logic.

1. 80C51 Central Processing Unit (CPU)
2. Full static operation
3. Security bits: ROM 2 bits
4. Encryption array of 64 bits
5. 4-level priority structure
6. 6 interrupt sources
7. Full duplex enhanced UART with framing error detection and automatic address recognition
8. Power control modes (the clock can be stopped and resumed in IDLE mode and power-down mode)
9. Wake-up from power-down by a falling edge on pins $\overline{\text{INT0}}$ and $\overline{\text{INT1}}$; with an embedded delay counter
10. Programmable clock output
11. Second DPTR register
12. Asynchronous port reset
13. Low EMI (inhibit ALE).

Table 28 gives a list of main features to get a better understanding of the differences between a standard 80C51, an 8XC51RB+ and the embedded microcontroller in the TDA8030; TDA8031.

Table 28 Principal blocks in the 80C51, 8XC51RB+ and the TDA8030; TDA8031

FEATURE	80C51	8XC51RB+	TDA8030; TDA8031
ROM/EPROM	4 kbytes	16 kbytes	16 kbytes
RAM	128 bytes	256 bytes	256 bytes
ERAM (MOVX)	no	256 bytes	512 bytes
PCA	no	yes	no
WDT	no	yes	no
T0	yes	yes	yes
T1	yes	yes	yes
T2	no	yes	yes
		lowest interrupt priority vector at 002BH	
4 level priority interrupt	no	yes	yes
enhanced UART	no	yes	yes
delay counter	no	no	yes

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8.4.1 LOW POWER MODES

Stop Clock Mode: The static design enables the clock speed to be reduced down to 0 MHz (stopped). When the oscillator is stopped, the RAM and Special Function Registers (SFRs) retain their values. This mode allows step-by-step utilization and permits reduced system power consumption by lowering the clock frequency down to any value. The power-down mode is suggested for the lowest power consumption.

IDLE Mode: In the Idle mode, the CPU puts itself to sleep while all of the on-chip peripherals stay active. The instruction to invoke the Idle mode is the last instruction executed in the normal operating mode before the Idle mode is activated. The CPU contents, the on-chip RAM and all of the special function registers remain intact during this mode. The Idle mode can be terminated either by any enabled interrupt (at which time the process is picked up at the interrupt service routine and continued), or by a hardware reset which starts the processor in the same manner as a Power-on reset.

Power-down Mode: To save even more power, a power-down mode can be invoked by software. In this mode, the oscillator is stopped and the instruction that invoked the power-down is the last instruction executed.

Either a hardware reset or external interrupt can be used to exit from the power-down mode. Applying a reset redefines all of the SFRs but does not change the on-chip RAM. An external interrupt allows both the SFRs and the on-chip RAM to retain their values.

The bits in the Interface Engine (IE) must be enabled with $\overline{\text{INT0}}$ and $\overline{\text{INT1}}$. Within the $\overline{\text{INT0}}$ interrupt service routine, the microcontroller has to read out the Hardware Status Register (HSR at 0FH) and/or the UART Status register (USR at 0EH) by means of MOVX instructions in order to establish the exact interrupt reason and to reset the interrupt source.

For enabling a wake-up by $\overline{\text{INT1}}$, the bit ENINT1 within UCR2 must be set.

An integrated delay counter maintains $\overline{\text{INT0}}$ and $\overline{\text{INT1}}$ LOW long enough to allow the oscillator to restart properly. A falling edge on pins $\overline{\text{INT0}}$ and $\overline{\text{INT1}}$ is enough to awaken the whole circuit.

Once the interrupt is serviced, the next instruction to be executed after RETI will be the one following the instruction that put the device into power-down.

8.5 USB INTERFACE

8.5.1 END-POINTS

The TDA8030; TDA8031 has 4 logic end-points which are listed in Table 29.

Each physical end-point, except for the control ones, can be enabled or disabled. All enabled end-points generate interrupts to the microcontroller via $\overline{\text{INT1}}$ when the end-point needs to be serviced.

The implementation of the function makes use of an SRAM for buffering the data.

Logic end-points can be accessed by the microcontroller interface.

Table 29 Mapping of logic to physical end-point numbers for used end-points

END-POINT NAME	LOGIC END-POINT	BUFFER SIZE	PHYSICAL END-POINT	
			OUT	IN
Control end-point	0	16	0	1
Generic end-point (may be used as bulk)	1	32	2	3
Generic end-point (may be used as interrupt)	2	8	—	4
Generic end-point	3	8	—	5

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8.5.2 PHASE-LOCKED LOOP

A 12 to 48 MHz clock multiplier PLL is integrated on-chip. No external components are needed for the operation of the PLL.

8.5.3 BIT CLOCK RECOVERY

The bit clock recovery circuit recovers the clock from the incoming USB data stream using 4× oversampling principle. It is able to track jitter and frequency drift as specified by the USB specification.

8.5.4 INTERFACE SIGNALS WITH THE MICROCONTROLLER

Table 30 The following I/O ports of the 83C51 are used for controlling the USB bus:

PORT	FUNCTION	DESCRIPTION
P10	USB_INT_MASK	should be set to logic 1 before entering power-down mode during suspend and reset to logic 0 when leaving power-down mode
P11	USB_SOFTCONNECT_INT	when set to logic 1, the internal 1.5 kΩ resistor is connected to pin D+
P12	USB_MC_READY	the device is ready to accept a new transaction
P13	USB_CLK_EN_N	when LOW, this signal indicates that the bus is no longer suspended
P14	USB_RESET_N	a LOW-level will reset the USB interface
P15	USB_SOFTCONNECT_EXT	when set to logic 1, V _{DD} is applied on the optional external 1.5 kΩ resistor which has been placed between pins D+ and DELATT
P33	USB_INT_N	interrupt to the microcontroller
P34	USB_SUSPEND	the device is in suspended state (TDA8030 only)
P35	USB_WAKEUP_N	remote wake-up (TDA8030 only)
P25	USB_MP_C	if set to logic 1, the data to the bus is a command; if set to logic 0 it is data
P26	USB_MP_SEL	if set to logic 1, the USB interface is selected

8.5.5 BLOCK DIAGRAM

The digital interface consists of 3 major blocks:

- The Philips Serial Interface Engine (SIE) handles the USB protocol (i.e. synchronization pattern, recognition, parallel/serial conversion, bit stuffing/de-stuffing, CRC checking/generating, PID verification/generation, address recognition and handshake evaluation/generation)
- A Memory Management Unit (MMU), controlling the buffering of data to and from the bus
- An interface to the embedded 83C51 microcontroller.

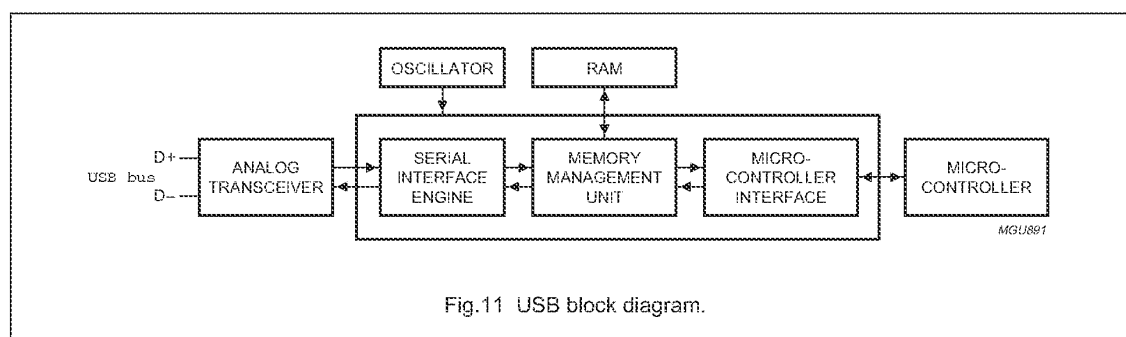


Fig.11 USB block diagram.

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8.5.6 USB REGISTERS

A first MOVX@DPTR instruction enables the module to be selected (via DPH) and send the command. A second one communicates the data (read or write).

8.5.7 INSTRUCTION SET

8.5.7.1 Overview

Table 31 summarizes all commands that can be used by the embedded microcontroller.

Table 31 Instruction set

COMMAND NAME	RECIPIENT	CODING	FUNCTION	DATA PHASE
Device commands; see Table 32				
Set address	device	0XD0H	set address	write 1 byte
Set end-points enable	device	0XD8H	set EP enable	write 1 byte
Set mode	device	0XF3H	set mode	write 1 byte
Read interrupt register	device	0XF4H		read 1 byte
Read current frame number	device	0XF5H		read 1 or 2 bytes
Read chip ID	device	0XFDH		read 2 bytes
Get device status	device	0XFEH		read 1 byte
Set device status	device	0XFEH		write 1 byte
Debug command: get error code	device	0XFFH		read 1 byte
End-point commands; see Table 41				
Select end-point	control output	0X00H	select EP0 output	read 1 byte (optional)
	control input	0X01H	select EP0 input	read 1 byte (optional)
	end-point 1 output	0X02H		read 1 byte (optional)
	end-point 1 input	0X03H		read 1 byte (optional)
	end-point 2 input	0X04H		read 1 byte (optional)
	end-point 3 input	0X05H		read 1 byte (optional)
Select end-point/clear interrupt	control output	0X40H		read 1 byte
	control input	0X41H		read 1 byte
	end-point 1 output	0X42H		read 1 byte
	end-point 1 input	0X43H		read 1 byte
	end-point 2 input	0X44H		read 1 byte
	end-point 3 input	0X45H		read 1 byte
Set end-point status	control output	0X40H		write 1 byte
	control input	0X41H		write 1 byte
	end-point 1 output	0X42H		write 1 byte
	end-point 1 input	0X43H		write 1 byte
	end-point 2 input	0X44H		write 1 byte
	end-point 3 input	0X45H		write 1 byte
Read buffer	selected end-point	0XF0H		read n + 2 bytes
Write buffer	selected end-point	0XF0H		write n + 2 bytes
Clear buffer	selected end-point	0XF2H		read 1 byte (optional)
Validate buffer	selected end-point	0XFAH		none

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Table 32 Device commands

COMMAND	DESCRIPTION
Set address	The set address command is used to set the USB assigned address and to enable the function. In the event that the status phase of the set address transaction is not successful, the device address will not be updated. The power-on value is given in Table 33.
Set end-points enable	A value of 1 written to the register indicates that the non-control end-points are enabled. The power-on value is given in Table 34.
Set Mode	The default value is logic 0; if logic 1 is written in this register, then NAKing is reported and will generate an interrupt. When set to logic 0, only successful transactions are reported.
Read interrupt register	This command indicates the origin of an interrupt. The end-point interrupt bits are cleared by the Select end-point/Clear Interrupt command. The power-on value is given in Table 35.
Read Current Frame Number	<p>The Read Current Frame Number returns the frame number of the last received Start Of Frame (SOF). The frame number is eleven bits wide. The frame number is returned LSB first, so, if the user is only interested in the lower 8 bits of the frame number, only the first byte needs to be read; see Table 36.</p> <p>The frame number returned by this command can be invalid in the event of one of the following conditions:</p> <ul style="list-style-type: none"> • If no SOF was received by the device at the beginning of a frame, the frame number returned is that of the last successfully received SOF • If the SOF frame number contained a CRC error, the frame number received will be the corrupted frame number as received by the device.
Read chip ID	The chip Identification is 16 bits wide. The command divides the ID into bytes and returns the least significant byte first. For the TDA8030; TDA8031, the ID is fixed at 2B00H.
Get Device Status	The Get Device Status command returns the Device Status Register; refer to the Set Device Status command
Set Device Status	<p>The Set Device Status command sets bits in the Device Status Register.</p> <p>In Table 37, the Type column indicates if the bit can be written and if the bit is cleared after reading the register. The Interrupt column indicates if the bit generates an interrupt when it is set.</p>
Debug command: Get Error Code	<p>The Get Error Code command returns the error code of the last generated error; this command is for debugging purpose. The 4 least significant bits form the error code. Bit 4 (Error Occurred) can be cleared by each new transfer. The power-on value is given in Table 39.</p> <p>This command is only useful during debugging.</p> <p>Table 40 gives an overview of the Error Codes.</p>

Table 33 Power-on value for Set address

FUNCTION	7	6	5	4	3	2	1	0
Device address ⁽¹⁾	–	0	0	0	0	0	0	0
Enable ⁽²⁾	0	–	–	–	–	–	–	–

Notes

1. The value written becomes the address.
2. A logic 1 enables the function.

After a bus reset, the address is reset to 000 0000. The enable bit is set. The device will respond on packets for function address 000 0000, end-point 0 (default end-point).

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Table 34 Power-on value for Set end-points enable

FUNCTION	7	6	5	4	3	2	1	0
Enable all end-points	–	–	–	–	–	–	–	0
Reserved	–	–	–	–	–	–	–	–

Table 35 Power-on value for Read interrupt register

FUNCTION	7	6	5	4	3	2	1	0
Physical EP0 (control output end-point)	–	–	–	–	–	–	–	0
Physical EP1 (control input end-point)	–	–	–	–	–	–	0	–
Physical EP2 (generic output end-point)	–	–	–	–	–	0	–	–
Physical EP3 (generic input end-point)	–	–	–	–	0	–	–	–
Physical EP4 (generic input end-point)	–	–	–	0	–	–	–	–
Physical EP5 (generic input end-point)	–	–	0	–	–	–	–	–
Reserved	–	0	–	–	–	–	–	–
Device event ⁽¹⁾	0	–	–	–	–	–	–	–

Note

1. The Device event bit is cleared by issuing the Get Device Status command.

Table 36 Read current frame number

BYTE	7	6	5	4	3	2	1	0
Byte 0	F	F	F	F	F	F	F	F
Byte 1	0	0	0	0	0	F	F	F

Table 37 Set device status command functions

FUNCTION	TYPE	INTERRUPT	7	6	5	4	3	2	1	0
Reserved	–	–	–	–	–	–	–	–	0	0
Suspend	read/write	no	–	–	–	–	–	0	–	–
Suspend change	read only; cleared on read	yes	–	–	–	–	0	–	–	–
Bus reset	read only; cleared on read	yes	–	–	–	0	–	–	–	–
Reserved	–	–	–	–	–	–	–	–	–	–

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Table 38 Set device status command function bits

FUNCTION	DESCRIPTION
Suspend	The Suspend bit represents the current Suspend state. It is logic 1 when the device has not seen any activity on its upstream port for more than 3 ms. It is reset to logic 0 on any activity. When the device is suspended, (Suspend bit = 1) and the microcontroller writes logic 0 into it, the device will generate a remote wake-up. When the device is not suspended, writing a logic 0 has no effect. Writing a logic 1 in this register has no effect.
Suspend Change	The Suspend Change bit is set to logic 1 when the Suspend bit toggles. The Suspend bit can toggle because: <ul style="list-style-type: none"> • The device goes into the suspended state • The device receives resume signalling on its upstream port • The Suspend Change bit is reset after the register has been read.
Bus reset	The Bus reset bit is set when the device receives a bus reset. It is cleared when read. On a bus reset, the device will automatically go to the default state (unconfigured and responding to address 0).

Table 39 Power-on value for Get Error Code

FUNCTION	7	6	5	4	3	2	1	0
Error code	–	–	–	–	0	0	0	0
Error occurred	–	–	–	0	–	–	–	–
Reserved	–	–	–	–	–	–	–	–

Table 40 Error codes

ERROR CODE[3:0]	DESCRIPTION
0000	no error
0001	PID encoding error
0010	unknown PID
0011	unexpected packet
0100	error in token CRC
0101	error in data CRC
0110	time-out error
0111	babble
1000	error in end of packet
1001	sent NAK
1010	sent Stall
1011	buffer overrun error
1100	reserved
1101	bitstuff error
1110	error in sync
1111	wrong toggle bit in data PID; ignored data

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Table 41 End-point commands

COMMAND	DESCRIPTION
Select end-point	The select end-point command initializes an internal pointer to the start of the selected buffer. Optionally, this command can be followed by a data read, which returns some additional information on the packet in the buffer. The command code of the select end-point is equal to the physical end-point number. The power-on value is given in Tables 42 and 43.
Select End-point/ Clear Interrupt	These commands are identical to Select End-point commands, but with the following differences: <ul style="list-style-type: none"> • They clear the associated interrupt • In the event of a control output end-point; they clear the set-up and overwritten bits • The read one byte is mandatory.
Set end-point status	The Set end-point status command sets status bits 7 to 5 and 0 of the end-point. The command code is equal to the sum of 40H and the physical end-point number. Not all bits can be set for all types of end-points. The power-on value is given in Tables 44 and 45.
Read buffer	The Read buffer command is followed by a number of data reads, which return the contents of the selected end-point data buffer. After each read, the internal buffer pointer is incremented. The buffer pointer is not reset to the beginning of the buffer by the Read buffer command. This means that reading a buffer can be interrupted by any other command (except for the Select end-point). The data buffer organization is given in Table 46.
Write buffer	The Write buffer command is followed by a number of data writes, which load the data buffer of the selected end-point. After each write, the internal buffer pointer is incremented. The buffer pointer is not reset to the beginning of the buffer by the Write buffer command. This means that writing to a buffer can be interrupted by any other command (except for the Select end-point and Select end-point/Clear Interrupt). The data buffer organization is given in Table 47.
Clear buffer	When a packet sent by the host has been received successfully, an internal end-point buffer full flag is set. All subsequent packets will be refused by returning a NAK. When the microcontroller has read the data, it should free the buffer by the Clear buffer command. When the buffer is cleared, new packets will be accepted. When bit 0 of the optional data byte is set to logic 1, the previously received packet was overwritten by a set-up packet. A buffer cannot be cleared when its Packet overwritten bit is set. The power-on value is given in Table 48.
Validate buffer	When the microcontroller has written data into an input buffer, it should set the buffer full flag by the Validate buffer command. This indicates that the data in the buffer is valid and can be sent to the host when the next input token is received. A control input buffer cannot be validated when the Packet overwritten bit of its corresponding output buffer is set.

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Table 42 Power-on value for Select end-point

FUNCTION	7	6	5	4	3	2	1	0
Full or empty	–	–	–	–	–	–	–	0
Stall	–	–	–	–	–	–	0	–
Set-up	–	–	–	–	–	0	–	–
Packet overwritten	–	–	–	–	0	–	–	–
Sent NAK	–	–	–	0	–	–	–	–
Reserved	–	–	–	–	–	–	–	–

Table 43 Description of the Power-on value for Select end-point bits

FUNCTION	DESCRIPTION
Full or empty	If set to logic 1, the buffer of the selected end-point is full. In the event of an output end-point, this bit is cleared by executing the Clear Buffer command, if the buffer was not overwritten. In the event of an input end-point, this bit is set by the Validate Buffer command.
Stall	If set to logic 1, the selected end-point is stalled.
Set-up	If set to logic 1, the last received packet for the selected end-point was a set-up packet. The value of this bit is updated after each successfully received packet (i.e. an ACKED package on that particular end-point).
Packet overwritten	If set to logic 1, the previously received packet was overwritten by a set-up packet. The value of this bit is cleared by the Select End-point command.
Sent NAK	If set to logic 1, the device has sent a NAK. If the host sends an output packet to a filled output buffer, the device returns a NAK. If the host sends an input token to an empty input buffer, the device returns a NAK. This bit is set when a NAK is sent and the Interrupt On Nak feature is enabled. This bit is reset after the device has sent an ACK after an output packet or when the device has seen an ACK after sending an input packet. It is only defined for the 2 physical control end-points.

Table 44 Power-on value for Set end-point status; notes 1 and 2

FUNCTION	7	6	5	4	3	2	1	0	CTRL EP	GEN IN/OUT	GEN IN
Stall	–	–	–	–	–	–	–	0	def	def	def
Disable	–	–	0	–	–	–	–	–	X	def	def
Rate feedback mode	–	0	–	–	–	–	–	–	X	def	def
Interrupt unmasked	0	–	–	–	–	–	–	–	X	X	X
Conditional stall	0	–	–	–	–	–	–	–	def	X	X

Notes

1. X = dont care.
2. def means that the bit can be set if the end-point is of the specified type.

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Table 45 Description of the Power-on value for Set end-point status bits

FUNCTION	DESCRIPTION
Stall	If set to logic 1, the end-point is stalled.
Disable	If set to logic 1, the end-point is disabled. After a bus reset, each end-point is enabled, i.e. this bit is set to logic 0.
Rate feedback mode	If set to logic 0, the interrupt end-point is in toggle mode. If set to logic 1, the interrupt end-point is in rate feedback mode.
Interrupt unmasked	If set to logic 1, an event on the end-point causes an interrupt to the microcontroller.
Conditional stall	<p>If set to logic 1, both end-points zero are stalled; unless the set-up packet bit is set.</p> <p>A stalled control end-point is automatically unstalled when it receives a SET-UP token, regardless of the content of the packet. If the end-point stays in the stalled state, the microcontroller should re-install it.</p> <p>When a stalled end-point is unstalled (either by the Set end-point status command or by receiving a Set-up token) it is also re-initialized. This flushes the buffer: in case of an output buffer, it waits for a DATA 0 PID; in case of an input buffer, it writes a DATA 0 PID. Even when unstalled, setting the stalled bit to logic 0 initializes the end-point.</p> <p>When an end-point is stalled by the Set end-point status command, it is also re-initialized.</p>

Table 46 Data buffer organization (read)

BYTE	7 ⁽¹⁾	6 ⁽²⁾	5	4	3	2	1	0
Byte 0	0/1	0/1	—	—	—	—	—	0
Byte 1	—	number of data bytes in buffer						
Byte 2	data byte 0							
....								
Byte n + 1	data byte n – 1							

Notes

1. Bit 7 of Byte 0 indicates whether the packet in the buffer was received successfully over the USB-bus. When this bit is set to logic 1, the packet was received successfully.
2. Bit 6 of Byte 0 indicates whether the packet in the buffer is a set-up packet.

Table 47 Data buffer organization (write)

BYTE	7	6	5	4	3	2	1	0
Byte 0	—	—	—	—	—	—	—	0
Byte 1	--	number of data bytes in buffer						
Byte 2	data byte 0							
....								
Byte n + 1	data byte n – 1							

Table 48 Power-on value for Clear buffer

FUNCTION	7	6	5	4	3	2	1	0
Packet overwritten	—	—	—	—	—	—	—	0
Reserved	—	—	—	—	—	—	—	—

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8.5.8 ANALOG INTERFACE

The transceiver interfaces directly to the USB cables through termination resistors. They are able to transmit and receive serial data at full speed (12 Mbits/s).

A 1.5 k Ω pull-up resistor is integrated between pins D+ and V_{DDP} and is connected by software by the microcontroller; in case a $\pm 5\%$ resistor is preferred, it can be externally connected between pins DELATT and D+ (DELATT is also controlled by software and is floating when OFF, or connected to V_{DDP} when ON).

8.5.9 SUSPEND MODE

When the USB interface enters Suspend mode, the software should set the microcontroller in power-down mode in order to respect the suspend current condition. The following sequence should be executed:

1. When the device enters the Suspend mode, it generates an interrupt on pin INT1
2. The software should set USB_INT_MASK to logic 1
3. Then it should wait until CLK_EN_N is HIGH before entering power-down mode.

When the device detects an activity on the bus, it resets CLK_EN_N to logic 0 and generates an interrupt on pin INT1. When leaving the Suspend mode, the following sequence should be executed:

1. The software should read the DEVICE_STATUS to enable the interrupt to be cleared
2. Reset USB_INT_MASK to logic 0.

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9 LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DDU}	bus supply voltage		-0.5	+6.5	V
V_{in}	input voltage on all pins		-0.5	+6.5	V
P_{tot}	total power dissipation		—	tbef	mW
T_{stg}	IC storage temperature		-55	+150	°C
T_j	junction temperature		—	125	°C
V_{esd}	electrostatic discharge voltage pins I/O, V_{CC} , RST, C4, C8, CLK and PRES all other pins	TDA8030; HBM JEDEC	-5	+5	kV
			-1	+1	kV
		MM JEDEC	-50	+50	V
		MM JEDEC	-100	+100	V
V_{esd}	electrostatic discharge voltage pins I/O, V_{CC} , RST, C4, C8, CLK and PRES all other pins	TDA8031; HBM JEDEC	-6	+6	kV
			-1.5	+1.5	kV
I_{lu}	latch-up free current on all pins	JEDEC; maximum voltage is 1.5/-0.5 supply voltage of the block	-100	+100	mA

10 THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	63	K/W

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11 CHARACTERISTICSV_{DDU} = 5 V; T_{amb} = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Supplies						
V _{DDU}	supply voltage for the bus		4.2	–	5.5	V
V _{DD}	supply voltage after inrush current suppression switch		4.2	–	5.5	V
I _{DDU}	supply current for the bus	5 V card; I _{CC} = 40 mA; f _{clk} = 6 MHz	–	–	100	mA
I _{sus}	suspend current	card inactive; microcontroller in power-down mode	–	–	500	µA
V _{th(VDD)}	threshold voltage on V _{DD}	falling	3.6	–	3.8	V
V _{hys}	hysteresis voltage on V _{th(VDD)}		150	–	350	mV
V _{th(CDELAY)}	threshold voltage on pin CDELAY		–	1.25	–	V
V _{CDELAY}	voltage on pin CDELAY		–	–	V _{DD} + 0.3	V
I _{Q(CDELAY)}	output current on pin CDELAY	pin ground; charge current	–	–2	–	µA
		V _{CDELAY} = V _{DD} ; discharge current	–	9	–	mA
C _{CDELAY}	capacitor on pin CDELAY		–	22	–	nF
Crystal oscillator (XTAL1 and XTAL2)						
f _{XTAL}	crystal frequency		–	12	–	MHz
V _{IL}	LOW-level input voltage on pin XTAL1		–0.3	–	+0.3V _{DD}	V
V _{IH}	HIGH-level input voltage on pin XTAL1		0.7V _{DD}	–	V _{DD} + 0.3	V
DC-to-DC converter						
f _{clk}	clock frequency		–	12	–	MHz
V _{UP}	output voltage	V _{CC} = 5 V	–	5.5	–	V
		V _{CC} = 3 or 1.8 V	–	5	–	V
P _E	power efficiency	L = 6.8 µH; C = 1 µF	–	85	–	%
V_{DDD} voltage regulator						
V _{DDD}	output voltage	PROG = 0	3	–	3.6	V
		PROG = 1 (TDA8030 only)	4.5	–	5.5	V
I _{DDD}	output current		0	–	25	mA
C _{dec}	decoupling capacitor		1000	–	–	nF

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SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Reset output to the card (RST)						
V_{inact}	output voltage in inactive mode	no load	0	–	0.1	V
		$I_{inact} = 1\text{ mA}$	0	–	0.3	V
I_{inact}	current from RST when inactive and pin grounded		0	–	–1	mA
V_{OL}	LOW-level output voltage	$I_{OL} = 200\text{ }\mu\text{A}$	0	–	0.3	V
		$I_{OL} = 20\text{ mA}$	$V_{CC} - 0.4$	–	V_{CC}	V
V_{OH}	HIGH-level output voltage	$I_{OH} = -200\text{ }\mu\text{A}$	$0.9V_{CC}$	–	V_{CC}	V
		$I_{OH} = -20\text{ mA}$	0	–	0.4	V
t_r	rise time	$C_L = 100\text{ pF}$; $V_{CC} = 5\text{ or }3\text{ V}$	–	–	0.1	μs
t_f	fall time	$C_L = 100\text{ pF}$; $V_{CC} = 5\text{ or }3\text{ V}$	–	–	0.1	μs
Clock output to the card (CLK)						
V_{inact}	output voltage in inactive mode	no load	0	–	0.1	V
		$I_{inact} = 1\text{ mA}$	0	–	0.3	V
I_{inact}	current from CLK when inactive and pin grounded		0	–	–1	mA
V_{OL}	LOW-level output voltage	$I_{OL} = 200\text{ }\mu\text{A}$	0	–	0.3	V
		$I_{OL} = 70\text{ mA}$	$V_{CC} - 0.4$	–	V_{CC}	V
V_{OH}	HIGH-level output voltage	$I_{OH} = -200\text{ }\mu\text{A}$	$0.9V_{CC}$	–	V_{CC}	V
		$I_{OH} = -70\text{ mA}$	0	–	0.4	V
t_r	rise time	$C_L = 35\text{ pF}$	–	–	16	ns
t_f	fall time	$C_L = 35\text{ pF}$	–	–	16	ns
f_{clk}	clock frequency	1 MHz Idle configuration	1	–	1.5	MHz
		operational	0	–	12	MHz
δ	duty factor (except for XTAL)	$C_L = 35\text{ pF}$	45	–	55	%
SR	slew rate (rise and fall)	$C_L = 30\text{ pF}$	0.2	–	–	V/ns
Card supply voltage (V_{CC}) (2 ceramic multilayer capacitors with low ESR of minimum 100 nF should be used in order to meet these specifications)						
V_{inact}	output voltage inactive	no load	0	–	0.1	V
		$I_{inact} = 1\text{ mA}$	0	–	0.3	V
I_{inact}	current from V_{CC} when inactive and pin grounded		–	–	–1	mA

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SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V _{CC}	output voltage	active mode; I _{CC} < 55 mA; 5 V card	4.75	5	5.25	V
		active mode; I _{CC} < 55 mA; 3 V card	2.78	3	3.22	V
		active mode; current pulses of 40 nAs with I < 200 mA; t < 400 ns; f < 20 MHz; 5 V card	4.6	—	5.4	V
		active mode; current pulses of 24 nAs with I < 200 mA; t < 400 ns; f < 20 MHz; 3 V card	2.75	—	3.25	V
		active mode; I _{CC} < 35 mA; 1.8 V card	1.64	1.8	1.96	V
		active mode; current pulses of 12 nAs with I < 200 mA; t < 400 ns; f < 20 MHz; 1.8 V card	1.62	—	1.98	V
I _{CC}	output current	5 V card; from 0 to 5 V	—	—	–55	mA
		3 V card; from 0 to 3 V	—	—	–55	mA
		1.8 V card; from 0 to 1.8 V	—	—	–35	mA
		when clock is stopped; at all V _{CC} values	—	—	–10	mA
		V _{CC} shorted to ground	—	—	–120	mA
SR	slew rate	up or down (maximum capacitance = 300 nF)	0.05	0.16	0.22	V/μs
V _{ripple(p-p)}	ripple voltage on V _{CC} (peak-to-peak value)	20 kHz < f < 200 MHz				
		5 V card	—	—	350	mV
		3 V card	—	—	200	mV
		1.8 V card	—	—	100	mV
Data line (I/O); I/O has an integrated 14 kΩ pull-up resistor at V _{CC}						
V _{inact}	output voltage inactive	no load	0	—	0.1	V
		I _{inact} = 1 mA	—	—	0.3	V
I _{inact}	current from I/O when inactive and pin grounded		—	—	–1	mA
V _{OL}	LOW-level output voltage	the I/O is configured as an output				
		I _{OL} = 1 mA	0	—	0.3	V
		I _{OL} = 10 mA	V _{CC} – 0.4	—	V _{CC}	V

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SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{OH}	HIGH-level output voltage	the I/O is configured as an output				
		$I_{OH} < -20\ \mu A$	$0.8V_{CC}$	—	$V_{CC} + 0.25$	V
		$I_{OH} < -40\ \mu A$; 5 and 3 V card	$0.75V_{CC}$	—	$V_{CC} + 0.25$	V
		$I_{OH} = -10\ mA$	0	—	0.4	V
V_{IL}	LOW-level input voltage	the I/O is configured as an input	-0.3	—	+0.8	V
V_{IH}	HIGH-level input voltage	the I/O is configured as an input	1.5	—	V_{CC}	V
I_{IL}	LOW-level input current on I/O	$V_{IL} = 0$	—	—	500	μA
I_{LIH}	HIGH-level input leakage current on I/O	$V_{IH} = V_{CC}$	—	—	10	μA
$t_{i(tr)}$	input transition times	$C_L \leq 60\ pF$; 5 or 3 V card	—	—	1.2	μs
$t_{o(tr)}$	output transition times	$C_L \leq 60\ pF$ 5 or 3 V card	—	—	0.1	μs
R_{pu}	internal pull-up resistance between I/O and V_{CC}		11	14	17	$k\Omega$
$t_{W(pu)}$	width of active pull-up pulse	the I/O is configured as an $2/f_{XTAL1}$ output; LOW-to-HIGH transition	$2/f_{XTAL1}$	—	$3/f_{XTAL1}$	ns
I_{pu}	current from I/O when active pull-up pulse	$V_{OH} = 0.9V_{CC}$; $C_L = 60\ pF$	-1	—	—	mA
Auxiliary contacts C4/C8; integrated 10 kΩ pull-up resistor to V_{CC}						
V_{inact}	output voltage inactive	no load	0	—	0.1	V
		$I_{inact} = 1\ mA$	—	—	0.3	V
I_{inact}	current from I/O when inactive and pin grounded		—	—	-1	mA
V_{OL}	LOW-level output voltage	C4 and C8 configured as an output; $I_{OL} = 1\ mA$	0	—	0.3	V
V_{OH}	HIGH-level output voltage	C4 and C8 configured as an output; $I_{OH} < -40\ \mu A$; 5 and 3 V card	$0.8V_{CC}$	—	$V_{CC} + 0.25$	V
V_{IL}	LOW-level input voltage	C4 and C8 configured as an input	-0.3	—	+0.8	V
V_{IH}	HIGH-level input voltage	C4 and C8 configured as an input	1.5	—	V_{CC}	V
I_{IL}	LOW-level input current	$V_{IL} = 0$	—	—	500	μA
I_{LIH}	HIGH-level input leakage current	$V_{IH} = V_{CC}$	—	—	10	μA

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SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$t_{i(tr)}$	input transition times	$C_L \leq 60$ pF	–	–	1.2	μ s
$t_{o(tr)}$	output transition times	$C_L \leq 60$ pF	–	–	0.1	μ s
R_{pu}	internal pull-up resistance between C4/C8 and V_{CC}		8	10	12	k Ω
$t_{W(pu)}$	width of active pull-up pulse	the I/O is configured as an output; LOW-to-HIGH transition	–	200	–	ns
I_{pu}	current from C4 and C8 when active pull-up	$V_{OH} = 0.9V_{CC}$; $C_L = 60$ pF	–1	–	–	mA
Timing						
t_{act}	activation sequence duration		–	–	160	μ s
t_{de}	deactivation sequence duration		–	–	100	μ s
Protections and limitations						
$I_{CC(sd)}$	shutdown and limitation current at V_{CC}		–	–100	–	mA
$I_{I/O(lim)}$	limitation current on I/O		–10	–	+10	mA
$I_{CLK(lim)}$	limitation current on pin CLK		–70	–	+70	mA
$I_{RST(lim)}$	limitation current on pin RST		–20	–	+20	mA
$I_{RST(sd)}$	shutdown current on pin RST		–	–20	–	mA
T_{sd}	shutdown temperature		–	150	–	$^{\circ}$ C
Card presence input; pin PRES						
V_{iL}	LOW-level input voltage		–	–	$0.3V_{DD}$	V
V_{iH}	HIGH-level input voltage		$0.7V_{DD}$	–	–	V
I_{iL}	input leakage current low	$V_{iN} = 0$	–	–	± 20	μ A
I_{iH}	input leakage current high	$V_{iN} = V_{DD}$	–	–	± 20	μ A
General purpose I/Os; pins P0X, P1X, P2X and P3X						
V_{iL}	LOW-level input voltage		–	–	$0.2V_{DD}$	V
V_{iH}	HIGH-level input voltage		$0.2V_{DD} + 0.9$	–	–	V
V_{oL}	LOW-level output voltage	$I_{OL} = 1.6$ mA	–	–	0.4	V
V_{oH}	HIGH-level output voltage	$I_{OH} = -30$ μ A	$V_{DD} - 0.7$	–	–	V
I_{iL}	LOW-level input current	$V_i = 0.4$ V	–1	–	–50	μ A
I_{TL}	HIGH-to-LOW transition current	$V_i = 2$ V	–	–	–650	μ A
Pins ALE and PSEN						
V_{oL}	LOW-level output voltage	$I_{OL} = 3.2$ mA	–	–	0.4	V
V_{oH}	HIGH-level output voltage	$I_{OH} = -3.2$ mA	$V_{DD} - 0.7$	–	–	V

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SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Pin EA/V_{PP}						
V _{IL}	LOW-level input voltage		–	–	0.2V _{DDD}	V
V _{IH}	HIGH-level input voltage		0.2V _{DDD} + 0.9	–	–	V
V _{prog}	programming voltage	TDA8030	12.5	12.75	13	V
Reset input; pin RESET (active HIGH)						
V _{IL}	LOW-level input voltage		–	–	0.2V _{DDD}	V
V _{IH}	HIGH-level input voltage		0.7V _{DDD}	–	–	V
DELATT output pin; optional connection for an external 1.5 kΩ resistor on pin D+						
V _{OH}	HIGH-level output voltage	when switched on; I _{OH} = 2 mA	3.0	–	3.6	V
I _L	leakage current	when switched off	–	–	10	μA
Programming input; pin PROG (active HIGH) and Test input; pin TEST (active HIGH)						
V _{IL}	LOW-level input voltage		–	–	0.2V _{DD}	V
V _{IH}	HIGH-level input voltage		0.7V _{DD}	–	–	V
ATX Transceiver						
DRIVER CHARACTERISTICS IN FULL-SPEED MODE; PINS D+ AND D–						
V _{OL(stat)}	LOW-level static output voltage	R _L = 1.5 kΩ	–	–	0.3	V
V _{OH(stat)}	HIGH-level static output voltage		2.8	–	3.6	V
R _{O(drive)}	driver output resistance	excluding outside resistors	10	–	30	Ω
t _{tr}	transition times	C _L = 50 pF	4	–	20	ns
t _{RFM}	rise and fall time matching	C _L = 50 pF	90	–	110	%
V _{cross}	output signal crossover voltage		1.3	–	2	V
R _{int(DP)}	integrated resistor on DP	when connected USB_SOFTCONNECT active	1.1	–	1.9	kΩ
RECEIVER CHARACTERISTICS IN FULL-SPEED MODE; PINS ATXDP AND ATXDM						
V _{i(dif)}	differential input sensitivity		0.2	–	–	V
V _{dif(CM)}	differential common mode range in which V _{i(dif)} applies		0.8	–	2.5	V
V _{th(SE)}	single-ended receiver threshold		0.8	–	2.0	V

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12 APPLICATION INFORMATION

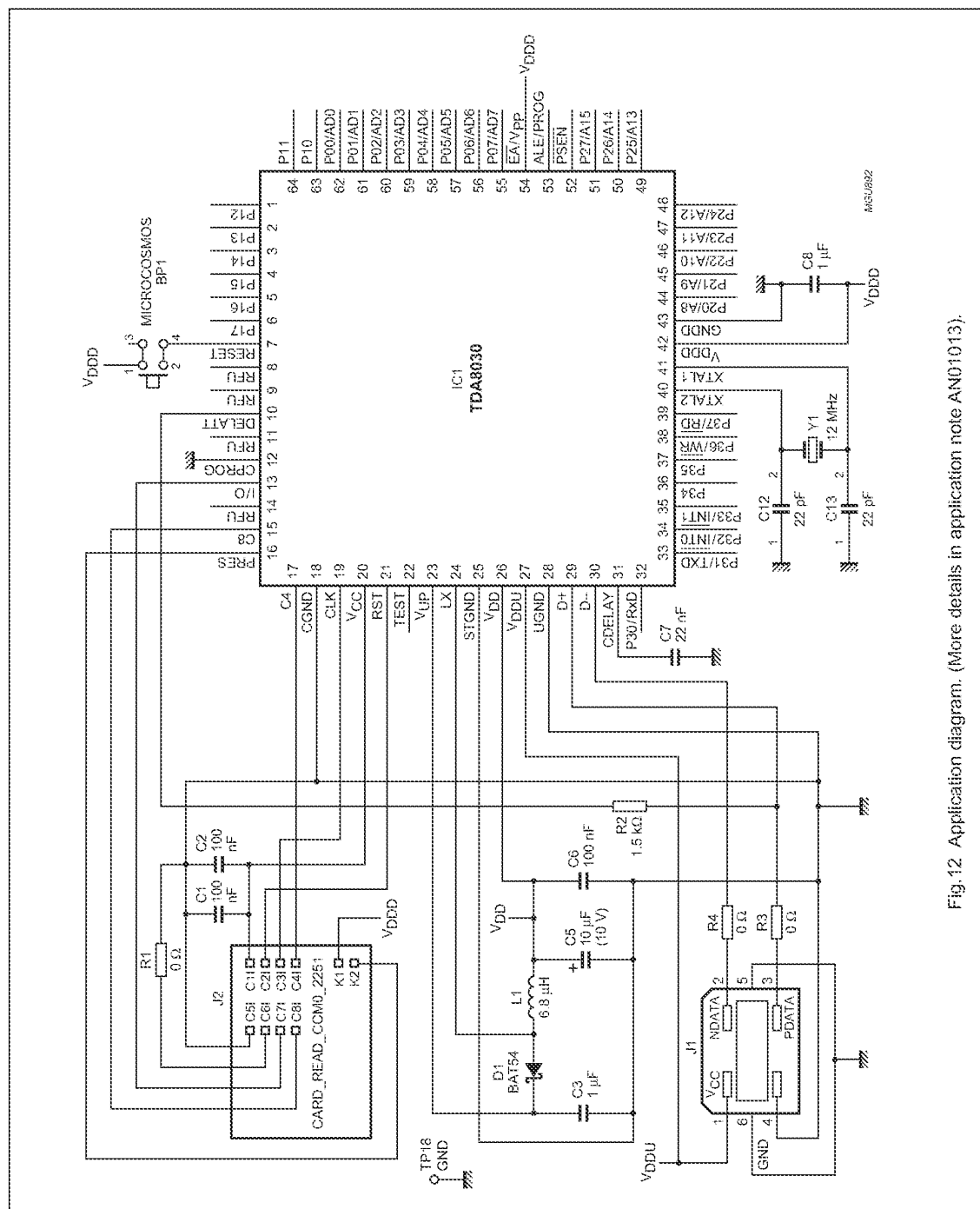


Fig. 12 Application diagram. (More details in application note AN01013).

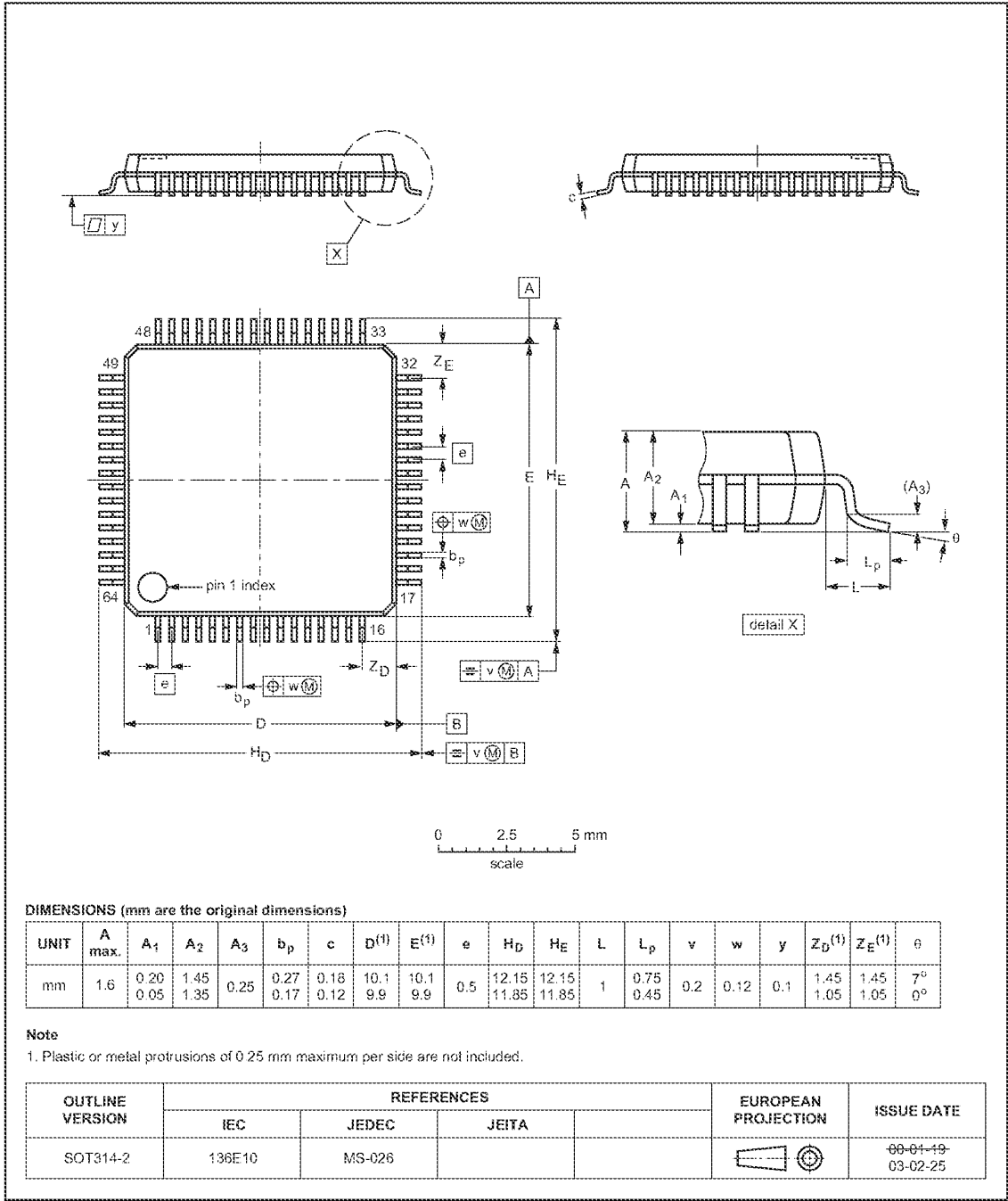
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13 PACKAGE OUTLINE

LQFP64: plastic low profile quad flat package; 64 leads; body 10 x 10 x 1.4 mm

SOT314-2



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14 SOLDERING**14.1 Introduction to soldering surface mount packages**

This text gives a very brief insight to a complex technology. A more in-depth account of soldering ICs can be found in our "Data Handbook IC26; Integrated Circuit Packages" (document order number 9398 652 90011).

There is no soldering method that is ideal for all surface mount IC packages. Wave soldering can still be used for certain surface mount ICs, but it is not suitable for fine pitch SMDs. In these situations reflow soldering is recommended.

14.2 Reflow soldering

Reflow soldering requires solder paste (a suspension of fine solder particles, flux and binding agent) to be applied to the printed-circuit board by screen printing, stencilling or pressure-syringe dispensing before package placement. Driven by legislation and environmental forces the worldwide use of lead-free solder pastes is increasing.

Several methods exist for reflowing; for example, convection or convection/infrared heating in a conveyor type oven. Throughput times (preheating, soldering and cooling) vary between 100 and 200 seconds depending on heating method.

Typical reflow peak temperatures range from 215 to 270 °C depending on solder paste material. The top-surface temperature of the packages should preferably be kept:

- below 220 °C (SnPb process) or below 245 °C (Pb-free process)
 - for all BGA and SSOP-T packages
 - for packages with a thickness ≥ 2.5 mm
 - for packages with a thickness < 2.5 mm and a volume ≥ 350 mm³ so called thick/large packages.
- below 235 °C (SnPb process) or below 260 °C (Pb-free process) for packages with a thickness < 2.5 mm and a volume < 350 mm³ so called small/thin packages.

Moisture sensitivity precautions, as indicated on packing, must be respected at all times.

14.3 Wave soldering

Conventional single wave soldering is not recommended for surface mount devices (SMDs) or printed-circuit boards with a high component density, as solder bridging and non-wetting can present major problems.

To overcome these problems the double-wave soldering method was specifically developed.

If wave soldering is used the following conditions must be observed for optimal results:

- Use a double-wave soldering method comprising a turbulent wave with high upward pressure followed by a smooth laminar wave.
- For packages with leads on two sides and a pitch (e):
 - larger than or equal to 1.27 mm, the footprint longitudinal axis is **preferred** to be parallel to the transport direction of the printed-circuit board;
 - smaller than 1.27 mm, the footprint longitudinal axis **must** be parallel to the transport direction of the printed-circuit board.

The footprint must incorporate solder thieves at the downstream end.

- For packages with leads on four sides, the footprint must be placed at a 45° angle to the transport direction of the printed-circuit board. The footprint must incorporate solder thieves downstream and at the side corners.

During placement and before soldering, the package must be fixed with a droplet of adhesive. The adhesive can be applied by screen printing, pin transfer or syringe dispensing. The package can be soldered after the adhesive is cured.

Typical dwell time of the leads in the wave ranges from 3 to 4 seconds at 250 °C or 265 °C, depending on solder material applied, SnPb or Pb-free respectively.

A mildly-activated flux will eliminate the need for removal of corrosive residues in most applications.

14.4 Manual soldering

Fix the component by first soldering two diagonally-opposite end leads. Use a low voltage (24 V or less) soldering iron applied to the flat part of the lead. Contact time must be limited to 10 seconds at up to 300 °C.

When using a dedicated tool, all other leads can be soldered in one operation within 2 to 5 seconds between 270 and 320 °C.

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14.5 Suitability of surface mount IC packages for wave and reflow soldering methods

PACKAGE ⁽¹⁾	SOLDERING METHOD	
	WAVE	REFLOW ⁽²⁾
BGA, LBGA, LFBGA, SQFP, SSOP-T ⁽³⁾ , TFBGA, VFBGA	not suitable	suitable
DHVQFN, HBCC, HBGA, HLQFP, HSQFP, HSOP, HTQFP, HTSSOP, HVQFN, HVSON, SMS	not suitable ⁽⁴⁾	suitable
PLCC ⁽⁵⁾ , SO, SOJ	suitable	suitable
LQFP, QFP, TQFP	not recommended ⁽⁵⁾⁽⁶⁾	suitable
SSOP, TSSOP, VSO, VSSOP	not recommended ⁽⁷⁾	suitable

Notes

- For more detailed information on the BGA packages refer to the "(LF)BGA Application Note" (AN01026); order a copy from your Philips Semiconductors sales office.
- All surface mount (SMD) packages are moisture sensitive. Depending upon the moisture content, the maximum temperature (with respect to time) and body size of the package, there is a risk that internal or external package cracks may occur due to vaporization of the moisture in them (the so called popcorn effect). For details, refer to the Drypack information in the "Data Handbook IC26; Integrated Circuit Packages; Section: Packing Methods".
- These transparent plastic packages are extremely sensitive to reflow soldering conditions and must on no account be processed through more than one soldering cycle or subjected to infrared reflow soldering with peak temperature exceeding $217\text{ }^{\circ}\text{C} \pm 10\text{ }^{\circ}\text{C}$ measured in the atmosphere of the reflow oven. The package body peak temperature must be kept as low as possible.
- These packages are not suitable for wave soldering. On versions with the heatsink on the bottom side, the solder cannot penetrate between the printed-circuit board and the heatsink. On versions with the heatsink on the top side, the solder might be deposited on the heatsink surface.
- If wave soldering is considered, then the package must be placed at a 45° angle to the solder wave direction. The package footprint must incorporate solder thieves downstream and at the side corners.
- Wave soldering is suitable for LQFP, TQFP and QFP packages with a pitch (e) larger than 0.8 mm; it is definitely not suitable for packages with a pitch (e) equal to or smaller than 0.65 mm.
- Wave soldering is suitable for SSOP, TSSOP, VSO and VSSOP packages with a pitch (e) equal to or larger than 0.65 mm; it is definitely not suitable for packages with a pitch (e) equal to or smaller than 0.5 mm.

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15 DATA SHEET STATUS

LEVEL	DATA SHEET STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾⁽³⁾	DEFINITION
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
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Notes

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3. For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

16 DEFINITIONS

Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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APPLICATION NOTE

**LIBRARY REFERENCE
FOR TDA8030**

Release 1.0

ISO 7816 and EMV 3.1.1 compliant

AN/01012

C51 KEIL Compiler



ABSTRACT

The single chip USB smart card device TDA8030 integrates in one chip both an smart card and an Usb interfaces. Two independent libraries driving these two interfaces are proposed to ease the development of Usb smart card reader applications.

This document describes the libraries references of the smart card and the Usb interfaces.

APPLICATION NOTE

LIBRARY REFERENCE FOR TDA8030

C51 KEIL Compiler

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Library
USB

Date: 26 April 2001

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1 General considerations

1.1 Assignment of micro-controller pins

In order to control and to communicate with these two interfaces, a number of micro-controller pins are used. The table below indicates the assignment of the micro-controller pins.

SMART CARD INTERFACE (SCI)			
UP Pins	Type	Linked to	Function description
P00-P07	I/O	SCI Low Address/Data Bus	Low address/Data bus
P20-P27	I/O	SCI high address bus	High address bus
P27	O	SCI Chip SelectS	SCI Selection
P32	I	SCI Interrupt	SCI Interrupt
P36	O	SCI WR strobe	WR strobe
P37	O	SCI RD strobe	RD strobe
USB INTERFACE (UI)			
P00-P07	I/O	UI Low Address/Data Bus	Low address/Data bus
P20-P27	I/O	UI high address bus	High address bus
P10	O	Mask Interrupt Usb	Used in suspend mode to mask usb interrupt
P11	O	Usb Softconnect	Links the 1,5K pull-up resistor to the cable voltage
P12	I	Usb Mp Ready	Indicate the ready/not-ready states of the UI
P13	I	Usb Clk Enable N	Indicates the exit from suspend mode
P14	O	Usb Reset N	Reset UI
P25	O	UI Command/data selection	Command/Data Selection
P26	O	UI Chip Select	UI Selection
P33	I	Usb Intr N	UI Interrupt
P34	I	Usb Suspend	Indicates suspend/ not suspend states of the UI
P35	O	Usb WakeUp N	????
P36	O	UI WR strobe	WR strobe
P37	O	UI RD strobe	RD strobe
AVAILABLE PINS FOR CUSTOMER APPLICATIONS			
P15	I/O		
P16	I/O		
P17	I/O		
P30	I/O		
P31	I/O		

1.2 ISO 7816 mode and EMV 3.11 mode

The choice between these two modes is made during the activation of the card (see power up function). At each activation it is possible to choose the mode.

For the EMV 3.11 mode, refer to the document:

- EMV 96 Integrated Circuit Card Specification For Payment Systems Version 3.1.1 May 31, 1998

The asynchronous library has been validated according to the Europay document:

- ICC Terminal Type Approval: Test Bench Description Executable Tests February 11th, 2000

1.3 Compilation

The libraries are compiled in **small model** (refer to the compiler manual, and for the 83/87C51RB+, this micro-controller has **512 bytes of additional auxiliary RAM** addressable as an external memory).

1.4 Auxiliary RAM

The library uses a **buffer in auxiliary RAM** to handle the communications between the host and the card reader and between the smart card and the card reader. The buffer length is limited by the auxiliary RAM size. The exchange block length between the card reader and the card is limited at 266 bytes. The start address of the buffer is 0 in auxiliary RAM. It is possible to configure the size of the buffer.

1.5 Interrupts

The interrupt **INT0** is used by the smart card library. Its interrupt service routine uses the **register bank 1**. **INT0** has a low priority level; all functions use the **register bank 0**. The register bank 2 and the register bank 3 are available for the software application.

The interrupt **INT1** is only used by the USB library to wake up from suspend mode. This interrupt, when it happens, uses register bank 0 and does not alter any register in bank 0. Otherwise, the interrupt **INT1** is not activated and consequently not used.

1.6 Timer

The TDA8030's timers are used for all the timing issues whatever the protocol (T=0 or T=1) is. Work Waiting Time, Extra Guard Time, Character Waiting Time, Block Waiting Time, Block Guard Time, Block Waiting Time extension are fully supported whatever the baud rate is on the I/O line.

The timers are also used for counting the 40.000 cycles (or more) during the ATR phase and also for counting the maximum duration of the ATR (19200 etu) in case of EMV standard.

1.7 System initialisation

Before calling any function of the libraries, it is **mandatory to call the function init_system**. It must be the **first instructions** of the application software. Refer to chapter 2.1 for more details about these functions.

1.8 Library function calls

Any function must be called from **the register bank 0**.

The maximum stack level used by the library is 8. The minimum depth of the stack is 16 bytes (1 level uses 2 bytes of stack).

1.9 Data exchange with the host

The libraries do not contain the software communication with the host. The software communication depends on the protocol used by the application.

1.10 Linker

In the command line of the link one has to specify both the internal RAM size (256) and the start address of the indirect memory area (80h).

Command line example to generate the object code for the emulation:

```
MyAppli.obj, edphl.obj, asynch.lib, usb.lib
RAMSIZE(256)
IDATA(80H)
```

If the start address of indirect memory area is not specify, the indirect data can be located in direct memory area. It is mandatory to specify the RAM size.

1.11 Variables location

All variables used by the libraries are located in the 256 bytes of the internal RAM.

1.12 Code and ram sizes of the libraries

The table blow gives some indications about the ROM and the RAM sizes of the libraries:

Name	Rom size	Data size	Idata size	Bit size
Async.lib	9 Kbytes	33	29	35
Usb.lib	1,6 Kbytes	3	20	0
Edphl.c	409 bytes	3	0	6

The figures given above is get with the level 9 of optimisation of the Keil C compiler.

2 Library of smart card interface

2.1 DESCRIPTION OF THE LIBRARY FUNCTIONS

All the library functions are using bank 0 and should be used in the same bank.

LIBRARY ASYNC.LIB			
Function Name	Syntax	Description	Stack Level
init_system	void init_system (unsigned int size)	<p>The init_system function defines the size of the data exchange buffer in auxiliary Ram. The data exchange buffer is used for data communication between the smart card and the card reader. Its length is limited to the auxiliary RAM size. This function initializes the variables system of the libraries. The maximum length of the data exchange buffer is 256 bytes</p> <p><u>It is mandatory to call this function at the beginning of the main application</u></p> <p>The data exchange buffer is used by the functions below:</p> <ul style="list-style-type: none"> • XmitAPDU function • power_up function • negotiate function • Send_Sblock_IFSD function 	3
XmitAPDU	Unsigned int XmitAPDU (unsigned int offset , unsigned int length)	<p>The XmitAPDU function is used for the transportation of the APDU in T=0 protocol or T=1 protocol according to ISO 7816-3 and 7816-4. offset contains the offset address of the data exchange buffer where the first byte APDU is stored (data exchange buffer address + offset). Length is APDU length (256 bytes max)</p> <p>The characters received from the card are stored at the data exchange buffer address + offset, the command is overwritten.</p> <p>Return value: Number of bytes returned by the card, offset -> received bytes from the card in the data exchange buffer. The command is overwritten.</p> <p>This function returns zero when an error occurred, in this case the error type can be obtained by the read_error() function (see Error list chapter 4)</p>	8
power_up	unsigned char power_up(unsigned int ptr , unsigned char voltage)	<p>The power_up function:</p> <ul style="list-style-type: none"> • switches the libraries in 7816 mode or in EMV 3.1.1 mode depending of the content of the Data Exchange Buffer + ptr. If '0' the 7816 mode will be selected, if other value the EMV 3.1.1 mode will be selected. This memory location will be overwritten during the ATR, • asserts VCC (3 or 5 volts depending of the voltage) on the card. Only 2 values voltage are possible 3 or 5 • sets Fcard = F_{Ntal} /4 • sets ETU = Fcard/372 during the Answer To Reset • sets F_{uc} = F_{Ntal} • sets UART prescaler = /31 • activate the card, • stores the Answer To Reset into the Data Exchange Buffer in the auxiliary RAM, ptr contains the offset address of the Data Exchange Buffer, • decodes the protocol T=0 or T=1, • memorizes WI, CWI, BWI which are used to control the communications with the card, • Initializes the Guard Time Register GTR, • In specific mode (TA2 is present) automatically applies the protocol indicated in TA2 and uses Fi/Di parameters given in ATR. • Return value: Number of bytes of the Answer To Reset (< 32 bytes). • 0h = error, in this case the error type is sent back by the read_error() function, see Error list chapter 4. • FFh = In EMV mode, a SIFS_REQUEST is automatically perform after a right A.T.R. and power_up() function will return FFh in case of error. 	6

		Example: init_system (256);The auxiliary RAM = 256 bytes length status = power_up(0, 3); The ATR will be stored at the first of the Data Exchange Buffer. The Vcc card is 3 Volts.	
power_down	void power_down(void)	The power_down function deactivates the card.	2
negotiate	unsigned char negotiate (unsigned int ptr, unsigned char protocol, unsigned char FiDi)	The negotiate function executes the Protocol Parameters Selection PPS . ptr contains the offset address of the Data Exchange buffer, the negotiate function uses 6 bytes from this address. protocol is used to select the protocol and Fi/Di is used to select the new Fi/Di parameters The coding of protocol is the following: <ul style="list-style-type: none"> 00H for T=0 protocol 01H for T=1 protocol The coding of FiDi is the coding of the TA1 parameter (see ISO7816-3). If the card is in negotiable mode (TA2 is not present) and answers in its ATR a Fi/Di different from the default value (Fi/Di = 372) or proposes 2 different protocols (T=0 and T=1), a PPS command can be given by using the negotiate command. This negotiate command automatically generates a PPS command by using the the selected Fi/Di parameters and the selected protocol. Return value: 1 = Successful 0 = Error, in this case the error type is sent back by the read_error() function, see Error chapter 4.	6
send_Sblock_IFSD	unsigned char send_Sblock_IFSD (unsigned char IFSD)	This function performs an IFSD negotiation with the card. An S(IFSD)request is sent to the card with the value of the IFSD parameter given as an input. Return value: 1 successful 0 IFSD value not supported. (read error function)	6
set_clock_card	bit set_clock_card (unsigned char divider)	The set_clock_card function selects the clock to be sent to the card: <ul style="list-style-type: none"> 0 RFU 1 $F_{Xtal}/2$ 2 $F_{Xtal}/4$ 3 $F_{Xtal}/8$ 4 $F_{int}/2$ (~1.25Mhz) Return value: 1 = Successful 0 = Divider not supported or not compatible with Fi. The error type is sent back by the read_error() function, see Error list in chapter 4.	2
set_baud_rate	void set_baud_rate (unsigned char FiDi, unsigned char CKU)	The set_baud_rate function programs the ETU of the ISO uart according the FiDi value (see ISO 7813-3) and the CKU parameter value. If CKU is set to 0, the baud rate is the one defined by FiDi ; if CKU is set to one, the baud rate on I/O line is the double of the baud rate defined by FiDi (the ETU value is divided by 2). CKU shall not be set if $F_{CLK} = F_{Xtal}$. Return value: 0 = FiDi not accepted. The error type is sent back by the read_error() function, see Error list chapter 4. 1 = FiDi accepted	2
clock_stop	void clock_stop (unsigned char clock_level)	This function stops the card clock card at the required level: <ul style="list-style-type: none"> 0 Fint/2 1 Clock stopped in low state 2 Clock stopped in high state. 	2
idle_mode	void idle_mode (unsigned char clock_level)	This function set the card clock at the required state and then puts the controller in idle mode: <ul style="list-style-type: none"> 0 Fint/2 1 Clock stopped in low state 2 Clock stopped in high state. 	3
read_alarm	unsigned char read_alarm (void)	This function returns 0 when there is no alarm. If the returned value is 1, the alarm problem comes from card 1; the alarm type can be obtained by calling read_error()function. It's mandatory to use this function to check if an alarm has occured. Example: Alarm is activated when : the card is inserted or removed, and when the TDA8030 has been deactivated due to a	1

		hardware problem (overcurrent on VCC overheating, voltage drop on VDD).	
read_error	unsigned char read_error(void)	This function returns the error type when the functions listed below return an error: <ul style="list-style-type: none"> • Power_up • XmitAPDU • Negotiate • Send_Sblock_IFSD • Set_clock_card This function must be called if the read_alarm() function return 1 Return value: Error Type(defined for each function, see Error list in chapter 4)	1
check_pres_card	bit check_pres_card(void)	The check_pres_card function checks if the card is inserted in the card reader. Return value: 1 = The card is present 0 = No card	2
read_alarm_card_moved	unsigned char read_alarm_card_moved(void)	This command returns a byte which gives the information on the moving card. The definition of bits in the byte is given below. The application has to test if the card is inserted or removed after a debouncing delay by means of read_register() function. Return value: 1 = Card movement 0 = No card movement It is mandatory to call this function when read_alarm() function is different of zero and when the read_error() function returns zero because in this case the alarm must be due to card movement.	1
GetCardParam	unsigned int GetCardParam (unsigned int ptr)	This function returns 3 current parameters of the actived card : <ul style="list-style-type: none"> • FiDi (by example 11h for Fi= 372 and Di = 1) • Clock Card (01h for Fxtal, 02h for Fxtal/2, 04h for Fxtal/4, 08h for Fxtal/8). • Protocol (00h for T=0, 01h for T=1). If the card is active, it returns 3 otherwise 0 and an error message is generated in this case.	
read_card_active	bit read_card_active (unsigned char slot)	This function returns 1 if the card selected by slot is active. Return value: • 1 card active • 0 card inactive. The error type is sent back by the read_error() function, see Error list chapter 4.	5
SetNAD	void SetNAD (unsigned char NewNad)	This command is used to specify a SAD (source address) and a DAD (destination address) for T=1 protocol as defined in ISO7816-3. The default value is 00 and will be kept until the send NAD command has been notified to the TDA8029. Any NAD submission where SAD and DAD are identical (except 00) will be rejected. If bits b4 or b8 of the NAD required are set to 1 (VPP programming) the NAD will be rejected. The NAD shall be initialised before any information exchange with the card using T=1 protocol, otherwise and error message will be generated.	
LOW LEVEL FUNCTIONS			
write_register	void write_register(unsigned char address , unsigned char data)	This function writes a data into any writable register of the TDA8030. The register is selected by the address parameter. Address of the writable registers: reserved words, see tda8030.h	1
read_register	unsigned char read_register(unsigned char address)	This function allow to read all readable registers of the TDA8030. The register is selected by the address parameter. Address of the readable registers: reserved words, see tda8030.h Return value: read value.	1
write_bit	void write_bit (unsigned char reg, unsigned char mapping, bit value)	This function writes bit_value in the register located at reg address, following the bitmap given by mapping .	1
read_bit	bit read_bit (unsigned char reg, unsigned char mapping)	This function gives the value of the bit in the register located at reg address, following the bitmap given by mapping . Mapping must select only one bit at the same time. Return value: value of the bit given by mapping	3

2.2 ERROR LIST

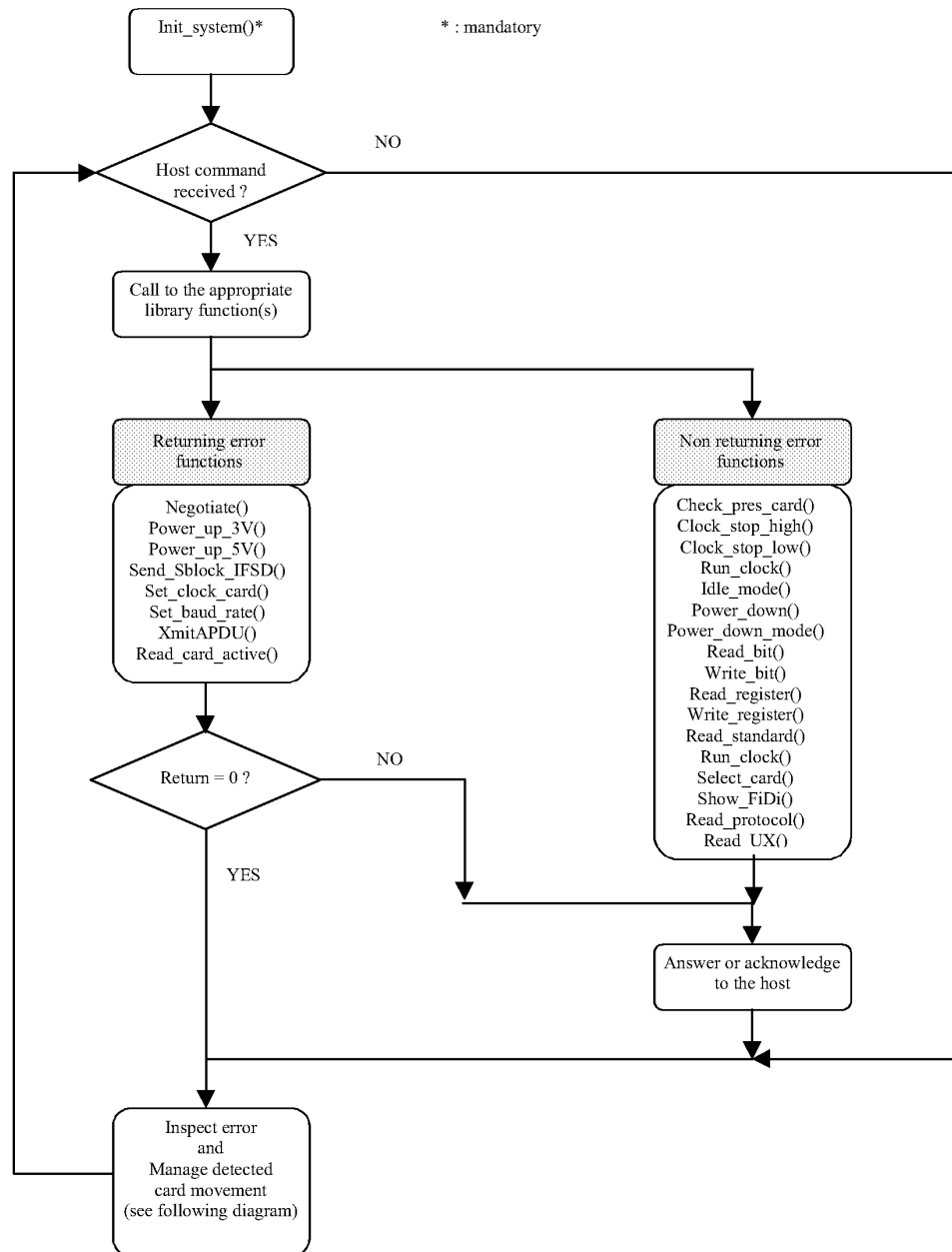
The error list gives the status code identification and a brief signification of the status error code. The error code is returned by the read_error() function. When this function returns 0 there is no error.

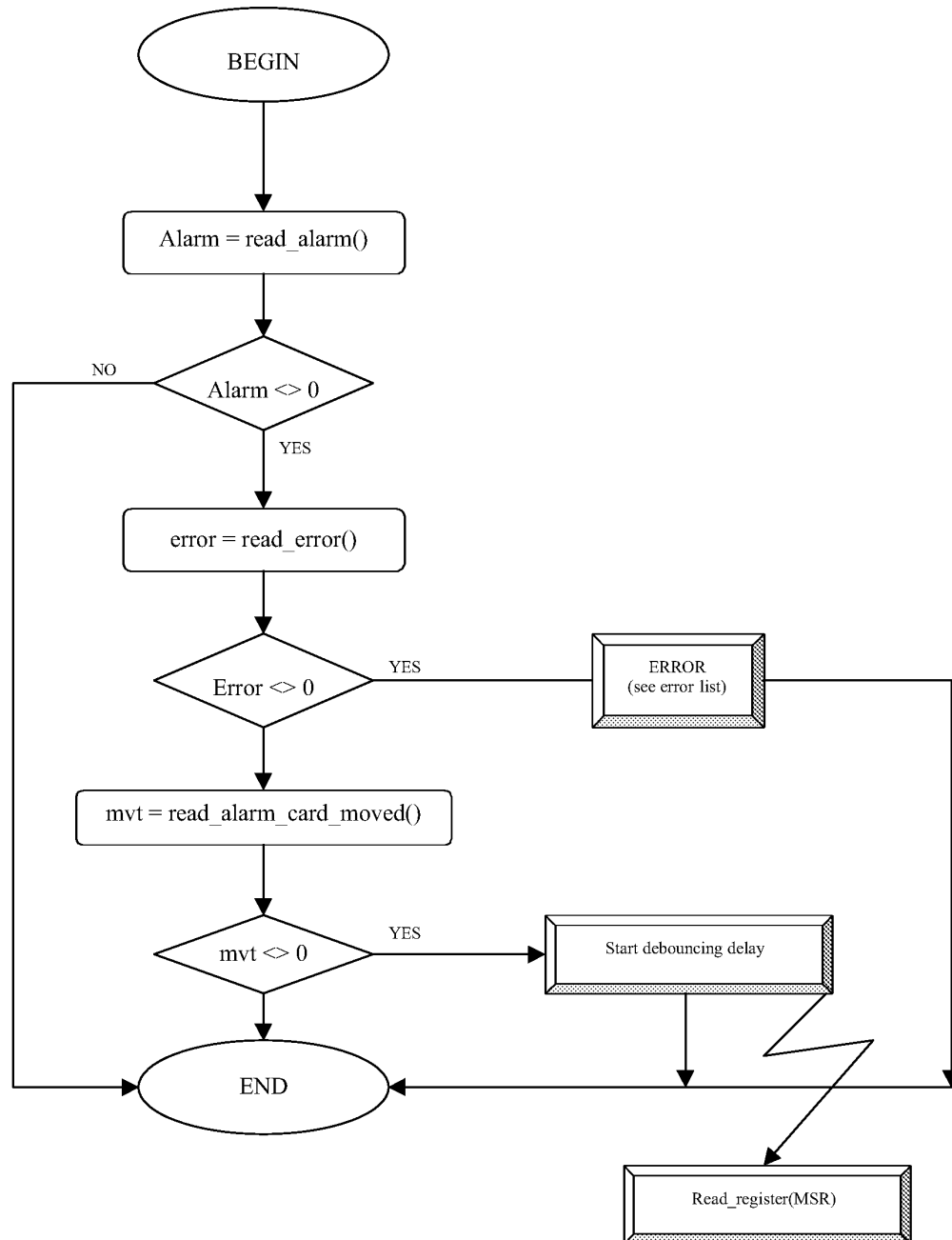
Error code	Meaning of error code
08h	Buffer length too short.
0Ah	3 errors in T=1.
20h	Wrong APDU.
21h	Too short APDU.
22h	Card mute during T=1 exchange.
24h	Bad NAD in a prologue field in T= 1
25h	Bad LRC in T = 1
26h	Card resynchronised in T = 1
27h	Chain aborted.
28h	Bad PCB in a prologue field in T = 1
29h	Card data overflow (512 bytes max)
2Ah	NAD not initialised
30h	Non negotiable mode
31h	Protocol different of T= 0 and T=1.
32h	Negotiation of protocol T=1 failed.
33h	PPS answer different of PPS request.
34h	Error on PCK.
35h	Parameter error
36h	Buffer overflow.
37h	BGT not reached.
38h	TB3 not present.
39h	PPS not accepted (no answer from card).
3Bh	Early answer of the card during activation
40h	Card deactivated
55h	Unknown command
80h	Card mute after power on.
81h	Time out.
82h	3 parity errors in TS.
83h	3 parity errors in reception
84h	3 parity errors in transmission.
85h	ATR too long.
86h	Bad FiDi
87h	Card clock not accepted.
88h	ATR duration longer than 19200 ETUs
89h	CWI not supported.
8Ah	BWI not supported.
8Bh	WI not supported.
8Ch	TC3 not supported.
8Dh	Parity errors during ATR.
8Eh	Error on SW1
90h	3 consecutive parity errors in T=1
91h	SW1 different of 6X and 9X
92h	Specific mode TA2 (b5=1)
93h	TB1 absent during cold reset
94h	TB1 different from 0 during cold reset

95h	IFSC less than 10h or IFSC equal to FFh
96h	Wrong Tdi
97h	TB2 present in ATR
98h	TC1 not compatible with CWT
99h	IFSD not accepted
A0h	Procedure byte error
B0h	Protected byte.
B1h	Pin error.
B2h	Write error.
B3h	Data length too long.
B4h	Error counter too long.
B5h	Pin code not verified.
B6h	Protected bit already set.
B7h	Verify pin error.
C0h	Card absent.
C1h	Io line locked
C2h	Protocol different T=0 and T=1.
C3h	Checksum error.
C4h	TS neither 3B or 3F.
C5h	Bad FiDi.
C6h	ATR not supported.
C7h	VPP not supported.
C8h	VCC error.
C9h	Card removed.
CAh	Class error without deactivation.
CBh	Class error with deactivation.
D0h	Bad secret code.
D1h	Card locked.
D2h	Write error.
D3h	Max erase time reached.
E0h	Card error
E1h	Bad clock card
E2h	Uart overflow
E3h	Supply voltage dropoff
E4h	Temperature alarm
E5h	Card 1 deactivated
E6h	Card 2 deactivated
E9h	Framing error
F0h	Serial LRC error
F1h	Command not executed (Collision)
FFh	Serial time-out

2.3 PRINCIPLE OF UTILISATION OF THE LIBRARY

The two following diagram show the logical use of the library function.

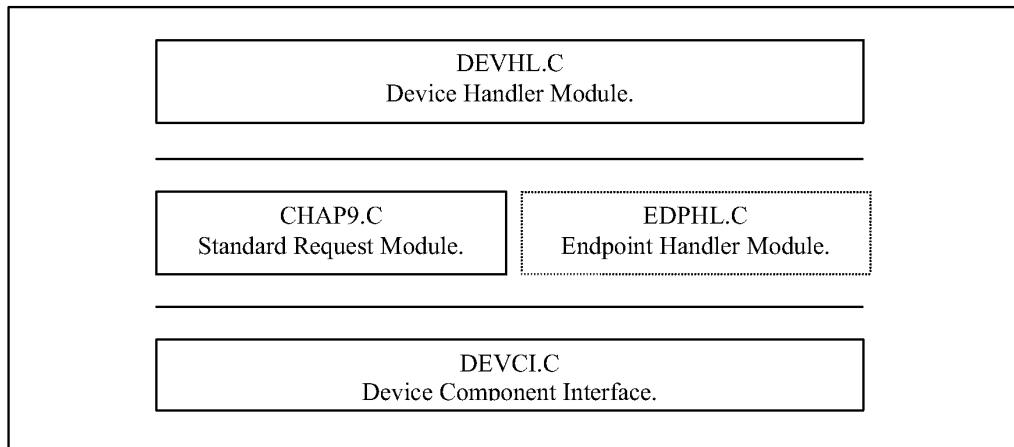


Alarm Monitoring:

3 Library of usb interface: Usb.Lib

3.1 STRUCTURE OF THE LIBRARY

The library of the USB interface consists of 3 modules encapsulated in a library package called USB.LIB and a custom module EDPHL.C. They are organised as follows:



3.1.1 Module Device Handler -- Devhl.c

This part of the code handles interrupts generated by the USB interface. It retrieves data from internal FIFO to CPU memory, and set up proper event flags to inform for processing. The main loop checks the event flags and passes to appropriate subroutine for further processing

3.1.2 Module Chapter 9 -- Chap9.c

This module handles standard USB device requests defined in the chapter 9 of the USB specifications.

3.1.3 Custom Module Endpoint Handler – Edphl.c

This module contains the handlers of the bulk out, bulk in and interrupt in endpoints. **As the handling of these endpoints are application dependent, this module is not part of the USB library. The customer can consequently modify the endpoints handlers if needed.**

3.1.4 Module Device Component Interface – Devci.c

To further simplify programming with the USB interface, the firmware defines a set of command interfaces, which encapsulate all the functions used to access it.

The following functions are defined as USB command interface to simplify device programming. They are simple implementations of the USB command set, which are defined in the data sheet.

3.2 FLOWCHART OF MAIN USB HANDLER ROUTINES

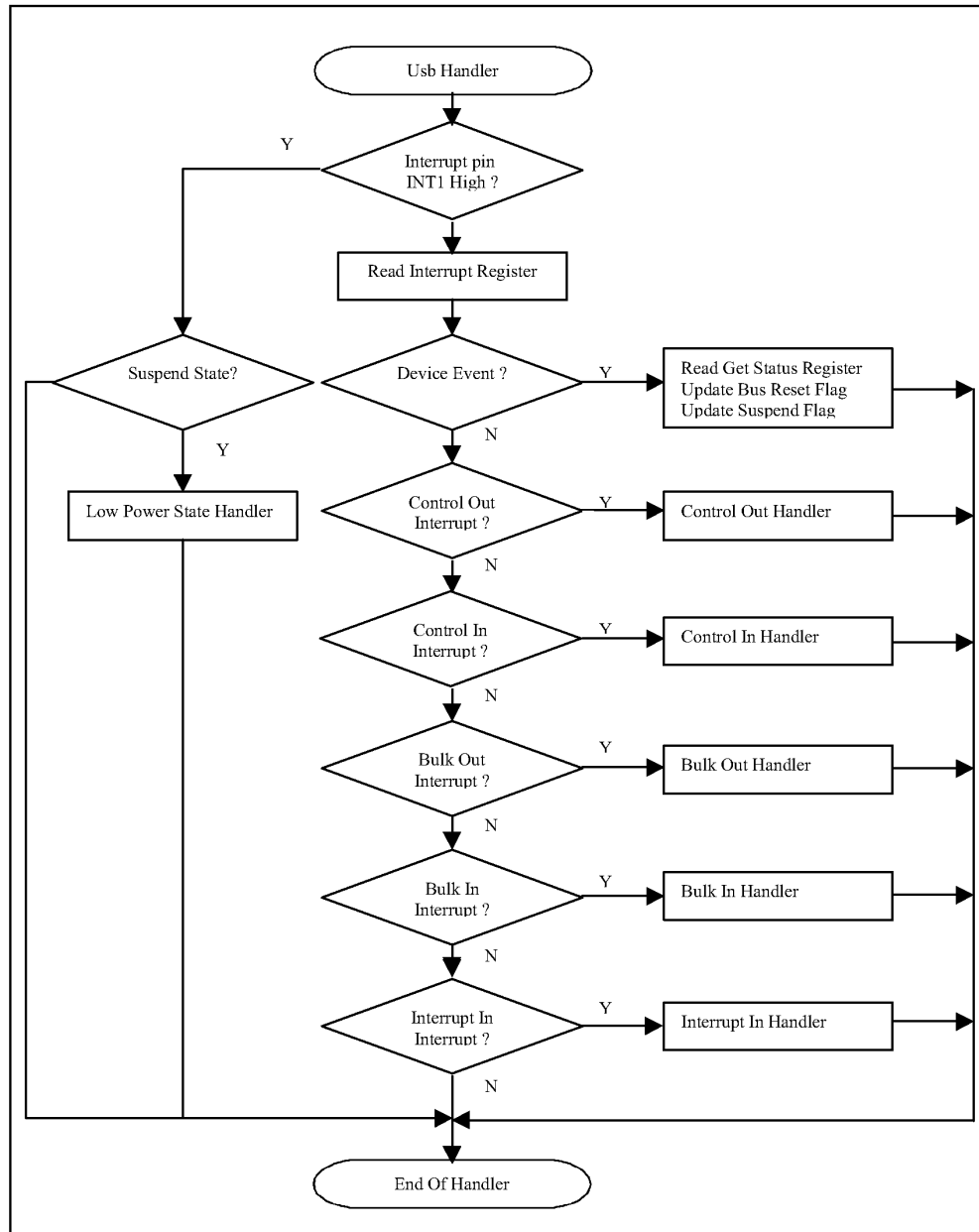
3.2.1 Usb event handler

UsbHandler is the service routine which handles all the USB events reported by the USB interface. The flow of the function *UsbHandler* is straightforward and is shown on the next page.

Everytime an USB event occurs – USB bus reset, suspend change or messages sent by the host – it is detected by the USB interface which puts low the interrupt pin INT1.

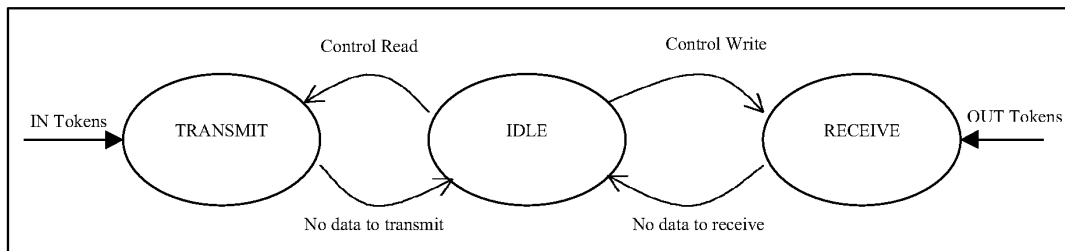
At the entrance of *UsbHandler*, the firmware uses the function *ReadInterruptRegister* to determine the origin of the interrupt source and then to dispatch it to the appropriate subroutines for processing.

When no USB activities are observed, the signal SUSPEND, normally in low state, goes to high state. The TDA8030 can be put in low power state by the function *LowPowerStateHandler*.



3.2.2 Control endpoint handlers

Control transfer always begins with the SETUP stage and then followed later by an optional DATA stage. It then ends with the STATUS stage. The diagram below shows the various states of transitions on the control endpoints. The firmware uses these 3 states to handle control transfers correctly.



When the SETUP packet is received by the USB interface, it will generate an interrupt to the MCU. The micro-controller will need to service this interrupt by reading the interrupt register to determine whether the packet is sent to Control Endpoint or the Generic Endpoint. If the packet is for the Control Endpoint, MCU will need to further determine whether the data is a SETUP packet through reading the Read Last Transaction Status Register. For the Get_Descriptor device request, the first packet will have to be the SETUP packet.

MCU will need to extract the content of the SETUP packet through Select Control Out Endpoint to determine whether this endpoint is full or empty. If the control endpoint is full, MCU will then read the content from the buffer and save the content to its memory. After that, it will validate the host device's request from the memory. If it is a valid request, MCU must send the ACKNOWLEDGE SETUP command to the Control Out endpoint to re-enable the next SETUP phase.

Next, MCU will need to verify whether the control transfer is a Control Read/Write. This can be achieved through reading the 8th bit of the `bmRequestType` from the SETUP packet. In our case, the control transfer is a Control Read type, that is, the device will need to send data packet back to the host in the coming data phase.

MCU will need to set a flag to indicate that the USB device is now in the transmit mode, that is, ready to send its data upon the host's request.

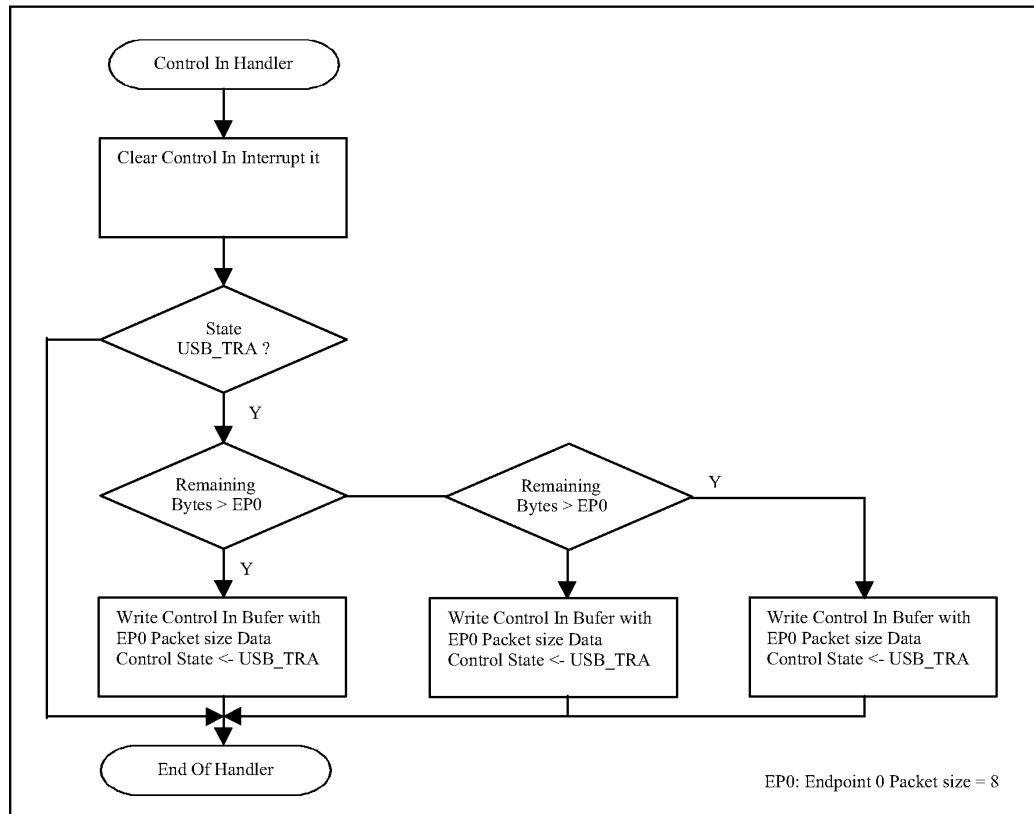
After the Setup stage is finished, the host will execute the data phase. The USB interface will expect to receive the Control_In packet. The process is shown in the next flowchart, "Control_In Handler". Again, MCU will first need to clear the Control_In interrupt Bit on the device by reading its Read Last Transaction Register. Then, MCU will proceed to send the data packet after verifying that the device is in the appropriate mode, that is, the Transmit mode.

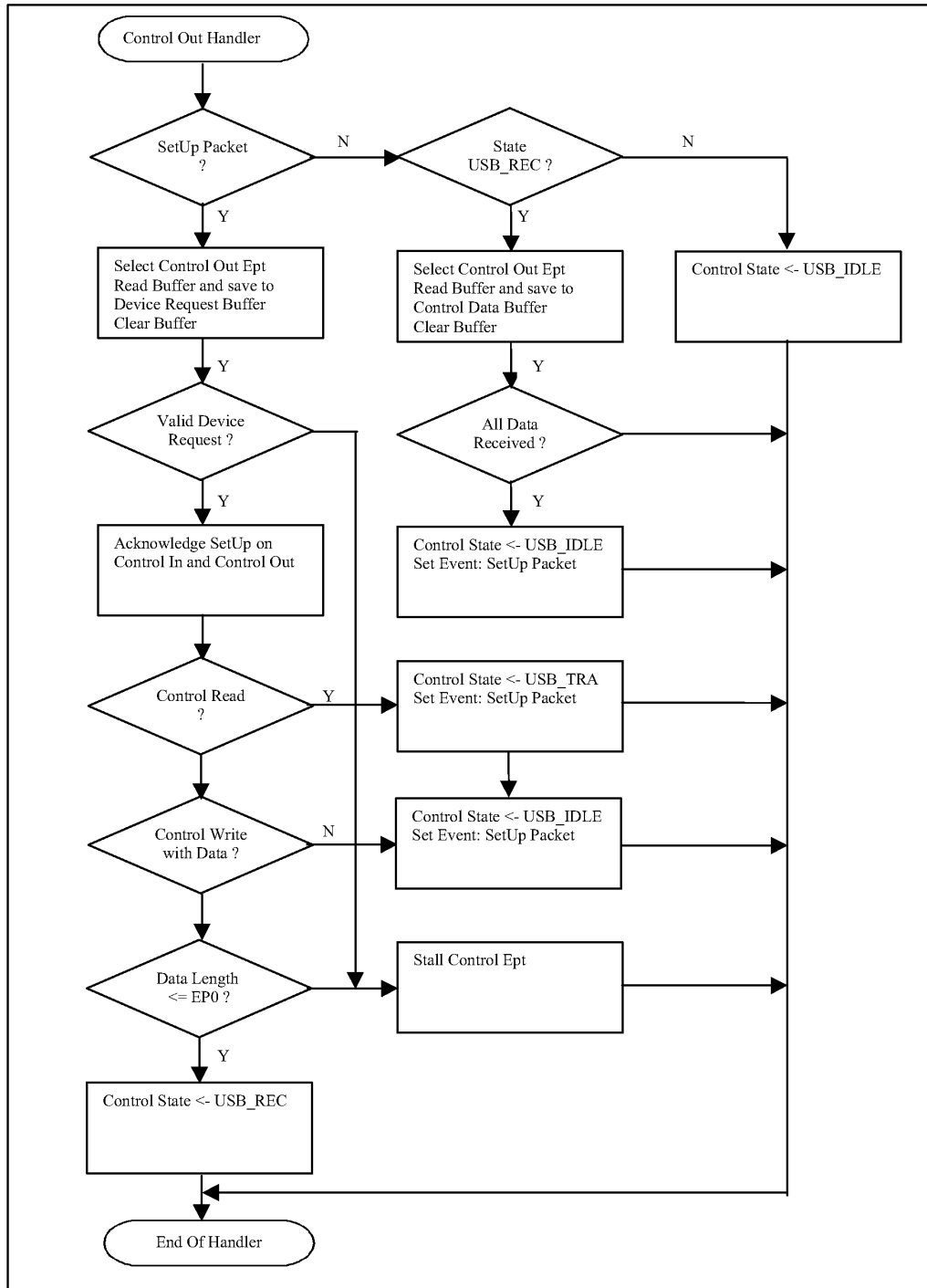
As the control endpoint has only 16 bytes FIFO, MCU will have to control the amount of data during the transmitting phase if the requested length is more than 16 bytes. As indicated on the flowchart, MCU will have to check its current and remaining size of the data to be sent to the host. If the remaining bytes are greater than 16 bytes, MCU will send the first 16 bytes and then subtract the reference length (requested length) by 16.

When the next Control_In token comes, MCU will determine whether the remaining bytes is zero. If there is no more data to send, MCU will need to send an empty packet to inform the host that there will be no more data to be sent over.

If the SETUP packet is Set_Descriptor request, then the control transfer in the SETUP packet will

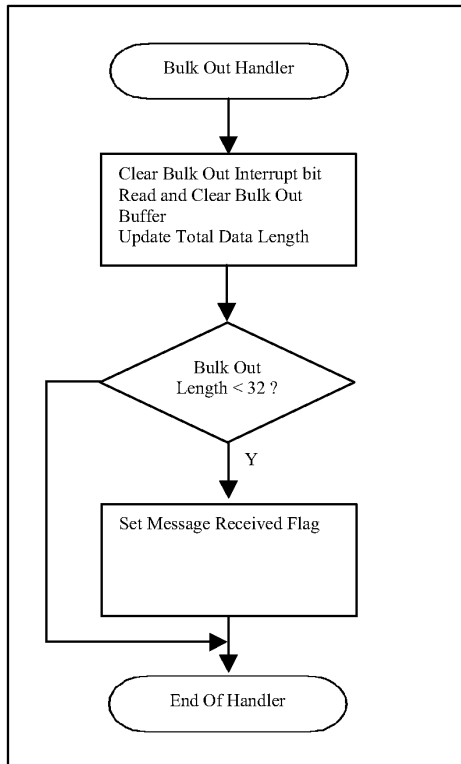
indicate that it is a Control Write type. After executing the procedure for the Set_Descriptor request, MCU will wait for the data phase. The host will send a Control Out token and MCU will have to extract the data from the device buffer. The flow will now be on the right side of the Control Out Handler flow sequence. MCU will have to first verify whether the device is in the USB_Receive mode. Then, MCU will have to verify whether the buffer is full by checking the Select Control Out Endpoint and read the data out from the buffer.





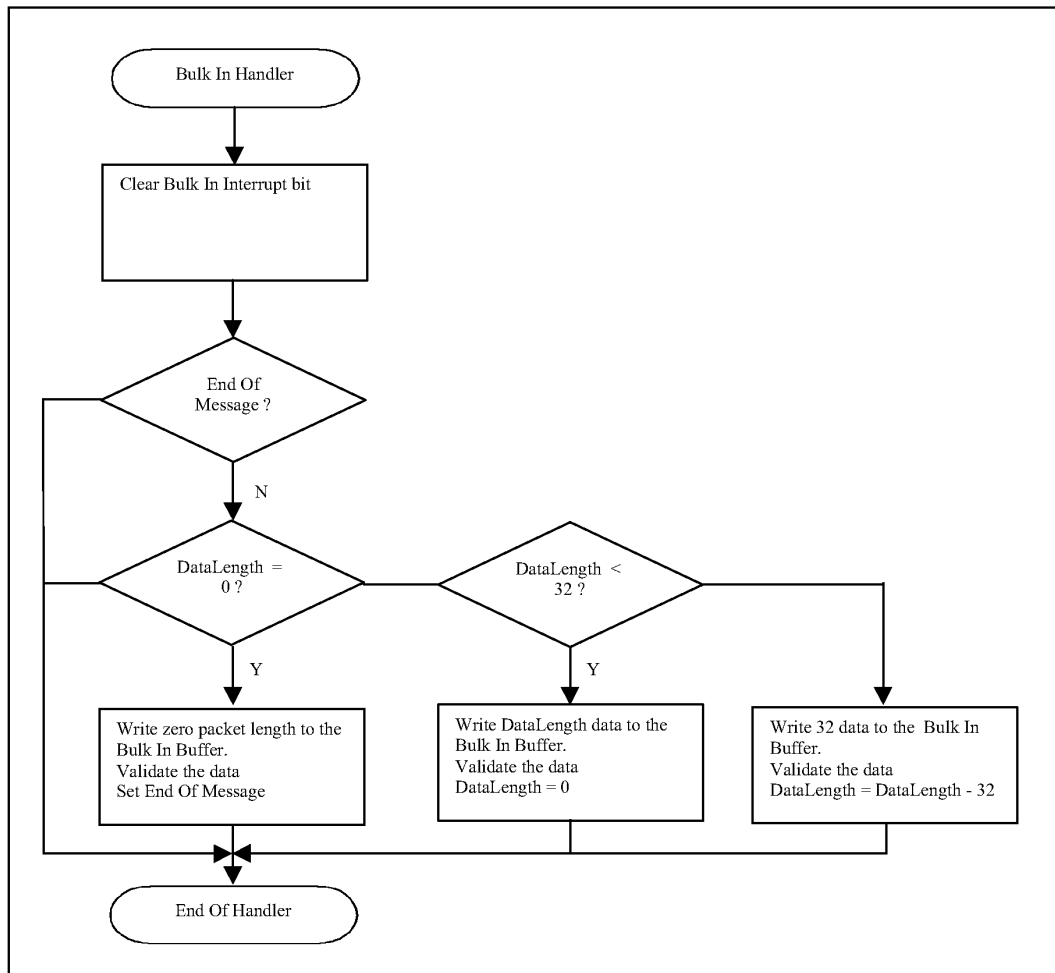
3.2.3 Bulk Out Handler

The bulk out endpoint is configured to receive data from the host. When the Usb interface receives OUT tokens from the host (identified through the Read Interrupt Register), the related interrupt bit has to be cleared. This flowchart below shows the processing of data incoming to this endpoint.



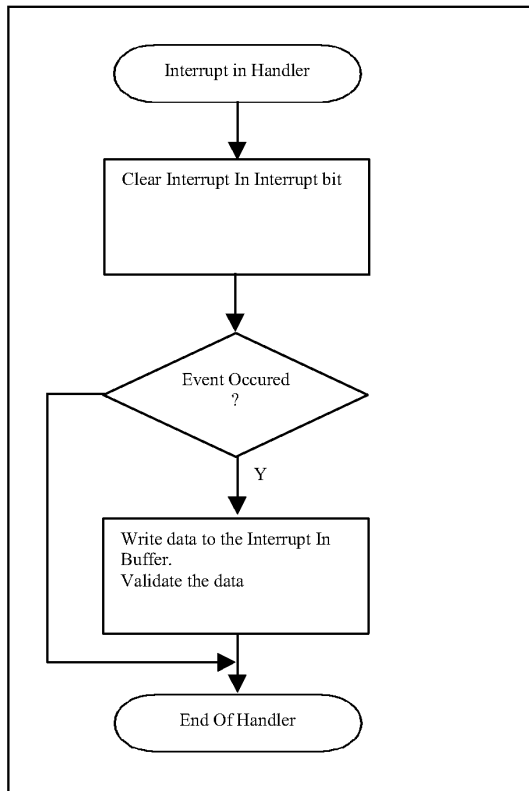
3.2.4 Bulk In Handler

The bulk in endpoint is configured to send data to the host. When the Usb interface receives IN tokens from the host (identified through the Read Interrupt Register), the related interrupt bit has to be cleared. This flowchart below shows the processing of data outcoming from this endpoint.



3.2.5 Interrupt In Handler

The interrupt in endpoint is configured to trigger card movement or emergency deactivation events to the host. When the Usb interface receives IN tokens from the host (identified through the Read Interrupt Register), the related interrupt bit has to be cleared. This flowchart below shows the processing of data outcoming from this endpoint.



3.3 DESCRIPTION OF THE USB LIBRARY FUNCTIONS

The library USB.LIB is made of three modules: Devhl.c, Chap9.c and Devci.c. The export functions of these modules are described below and can be found in the corresponding header modules (Devhl.h and Devci.h). The module Chap9.c does not export any functions.

The file Edphl.c is considered as not a part of the library. The body of the handlers EDP_BulkOut, EDP_BulkIn and EDP_InterruptIn can be recoded for every specific application. Nevertheless, their names can not be changed because they are referenced in the module Devhl.c.

All the USB library functions use bank 0 and should be called in the same bank.

MODULE DEVHL.C			
Function Name	Syntax	Description	Stack Level
InitialiseUsb	void InitialiseUsb(void)	This function initialises the USB interface. It should be called after every power-on -reset of the TDA8030.	3
UsbHandler	void UsbHandler(void)	This function handles all the USB events triggered by the USB interface of the TDA8030. It should be called in the main loop of the application.	6
MODULE EDPHL.C			
Function Name	Syntax	Description	Stack Level
EDP_BulkOut	void EDP_BulkOut(void)	This bulk out handler is application-dependent and so can be recoded for specific application.	3
EDP_BulkIn	void EDP_BulkIn(void)	This bulk in handler is application-dependent and so can be recoded for specific application.	3
EDP_InterruptIn	void EDP_InterruptIn(void)	This interrupt in handler is application-dependent and so can be recoded for specific application.	3
EDP_TxCardData	void EDP_TxCardData (unsigned int StartAddress, unsigned int CardDataLength)	This function is used to initiate a data transfer via the bulk in endpoint.	1
MODULE CHAP9.C			
Function Name	Syntax	Description	Stack Level
This module contains no export functions. They are related to the USB standard requests: <ul style="list-style-type: none"> - get status - clear feature - set feature - set address - get descriptor - get configuration - set configuration - get interface - set interface. 			
MODULE DEVCI.C			
Function Name	Syntax	Description	Stack Level
WriteCommand	void WriteCommand (unsigned char bCommand)	This function sends a command to the USB interface	1
WriteOneData	void WriteOneData (unsigned char bCommand, unsigned char bDataByte)	This function writes a databyte to the specified command.	1
ReadOneData	unsigned char ReadOneData (unsigned char bCommand)	This functions returns a databyte read from the specified command.	2
SetAddressEnable	void SetAddressEnable (unsigned char bAddress, bit fEnable)	This functions allows to assign a device address to the USB interface.	2
SetEndpointEnable	void SetEndpointEnable (bit fEnable)	This functions enables all endpoints of the USB interface	2
SetMode	void SetMode (unsigned char bMode)	This function writes a databyte to the command SetMode (F3h)	2

ReadInterruptRegister1	unsigned char ReadInterruptRegister1(void)	This functions returns a databyte read from the command ReadInterruptRegister (F4h).	2
GetDeviceStatus	unsigned char GetDeviceStatus(void)	This functions returns a databyte read from the command GetDeviceStatus (FEh).	2
SelectEndpoint	unsigned char SelectEndpoint (unsigned char bCommand)	This functions returns a databyte read from the command SelectEndpoint (40-46h).	2
ReadLastTransactionStatus	unsigned char ReadLastTransactionStatus (unsigned char bCommand)	This functions returns a databyte read from the command SelectEndpoint/ClearInterrupt (40-46h).	2
ReadEndpointStatus	unsigned char ReadEndpointStatus (unsigned char bCommand)	This functions returns a databyte read from the command SelectEndpoint (00-06h).	2
SetEndpointStatus	void SetEndpointStatus (unsigned char bCommand, unsigned char bEndpointStatus)	This function sends the command SetEndpointStatus (command 40-46h).	2
SendResume	void SendResume(void)	This function allows to generate a remote wakeup of the Usb interface in suspend.	2
ReadEndpoint	unsigned char ReadEndpoint (unsigned char bCommand, unsigned char idata *pbBuf, unsigned char bLen)	This function reads bLen databyte from the specified command bCommand.	3
WriteEndpoint	unsigned char WriteEndpoint (unsigned char bCommand, unsigned char idata *pbBuf, unsigned char bLen)	This function writes bLen databyte to the specified command.	3
AcknowledgeEndpoint	yoid AcknowledgeEndpoint (unsigned char bCommand)	This function sets up acknowledge to the specified control endpoint.	2
stall_ep0	void stall_ep0(void)	This functions stalls both the control in/out endpoints.	2
transmit_empty_packet	void transmit_empty_packet (void)	This function load a zero packet in the Control In buffer.	3
single_transmit	void single_transmit (unsigned char idata *pbBuf, unsigned char bLen)	This function writes bLen databyte to the Control In buffer.	2

3.4 CODING EXAMPLES

3.4.1 Example of main loop

```

/*=====*/
/*
;   SOURCE_FILE:      MAIN.C
;   APPLICATION:      TDA8030
;   VERSION:          1.0
;   DATE:             08/03/2001
;
;   (C) 2001:         PHILIPS COMPONENTS & SEMICONDUCTORS
;                     SYSTEM & APPLICATIONS -CAEN
;
;   All rights are reserved. Reproduction in whole or in part is
;   prohibited without the prior written consent of the copyright
;   owner. The information presented in this document does not
;   form part of any quotation or contract, is believed to be
;   accurate and reliable and may be changed without notice.
;   No liability will be accepted by the publisher for any
;   consequence of its use. Publication thereof does not convey
;   nor imply any license under patent- or other industrial or
;   intellectual property rights.
*/
/*=====*/

/*=====*/
/*   I N C L U D E S                               */
/*=====*/

#include "common.h"
#include "../aud26/edph1.h"
#include "../aud26/devci.h"
#include "../aud26/devh1.h"

/*=====*/
/*
FUNCTION NAME:      main
DESCRIPTION:        main loop of the application CAKE8030
*/
void main(void)
/*=====*/
{
    test_card_move = TRUE;           // trick !!! to update the card status after
    card_move_latched = TRUE;        // trick !!! power-on_reset

    init_system(512);
    DEC_initialise_usb_hardware();
    InitialiseUsb();                 // initialise usb device
    while (TRUE)
    {
        UsbHandler();

        if (EDP_OpcodeReceived)
        { // if usb opcode received then process the opcode
            DEC_handle_rx_usb_opcode();
        }
        proceed_alarm();             // proceed a possible alarm
    }
}

```

```

    if (test_card_move)
    {
        EX0          = 0;          // when debouncing timer reached then test presence bit
        test_card_move = 0;

        if (card_move_latched)
        {
            DEC_card1_move = 1;
            DEC_card1_presence = ((read_register(MSR) & 0x04) == 0x04);
            card_move_latched = 0;
        }
        EX0 = 1;
    }
}

//=====//
static void proceed_alarm(void)
//=====//
{
    EX0 = 0;

    if ((read_alarm()) && (test_card_move == 0))
    {
        if (read_error())
        {
            // trigger alarm message to the host
            // to be implemented later
        }
        else if (card_move_latched != read_alarm_card_moved())
        {
            // latched presence, then start debouncing timer0 (20ms @ 14.745MHz)
            TL0 = (uchar) (~ (24575) + 1);
            TH0 = (uchar) ((~ (24575) + 1) >> 8);
            ET0 = 1;
            TR0 = 1;
        }
    }
    EX0 = 1;
}

//=====//
int_timer0() interrupt 1 using 1 // Timer 0 is used to manage the card debouncing.
//=====//
{
    TR0          = 0;
    ET0          = 0;
    test_card_move = 1;
    alarm        = 1;
}

/*=====*/

```

3.4.2 Example of opcode handler

```

/*=====*/
;   SOURCE_FILE:      DECODE.C
;   APPLICATION:      TDA8030
;   VERSION:
;   DATE:             02-02-2001
;
;   (C) 2001:         PHILIPS COMPONENTS & SEMICONDUCTORS
;                     APPLICATION LABORATORIES - CAEN
;
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;   No liability will be accepted by the publisher for any
;   consequence of its use. Publication thereof does not convey
;   nor imply any license under patent- or other industrial or
;   intellectual property rights.
*/
/*=====*/

/*=====*/
/*   I N C L U D E S                               */
/*=====*/

#include "common.h"
#include "decode.h"
#include "..\aud26\edph1.h"
#include "..\lib\lib.h"
#include "..\lib\tdalib.h"

/*=====*/
/*   G L O B A L   D E F I N I T I O N S           */
/*=====*/

/*=====*/
/*
ITEM NAME:      DEC_card1_presence
DESCRIPTION:    card1_presence is TRUE (FALSE) if a card (not)
                inserted in the reader 1
*/
/*=====*/

uchar xdata data_exch_buff[300];
bool DEC_card1_presence;
bool DEC_power_down_mode;
bool DEC_card1_move;

/*=====*/
/*   L O C A L   F U N C T I O N S   P R O T O T Y P E S   */
/*=====*/

static void handle_mask_number(void);
static void handle_card_cmd(void);
static void handle_negociate(void);
static void handle_ifs_request(void);
static void handle_set_clock_card(void);
static void handle_set_card_baud_rate(void);
static void handle_power_down(void);
static void handle_power_up_5V(void);
static void handle_power_up_3V(void);
//static void handle_write_register(void);
//static void handle_read_register(void);

//static void handle_idle_clk_high(void);
//static void handle_idle_clk_low(void);
//static void handle_power_down_mode(void);
static void handle_check_card_presence(void);

```



```

static void handle_check_reader_status(void);

static void handle_test_mirror(void);
static void handle_bad_opcode(void);

static void LoadAnswerHeader(void);

/*=====*/
/*      LOCAL VARIABLES DEFINITIONS      */
/*=====*/
//static bit flag_power_up_S10;

/*=====*/
/*
ITEM NAME:          COMMAND_FUNCTION_NEEDED_STRUCT
DESCRIPTION:
*/
/*=====*/
typedef struct
{
    uchar            command;
    VOID_FUNCTION_PTR function;
    uchar            CardNeeded;
} COMMAND_FUNCTION_NEEDED_STRUCT;

/*=====*/
/*
ITEM NAME:          DataLength
DESCRIPTION:        DataLength contains the data number received from the card.
*/
/*=====*/

static word idata DataLength;
static uchar idata ErrorCode;

static uchar code num_mask[] = {"Cake8030-4-5"};
static uchar code date[] = __DATE__;
static uchar code time[] = __TIME__;

/*=====*/
/*
ITEM NAME:          OPCODE_FUNCTION_TABLE
PACKAGE:
SCOPE:              COMPONENT
DESCRIPTION:
DEFINITION:
*/
/*=====*/

static COMMAND_FUNCTION_NEEDED_STRUCT code OPCODE_FUNCTION_TABLE[]=
{
    { CHECK_CARD_PRESENCE,      handle_check_card_presence, 0},
    { CARD_CMD,                 handle_card_cmd, 1},
    { POWER_UP_5V,              handle_power_up_5V, 1},
    { POWER_UP_3V,              handle_power_up_3V, 1},

    { MASK_NUMBER,              handle_mask_number, 0},
    { POWER_OFF,                handle_power_down, 0},
    { NEGOCIATE,                handle_negociate, 1},
    { POWER_DOWN_MODE,          handle_power_down_mode, 0},

    { SET_CLOCK_CARD,           handle_set_clock_card, 1},
    { IFS_REQUEST,              handle_ifs_request, 1},
    { SET_CARD_BAUD_RATE,       handle_set_card_baud_rate, 1},
    { CHECK_READER_STATUS,      handle_check_reader_status, 0},
    { TEST_MIRROR,              handle_test_mirror, 0},
    { BAD_OPCODE,               handle_bad_opcode, 0}
};

```

```

/*=====*/
/*
    ITEM NAME:          PATTERN, MSB_LEN, LSB_LEN, OPCODE, ERROR_CODE
    DESCRIPTION:
*/
/*=====*/

#define PATTERN          START_USB_BUFFER_HEADER
#define MSB_LEN          PATTERN+1
#define LSB_LEN          PATTERN+2
#define OPCODE           PATTERN+3
#define ERROR_CODE       PATTERN+4

/*=====*/
/*
    E X P O R T E D   F U N C T I O N S
*/
/*=====*/

/*=====*/
/*
    FUNCTION NAME:      DEC_handle_rx_opcode
    DESCRIPTION:
*/
void DEC_handle_rx_usb_opcode(void)
/*=====*/
{
    uchar index = 0;
    DataLength = 0;           // reset this variable
    ErrorCode = NO_ERROR;     // reset error code

    if (EDP_MessageValid)
    {
        while ( (OPCODE_FUNCTION_TABLE[index].command != EDP_Opcode) &&
                (OPCODE_FUNCTION_TABLE[index].command != BAD_OPCODE) )
            index ++;

        if (OPCODE_FUNCTION_TABLE[index].CardNeeded && !check_pres_card())
        { // if the execution of the opcode needs card presence
            ErrorCode = CARD_ABSENT;
            alarm      = 1;           // trigger alarm
        }
        else
        { // if no error then execute the opcode
            OPCODE_FUNCTION_TABLE[index].function();
        }
    }
    else
    { // if message not valid then set unknown command ...
        ErrorCode = UNKNOWN_COMMAND;
    }

    DEC_LoadMessage();
    EDP_OpcodeReceived = FALSE;      // the request is
    processed, reset this flag
}

/*=====*/
/*
    FUNCTION NAME:      DEC_initialise_hardware
    DESCRIPTION:        This function is called after a power-on to initialise the hardware
                        of the tda8030.
*/
void DEC_initialise_usb_hardware(void)
/*=====*/
{
    //  init_system(DATA_EXCH_BUFF_SIZE); // initialise tda8007
    //  for RB+, buffer is limited to 256 bytes
    DEC_power_down_mode = FALSE;
}

```

```

/*=====*/
/*
    FUNCTION NAME:      DEC_LoadMessage
    DESCRIPTION:        this function loads 4 bytes for the answer string:
                        - if the transmission is successful
                          60h, msb of length, lsb of length, Opcode
                        - if there is an error
                          E0h, msb of length, lsb of length, Opcode, error number
                        and transmits the data
*/
void DEC_LoadMessage(void)
/*=====*/
{
    LoadAnswerHeader();
    EDP_TxCardData(START_USB_BUFFER_HEADER, (DataLength + OFFSET));
}

/*=====*/
/*      S T A T I C   F U N C T I O N S      */
/*=====*/

/*=====*/
/*
    FUNCTION NAME:      handle_check_card_presence
    DESCRIPTION:        This function returns the card presence in the reader.
*/
static void handle_check_card_presence(void)
/*=====*/
{
    data_exch_buff[OFFSET] = check_pres_card();
    DataLength = 1;
}

/*=====*/
/*
    FUNCTION NAME:      handle_command_card
    DESCRIPTION:        This function processes command card opcode
*/
static void handle_card_cmd(void)
/*=====*/
{
    DataLength = XmitAPDU(OFFSET, EDP_Length);
}

/*=====*/
/*
    FUNCTION NAME:      handle_mask_number
    DESCRIPTION:        This functions returns the mask number.
*/
static void handle_mask_number(void)
/*=====*/
{
    uchar index;
    for (index = 0; index < sizeof(num_mask) - 1; index++)
        data_exch_buff[OFFSET + index] = num_mask[index];
    // do not send the character EndOfString (0x00) of the string MASK_NR_STR[]
    DataLength = (sizeof(num_mask) - 1);
}

/*=====*/
/*
    FUNCTION NAME:      handle_power_down
    DESCRIPTION:        This function
*/
static void handle_power_down(void)
/*=====*/
{
    power_down();
}

```

```

/*=====*/
/*
    FUNCTION NAME:  handle_power_up_5V
    DESCRIPTION:    This function active a card with parameter given in
                   command.
*/
static void handle_power_up_5V(void)
/*=====*/
{
    DataLength = power_up(OFFSET, V5);
}

/*=====*/
/*
    FUNCTION NAME:    handle_power_down_mode
    DESCRIPTION:
*/
static void handle_power_down_mode(void)
/*=====*/
{
    DEC_power_down_mode = TRUE;
}

/*=====*/
/*
    FUNCTION NAME:  handle_power_up_3V
    DESCRIPTION:    This function performs a 3V activation of an async. card.
*/
static void handle_power_up_3V(void)
/*=====*/
{
    DataLength = power_up(OFFSET, V5);
}

/*=====*/
/*
    FUNCTION NAME:    handle_negociate
    DESCRIPTION:      This function negociates with card.
*/
static void handle_negociate(void)
/*=====*/
{
    DataLength = negotiate(OFFSET, data_exch_buff[OFFSET], data_exch_buff[OFFSET + 1]);
}

/*=====*/
/*
    FUNCTION NAME:    handle_set_clock_card
    DESCRIPTION:      This function sets a new clock card frequency.
*/
static void handle_set_clock_card(void)
/*=====*/
{
    set_clock_card(data_exch_buff[OFFSET]);
    DataLength = 1;
}

/*=====*/
/*
    FUNCTION NAME:  handle_set_card_baud_rate
    DESCRIPTION:    This function sets a new card baud rate. The baud
                   rate take place just after this command.
*/
static void handle_set_card_baud_rate(void)
/*=====*/
{
    if (set_baud_rate(data_exch_buff[OFFSET], data_exch_buff[OFFSET + 1]))
        DataLength = 2;
}

```

```

/*=====*/
/*
    FUNCTION NAME:      handle_check_reader_status
    DESCRIPTION:        This functions returns to the host the reader status.
*/
static void handle_check_reader_status(void)
/*=====*/
{
    // store in data_exch_buff array
    data_exch_buff[OFFSET] = ((uchar)DEC_card1_presence << 1) + (uchar)DEC_card1_move;
    DataLength = 1;          // 2 bytes to send
    DEC_card1_move = 0;      // reset card move informations
}

/*=====*/
/*
    FUNCTION NAME:      handle_ifs_request
    DESCRIPTION:        This function sends an ifs request to the card.
*/
static void handle_ifs_request(void)
/*=====*/
{
    send_Sblock_IFSD(data_exch_buff[OFFSET]);
}

/*=====*/
/*
    FUNCTION NAME:      handle_test_mirror
    DESCRIPTION:        This functions returns the host the same amout of
                        received data. It is used for test purposes.
*/
static void handle_test_mirror(void)
/*=====*/
{
    DataLength = EDP_Length;
}

/*=====*/
/*
    FUNCTION NAME:      handle_bad_opcode
    DESCRIPTION:
*/
static void handle_bad_opcode(void)
/*=====*/
{
    ErrorCode = UNKNOWN_COMMAND;
}

```

```

/*=====*/
/*
  FUNCTION NAME:      LoadAnswerHeader
  DESCRIPTION:        this function loads 4 bytes for the answer string:
                      - if the transmission is successful
                        60h, msb of length, lsb of length, Opcode
                      - if there is an error
                        E0h, msb of length, lsb of length, Opcode, error number
*/
static void LoadAnswerHeader(void)
/*=====*/
{
  if (ErrorCode == NO_ERROR)
  { // get error code
    ErrorCode = read_error();
  }
  if ((DataLength == 0) && (ErrorCode != NO_ERROR))
  {
    data_exch_buff[PATTERN] = ERROR_HEADER;
    data_exch_buff[MSB_LEN] = 0;
    data_exch_buff[LSB_LEN] = 1;
    data_exch_buff[OPCODE] = EDP_Opcode;
    data_exch_buff[ERROR_CODE] = ErrorCode; // error code to be transmitted
    DataLength = 1; // 1 databyte to be transmitted
  }
  else
  {
    data_exch_buff[PATTERN] = NORMAL_HEADER;
    data_exch_buff[MSB_LEN] = DataLength >> 8; // msb of length
    data_exch_buff[LSB_LEN] = DataLength; // lsb of length
    data_exch_buff[OPCODE] = EDP_Opcode; // opcode
  }
  ErrorCode = NO_ERROR; // reset error code afterwards
}

```

3.4.3 Example of endpoint handlers

```

/*=====*/
/*
;   SOURCE_FILE:      EDPHL.C
;   APPLICATION:      TDA8030
;   VERSION:
;   DATE:             08/03/2001
;
;   (C) 2001:         PHILIPS COMPONENTS & SEMICONDUCTORS
;                     APPLICATION LABORATORIES - CAEN
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;   No liability will be accepted by the publisher for any
;   consequence of its use. Publication thereof does not convey
;   nor imply any license under patent- or other industrial or
;   intellectual property rights.
*/
/*=====*/

/*****/
/*

*/
/*****/

/*=====*/
/*
;   STATUS OF ENDPOINTS USED IN THIS APPLICATION
;
;   CONTROL OUT, index 0: Control Out
;   CONTROL IN , index 1: Control In
;   EPT 1 OUT , index 2: Bulk Out
;   EPT 1 IN , index 3: Bulk In
;   EPT 2 IN , index 4: Interrupt In
;   EPT 3 IN , index 5: Not used
;
;
;
*/
/*=====*/

/*=====*/
/*
;   LAYOUT OF USB TRANSACTION USED IN THIS PROJECT
;
;   HOST                                DEVICE
;
;   BULK OUT
;   1  ----->
;   60h, Msb BulkOutLength, Lsb BulkOutLength, Opcode, data[1],..,data[BulkOutLength]
;
;   BULK IN
;   2  <-----
;   60h, Msb BulkInLength, Lsb BulkInLength, Opcode, data[1],..., data[BulkInLength]
;
;   INTERRUPT IN
;   3  <-----
;   CARD1_INSERTION (or CARD1_EXTRACTION)
;
;
;
*/
/*=====*/

/*=====*/
/*
;   I N C L U D E S
;
;
;
*/
/*=====*/

#include "reg51rd.h"
#include "..\src\common.h"
#include "devci.h"
#include "devh1.h"

```

```

#include "edph1.h"
#include "..\src\decode.h"
#include "..\src\lib\tdalib.h"

/*=====*/
/*      G L O B A L   D E F I N I T I O N S      */
/*=====*/

/*=====*/
/*
ITEM NAME:          EDP_OpcodeReceived, EDP_Opcode, EDP_Length
DESCRIPTION:        EDP_OpcodeReceived is TRUE (FALSE) if an opcode is
                    (not) received.
                    EDP_MessageValid is TRUE (FALSE) if the message just
                    received is (not) valid.
                    EDP_Opcode contents the opcode value just received.
                    EDP_Length contents the length of the incoming databytes
                    received at BULK OUT endpoint.
*/
/*=====*/
bool  EDP_OpcodeReceived;
bool  EDP_MessageValid;
uchar data EDP_Opcode;
word  data EDP_Length;

/*=====*/
/*
ITEM NAME:          DEVICE_DATA_REG, DEVICE_COMMAND_REG
DESCRIPTION:        These constants define the addresses of the data
                    and the command registers used in this application.
*/
/*=====*/
// P26 = Chip Select of TDA8030
// P25 = Usb Command/Data Selector
#define DEVICE_DATA_REG      0x4000
#define DEVICE_DATA_REG_BIS  0x4001
#define DEVICE_COMMAND_REG   0x6000
unsigned char xdata DEVICE_DATA_REG;
unsigned char xdata DEVICE_DATA_REG_BIS;
unsigned char xdata DEVICE_COMMAND_REG;

/*
uchar xdata data_exch_buff[300];

bool  DEC_power_down_mode;
bool  DEC_card1_presence;
bool  DEC_card2_presence;

#define NO_MOVE              0
#define CARD1_EXTRACTION    0
#define CARD2_EXTRACTION    0
#define CARD_INSERTION      0
*/
/*=====*/
/*      L O C A L   S Y M B O L   D E C L A R A T I O N S      */
/*=====*/
sbit USB_MP_READY          = P1^2;
#define WAIT_DEVICE_READY   while (!USB_MP_READY)

/*=====*/
/*      L O C A L   F U N C T I O N S   P R O T O T Y P E S      */
/*=====*/
static uchar ReadFromBulkBuffer(void);
static void WriteToBulkBuffer(uchar DevByteCnt);

```



```

/*=====*/
/*      L O C A L      D A T A      D E F I N I T I O N S      */
/*=====*/

/*=====*/
/*
ITEM NAME:          TxData, wTxLength
DESCRIPTION:        TxData is TRUE (FALSE) if sending of data to the host
                    is enabled (disabled) at BULK IN endpoint.
                    wTxLength contents the data number to be transmitted
                    via BULK IN endpoint.
*/
/*=====*/
static bool TxData;
static word idata wTxLength;

/*=====*/
/*
ITEM NAME:          EndOfMessage
DESCRIPTION:        EndOfMessage is TRUE when a message is over.
*/
/*=====*/
static bool EndOfMessage;

/*=====*/
/*
ITEM NAME:          card1_presence
DESCRIPTION:        card1_presence is TRUE (FALSE) if a card is (not) inserted
                    in the reader
*/
/*=====*/
static bool card1_presence;
static bool card2_presence;

/*=====*/
/*
ITEM NAME:          wDataAddress
DESCRIPTION:
*/
/*=====*/
static word data wDataAddress;

/*=====*/
/*
ITEM NAME:          PROTOCOL_HEADER_LENGTH
DESCRIPTION:
*/
/*=====*/
#define PROTOCOL_HEADER_LENGTH 4
#define BULK_LENGTH 32

/*=====*/
/*
ITEM NAME:          CARD_MOVE_STR,
DESCRIPTION:        Fixed string of ascii characters
*/
/*=====*/
//static uchar code CARD_MOVE_STR[] = {NORMAL_HEADER, 0x00, 0x00, CARD_INSERTION};

```

```

/*=====*/
/*      E X P O R T E D      F U N C T I O N S      */
/*=====*/

/*=====*/
/*
  FUNCTION NAME:      EDP_GetRestOfMessage
  DESCRIPTION:        This function is called to process the rest of the message > 64 bytes
                      incoming to BULK OUT endpoint.
*/
void EDP_GetRestOfMessage(void)
/*=====*/
{
    if (!EndOfMessage)          // if not end of message
        EDP_BulkOut();          // then get rest of message
}

/*=====*/
/*
  FUNCTION NAME:      EDP_IntEp3In
  DESCRIPTION:        This function is used when the endpoint 3 INTERRUPT IN is
                      addressed.
*/
void EDP_InterruptIn(void)
/*=====*/
{
    ReadLastTransactionStatus(READ_LTRX_EPT2_IN);    /* Clear interrupt flag */

    if (!(ReadOneData(SEL_EPT_2_IN) & SUCCESSFULLY)) // check if buffer empty
    {
        if (card1_presence != DEC_card1_presence)
        {
            card1_presence = DEC_card1_presence;    // update card presence
            bDataBuffer[0] = 0x00;
            bDataBuffer[1] = 0x00;
            bDataBuffer[2] = 0x00;
            bDataBuffer[3] = CARD1_EXTRACTION + (uchar)card1_presence;
            WriteRamToDevice(bDataBuffer, 4);        // 4 bytes to write to buffer
        }
    }
}

```

```

/*=====*/
/*
  FUNCTION NAME:      EDP_BulkOut
  DESCRIPTION:        This function is called to handle the sending of data to the
                      endpoint BULK OUT.
                      The data are received by packet of 32 bytes. The processing
                      goes on until the reception of a packet of which the length
                      is less than 32 bytes. After that, the request (opcode + data)
                      is considered as complete.
*/
void EDP_BulkOut(void)
/*=====*/
{
  ReadLastTransactionStatus(READ_LTRX_EPT1_OUT);    /* Clear interrupt flag */

  if (ReadOneData(SEL_EPT_1_OUT) & SUCCESSFULLY)    // check buffer full (CRC16 and EOP
                                                    // correctly received)
  {
    if (!EDP_OpcodeReceived)
    { // if the previous message is processed
      if (EndOfMessage)
      { // if the previous message is over then new message can be received
        wDataAddress = START_USB_BUFFER_HEADER;    // set the pointer of ram to receive
                                                    // data
        EndOfMessage = FALSE;                      // indicate not end of message
      }

      if (ReadFromBulkBuffer() < BULK_LENGTH)
      { // if end of message then
        EDP_OpcodeReceived = TRUE;                  // indicate a message received
        EDP_MessageValid   = TRUE;                  // and assumed to be valid
        EndOfMessage       = TRUE;                  // indicate end of message
        // get total length i.e. protocol header + useful data
        wTxLength = wDataAddress - START_USB_BUFFER_HEADER;
        // reset the length of useful data
        EDP_Length = 0;

        if ((data_exch_buff[START_USB_BUFFER_HEADER] != NORMAL_HEADER) || (wTxLength <
          PROTOCOL_HEADER_LENGTH) )
        { // if wrong header or length too short
          EDP_MessageValid = FALSE;                  // indicate a invalid message received
        }
        else
        {
          EDP_Opcode = data_exch_buff[START_USB_BUFFER_HEADER+3];    // get EDP_Opcode
          EDP_Length = wTxLength - PROTOCOL_HEADER_LENGTH;           // get length
        }
      }
    }
  }
}

```

```

/*=====*/
/*
  FUNCTION NAME:      EDP_BulkIn
  DESCRIPTION:        This function is called to handle the sending of data
                      from the endpoint BULK IN.
                      The data are loaded at the current IN token and transmitted
                      by packet of max. 32 bytes at the next IN token.

                      The frames of the data are as follows:
                        1st frame: max 32 bytes
                          Header 1
                          Header 2
                          Header 3
                          Header 4
                          Data[1]
                          ...
                          Data[32 - 4]
                        2nd frame: max 32 bytes
                          Data[32 - 3]
                          Data[32 - 2]
                          ....
                      If the length of the data packet is modulo 32, an
                      empty packet should be sent to end the transmission.
*/
void EDP_BulkIn(void)
/*=====*/
{
    uchar DevByteCnt;

    ReadLastTransactionStatus(READ_LTRX_EPT1_IN);    /* Clear interrupt flag */

    if (!(ReadOneData(SEL_EPT_1_IN) & SUCCESSFULLY)) // check if buffer empty
    {
        // then
        if (TxData) // if data left
        {
            // then load
            if (wTxLength >= BULK_LENGTH)
            {
                DevByteCnt = BULK_LENGTH;
                wTxLength -= BULK_LENGTH;
            }
            else
            {
                DevByteCnt = wTxLength;
                wTxLength = 0;
                //EndOfMessage = TRUE; // then end of message
                TxData = FALSE; // then end
                //EDP_OpcodeReceived = FALSE; // clear this flag to receive a new message
            }
            WriteToBulkBuffer(DevByteCnt); // load to bulk in buffer
        }
    }
}

```

```

/*=====*/
/*
    FUNCTION NAME:      EDP_TxCardData
    DESCRIPTION:        This function is called to initiate the data transfer to
                        the endpoint BULK IN.
                        The transmission of the remainder of data is performed
                        afterwards by the function EDP_BulkIn.
*/
void EDP_TxCardData(word StartAddress, word CardDataLength)
/*=====*/
{
    // get length of data to be sent to the host via BULK IN endpoint
    wTxLength = CardDataLength;
    // initialise the address of the data buffer
    wDataAddress = StartAddress;
    // enable the transmission of data to the host via BULK IN endpoint
    TxData = TRUE;
}

/*=====*/
/*      S T A T I C   F U N C T I O N S      */
/*=====*/

/*=====*/
/*
    FUNCTION NAME:      ReadFromBulkBuffer
    DESCRIPTION:        This function performs a direct reading from the buffer
                        of the device to the data array pointed by the pointer
                        wDataAddress.
                        Before calling this function, the pointer wDataAddress
                        should be initialised and the endpoint should be
                        selected.
                        The data read are stored in the following way:

                        data_exch_buffer[START_USB_BUFFER_HEADER + 0] = pattern
                        data_exch_buffer[START_USB_BUFFER_HEADER + 1] = Msb Length
                        data_exch_buffer[START_USB_BUFFER_HEADER + 2] = Lsb Length
                        data_exch_buffer[START_USB_BUFFER_HEADER + 3] = Opcode
                        data_exch_buffer[START_USB_BUFFER_HEADER + 4] = data 1
                        ...
                        data_exch_buffer[START_USB_BUFFER_HEADER + 4 + n] = data n
*/
static uchar ReadFromBulkBuffer(void)
/*=====*/
{
    uchar DummyByte, DevByteCnt, DevDataVal, SaveDevByteCnt;

    WriteCommand(READ_BUFFER);           // select read buffer
    //SELECT_DATA;
    DummyByte = DEVICE_DATA_REG;         // 1st databyte = dummy byte
    WAIT_DEVICE_READY;                   // wait device ready
    DevByteCnt = DEVICE_DATA_REG_BIS;    // 2nd databyte = number of available databytes
    WAIT_DEVICE_READY;
    SaveDevByteCnt = DevByteCnt;          // save the number of available databytes

    for ( ; DevByteCnt > 0; DevByteCnt --)
    {
        //SELECT_EXTRAM;                  // select external ram
        DevDataVal = DEVICE_DATA_REG;     // get databyte from D12 device
        WAIT_DEVICE_READY;                // wait device ready
        //DESELECT_EXTRAM;                // deselect external ram
        data_exch_buff[wDataAddress] = DevDataVal; // store the databyte
        wDataAddress ++;                  // increment the datapointer
    }
    WriteCommand(CLEAR_BUF);              // clear buffer after reading

    return(SaveDevByteCnt);                // return the number of available databytes
}

```

```

/*=====*/
/*
  FUNCTION NAME:      WriteToBulkBuffer
  DESCRIPTION:        This function writes directly data to the buffer of the
                      device. The data is get from a data array pointed by the
                      pointer wDataAddress.
                      Before calling this function, the pointer wDataAddress
                      should be initialised.
                      The data to be written are stored in the array data_exch_buff
                      in the following order:

                      data_exch_buffer[0]   = header
                      data_exch_buffer[1]   = Msb Length
                      data_exch_buffer[2]   = Lsb Length
                      data_exch_buffer[3]   = Opcode
                      data_exch_buffer[4]   = data 1
                      ...
                      data_exch_buffer[4+n] = data n
*/
static void WriteToBulkBuffer(uchar DevByteCnt)
/*=====*/
{
    uchar DevDataVal;

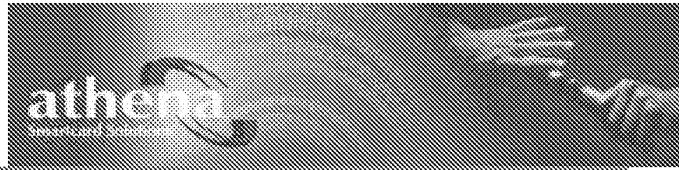
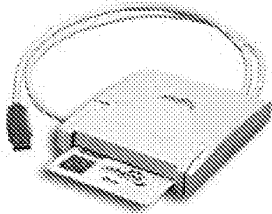
    WriteCommand(WRITE_BUFFER);           // select write buffer
    //SELECT_DATA;                         // select data
    DEVICE_DATA_REG = 0;                   // always 0
    WAIT_DEVICE_READY;                     // wait device ready
    DEVICE_DATA_REG_BIS = DevByteCnt;      // number of bytes
    WAIT_DEVICE_READY;                     // wait device ready

    for ( ; DevByteCnt > 0; DevByteCnt --)
    {
        //DESELECT_EXTRAM;                 // deselect external ram
        DevDataVal = data_exch_buff[wDataAddress]; // get the byte
        wDataAddress ++;                   // increment datapointer
        //SELECT_EXTRAM;                   // select external ram
        DEVICE_DATA_REG = DevDataVal;      // write databyte to device
        WAIT_DEVICE_READY;                 // wait device ready
    }
    WriteCommand(VALIDATE_BUF);           // validate the buffer after writing
}

```

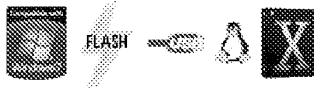
Declaration Exhibit C

USB Smart Card Readers



ASEDrive IIIe

Quantity	Unit price
50 or more	contact us
10-49	\$ 32
1-9	\$ 39



ASEDrive IIIe USB V2 Smart Card Reader

PC/SC • WHQL • EMV • CAC • FIPS 201 • FLASH
Upgradeable • USB • Windows • Linux • Mac OS X

ASE Drive IIIe USB V2 is Athena's high performance advanced PC/SC USB smart card reader.

The ASEDrive IIIe USB V2 Smart Card Reader supports multiple smart card protocols under the PC/SC API, utilizing the USB 2.0 Full speed connection to increase reliability, communication speed and ease of operation.

The ASEDrive IIIe USB V2 Smart Card Reader utilizes the most durable landing type smart card acceptor to ensure longer card life and minimum damage to the cards outer surface.

The Smart Card Reader firmware is flash upgradeable for future unlimited updates.

Optimized for Smart card applications where high speed is essential such as Smart Card Logon, VPN and PKI operations.

ASEDrive IIIe USB V2 Smart Card Reader supports a wide range of protocols: ISO7816 T=0; T=1; EMV; I2C/Extended I2C Memory and 2/3 -Bus Protected Memory Cards.

Special EEPROM area for writing unique information for each reader or batch of readers.

The **ASEDrive IIIe USB V2** Smart Card Reader passed the **Microsoft Windows Hardware Quality Lab (WHQL)** certification program and is eligible for the "**Windows 7 Compatible**" logo and supports Windows 7, Windows Vista, Windows XP, 2000 and Windows Server 2008R2/2008/2003.

Smart Card Support	ISO 7816 T=0, T=1, EMV, CAC, 2/3 BUS I2C/Extended I2C memory cards.
Host Interface	USB 2.0 Full Speed 12Mbit/s
Card-Reader Communication	Up to 323 Kbps at 4 MHz.
Smart Card Acceptor	ISO 8 contacts. Landing type, minimum 200,000 cycles.
Card operating voltage	5V (ISO7816 Class A), 3V (ISO7816 Class B), 1.8V (ISO7816 Class C)

Related Links

- [Smart Cards](#)
- [Smart Card Readers](#)

Downloads

- [Driver](#)
- [Datasheet](#) [368 Kb]

Power Source	USB port
Safety & Environmental Standard	FCC Class B, VCCI, CE
Card operating frequency	4 MHz
Operating System Support	Win 7, Vista, XP, 2000 , Server 2008R2/2008/2003, Linux, Mac OS X (built in driver)
Smart Card Reader Approvals	FIPS 201 GSA APL, Microsoft WHQL, PC/SC Compliant, USB Logo, EMV Level 1

Note: Supporting CAC/PIV cards requires that the CAC/PIV client software is installed on the workstation.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 13/403,141
Applicant: C. Douglas Yeager
Filing Date: 2/23/2012
Confirmation No.: 6813
Title: SELF-AUTHORIZING TOKEN
Examiner: (TBD)
Group Art Unit: (TBD)

Submittal of Rule 132 Declaration and Remarks

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Submitted herewith is a Declaration of Brian Charles Murray, which was originally prepared for submittal under pending and allowed U.S. Patent Application Serial No. 12/019,318 filed 01/24/2008, entitled "Self-Authorizing Devices," which is the parent utility application of the present Continuation Application. The Applicant request that this Declarations be made of record and considered by the Examiner in the course of examination of the merits of the present Application.

In Statement No. 10 of the Declaration, Mr. Murray establishes distinctions between ordinary "smart card readers" and the claimed secure element reader/interrogator, particularly with respect to claims that explicitly employ communications formatted according to ISO 7816-4.

The Applicant further wishes to draw the Examiner's attention certain features of claims in the present application that the Applicant asserts distinguish the claims over the art of record in the parent application.

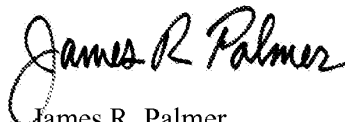
1. For example, the Applicant points to the merits of claims specifying a secure element interrogator and a secure element, **both affixed to the same mounting structure**, where the secure element interrogator is configured to interrogate the secure element to acquire transaction information from the data file by exchanging transaction data communications only between the secure element and the secure element interrogator. This is far different from ordinary card readers that acquire transaction information from magnetic stripes on a credit card where, of course, the card reader and the magnetic stripes are on different mounting structures.
2. The Applicant further wishes to draw the Examiner's attention to the merits of claims specifying a secure element interrogator and a secure element on the same mounting structure, where the secure element includes a payment card application.
3. The Applicant further wishes to draw the Examiner's attention to claims specifying a **plurality of communications only between the secure element interrogator and the secure element** to acquire transaction information, and also to claims specifying transmission of the transaction information to the computer terminal as a **single data communication**. These limitations are graphically presented in Figure 14 of the drawings.

If the Examiner believes that a telephone call would expedite the early disposition of this application, a call to the undersigned is respectfully requested.

Respectfully submitted,

LUEDEKA NEELY GROUP, P.C.

By:


James R. Palmer
Registration No. 48,633

Date: February 23, 2012
P.O. Box 1871
Knoxville, Tennessee 37901
(865) 546-4305

Electronic Acknowledgement Receipt	
EFS ID:	12143625
Application Number:	13403141
International Application Number:	
Confirmation Number:	6813
Title of Invention:	SELF-AUTHORIZING TOKEN
First Named Inventor/Applicant Name:	C. Douglas Yeager
Customer Number:	408
Filer:	James Roy Palmer/Jennifer McDonald
Filer Authorized By:	James Roy Palmer
Attorney Docket Number:	63766.C1
Receipt Date:	23-FEB-2012
Filing Date:	
Time Stamp:	15:00:52
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Rule 130, 131 or 132 Affidavits	63766c1-topto-20120223-132DeclarationWithAttachedBioAndAppendices.pdf	5194172 7d4ad9875e0bc9467b99458a9638c5d7d6b7b420	no	108

Warnings:

Information:

2	Miscellaneous Incoming Letter	63766c1-topto-2012023-SubmittalOfDeclarationAndRemarks.pdf	107767 6348d23ab7317536d0a3d3c92142558f65031e50	no	3
Warnings:					
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Total Files Size (in bytes):				5301939	
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 13/403,141				
APPLICATION AS FILED - PART I										
(Column 1)		(Column 2)		SMALL ENTITY		OTHER THAN SMALL ENTITY				
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)			
BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A	95		N/A				
SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A	310		N/A				
EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A	125		N/A				
TOTAL CLAIMS <small>(37 CFR 1.16(j))</small>	31	minus 20 = *	11	x 30 =	330					
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	6	minus 3 = *	3	x 125 =	375					
APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00						
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00						
			TOTAL	1235		TOTAL				
* If the difference in column 1 is less than zero, enter "0" in column 2.										
APPLICATION AS AMENDED - PART II										
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OTHER THAN SMALL ENTITY		
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total <small>(37 CFR 1.16(i))</small>	*	Minus	**	=	x	=		x	=
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus	***	=	x	=		x	=
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
					TOTAL ADD'L FEE				TOTAL ADD'L FEE	
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OTHER THAN SMALL ENTITY		
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total <small>(37 CFR 1.16(i))</small>	*	Minus	**	=	x	=		x	=
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus	***	=	x	=		x	=
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
					TOTAL ADD'L FEE				TOTAL ADD'L FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.										



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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
13/403,141	02/23/2012	3621	1235	63766.C1	31	6

CONFIRMATION NO. 6813

408

LUEDEKA NEELY GROUP, P.C.

P O BOX 1871

KNOXVILLE, TN 37901

FILING RECEIPT



OC000000053348678

Date Mailed: 03/28/2012

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

C. Douglas Yeager, Austin, TX;

Power of Attorney: The patent practitioners associated with Customer Number 00408

Domestic Priority data as claimed by applicant

This application is a CON of 12/019,318 01/24/2008 PAT 8151345
which claims benefit of 60/897,110 01/25/2007
and claims benefit of 60/932,704 06/01/2007

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.)

If Required, Foreign Filing License Granted: 03/26/2012

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/403,141**

Projected Publication Date: 07/05/2012

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

SELF-AUTHORIZING TOKEN

Preliminary Class

705

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

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NOT GRANTED

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Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		13403141
	Filing Date		2012-02-23
	First Named Inventor	C. Douglas YEAGER	
	Art Unit	3621	
	Examiner Name		
	Attorney Docket Number	63766.C1	

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Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6439464		2002-08-27	Fruhauf et al.	
	2	6763399		2004-07-13	Margalit et al.	
	3	6883715		2005-04-26	Fruhauf et al.	
	4	6991173		2006-01-31	Fruhauf	
	5	7011247		2006-03-14	Drabczuk et al.	
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	Filing Date		2012-02-23
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	Art Unit	3621	
	Examiner Name		
	Attorney Docket Number	63766.C1	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	13403141
	Filing Date	2012-02-23
	First Named Inventor	C. Douglas YEAGER
	Art Unit	3621
	Examiner Name	
	Attorney Docket Number	63766.C1

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/James R. Palmer/	Date (YYYY-MM-DD)	2012-05-18
Name/Print	James R. Palmer	Registration Number	48633

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1.14. This collection is estimated to take 1 hour 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.**

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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 inspections or an issued patent.
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Electronic Acknowledgement Receipt	
EFS ID:	12810345
Application Number:	13403141
International Application Number:	
Confirmation Number:	6813
Title of Invention:	SELF-AUTHORIZING TOKEN
First Named Inventor/Applicant Name:	C. Douglas Yeager
Customer Number:	408
Filer:	James Roy Palmer/Jennifer McDonald
Filer Authorized By:	James Roy Palmer
Attorney Docket Number:	63766.C1
Receipt Date:	18-MAY-2012
Filing Date:	23-FEB-2012
Time Stamp:	09:41:06
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	63766c1-topto-20120518-IDS.pdf	612422 <small>76664cd88115f5527ecd156ae0f143af8bb5f3a4</small>	no	4

Warnings:

Information:

2	Foreign Reference	63766us-topto-20120518- ForeignRef-EP1843277.pdf	470400 46381bf653064ad6d719ab6eae7b939eb32 fb761	no	11
Warnings:					
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Total Files Size (in bytes):				1082822	
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/403,141	02/23/2012	C. Douglas Yeager	63766.C1

CONFIRMATION NO. 6813

408
LUEDEKA NEELY GROUP, P.C.
P O BOX 1871
KNOXVILLE, TN 37901

PUBLICATION NOTICE



Title:SELF-AUTHORIZING TOKEN

Publication No.US-2012-0173432-A1

Publication Date:07/05/2012

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/403,141	02/23/2012	C. Douglas Yeager	63766.C1	6813

408	7590	10/11/2012
LUEDEKA NEELY GROUP, P.C.		
P O BOX 1871		
KNOXVILLE, TN 37901		

EXAMINER	
SONG, HEE K	

ART UNIT	PAPER NUMBER
2433	

NOTIFICATION DATE	DELIVERY MODE
10/11/2012	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTO-EMAIL@LNG-patent.com
LNG.PATENT@gmail.com

Office Action Summary	Application No.		Applicant(s)	
	13/403,141		YEAGER, C. DOUGLAS	
	Examiner		Art Unit	
	HEE SONG		2433	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on 23 February 2012.

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.

4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5) ☒ Claim(s) 1-31 is/are pending in the application.

5a) Of the above claim(s) ____ is/are withdrawn from consideration.

6) ☐ Claim(s) ____ is/are allowed.

7) ☒ Claim(s) 1-31 is/are rejected.

8) ☐ Claim(s) ____ is/are objected to.

9) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

10) ☐ The specification is objected to by the Examiner.

11) ☒ The drawing(s) filed on 23 February 2012 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)	4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. ____.
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)	5) ☐ Notice of Informal Patent Application
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>5/18/2012</u>	6) ☐ Other: ____.

DETAILED ACTION

This is in response to Application 13/403,141 filed on 23 February 2012 in which claims 1-31 are presented for examination.

Status of Claims

Claims 1-31 are pending, of which claim 1, 6, 12, 17, 22, and 28 are in independent form.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 18 May 2012 is being considered by the examiner.

Priority

Applicant's claim for the benefit of priority to Provisional Application No. 60/897,110 filed 25 January 2007 is acknowledged.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ryan et al. (US Patent 7,213,766 B2) hereinafter Ryan, in view of Gold (US PG-Pub. US PG-Pub. 2005/0231467 A1), and further in view of Somers et al. (US PG-Pub. 2007/0262138 A1) hereinafter Somers.

1. As to claim 1, Ryan teaches a token comprising (see Figs. 1C, 3A, 3B):

a mounting structure having a communication connector configured to connect to a computer terminal (see USB plug 322 in Fig. 3B);

a secure element affixed to the mounting structure, the secure element comprising a data file (see Fig. 1C 146 and 148 for smartcard (i.e. secure element)

comprising a memory strong a data file; see also Fig. 3B; see col. 14, line 66 through col. 15, line 8, and col. 20, lines 38-49; It is noted that a data in a data file could be transferred to smart card fob via ISO 7816-x interface.),

a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire transaction information from the data file by exchanging a plurality of transaction data communications only between the secure element and the secure element interrogator (e.g., translation module; see Fig. 3A, 300 and Fig. 3B, 324, and col. 20, lines 38-58; It is noted that a data in a data file could be transferred to smart card fob via ISO 7816-x interface.); and

a communications controller affixed to the mounting structure and configured to receive the data from the secure element interrogator and to transmit the transaction information as a single data communication to the computer terminal

through the communications connector (see Fig. 1C, Translation module 144; see also col. 18, lines 12-22).

Even though Ryan teaches that the commands are converted from USB interface format to ISO 7816-x interface format and vice versa, Ryan does not explicitly teach the secure element reader is a card reader located within the card token itself to receive data from the secure element.

However, Gold teaches a RFID interrogator/deader 58 positioned on the electronic memory card 60 (see Fig. 4 and par. [0030] and [0031]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the current invention was made, having the teachings of Ryan and Gold before him or her, to modify the Ryan's scheme by including the Gold's scheme for placing the card interrogator on the card itself. The suggestion/motivation for doing so would have been to achieve simplicity in completing transactions at the point of sale (POS) without the card reader at the POS.

The combination of Ryan and Lu does not explicitly teach what the transaction information is and how to convert at least a portion of the file information into transaction information.

However, Somers teaches that what the transaction information is (see Fig. 2A, Primary Account Number (PAN) in Track 1 fields, and Fig. 2, PAN in Track 2 fields) and how to convert at least a portion of the file information into transaction information (see also Fig. 3 for transmitting the sensitive portion of PAN as encrypted; see also, paragraphs 22-25, 32, and 40).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the current invention was made, having the teachings of Ryan, Gold, and Somers before him or her, to modify the scheme of Ryan and Gold by including the scheme of Somers for extracting the PAN data from the Track 1 or Track 2 data of the smartcard and encrypting the individual account identification number of the PAN but BIN untouched. The suggestion/motivation for doing so would have been to protect confidential data from being disclosed by encrypting the sensitive data, as briefly discussed in para. 22.

2. 6. A token comprising: a mounting structure having a communication connector configured to connect to a computer terminal; a secure element affixed to the mounting structure, the secure element comprising ***a payment card application and a data file***, a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire transaction information from the data file by exchanging a plurality of transaction data communications only between the secure element and the secure element interrogator; and a communications controller affixed to the mounting structure and configured to receive the data from the secure element interrogator and to transmit the transaction information as track data to the computer terminal through the communications connector (Claim 6 is rejected for the same reason in the rejected claim 1).

3. 12. A token comprising: a mounting structure having a communication connector configured to connect to a computer terminal; a secure element affixed to the mounting structure, the secure element comprising *a data file*, a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire *transaction information from the data file* by exchanging *a plurality of transaction data* communications only between the secure element and the secure element interrogator; and a communications controller affixed to the mounting structure and configured to receive the data from the secure element interrogator and to transmit *the transaction information* to the computer terminal through the communications connector (Claim 12 is rejected for the same reason as in rejected claim 1).

4. 17. A token comprising: *a mounting structure* having a communication connector configured to connect to a computer terminal; a secure element affixed to the mounting structure, *the secure element* comprising a data file, *a secure element interrogator* affixed to the mounting structure and configured to interrogate the secure element to acquire transaction information from the data file by exchanging *at least one transaction data communication* only between the secure element and the secure element interrogator; and a communications controller affixed to the mounting structure and configured to receive the data from the secure element interrogator and to transmit the transaction information as a single data communication to the computer terminal through the communications connector (Claim 17 is rejected for the same reason as in the rejected claim 1.)

5. 22. A token comprising: a mounting structure having a communication connector configured to connect to a computer terminal; a secure element affixed to the mounting structure, the secure element comprising *a payment card application and a data file*, a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire *transaction information* from the data file by exchanging *at least one transaction data communication* only between the secure element and the secure element interrogator; and a communications controller affixed to the mounting structure and configured to receive the data from the secure element interrogator and to transmit the transaction information as *track data* to the computer terminal through the communications connector (Claim 22 is rejected for the same reason as in claim 1).

6. 28. A token comprising: *a mounting structure* having a communication connector configured to connect to a computer terminal; *a secure element* affixed to the mounting structure, the secure element comprising *a data file, a secure element interrogator* affixed to the mounting structure and configured to interrogate the secure element to acquire *transaction information from the data file* by exchanging *at least one transaction data communications* only between the secure element and the secure element interrogator; and a communications controller affixed to the mounting structure and configured to receive the data from the secure element interrogator and to transmit the transaction information to the computer terminal through the communications connector (Claim 28 is rejected for the same reasons as in claim 1.)

7. As to claims 2, 7, 13, 18, 23, and 29, in view of claims 1, 6, 12, 17, 22, and 28, respectively, Ryan teaches wherein the plurality of transaction data communications/(at least one transaction data communication) comprises communications formatted according to ISO 7816-4 (see discussion in the rejected claim 1; It is also well-known that moving data, to be interpreted by the application in the chip of card, between circuitry components (e.g., between secure memory and authentication circuit) is ISO 7816-4 formatted (see Beradi et al. (US PG-Pub. 2005/0165,695))).

8. As to claims 3, 8, 14, 19, 24, and 30, in view of claims 1, 6, 12, 17, 22, and 28, respectively, Sombers teaches **wherein the secure element comprises personalization information that is unique to a specific holder to whom the token is issued** (see Fig. 2A, 3; par. [0022] - [0055], [0032], and [0040]; e.g., PAN).

9. As to claims 4, 9, 15, 20, 25, and 31, in view of claims 1, 6, 12, 17, 22, and 28, respectively, Gold teaches wherein the secure element interrogator exchanges the plurality of transaction data communications/(at least one transaction data communication) with the secure element only within libraries or memory space residing on the mounting structure (see Fig. 4 and par. [0030] and [0031]).

10. As to claims 5, 16, 21, in view of claims 1, 12, 17, respectively, Sombers teaches wherein the secure element comprises *a payment card application* and the single data communication to the computer terminal comprises *track data* (see also Fig. 3 for

transmitting the sensitive portion of PAN as encrypted (see also, paragraphs 22-25, 32, and 40).

11. As to claims 10, 26, in view of claim 6, 22, Sombers teaches wherein the track data is transmitted as a single data communication to the computer terminal (see also, paragraphs 22-25, 32, and 40).

12. As to claims 11, 27, in view of claim 6, 22, Sombers teaches wherein the track data comprises full Track 1 and Track 2 data (see discussion in the rejected claim 1 and paragraphs 22-25, 32, and 40).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HEE SONG whose telephone number is (571)270-3260. The examiner can normally be reached on Mon - Fri, 7:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey Pwu can be reached on (571)272-6798 . The fax phone number for the organization where this application or proceeding is assigned is 571-273-7291.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HEE SONG
Examiner, Art Unit 2433
9/28/2012

/Jeffrey Pwu/
Supervisory Patent Examiner, Art
Unit 2433

Notice of References Cited	Application/Control No. 13/403,141	Applicant(s)/Patent Under Reexamination YEAGER, C. DOUGLAS	
	Examiner HEE SONG	Art Unit 2433	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-7,213,766	05-2007	Ryan et al.	235/492
*	B	US-2007/0262138 A1	11-2007	Somers et al.	235/380
*	C	US-2005/0231467 A1	10-2005	Gold, Charles D.	345/156
*	D	US-2007/0170266 A1	07-2007	Krygier et al.	235/492
*	E	US-2007/0152070	07-2007	D'ALBORE, Guido	235/492
*	F	US-2007/0084925	04-2007	Palmade, Romain	235/451
*	G	US-2007/0023503	02-2007	Kang, Byung-Yoon	235/380
*	H	US-2005/0165695	07-2005	Berardi et al.	705/064
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

<i>Search Notes</i> 	Application/Control No. 13403141	Applicant(s)/Patent Under Reexamination YEAGER, C. DOUGLAS
	Examiner HEE SONG	Art Unit 2433

SEARCHED			
Class	Subclass	Date	Examiner
726	9, 20	9/30/2012	HS
235	380, 375, 439, 492	9/30/2012	HS
713	165	9/30/2012	HS
710	313	9/30/2012	HS
705	65	9/30/2012	HS

SEARCH NOTES		
Search Notes	Date	Examiner
EAST Inventor Name Search	9/28/2012	HS
EAST Class/Subclass Search	9/28/2012	hs
EAST Keyword Search	9/28/2012	HS
Google Keyword Search	9/28/2012	HS
IEEE/ACM NPL Search	9/28/2012	HS

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

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Receipt date: 05/18/2012

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

13403141 - GAU: 2433

Approved for use through 07/31/2012. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		13403141
	Filing Date		2012-02-23
	First Named Inventor	C. Douglas YEAGER	
	Art Unit	3621	
	Examiner Name		
	Attorney Docket Number	63766.C1	

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6439464		2002-08-27	Fruhauf et al.	
	2	6763399		2004-07-13	Margalit et al.	
	3	6883715		2005-04-26	Fruhauf et al.	
	4	6991173		2006-01-31	Fruhauf	
	5	7011247		2006-03-14	Drabczuk et al.	
	6	7150397		2006-12-19	Morrow et al.	
	7	7249266		2007-07-24	Margalit et al.	
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Receipt date: 05/18/2012 INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		13403141	13403141 - GAU: 2433
	Filing Date		2012-02-23	
	First Named Inventor	C. Douglas YEAGER		
	Art Unit	3621		
	Examiner Name			
	Attorney Docket Number	63766.C1		

Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20060255158		2006-11-16	Margalit et al.	

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Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1	EP1843277	EP		2007-10-10	Axalso SA		☐

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EXAMINER SIGNATURE			
Examiner Signature	/Hee Song/	Date Considered	09/30/2012

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S99	46	((C) near2 (YEAGER)).INV.	US-PGPUB; USPAT	OR	OFF	2012/09/30 09:03
S100	46	((C) near2 (YEAGER)).INV.	US-PGPUB; USPAT	OR	OFF	2012/09/30 09:04
S105	58	(self\$1authorizing self\$1authenticating) near3 card\$2 and @ad < "20070125"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 09:08
S106	0	(self\$1authorizing self\$1authenticating) near3 card\$2 same (secure near2 element\$2) and @ad < "20070125"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 09:09
S107	58	(self\$1authorizing self\$1authenticating self\$1swifing) near3 card\$2 and @ad < "20070125"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 10:38
S108	2	security near3 element\$2 same2 interrogator\$2 same3 (token\$2 FOB card\$2 smart\$1card\$2) and @ad < "20070125"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 10:40
S109	235	security near3 element\$2 same2 (reader interrogator\$2) same3 (token\$2 FOB card\$2 smart\$1card\$2) and @ad < "20070125"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 10:58
S110	1	("2005/0228821").URPN.	USPAT	OR	OFF	2012/09/30 11:54
S111	235	S109 not S107	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 12:04
S112	58	S107 not S109	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 12:04
S113	4715	iso near3 "7816"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 12:08
S114	7	security near3 element\$2 same3 (iso adj "7816") and @ad < "20070125"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2012/09/30 12:09

			DERWENT; IBM_TDB			
S115	0	iso near3 "7816" and security near3 element2 and token\$2	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 12:15
S116	0	iso near3 "7816" and security near3 element2	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 12:15
S117	2447	iso near3 "7816" same3 (token\$2 FOB card\$2 smart\$1card\$2) and @ad < "20070125"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 12:16
S118	1846	726/9,20.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 12:17
S119	20683	235/380,375,439,492.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 12:17
S120	1688	713/165.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 12:17
S121	1281	710/313.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 12:17
S122	25394	S118 S119 S120 S121	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 12:17
S123	741	705/65.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 12:17
S124	25959	S122 S123	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 12:18
S125	737	S117 and S124	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 12:18
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			DERWENT; IBM_TDB			
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S130	2	"7011247".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 14:16
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S133	2	"7249266".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 14:20
S134	2	"20060255158".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 14:22
S135	5	"1843277".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 14:23
S136	0	iso near3 "7816\$14" same3 (token\$2 FOB card\$2 smart\$1card\$2) and @ad < "20070125"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 15:03
S137	0	iso near3 "7816\$14" and @ad < "20070125"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 15:04
S138	570	iso near3 "7816-4" and @ad < "20070125"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2012/09/30 15:04

EAST Search History

			DERWENT; IBM_TDB			
S139	407	iso near3 "7816-4" same3 (token\$2 FOB card\$2 smart\$1card\$2) and @ad < "20070125"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 15:04
S140	157	S124 and S139	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/30 15:05

EAST Search History (Interference)

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9/ 30/ 2012 6:07:40 PM

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CONFIRMATION NO. 6813

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
13/403,141	02/23/2012 RULE	705	2433	63766.C1		
APPLICANTS C. Douglas Yeager, Austin, TX; ** CONTINUING DATA ***** This application is a CON of 12/019,318 01/24/2008 PAT 8,151,345 which claims benefit of 60/897,110 01/25/2007 YES, HS and claims benefit of 60/932,704 06/01/2007 ** FOREIGN APPLICATIONS ***** None, HS ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** ** SMALL ENTITY ** 03/26/2012						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and /HEE K SONG/ Acknowledged Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY TX	SHEETS DRAWINGS 19	TOTAL CLAIMS 31	INDEPENDENT CLAIMS 6
ADDRESS LUEDEKA NEELY GROUP, P.C. P O BOX 1871 KNOXVILLE, TN 37901 UNITED STATES						
TITLE SELF-AUTHORIZING TOKEN						
FILING FEE RECEIVED 1235	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit		

<p align="center"><i>Index of Claims</i></p> 	Application/Control No. 13403141	Applicant(s)/Patent Under Reexamination YEAGER, C. DOUGLAS
	Examiner HEE SONG	Art Unit 2433

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant											☐ CPA											☐ T.D.											☐ R.1.47										
CLAIM			DATE																																								
Final	Original	09/30/2012																																									
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Applicant Initiated Interview Request Form

Application No.: 13/403,141 First Named Applicant: C. Douglas Yeager
 Examiner: Song, Hee K Art Unit: 2433 Status of Application: Pending

Tentative Participants:

(1) Examiner Song (2) Applicant's Representative James Palmer

(3) _____ (4) _____

Proposed Date of Interview: Wednesday, January 9, 2013 Proposed Time: 10:00 AM (AM/PM)

Type of Interview Requested:

(1) ☒ Telephonic (2) ☐ Personal (3) ☐ Video Conference

Exhibit To Be Shown or Demonstrated: ☐ YES ☐ NO

If yes, provide brief description: _____

Issues To Be Discussed

Issues (Rej., Obj., etc)	Claims/ Fig. #s	Prior Art	Discussed	Agreed	Not Agreed
(1) <u>Rejection</u>	<u>Cls 1, 6, 12, 17, 22, 28</u>	<u>US2005/0231467 – Gold</u>	☐	☐	☐
(2) <u>Rejection</u>	<u>6, 22</u>	<u>??</u>	☐	☐	☐
(3) _____	_____	_____	☐	☐	☐
(4) _____	_____	_____	☐	☐	☐

☐ Continuation Sheet Attached ☒ Proposed Amendment or Arguments Attached

Brief Description of Arguments to be Presented: _____

An interview was conducted on the above-identified application on _____

NOTE: This form should be completed and filed by applicant in advance of the interview (see MPEP § 713.01). If this form is signed by a registered practitioner not of record, the Office will accept this as an indication that he or she is authorized to conduct an interview on behalf of the principal (37 CFR 1.32(a)(3)) pursuant to 37 CFR 1.34. This is not a power of attorney to any above named practitioner. See the Instruction Sheet for this form, which is incorporated by reference. By signing this form, applicant or practitioner is certifying that he or she has read the Instruction Sheet. After the interview is conducted, applicant is advised to file a statement of the substance of this interview (37 CFR 1.133(b)) as soon as possible. This application will not be delayed from issue because of applicant's failure to submit a written record of this interview.

/James R Palmer/

Applicant/Applicant's Representative Signature

James R. Palmer

Typed/Printed Name of Applicant or Representative

48,633

Registration Number, if applicable

Examiner/SPE Signature

This collection of information is required by 37 CFR 1.133. 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 24 minutes 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.

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Attachment to PTOL-413A

Application No. 13/403,141

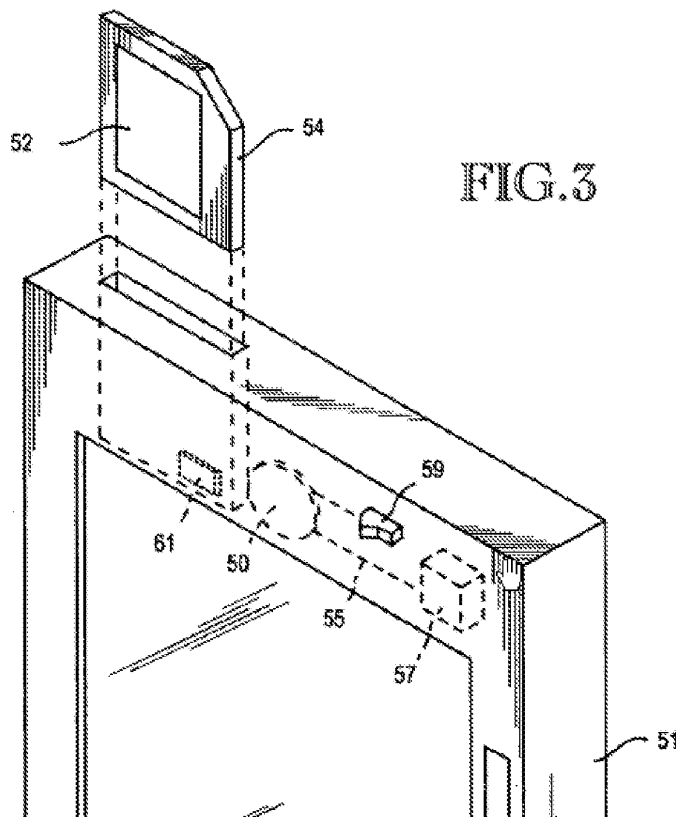
First Named Inventor: C. Douglas Yeager

Atty. Docket No. 63766.C1

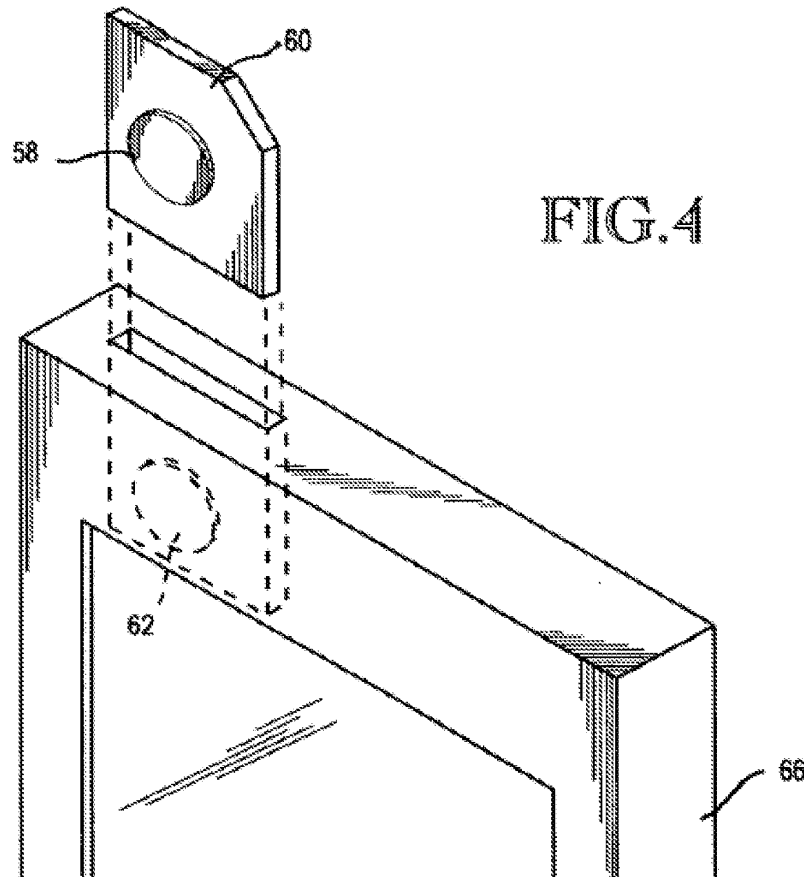
Re: Office Action Dated: 10/11/2012

- 1) All of the independent claims (1, 6, 12, 17, 22 and 28) in this application have the Secure Element (SE) and the Interrogator affixed to the same mounting structure. The Examiner cites US2005/0231467 – Gold) as showing this feature. However, Gold shows two configurations, neither of which has an interrogator and SE on the same mounting structure.

In Figure 3 the interrogator 50 is in the reader 51 and the RFID tag 52 is on a chip.



In Figure 4 the reader/interrogator 58 is on the chip 60 and according to Paragraph [0031], “an RFID tag or label 62 [is] in the display device 66.”



In other words, in Figure 3 Gold discloses an interrogator 50 in the reader 51 and an RFID tag 52 on a chip. Then in Figure 4, Gold discloses an interrogator 58 on a chip and an RFID tag 62 in a reader. Thus Gold adds nothing to the other references to disclose or suggest that the Secure Element and the Interrogator could be on the same mounting structure.

- 2) Independent Claims 6 and 22 include an SE that comprises a payment card application. Paragraph [0043] provides information regarding this configuration:

Executable applications such as the MasterCard, PayPass, VISA, Contactless, and AMEX Express Pay may be compiled and placed on an SE. Personalization information that is unique to the specific card holder is generally also placed on an SE. The applications for

an SE are typically specified by application providers such as MasterCard, VISA, or AMEX among others. The applications may be created using any number of software development tools and then compiled to run on any number of SE architectures.

The Examiner doesn't address how the cited art discloses or suggests an SE that comprises a payment card application.

Electronic Acknowledgement Receipt	
EFS ID:	14628655
Application Number:	13403141
International Application Number:	
Confirmation Number:	6813
Title of Invention:	SELF-AUTHORIZING TOKEN
First Named Inventor/Applicant Name:	C. Douglas Yeager
Customer Number:	408
Filer:	James Roy Palmer/Jennifer McDonald
Filer Authorized By:	James Roy Palmer
Attorney Docket Number:	63766.C1
Receipt Date:	07-JAN-2013
Filing Date:	23-FEB-2012
Time Stamp:	13:20:32
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Letter Requesting Interview with Examiner	63766c1-temp-20120107-RequestForInterview_WithAttachment.pdf	244163 <small>fa199c5d578d822405cb582d82b5572568109195</small>	no	4

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Information:

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/403,141	02/23/2012	C. Douglas Yeager	63766.C1	6813

408	7590	01/16/2013
LUEDEKA NEELY GROUP, P.C.		
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EXAMINER	
SONG, HEE K	

ART UNIT	PAPER NUMBER
2433	

NOTIFICATION DATE	DELIVERY MODE
01/16/2013	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTO-EMAIL@LNG-patent.com
LNG.PATENT@gmail.com

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 13/403,141
Applicant: YEAGER, C. Douglas
Filing Date: 02/23/2012
Confirmation No.: 6813
Title: SELF-AUTHORIZING TOKEN
Examiner: SONG, Hee K.
Group Art Unit: 2433

AMENDMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Office Action dated 10/11/2012, please amend the above-referenced application as follows and reconsider the application in view of this amendment and the accompanying Remarks.

Interview Summary begins on page 2 of this submittal.

Amendments to the Claims are reflected in the listing of claims which begins on page 3 of this submittal.

Remarks begin on page 17 of this submittal.

Interview Summary

These comments are in response to the Interview Summary mailed 1/16/2013. The Examiner states:

Participants: (1) Hee Song, (2) , James Palmer

Date of Interview: 10 January 2013

Type: Telephonic

Exhibit shown or demonstration conducted: No

Claim(s) discussed: 1, 6, 12, 17, 22 and 28

Identification of prior art discussed: Gold

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: Applicant's representative James Palmer and the examiner discussed the difference between the application and prior arts of record focusing on the applicant's mounting structure of a token having a secure element and a secure element interrogator affixed to the same mounting structure. It was agreed that the Gold reference and other prior arts of record does not explicitly teach the token with a mounting structure having the secure element and the secure element interrogator affixed to the same mounting structure.

Although the Examiner's summary is quite brief, the Applicant affirms that it is substantially complete because of the simple nature of the interview, and the Applicant accepts the summary of the interview prepared by the Examiner.

In the Claims:

This listing of claims replaces all prior versions and prior listings of claims in the application:

Listing of Claims:

What is claimed is:

1. (Original) A token comprising:
 - a mounting structure having a communication connector configured to connect to a computer terminal;
 - a secure element affixed to the mounting structure, the secure element comprising a data file,
 - a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire transaction information from the data file by exchanging a plurality of transaction data communications only between the secure element and the secure element interrogator; and
 - a communications controller affixed to the mounting structure and configured to receive the data from the secure element interrogator and to transmit the transaction information as a single data communication to the computer terminal through the communications connector.
2. (Original) The token of Claim 1 wherein the plurality of transaction data communications comprises communications formatted according to ISO 7816-4.
3. (Currently Amended) The token of Claim 1 wherein the secure element comprises ~~personalization information that is unique to a specific holder to whom the token is issued~~ an encryption algorithm, an encryption key, and a transaction counter.
4. (Original) The token of Claim 1 wherein the secure element interrogator exchanges the plurality of transaction data communications with the secure element only within libraries or memory space residing on the mounting structure.

5. (Original) The token of Claim 1 wherein the secure element comprises a payment card application and the single data communication to the computer terminal comprises track data.
6. (Currently Amended) A token ~~system for authorizing a transaction~~ comprising:
 - a mounting structure having a communication connector configured to connect to a computer terminal;
 - a secure element affixed to the mounting structure, the secure element comprising a payment card application and a ~~[[a]]~~ data file~~[[,]]~~;
 - a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire transaction information from the data file by exchanging a plurality of transaction data communications only between the secure element and the secure element interrogator; and
 - a communications controller affixed to the mounting structure and configured to receive the data from the secure element interrogator and to transmit the transaction information as track data to the computer terminal through the communications connector.
7. (Original) The token of Claim 6 wherein the plurality of transaction data communications comprises communications formatted according to ISO 7816-4.
8. (Currently Amended) The token of Claim 6 wherein the secure element comprises ~~personalization information that is unique to a specific holder to whom the token is issued~~ an encryption algorithm, an encryption key, and a transaction counter.
9. (Original) The token of Claim 6 wherein the secure element interrogator exchanges the plurality of transaction data communications with the secure element only within libraries or memory space residing on the mounting structure.
10. (Currently Amended) The token of Claim 6 wherein ~~the track data is transmitted as a single data communication to the computer terminal~~ the communications controller creates a random unpredictable number and sends it to the secure element.

11. (Currently Amended) The token of Claim 6 wherein the ~~track data comprises full Track 1 and Track 2 data~~ transaction information comprises a dynamic card verification code.
12. (Original) A token comprising:
 - a mounting structure having a communication connector configured to connect to a computer terminal;
 - a secure element affixed to the mounting structure, the secure element comprising a data file,
 - a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire transaction information from the data file by exchanging a plurality of transaction data communications only between the secure element and the secure element interrogator; and
 - a communications controller affixed to the mounting structure and configured to receive the data from the secure element interrogator and to transmit the transaction information to the computer terminal through the communications connector.
13. (Original) The token of Claim 12 wherein the plurality of transaction data communications comprises communications formatted according to ISO 7816-4.
14. (Currently Amended) The token of Claim 12 wherein the secure element comprises ~~personalization information that is unique to a specific holder to whom the token is issued~~ an encryption algorithm, an encryption key, and a transaction counter.
15. (Original) The token of Claim 12 wherein the secure element interrogator exchanges the plurality of transaction data communications with the secure element only within libraries or memory space residing on the mounting structure.
16. (Currently Amended) The token of Claim 12 wherein the secure element comprises a payment card application ~~and the single data communication to the computer terminal~~ and the transaction information comprises track data.

17. (Original) A token comprising:

a mounting structure having a communication connector configured to connect to a computer terminal;

a secure element affixed to the mounting structure, the secure element comprising a data file,

a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire transaction information from the data file by exchanging at least one transaction data communication only between the secure element and the secure element interrogator; and

a communications controller affixed to the mounting structure and configured to receive the data from the secure element interrogator and to transmit the transaction information as a single data communication to the computer terminal through the communications connector.

18. (Original) The token of Claim 17 wherein the at least one transaction data communication comprises communications formatted according to ISO 7816-4.

19. (Currently Amended) The token of Claim 17 wherein the secure element comprises ~~personalization information that is unique to a specific holder to whom the token is issued~~ an encryption algorithm, an encryption key, and a transaction counter.

20. (Original) The token of Claim 17 wherein the secure element interrogator exchanges the at least one transaction data communication with the secure element only within libraries or memory space residing on the mounting structure.

21. (Original) The token of Claim 17 wherein the secure element comprises a payment card application and the single data communication to the computer terminal comprises track data.

22. (Currently Amended) A token comprising:

a mounting structure having a communication connector configured to connect to a computer terminal;

a secure element affixed to the mounting structure, the secure element comprising a payment card application and a data file[[,]]; and

a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire transaction information from the data file by exchanging at least one transaction data communication only between the secure element and the secure element interrogator; and

a communications controller affixed to the mounting structure and configured to receive the data from the secure element interrogator and to transmit the transaction information as track data to the computer terminal through the communications connector.

23. (Original) The token of Claim 22 wherein the at least one transaction data communication comprises communications formatted according to ISO 7816-4.

24. (Currently Amended) The token of Claim 22 wherein the secure element comprises ~~personalization information that is unique to a specific holder to whom the token is issued~~ an encryption algorithm, an encryption key, and a transaction counter.

25. (Original) The token of Claim 22 wherein the secure element interrogator exchanges the at least one transaction data communication with the secure element only within libraries or memory space residing on the mounting structure.

26. (Currently Amended) The token of Claim 22 wherein ~~the track data is transmitted as a single data communication to the computer terminal~~ the communications controller creates a random unpredictable number and sends it to the secure element.

27. (Currently Amended) The token of Claim 22 wherein the ~~track data comprises full Track 1 and Track 2 data~~ transaction information comprises a dynamic card verification code.

28. (Original) A token comprising:

a mounting structure having a communication connector configured to connect to a computer terminal;

a secure element affixed to the mounting structure, the secure element comprising a data file,

a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire transaction information from the data file by exchanging at least one transaction data communications only between the secure element and the secure element interrogator; and

a communications controller affixed to the mounting structure and configured to receive the data from the secure element interrogator and to transmit the transaction information to the computer terminal through the communications connector.

29. (Original) The token of Claim 28 wherein the at least one transaction data communication comprises communications formatted according to ISO 7816-4.

30. (Currently Amended) The token of Claim 28 wherein the secure element comprises ~~personalization information that is unique to a specific holder to whom the token is issued~~ an encryption algorithm, an encryption key, and a transaction counter.

31. (Original) The token of Claim 28 wherein the secure element interrogator exchanges the at least one transaction data communication with the secure element only within libraries or memory space residing on the mounting structure.

32. (New) The token of Claim 1 wherein communications to and from the secure element consist of communications from and to the secure element reader.

33. (New) The token of Claim 1 further comprising an antenna that transmits data to and from the secure element, wherein the secure element is interrogated by an external reader.

34. (New) The token of Claim 6 wherein communications to and from the secure element consist of communications from and to the secure element reader.
35. (New) The token of Claim 6 further comprising an antenna that transmits data to and from the secure element, wherein the secure element is interrogated by an external reader.
36. (New) The token of Claim 12 wherein communications to and from the secure element consist of communications from and to the secure element reader.
37. (New) The token of Claim 12 further comprising an antenna that transmits data to and from the secure element, wherein the secure element is interrogated by an external reader.
38. (New) The token of Claim 17 wherein communications to and from the secure element consist of communications from and to the secure element reader.
39. (New) The token of Claim 17 further comprising an antenna that transmits data to and from the secure element, wherein the secure element is interrogated by an external reader.
40. (New) The token of Claim 22 wherein communications to and from the secure element consist of communications from and to the secure element reader.
41. (New) The token of Claim 22 further comprising an antenna that transmits data to and from the secure element, wherein the secure element is interrogated by an external reader.
42. (New) The token of Claim 28 wherein communications to and from the secure element consist of communications from and to the secure element reader.
43. (New) The token of Claim 28 further comprising an antenna that transmits data to and from the secure element, wherein the secure element is interrogated by an external reader.
44. (New) The token of Claim 6 wherein the secure element comprises a plurality of payment card applications from different card associations and the secure element interrogator interrogates one of the payment card applications.

45. (New) The token of Claim 22 wherein the secure element comprises a plurality of payment card applications from different card associations and the secure element interrogator interrogates one of the payment card applications.
46. (New) A token for transmitting a communications data package to a host device, the token comprising:
- a mounting structure;
 - a secure element affixed to the mounting structure, the secure element including a data file containing transaction information;
 - a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire the transaction information from the data file by exchanging at least one transaction data communication between the secure element and the secure element interrogator and to generate the communications data package based on the transaction information; and
 - a communications controller affixed to the mounting structure and configured to receive the communications data package from the secure element interrogator and to transmit the communications data package to the host device.
47. (New) The token of Claim 46 wherein the at least one transaction data communication comprises a plurality of transaction data communications between the secure element and the secure element interrogator, the plurality of transaction data communications being formatted according to ISO 7816-4.
48. (New) The token of Claim 46 wherein the secure element comprises an encryption algorithm, an encryption key, and a transaction counter.
49. (New) The token of Claim 46 wherein the secure element interrogator exchanges the at least one transaction data communication with the secure element occurs only within libraries or memory space residing on the mounting structure.

50. (New) The token of Claim 46 wherein all communications to and from the secure element consist of communications from and to the secure element reader.
51. (New) The token of Claim 46 wherein the secure element comprises a microprocessor and the transaction information comprises a dynamic card verification code calculated from an unpredictable number by the microprocessor.
52. (New) The token of Claim 46 further comprising an antenna that transmits data to and from the secure element, wherein the secure element is interrogated by an external reader.
53. (New) The token of Claim 46 wherein the secure element comprises a plurality of payment card applications from different card associations and the secure element interrogator interrogates one of the payment card applications.
54. (New) The token of Claim 46 wherein the host device comprises a cellular network device and the cellular network device comprises the secure element, the interrogator and the communications controller. .
55. (New) The token of Claim 46 wherein the host device comprises a cellular network device and the cellular network device comprises the secure element, the interrogator and the communications controller and the host device has the physical form of a mobile phone or a PDA.
56. (New) The token of Claim 46 wherein the mounting structure comprises a substrate.
57. (New) The token of Claim 46 wherein the mounting structure comprises a packaging case.
58. (New) The token of Claim 46 wherein the token has the physical form of a payment card.
59. (New) The token of Claim 46 wherein the token has the physical form of a fob.
60. (New) The token of Claim 46 wherein the token has the physical form of a cartridge.
61. (New) The token of Claim 46 wherein the token has the physical form of a dongle.

62. (New) The token of Claim 46 wherein the token has the physical form of a secure digital (SD) chip.
63. (New) The token of Claim 46 wherein the host device comprises a cellular network device and the cellular network device is configured to transmit the data communications package over a wireless network.
64. (New) A cellular network device comprising:
- a mounting structure;
 - a secure element affixed to the mounting structure, the secure element including a data file containing transaction information; and
 - a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire the transaction information from the data file by exchanging at least one transaction data communication between the secure element and the secure element interrogator and to generate a communications data package based on the transaction information.
65. (New) The token of Claim 64 wherein the at least one transaction data communication comprises a plurality of transaction data communications between the secure element and the secure element interrogator, the plurality of transaction data communications being formatted according to ISO 7816-4.
66. (New) The token of Claim 64 wherein the secure element interrogator exchanges the at least one transaction data communication with the secure element only within libraries or memory space residing on the mounting structure.
67. (New) The token of Claim 64 wherein all communications to and from the secure element consist of communications from and to the secure element reader.
68. (New) The token of Claim 64 wherein the secure element comprises a microprocessor and the transaction information comprises a dynamic card verification code calculated from an unpredictable number by the microprocessor.

69. (New) The token of Claim 64 further comprising an antenna that transmits data to and from the secure element, wherein the secure element is interrogated by an external reader.
70. (New) The token of Claim 64 wherein the secure element comprises a plurality of payment card applications from different card associations and the secure element interrogator interrogates one of the payment card applications.
71. (New) The token of Claim 1 wherein:
- the secure element comprises an executable application; and
- the secure element interrogator is configured to interrogate the executable application to acquire the transaction information from the data file.
72. (New) The token of Claim 6 wherein:
- the payment card application comprises an executable payment card application; and
- the secure element interrogator is configured to interrogate the executable payment card application to acquire the transaction information from the data file.
73. (New) The token of Claim 12 wherein:
- the secure element comprises an executable application; and
- the secure element interrogator is configured to interrogate the executable application to acquire the transaction information from the data file.
74. (New) The token of Claim 17 wherein:
- the secure element comprises an executable application; and
- the secure element interrogator is configured to interrogate the executable application to acquire the transaction information from the data file.

75. (New) The token of Claim 22 wherein:
- the payment card application comprises an executable payment card application; and
- the secure element interrogator is configured to interrogate the executable payment card application to acquire the transaction information from the data file.
76. (New) The token of Claim 28 wherein:
- the secure element comprises an executable application; and
- the secure element interrogator is configured to interrogate the executable application to acquire the transaction information from the data file.
77. (New) The token of Claim 6 wherein the executable payment card application includes an application level protocol for authentication of the secure element.
78. (New) The token of Claim 22 wherein the executable payment card application includes an application level protocol for authentication of the secure element.
79. (New) The cellular network device of Claim 64 further comprising a communications controller affixed to the mounting structure and configured for receiving the communications data package for transmission by the cellular network device over a wireless network.

80. (New) The cellular network device of Claim 64 wherein:
- the secure element comprises a payment card application;
 - the secure element interrogator is configured to interrogate the payment card application;
 - and
 - the communications data package comprises card-present data.
81. (New) The token of Claim 1 wherein:
- the secure element comprises a payment card application;
 - the secure element interrogator is configured to interrogate the payment card application;
 - and
 - the transaction information comprises card-present data.
82. (New) The token of Claim 6 wherein the transaction information comprises card-present data.
83. (New) The token of Claim 12 wherein:
- the secure element comprises a payment card application;
 - the secure element interrogator is configured to interrogate the payment card application;
 - and
 - the transaction information comprises card-present data.
84. (New) The token of Claim 17 wherein:
- the secure element comprises a payment card application;
 - the secure element interrogator is configured to interrogate the payment card application;
 - and
 - the transaction information comprises card-present data.

85. (New) The token of Claim 22 wherein the transaction information comprises card-present data.
86. (New) The token of Claim 28 wherein:
- the secure element comprises a payment card application;
 - the secure element interrogator is configured to interrogate the payment card application;
 - and
 - the transaction information comprises card-present data.
87. (New) The token of Claim 46 wherein:
- the secure element comprises a payment card application;
 - the secure element interrogator is configured to interrogate the payment card application;
 - and
 - the transaction information comprises card-present data.

Remarks

The Office Action dated 10/11/2012 recorded the following status of claims in this application. Claims 1 – 31 were pending in the application. Claims 1 – 31 were rejected. This amendment amends Claims 3, 6, 8, 10, 11, 14, 16, 19, 22, 24, 26, 27, and 30 and submits new Claims 32 – 87. Reconsideration of this application is requested in view of these changes and the remarks presented below.

Claim Amendments / New Claims

Claims 3, 8, 14, 19, 24, 30 and 48 depend from independent Claims 1, 6, 12, 17, 22, 28, and new independent Claim 46 respectively. Claims 3, 8, 14, 19, 24, and 30 are currently amended, and new claim 48 is entered, to specify that the secure element comprises an encryption algorithm, an encryption key, and a transaction counter. Support for this limitation may be found at least, for example, in paragraph [0086] of the specification. Consequently no new matter is entered with the current amendment of Claims 3, 8, 14, 19, 24, and 30, and new Claim 48.

Claim 16 depends from independent Claim 12 and Claim 16 is currently amended to specify that comprises track data. the transaction information Claim 16 previously specified that “the single data communication to the computer terminal comprises track data. However, Claim 12 does not include “a single data communication.” The current amendment to Claim 16 corrects the antecedent basis for the track data. Consequently no new matter is entered with the amendments of Claim 16.

Independent Claim 6 is currently amended to correct some typographical errors. Consequently no new matter is entered with the current amendment of Claim 6.

Claims 10 and 26 depend from independent Claims 6 and 22 respectively. Claims 10 and 26 are currently amended to specify that the communications controller of the respective independent claim creates a random unpredictable number and sends it to the secure element. Support for this limitation may be found at least, for example, in paragraph [0097] of the

specification. Consequently no new matter is entered with the current amendments of Claims 10 and 26.

Claims 11 and 27 depend from independent Claims 6 and 22 respectively. Claims 11 and 27 are currently amended to specify that the transaction information comprises a dynamic card verification code. Support for this limitation may be found at least, for example, in paragraph [0097] of the specification. Consequently no new matter is entered with the current amendments of Claims 11 and 27.

Independent Claim 22 is currently amended to correct a typographical error. . Consequently no new matter is entered with the current amendment of Claim 22.

New dependent Claims 32, 34, 36, 38, 40, 42, 50, and 67 are entered, depending from independent Claims 1, 6, 12, 17, 22, 28 and new independent Claims 46 and 64, respectively. New Claims 32, 34, 36, 38, 40, 42, 50, and 67 specify that all communications to and from the secure element consist of communications from and to the secure element reader. Support for these limitations may be found at least, for example, in Figures 5.1 and 5.2 and paragraphs [0016], [0073], [0075], [0084], [0085], [0086], and [0103]. Consequently no new matter is entered with new Claims 32, 34, 36, 38, 40, 42 50 and 67.

New dependent Claims 33, 35, 37, 39, 41, 43, 52 and 69 are entered, depending from independent Claims 1, 6, 12, 17, 22, 28 and new independent Claims 46 and 64 respectively. New Claims 33, 35, 37, 39, 41, 43, 52 and 69 specify that respective token comprises an antenna that transmits data to and from the secure element such that the secure element is interrogated by an external reader. Support for these limitations may be found at least, for example, in Figure 3 and at paragraphs [0069], which states that the antenna serves as the sole power supply, data transmitter, and data receiver for the SE, and by portions of paragraph [0052] that describe further considerations regarding powering and the antenna, and paragraph [0079], which states “in many embodiments the SE on the requester’s card device may be used to make contactless transactions at in-store POS terminals by holding the card device up to a contactless reader.” Consequently no new matter is entered with new Claims 33, 35, 37, 39, 41, 43 52 and 69.

New dependent Claims 44, 45, 53, and 70 are entered, depending from independent Claims 6, 22 and new independent Claims 46 and 64, respectively. New claims 44, 45 53, and 70 specify that the secure element comprises a plurality of payment card applications from different card associations and the secure element interrogator interrogates one of the payment card applications. Support for these limitations may be found at least, for example, in paragraph [0043], which states, “The applications for an SE are typically specified by application providers such as MasterCard, VISA, or AMEX among others,” and “[e]xecutable applications such as the MasterCard, PayPass, VISA, Contactless, and AMEX Express Pay may be compiled and placed on an SE,” and paragraph [0044], which states “The provisioning entities such as First Data Corp. must follow strict guidelines set forth by **card associations** [emphasis added] such as VISA, MasterCard, AMEX,” and paragraph [0074], which states “It is important to know that the SE can run multiple applications from different application providers.” Consequently no new matter is entered with new Claims 44, 45, 53, and 70.

New independent Claim 46 is entered and new Claim 46 specifies certain features that may be generally characterized as elements selected from features claimed in the original claim set as filed. Support for the element “host device” may be found at least, for example, in paragraph [0036]. Support for the element “communication data package” may be found at least, for example, in Figure 16.1 and paragraph [0102]. Consequently no new matter is entered with new independent Claim 46.

New dependent Claim 47 depends from new independent Claim 46 and new Claim 65 depends from new independent Claim 64. New Claims 47 and 65 specify that the at least one transaction data communication comprises a plurality of transaction data communications between the secure element and the secure element interrogator, the plurality of transaction data communications being formatted according to ISO 7816-4. These limitations conform in general to limitations from original Claims 12 and 13. Consequently no new matter is entered with new Claims 47 and 65.

New dependent Claim 49 depends from new independent Claim 46 and new Claim 49 specifies that the secure element interrogator exchanges the at least one data communication with the secure element occurs only within libraries or memory space residing on the mounting

structure. These limitations conform in general to limitations from original Claims 4, 9, 15, 20, and 25. Consequently, no new matter is entered with new Claim 49.

New dependent Claim 51 depends from new independent Claim 46 and new Claim 66 depends from new independent Claim 64. News Claims 51 and 68 specify that the secure element comprises a microprocessor and the transaction information comprises a dynamic card verification code calculated from an unpredictable number by the microprocessor. Support for this limitation may be found at least, for example, in paragraph [0097] of the specification. Consequently no new matter is entered with new Claims 51 and 66.

New dependent Claim 54 depends from new independent Claim 46 and new Claim 54 specifies that host device comprises a cellular network adapter and the cellular network adapter comprises the secure element, the interrogator and the communications controller. Support for limitation cellular network adapter may be found at least, for example, in paragraph [0102] which states “The cellular network adapter 430 (the interrogator and the communications controller and the secure element), in this case, may be contained as an element 420 inside the mobile phone and exist as a software module running on the baseband of the phone. Support for the host device comprising a cellular network device may be found at least, for example in paragraph [0036]. Consequently no new matter is entered with new Claim 54.

New dependent Claim 55 depends from new independent Claim 46 and new Claim 55 specifies that the host device comprises a cellular network device and the cellular network device comprises the secure element, the interrogator and that the host device comprises a cellular network device and the token has the physical form of a mobile phone or a PDA. Support for the host device comprising a cellular network device may be found at least, for example in paragraph [0036]. Support for the token having a physical appearance of a mobile phone or a PDA may be found at least, for example, in paragraph [0105]. Consequently no new matter is entered with new Claim 55.

New dependent Claim 56 depends from new independent Claim 46 and new Claim 55 specifies that the mounting structure comprises a substrate. Support for this limitation may be found at least, for example, in paragraph [0032]. Consequently no new matter is entered with new Claim 56.

New dependent Claim 57 depends from new independent Claim 46 and new Claim 57 specifies that the mounting structure comprises a packaging case. Support for this limitation may be found at least, for example, in paragraph [0032]. Consequently no new matter is entered with new Claim 57.

New dependent Claim 58 depends from new independent Claim 46 and new Claim 57 specifies that the token has the physical form of a payment card. Support for this limitation may be found at least, for example, in paragraph [0032]. Consequently no new matter is entered with new Claim 58.

New dependent Claim 59 depends from new independent Claim 46 and new Claim 57 specifies that the token has the physical form of a fob. Support for this limitation may be found at least, for example, in paragraph [0032]. Consequently no new matter is entered with new Claim 59.

New dependent Claim 60 depends from new independent Claim 46 and new Claim 60 specifies that the token has a physical form of a cartridge. Support for this limitation may be found at least, for example, in paragraph [0032]. Consequently no new matter is entered with new Claim 60.

New dependent Claim 61 depends from new independent Claim 46 and new Claim 61 specifies that the token has a physical form of a dongle. Support for this limitation may be found at least, for example, in paragraph [0032]. Consequently no new matter is entered with new Claim 61.

New dependent Claim 62 depends from new independent Claim 46 and new Claim 62 specifies that the token has a physical form of a secure digital (SD) chip. Support for this limitation may be found at least, for example, in paragraph [0032]. Consequently no new matter is entered with new Claim 62.

New dependent Claim 63 depends from new independent Claim 46 and new Claim 63 specifies that the host device comprises a cellular network device and the cellular network device is configured to transmit the data communications package over a wireless network. This

limitation is supported at least, for example, by Figure 16.1 and paragraph [0102] of the specification. Consequently no new matter is entered with new Claim 63.

New independent Claim 64 provides a cellular network device. Support for claims for a cellular network device may be found at least, for example, in paragraphs [0034], [0035]. Support for the claimed elements of a cellular network device may be found at least, for example, in paragraphs [0004] – [0009], [0032], [0034], [0035], and [0050]. Consequently no new matter is entered with new Claim 64.

New dependent Claim 66 depends from new independent Claim 64 and new Claim 66 specifies that the secure element interrogator exchanges the at least one data communication with the secure element occurs only within libraries or memory space residing on the mounting structure. These limitations conform in general to limitations from original Claims 4, 9, 15, 20, and 25. Consequently, no new matter is entered with new Claim 66.

New Claims 71, 73, 74, and 76 are entered, depending from Claim 1, 12, 17, and 28 respectively. New Claims 71, 73, 74, and 76 specify that the secure element comprises an executable application and that the secure element interrogator is configured to interrogate the executable application. Support for these limitations may at least, for example, be found at paragraph [0043] of the specification which states that “An SE typically contains a microprocessor . . .” and that “[e]xecutable applications may be compiled and placed on an SE . . .” and in Figures 5.1 and 5.2 and paragraphs [0073] and [0075] that discuss the interrogation process. Consequently no new matter is entered with new Claims 71, 73, 74, and 76.

New Claims 72 and 75 are entered, depending from Claims 6 and 22 respectively. New Claims 72 and 75 specify that the payment card application comprises an executable payment card application and that the secure element interrogator is configured to interrogate the executable payment card application. Support for these limitations may at least, for example, be found at paragraph [0043] of the specification which states that “An SE typically contains a microprocessor . . .” and that “[e]xecutable applications may be compiled and placed on an SE . . .” and in Figures 5.1 and 5.2 and paragraphs [0073] and [0075] that discuss the interrogation process. Consequently no new matter is entered with new Claims 72 and 75.

New Claims 77 and 78 depend from Claims 66 and 22 respectively and new Claims 77 and 78 specify that the executable payment card application includes an application level protocol for authentication of the secure element. Support for this limitation may at least, for example, be found in Figure 5 and paragraph [0073] that discusses application level protocols (APIs) that allow the smart card and the reader to mutually identify themselves. Paragraph [0032] describes the integral relationship between smart cards and tokens and secure elements such that the reference to “authentication of the secure element” in new Claims 77 and 78 is inherently disclosed. Consequently no new matter is entered with new Claims 77 and 78.

New Claim 79 depends from new independent Claim 64 and adds a communication controller affixed to the mounting structure. Support for this limitation may be found at least for example in paragraphs [0050], [0051], [0056] and [00102] of the specification and Figure 16.1. Consequently no new matter is entered with new Claim 79.

New Claim 80 depends from new independent Claim 64 and specifies further features of the cellular network device, including the limitation that the communications data package comprises card-present data. Support for this limitation may be found at least, for example, in paragraph [00101] of the specification which describes how a cellular network device may, for example, be presented at a retailer location and that “that the interrogation of the SE can be initiated and carried out by either the reader in the cellular network adapter 320 or an external reader as shown in the diagram in Fig. 16.” Paragraph [0038] describes “card-present” transactions at retailers and paragraph [0039] describes how features of paragraph [0038] may be incorporated into disclosed embodiments. Consequently no new matter is entered with new Claim 80.

New Claims 81, 82 83, 84, 85, 86 and 87 depend from independent Claims 1, 6, 12, 17, 22, 28 and new independent Claim 46 respectively. New Claims 81, 82, 83, 84, 85, 86 and 87 specify inter alia that the transaction information comprises card-present data. Support for this limitation may be found at least, for example in paragraph [0038], which describes “card-present” transactions at retailers, and in paragraph [0039], which describes how features of paragraph [0038] may be incorporated into disclosed embodiments. Consequently no new matter is entered with new Claims 81, 82 83, 84, 85, 86 and 87.

Claim Rejections – 35 U.S.C. §103(a) – [Ryan et al. (US Patent 7,213,766 B2) in view of Gold (US PG-Pub. 2005/0231467 A1) and further in view of Somers et al. (US PG-Pub. 2007/0262138 A1)]

Claims 1 – 31 were rejected under 35 U.S.C. 103(a) as being unpatentable over Ryan et al. (US Patent 7,213,766 B2) (hereinafter “Ryan”), in view of Gold (US PG-Pub. 2005/0231467 A1) (hereinafter “Gold”), and further in view of Somers et al. (US PG-Pub. 2007/0262138 A1) (hereinafter “Somers”).

Regarding independent Claims 1, 6, 12, 17, 22, 28, the Examiner states that Ryan discloses various elements of the Claims, but the Examiner acknowledges that “Ryan does not explicitly teach the secure element reader is a card reader located within the card token itself to receive data from the secure element.” The Examiner then turns to Gold for a disclosure of the claimed limitation. However, as illustrated in the attachment to the Applicant’s Letter Requesting Interview with Examiner that was made of record on 01/17/2013, Gold shows two configurations, neither of which has an interrogator and SE affixed to the same mounting structure. Nor does other prior art of record disclose or suggest this limitation. The Examiner’s agreement to that conclusion, per the Applicant Initiated Interview Summary (PTOL-413) that was made of record on 1/19/2013 is much appreciated.

As the Examiner certainly recognizes, to support an obviousness rejection, MPEP §2143.03 requires “all words of a claim to be considered” and MPEP § 2141.02 requires consideration of the “[claimed] invention and prior art as a whole.” A failure of the prior art to disclose all of the elements of a claim is a robust indication that a claim is not obvious. See *Kinetic Concepts, Inc. v. Blue Sky Medical Group, Inc.*, 554 F.3d 1010, cert. denied, 130 S. Ct. 624 (2009); *Callaway Golf Co. v. Acushnet Co.*, 576 F.3d 1331 (2009), cert. denied, 130 S. Ct. 1525 (2010); *Abbott Labs. v. Sandoz, Inc.*, 544 F.3d 1341 (2008). In sum, it remains well-settled law that an obviousness rejection requires at least a suggestion of *all* of the claim elements. Ryan in view of Gold and Somers fails to disclose or suggest a secure element and an interrogator affixed to the same mounting structure. Consequently, the Applicant asserts that Ryan in view of Gold and in further view of Somers is an inadequate basis for the obviousness rejection of Claims 1, 6, 12, 17, 22, 28, and the Applicant requests that the rejection of Claims 1,

6, 12, 17, 22, 28 under Ryan in view of Gold and in further view of Somers be withdrawn and that Claims 1, 6, 12, 17, 22, 28 be allowed.

Claims 2, 7, 13, 18, 23, and 29 specify that the plurality of transaction data communications in the respective independent claim comprises communications formatted according to ISO 7816-4. In comments directed toward Claim 1, the Office Action states, “It is noted that a data in a data file **could be transferred** [emphasis added] to smart card fob via ISO 7816-x interface.” The Applicant respectfully asserts that the Examiner’s conjecture, unsupported by any technical evidence, that the prior could do something is totally inadequate to meet the standard for an obviousness rejection that the prior art discloses or suggests the claimed limitation. In comments directed specifically toward Claim 2, the Examiner states, “It is also well-known that moving data, to be interpreted by the application in the chip of card, between circuitry components (e.g., between secure memory and authentication circuit) is ISO 7816-4 formatted (see Beradi et al. (US PG-Pub. 2005/0165, 695)). However, Beradi’s only mention of ISO 7816-4 is in paragraph [0061] where Beradi states, “Secure memory database 212 may be any suitable elementary file system such as that defined by ISO/IEC 7816-4 or any other elementary file system allowing a lookup of data to be interpreted by the application on the chip.” Thus Beradi’s reference to ISO 7816-4 pertains to a data file structure system, not to the Applicant’s claimed data communication system.

The claimed limitation for “communications formatted according to ISO 7816-4” specifies a particular data communication structure that yields yield a useful, concrete and tangible result” and such a limitation should be given patentable weight. (See *State Street*, 149 F.3d at 1373, 47 USPQ2d at 1601-02, cited in MPEP 2106 - Patentable Subject Matter - Computer-Related Inventions.) The Applicant asserts that there is no indication in Ryan that Ryan’s “translation module” is capable of operating as the Applicant’s limitation that “the plurality of transaction data communications comprises communications formatted according to ISO 7816-4.” As noted in the Declaration of Brian Charles Murray under 37 CFR 1.132, which was originally submitted during prosecution of the Applicant’s Patent Application 12/019,318 and is resubmitted concurrently herewith, ISO 7816 is a broad specification with different sections directed toward different “layers” of communication protocol. The Applicant notes that Ryan only refers to “ISO 7816” and there is no indication that Ryan even recognizes that ISO

7816 contains a large number of subsections. For example, Ryan does not refer to “7816-x.” That additional “-x” reference is an extrapolation made by the Examiner from what Ryan actually discloses. The Applicant acknowledges that at col. 20, lines 38-58 Ryan discloses a smart card reader. However, as noted in the Brian Charles Murray Declaration, a “smart card reader” is not equivalent to “a secure element reader . . . configured to interrogate the secure element by executing file system functions according to ISO 7816-4.” The Applicant further acknowledges that in the cited passage Ryan describes connecting the Fig. 3A/3B product to a computer and loading a cash value on the product. Ryan further states that “In these cases, the FIG. 3A/3B embodiment is not simply a smart card reader.” However, Ryan’s statement about what something “is not” does not indicate anything about what it is. Thus it is clear that while Ryan’s systems may conform to some aspect of ISO-7816, Ryan does not disclose the Applicant’s claimed system comprising a secure element reader affixed to the mounting structure and configured to interrogate the secure element by executing file system functions according to ISO-7816-4. Nor does Gold or Somers fill this deficiency.

The distinction provided by providing a secure element reader for executing file system functions according to ISO-7816-4 is a hypertechnical distinction, but it is of great importance. As stated in paragraph [0035] of the Applicant’s specification, “A significant advantage of extracting and delivering the data **within a card device or cellular network adapter** is the ability to know beyond reasonable doubt that the data string being delivered over the internet indeed came from a particular SE. This knowledge creates a more secure transaction with lower risk to the merchant, card issuing bank, and card associations.” Ryan, Gold and Somers fail to recognize this significant advantage that is provided by the Applicant’s “secure element reader . . . configured to interrogate the secure element by executing file system functions according to ISO 7816-4.”

In view of these shortcomings of the cited references the Applicant respectfully asserts that the Examiner has failed to establish a *prima facie* case of obviousness of Claim 2 by Ryan in view of Gold and in further view of Somers and Beradi, and the Applicant requests that the rejection of Claims 2, 7, 13, 18, 23, and 29 under Ryan in view of Gold and Somers (and Beradi) be withdrawn, and that Claims 2, 7, 13, 18, 23, and 29 be allowed.

Claims 3, 8, 14, 19, 24, 30 as currently amended specify that the secure element comprises one or more elements selected from the group consisting of an encryption algorithm, an encryption key, and a transaction counter. The Applicant asserts that the prior art of record does not disclose or suggest any of these limitations, and therefore Claims 3, 8, 14, 19, 24, 30 as currently amended should be allowed.

Claims 4, 9, 15, 20, and 25 specify that the secure element interrogator of the respective independent claim exchanges the plurality of transaction data communications with the secure element **only** within libraries or memory space residing on the mounting structure. The Examiner refers to Fig. 4 and par. [0030] and [0031] of Gold for disclosure of this limitation. However, as previously noted with respect to Claim 1, Gold discloses an interrogator 58 affixed to a chip 60 and an RFID tag 62 is mounted in the reader 66 for the exchange of information. Thus not only does Gold not disclose the limitation of Claim 1 where an interrogator and an SE are affixed to the same mounting structure, Gold further fails to disclose the limitation of Claim 4 that the plurality of transaction data communications with the secure element only within libraries or memory space residing on the mounting structure. Neither Ryan nor Somers fill this deficiency, and consequently the Applicant requests that the rejection of Claim 4 under Ryan in view of Gold and Somers be withdrawn, and that Claim 4 be allowed.

Claims 5, 16, and 21 as currently amended specify that the secure element of the respective independent claim comprises a microprocessor and a payment card executable application that includes an application level protocol for authentication of the secure element. The Applicant asserts that the prior art of record does not disclose or suggest any of these limitations, and therefore Claims 5, 16 and 21 as currently amended should be allowed.

Independent Claim 6 is currently amended to specify that the secure element comprises a microprocessor and an application for execution by the microprocessor and that the application includes an application level protocol for authentication of the secure element. The Applicant asserts that the prior art of record does not disclose or suggest these limitations, and therefore Claim 6 as currently amended should be allowed.

Claims 10 and 26 as currently amended specify that the communications controller of the respective independent claim creates a random unpredictable number and sends it to the secure

element. The Applicant asserts that the prior art of record does not disclose or suggest these limitations, and therefore Claims 10 and 26 as currently amended should be allowed.

Claims 11 and 27 as currently amended specify that the transaction information of the respective independent claim comprises a dynamic card verification code. The Applicant asserts that the prior art of record does not disclose or suggest these limitations, and therefore Claims 11 and 27 as currently amended should be allowed.

Independent Claim 22 is currently amended to specify that the secure element comprises a microprocessor and an application for execution by the microprocessor and that the application includes an application level protocol the secure element and the secure element interrogator to mutually authenticate themselves. The Applicant asserts that the prior art of record does not disclose or suggest these limitations, and therefore Claim 22 as currently amended should be allowed.

New Claims

New independent Claim 46 provides a useful token. The Applicant asserts that the art of record does not disclose or suggest the combination of elements in new Claim 46, and therefore new Claim 46 should be allowed.

New dependent Claims 32, 34, 36, 38, 40, 42, and 50 further limit the structure of communications to and from the secure element in their respective independent claims. The Applicant asserts that the art of record does not disclose or suggest these limitations, and therefore new Claims 32, 34, 36, 38, 40, 42, and 50 should be allowed.

New dependent Claims 33, 35, 37, 39, 41, 43, 52, and 69 provide a useful antenna to their respective independent claims. The Applicant asserts that the prior art of record does not disclose or suggest such an antenna in combination with the elements of the respective independent claims, and therefore new Claims 33, 35, 37, 39, 41, 43, 52, and 69 should be allowed.

New dependent Claims 44 and 45 depend from independent Claims 6 and 22 respectively. New dependent Claim 70 depends from new independent Claim 64. New Claims

44, 45, and 70 provide that the secure element of their respective independent claims comprises a plurality of payment card applications from different card associations and the secure element interrogator interrogates one of the payment card applications. The Applicant asserts that the prior art of record does not disclose or suggest such features in combination with the elements of the respective independent claims, and therefore new Claims 44, 45, and 70 should be allowed.

New Claims 47 and 65 depends from new independent Claims 46 and 64 respectively, and new Claims 47 and 65 add the useful limitation that the at least one transaction data communication of Claim 46 comprises a plurality of transaction data communications between the secure element and the secure element interrogator, where the plurality of transaction data communications being formatted according to ISO 7816-4. The Applicant asserts that the prior art of record does not disclose or suggest this further beneficial feature in combination with the elements of Claims 46 and 64, and therefore new Claims 47 and 65 should be allowed.

New Claim 48 depends from new independent Claim 46 and provides that the secure element comprises one or more elements selected from the group consisting of an encryption algorithm, an encryption key, and a transaction counter. The Applicant asserts that the prior art of record does not disclose or suggest this further beneficial feature in combination with the elements of Claim 46, and therefore new Claim 48 should be allowed.

New Claim 49 depends from new independent Claim 46 and new Claim 66 depends from new Claim 64. New Claims 49 and 66 and provide that the secure element interrogator exchanges the at least one transaction data communications with the secure element only within libraries or memory space residing on the mounting structure. The Applicant asserts that the prior art of record does not disclose or suggest this further beneficial feature in combination with the elements of Claims 46 and 64, and therefore new Claim 49 should be allowed.

New Claim 51 and new Claim 68 depends from new Claims 46 and 64 respectively, and new Claims 51 and 68 provide that the secure element comprises a microprocessor and the transaction information comprises a dynamic card verification code calculated from an unpredictable number by the microprocessor. The Applicant asserts that the prior art of record does not disclose or suggest this further beneficial feature in combination with the elements of Claim 46 and 64, and therefore new Claims 51 and 68 should be allowed.

New Claim 53 depends from new Claim 46 and provides that the secure element comprises a plurality of payment card applications from different card associations and the secure element interrogator interrogates one of the payment card applications. The Applicant asserts that the prior art of record does not disclose or suggest this further beneficial feature in combination with the elements of Claim 46, and therefore new Claim 53 should be allowed.

New Claim 54 depends from new Claim 46 and provides that the host device comprises a cellular network device and the cellular network device comprises the secure element, the interrogator and the communications controller. The Applicant asserts that the prior art of record does not disclose or suggest these further beneficial features in combination with the elements of Claim 46, and therefore new Claim 54 should be allowed.

New Claim 55 depends from new Claim 46 and provides that the host device comprises a cellular network device and the cellular network device comprises the secure element, the interrogator and the communications controller and the host device has the physical form of a mobile phone or a PDA. The Applicant asserts that the prior art of record does not disclose or suggest these further beneficial features in combination with the elements of Claim 46, and therefore new Claim 55 should be allowed.

New Claims 56 – 62 depend from new Claim 46 and new Claims 56 – 62 specify further structural limitations. The Applicant asserts that the prior art of record does not disclose or suggest these further beneficial features in combination with the elements of Claim 46, and therefore new Claims 56 – 62 should be allowed.

New Claim 63 depends from new Claim 46 and provides that the host device comprises a cellular network device and the cellular network device is configured to transmit the data communications package over a wireless network. The Applicant asserts that the prior art of record does not disclose or suggest these further beneficial features in combination with the elements of Claim 46, and therefore new Claim 63 should be allowed.

New independent Claim 64 provides a cellular network device. The Applicant asserts that the art of record does not disclose or suggest the combination of elements in new Claim 64, and therefore new Claim 64 should be allowed.

New Claims 71, 73, 74, and 76 specify that the secure element comprises an executable application and that the secure element interrogator is configured to interrogate the executable application. The Applicant asserts that the prior art of record does not disclose or suggest these further beneficial features in combination with the elements of Claim 1, 12, 17 and 28 from which Claims 71, 73, 74 and 75 depend, respectively, and therefore new Claims 71, 73, 74, and 76 should be allowed.

New Claims 72 and 75 specify that the payment card application comprises an executable payment card application and that the secure element interrogator is configured to interrogate the executable payment card application. The Applicant asserts that the prior art of record does not disclose or suggest these further beneficial features in combination with the elements of Claim 6, and 22 from which Claims 72 and 75 depend, respectively, and therefore new Claims 72 and 75 should be allowed.

New Claims 77 and 78 specify that the executable payment card application includes an application level protocol for authentication of the secure element. The Applicant asserts that the prior art of record does not disclose or suggest these further beneficial features in combination with the elements of Claim 6, and 22 from which Claims 77 and 78 depend, respectively, and therefore new Claims 77 and 78 should be allowed.

New Claim 79 depends from new Claim 64 and Claim 79 specifies that the cellular network device of Claim 64 further comprises a communications controller affixed to the mounting structure, with specified additional limitations. The Applicant asserts that the prior art of record does not disclose or suggest these further beneficial features in combination with the elements of Claim 64 from which Claim 79 depends, and therefore new Claim 79 should be allowed.

New Claim 80 depends from new independent Claim 64 and Claim 80 specifies further features of the cellular network device, including the limitation that the communications data package comprises card-present data. The Applicant asserts that the prior art of record does not disclose or suggest these further beneficial features in combination with the elements of Claim 64 from which Claim 80 depends, and therefore new Claim 80 should be allowed.

New Claims 81, 82 83, 84, 85, 86 and 87 depend from independent Claims 1, 6, 12, 17, 22, 28 and new independent Claim 46 respectively. New Claims 81, 82, 83, 84, 85, 86 and 87 specify inter alia that the transaction information comprises card-present data. The Applicant asserts that the prior art of record does not disclose or suggest these further beneficial features in combination with the elements of their respective independent claims, and therefore new Claims 81, 82 83, 84, 85, 86 and 87 should be allowed.

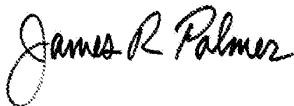
Conclusion

The Office Action findings have been carefully reviewed and in view of this submittal the Applicant believes that the claims are in a form requiring allowance, and such action is earnestly requested.

If the Examiner believes that a telephone call would expedite the early disposition of this application, a call to the undersigned is respectfully requested.

In the event this response is not timely filed, the Applicant hereby petitions for the appropriate extension of time and the Applicant requests that the fee for the extension along with any other fees which may be due with respect to this filing be charged to our Deposit Account No. 12-2355.

Respectfully submitted,
LUEDEKA NEELY GROUP, P.C.

By: 

James R. Palmer
Registration No. 48,633

Date: February 11, 2013
P.O. Box 1871
Knoxville, Tennessee 37901
(865) 546-4305

Attachment: Declaration of Brian Charles Murray under 37 CFR 1.132.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 12/019,318
Applicant: YEAGER, C. Douglas
Filing Date: 01/24/2008
Confirmation No.: 9759
Title: SELF-AUTHORIZING DEVICES
Examiner: SONG, Hee K.
Group Art Unit: 2433

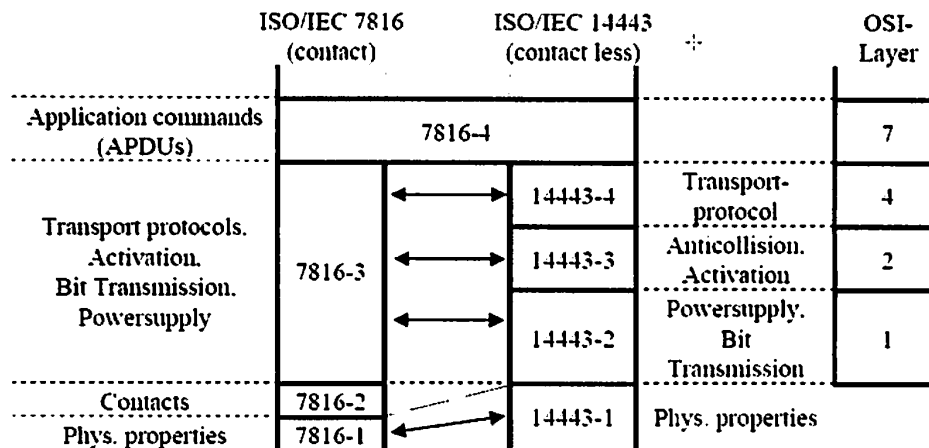
DECLARATION OF Brian Charles Murray
under 37 CFR 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

1. I, Brian Charles Murray declare as follows:
2. I live in San Diego, California United States of America.
3. I have no current or prospective inventorship or ownership interest in U.S. Patent Application Serial Number 12/019,318.
4. I have extensive knowledge and experience in payment card technologies and standards
5. I am recognized as an expert in the field of payment card technology. My curriculum vitae is appended hereto as Exhibit A.
6. I have reviewed and evaluated Claims 1, 15, and 25 as amended by an Amendment submitted concurrently with this Declaration. I have also reviewed originally-filed Claims 1, 15, and 24 and I have reviewed and evaluated the

Examiner's rejections of originally-filed Claims 1, 15, and 24 as being unpatentable over US Patent 7,213,766 (Ryan) in view of US Pre-grant Pub. 2007/0208949 (Lu) and further in view of US Pre-grant Publication 2007/0262138 (Somers).

7. Claim 1 as originally-filed (and as currently amended) specifies "a secure element reader affixed to the mounting structure and configured to interrogate the secure element by executing file system functions according to ISO 7816-4." The Examiner refers to Ryan's translation module as disclosing this limitation. However that conclusion is inconsistent with the details of Ryan's document.
8. ISO 7816 is a broad specification with different sections directed toward different "layers" of communication protocols, as seen in the following diagram:



Among the various sections of 7816, system developers freely pick and choose what layer's of communication will be implemented in a particular device. Ryan does not disclose which portions of 7816 are to be implemented. However, in Figures 1A, 1B and 1C Ryan refers to elements 104, 124 and 144 as a translation module. Those designations are confirmed at various places in the specification. Then at Column 18, lines 12 – 17, Ryan states

The translation module 104 is for going (moving signals) from USB (the exemplary interface with the computer) to a smart card interface format, such as ISO 7816, and vice-versa. The translation module may comprise a Philips TDA8030 USB/7816. (ISO 7816 is a smart card contact interface.)

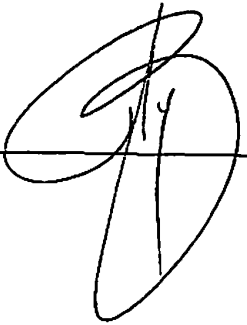
Based on Ryan's explicit statement that the translation module 104 is for "moving signals" it is clear that Ryan's translation modules are directed at protocols well below OSI layer 7 to which ISO 7816-4 applies. This is further emphasized from the example provided by Ryan, "a Philips TDA8030 USB/7816." A copy of the data sheet for the TDA8030 and an Application Note for that device are attached as Appendix A and Appendix B respectively. The data sheet states that "The TDA8030; TDA8031 is a bus powered full-speed USB device. All analog and digital functions for an EMV compliant Smart Card Reader are built-in."

9. It is important to note that a "smart card reader" is not equivalent to a "a secure element reader . . . configured to interrogate the secure element by executing file system functions according to ISO 7816-4." A "smart card reader" is a device that provides low-level communications capability with a smart card. As evidence of that, Exhibit C presents a summary page for Smart Card Reader distributed by Athena Smartcard Products. That document states that the reader supports "ISO7816 T=0; T=1." T=0 and T=1 are two transmission protocols: character protocol (T=0) or block protocol (T=1). These are low level communications protocols that are specified in ISO 7816-3. There are no "smarts" built in to a Smart Card Reader that would conform to OSI Layer 7 / ISO 7816-4.
10. Commands executed by a secure element reader may be further defined by specific payment card standards or other proprietary card applications. Consequently, a "secure element reader affixed to the mounting structure and configured to interrogate the secure element by executing file system functions comprising a command to select a payment card application according to ISO 7816-4" is further distinguished over a "smart card reader." A "smart card

reader” would **only** execute such functions if/when commanded to do so by an **external device** such as a host computer.

11. In standard smart card systems that were publicly known in January 2008 (i.e., at the filing date of the present application) the “smarts” for interrogating the secure element by executing file system functions according to ISO 7816-4 were resident in a host computer. A Smart Card Reader was used provide communication between the secure element and the host computer. It is unexpected that a secure element reader would be affixed to the mounting structure of a smart token and configured to interrogate the secure element by executing file system functions according to ISO 7816-4.
12. Regarding Claim 15, USB Human Interface Devices (HIDs) are defined by an industry standards organization (USB Implementers Forum (USB-IF)). The USB HID class specifications allow for myriad of user/computer interface devices including various input devices such as keyboards, mice, track balls, game controllers, as well as output devices such as CRT/LCD displays and audio speakers. The use of the USB HID class specifications has been extended even beyond computer input/output devices to include such wide-ranging applications as simulation controllers, exercise machines, telephony devices, thermometers, medical instruments and uninterruptible power supplies. Any device can be a USB HID class device as long as a designer meets the USB HID class logical specifications. It is unexpected that a smart card would be specifically configured as a keyboard interface device.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

A handwritten signature, possibly reading "J. H. Y.", is written over a horizontal line.

May 1st 2011.
Date ✓

Brian C. Murray
Founder and Chief Executive Officer U.S. Encode Corporation.

U.S. Encode is a payment technology provider positioned in online authentication addressing consumer payments. The company has headquarters at 12707 High Bluff Drive, San Diego, California.

Brian Murray has over 20 years of international experience as a Senior Officer and Director of companies in Banking, Card Processing and Payment Technology, including Barclays International, where he was located in London, Italy, Germany and France; First National Bank and The NedCor Banking Group. He relocated to the USA in 1999 where he was CEO and a Director of TradeRoot California, a start-up Information Technology Company involved in Internet Payment Processing. During 2002 Bob Eprile and Brian Murray founded U.S. Encode® Corporation.

Mr. Murray's expertise in the payments industry has led to him presenting at numerous payment and fraud forums.

Brian was educated at The College for Advanced Technical Education Business School in Port Elizabeth South Africa, Barclays School of Management and Oxford Brookes University in the United Kingdom.

Brian served in the South African Armed Forces and was awarded the Pro Patria Medal. He is an avid sportsman, played Division One Rugby and served as President of The Transvaal Union Rugby Football Club and as Chairman of the Barclays Transvaal Rugby Football Club. He has also completed a number of marathons and ultra marathons.

Electronic Patent Application Fee Transmittal				
Application Number:		13403141		
Filing Date:		23-Feb-2012		
Title of Invention:		SELF-AUTHORIZING TOKEN		
First Named Inventor/Applicant Name:		C. Douglas Yeager		
Filer:		James Roy Palmer/Jennifer McDonald		
Attorney Docket Number:		63766.C1		
Filed as Small Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Claims in excess of 20	2202	56	31	1736
Independent claims in excess of 3	2201	2	125	250
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Extension - 1 month with \$0 paid	2251	1	75	75
Miscellaneous:				
Total in USD (\$)				2061

Electronic Acknowledgement Receipt	
EFS ID:	14927877
Application Number:	13403141
International Application Number:	
Confirmation Number:	6813
Title of Invention:	SELF-AUTHORIZING TOKEN
First Named Inventor/Applicant Name:	C. Douglas Yeager
Customer Number:	408
Filer:	James Roy Palmer/Jennifer McDonald
Filer Authorized By:	James Roy Palmer
Attorney Docket Number:	63766.C1
Receipt Date:	11-FEB-2013
Filing Date:	23-FEB-2012
Time Stamp:	16:03:54
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$2061
RAM confirmation Number	2972
Deposit Account	122355
Authorized User	
<p>The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:</p> <p>Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)</p> <p>Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)</p>	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)					
Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)					
Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)					
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		63766c1-topto-20130211-Amendment_1MoExt.pdf	222025 5804e48f30aeab33991a1622ffb85a5376343071	yes	32
	Multipart Description/PDF files in .zip description				
	Document Description	Start	End		
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1		
	Applicant summary of interview with examiner	2	2		
	Claims	3	16		
	Applicant Arguments/Remarks Made in an Amendment	17	32		
Warnings:					
Information:					
2	Rule 130, 131 or 132 Affidavits	63766c1-topto-20130211-132DeclWithAttachedBio_Resubmitted.pdf	187193 fba68f1gbf0825a649a478e675a2643a639de07	no	6
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	33709 dc8dc738118ee6615cd11446ac5f7638bd66df1e	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			442927		

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 13/403,141		Filing Date 02/23/2012		☐ To be Mailed	
APPLICATION AS FILED – PART I										
(Column 1)			(Column 2)			SMALL ENTITY ☒ OR		OTHER THAN SMALL ENTITY		
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)			
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A				
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A				
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A				
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =		OR	X \$ =				
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =			X \$ =				
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).									
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
* If the difference in column 1 is less than zero, enter "0" in column 2.										
APPLICATION AS AMENDED – PART II										
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT	02/11/2013	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 87	Minus	** 31	= 56	X \$31 =	1736	OR	X \$ =	
	Independent (37 CFR 1.16(h))	* 8	Minus	***6	= 2	X \$125 =	250	OR	X \$ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
						TOTAL ADD'L FEE	1986	OR	TOTAL ADD'L FEE	
AMENDMENT	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =		OR	X \$ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =		OR	X \$ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.										

 Legal Instrument Examiner:
 /ANGELONA JONES/

This collection of information is required by 37 CFR 1.16. 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 1.14. This collection is estimated to take 12 minutes 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.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	13403141
	Filing Date	2012-02-23
	First Named Inventor	YEAGER, Douglas C.
	Art Unit	3621
	Examiner Name	
	Attorney Docket Number	63766.C1

U.S. PATENTS							Remove	
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
	1							
If you wish to add additional U.S. Patent citation information please click the Add button.							Add	
U.S. PATENT APPLICATION PUBLICATIONS							Remove	
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
	1	20100207742	A1	2010-08-19	Buhot et al.			
If you wish to add additional U.S. Published Application citation information please click the Add button.							Add	
FOREIGN PATENT DOCUMENTS							Remove	
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ² j	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1							☐
If you wish to add additional Foreign Patent Document citation information please click the Add button								Add
NON-PATENT LITERATURE DOCUMENTS								Remove
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.						T ⁵

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		13403141
	Filing Date		2012-02-23
	First Named Inventor	YEAGER, Douglas C.	
	Art Unit	3621	
	Examiner Name		
	Attorney Docket Number	63766.C1	

	1		☐
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If you wish to add additional non-patent literature document citation information please click the Add button **Add**

EXAMINER SIGNATURE

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	13403141
	Filing Date	2012-02-23
	First Named Inventor	YEAGER, Douglas C.
	Art Unit	3621
	Examiner Name	
	Attorney Docket Number	63766.C1

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/James R Palmer/	Date (YYYY-MM-DD)	2013-03-01
Name/Print	James R. Palmer	Registration Number	48,633

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1.14. This collection is estimated to take 1 hour 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.**

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 the Freedom of Information Act requires disclosure of these records.
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 inspections 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.

Electronic Patent Application Fee Transmittal				
Application Number:		13403141		
Filing Date:		23-Feb-2012		
Title of Invention:		SELF-AUTHORIZING TOKEN		
First Named Inventor/Applicant Name:		C. Douglas Yeager		
Filer:		James Roy Palmer/Jennifer McDonald		
Attorney Docket Number:		63766.C1		
Filed as Small Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
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:				
Submission- Information Disclosure Stmt	1806	1	180	180
Total in USD (\$)				180

Electronic Acknowledgement Receipt	
EFS ID:	15092725
Application Number:	13403141
International Application Number:	
Confirmation Number:	6813
Title of Invention:	SELF-AUTHORIZING TOKEN
First Named Inventor/Applicant Name:	C. Douglas Yeager
Customer Number:	408
Filer:	James Roy Palmer/Jennifer McDonald
Filer Authorized By:	James Roy Palmer
Attorney Docket Number:	63766.C1
Receipt Date:	01-MAR-2013
Filing Date:	23-FEB-2012
Time Stamp:	13:43:00
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$180
RAM confirmation Number	15231
Deposit Account	122355
Authorized User	
<p>The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:</p> <p>Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)</p> <p>Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)</p>	

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Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	63766c1-topto-20130301-IDS.pdf	612510	no	4
			4a424565b60dc1130a40aaafbc7aed7b169e695a		

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30193	no	2
			6fab3dac829e3c3b030f8ab16752038ae58e1a62		

Warnings:

Information:

Total Files Size (in bytes): 642703

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

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New International Application Filed with the USPTO as a Receiving Office

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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/403,141	02/23/2012	C. Douglas Yeager	63766.C1	6813
408 7590 05/30/2013 LUEDEKA NEELY GROUP, P.C. P O BOX 1871 KNOXVILLE, TN 37901			EXAMINER SONG, HEE K	
			ART UNIT 2433	PAPER NUMBER
			NOTIFICATION DATE 05/30/2013	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTO-EMAIL@LNG-patent.com
LNG.PATENT@gmail.com

Office Action Summary	Application No. 13/403,141	Applicant(s) YEAGER, C. DOUGLAS	
	Examiner HEE SONG	Art Unit 2433	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 1 March 2013.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 5) ☒ Claim(s) 1-87 is/are pending in the application.
5a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) ____ is/are allowed.
- 7) ☒ Claim(s) 1, 6, 12, 17, 22, 28, 32, 34, 36, 38, 40, 42, 46, 50, 64, 67, 77 and 78 is/are rejected.
- 8) ☒ Claim(s) See Continuation Sheet is/are objected to.
- 9) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

- a) ☐ All b) ☐ Some * c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Interim copies:

- a) ☐ All b) ☐ Some c) ☐ None of the: Interim copies of the priority documents have been received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 3/1/2013
- 3) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____
- 4) ☐ Other: ____

Continuation of Disposition of Claims: Claims objected to are 2-5,7-11,13-16,18-21,23-27,29-31,33,35,37,39,41,43-45,47-49,51-63,65,66,68-76 and 79-87.

Response to Amendment

This office action has been issued in response to Remarks and amendment to claims filed 11 February 2013. No claims are cancelled. Claims 3, 6, 8, 10, 11, 14, 16, 19, 22, 24, 26, 27, 30 have been amended. New claims 32 - 87 are added. As a result, claims 1-87 are pending, in which claims 1, 6, 12, 17, 22, 28, 46, 64 are in independent form.

In view of the Remarks, submitted on 01 March 2013, applicant's arguments in view of amendments have been carefully and respectfully considered, but are moot in view of the new ground(s) of rejection.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 01 March 2013 is being considered by the examiner.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 32, 34, 36, 38, 40, 42, 50, 67 recite the limitation "the secure element reader." There is insufficient antecedent basis for this limitation in the claim.
2. Claims 77 and 78 recite the limitation "the executable payment card application." There is insufficient antecedent basis for this limitation in the claim.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 6, 12, 17, 22, 28, 46, and 64 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 30, and 34 of US Patent No. 8,151,345 B2. Although the conflicting claims are not identical, they are not patentably distinct from each other.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HEE SONG whose telephone number is (571)270-3260. The examiner can normally be reached on Mon - Fri, 7:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey Pwu can be reached on (571)272-6798 . The fax phone number for the organization where this application or proceeding is assigned is 571-273-7291.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HEE SONG/
Examiner, Art Unit 2433

/Brandon S Hoffman/

Primary Examiner, Art Unit 2433

Notice of References Cited	Application/Control No. 13/403,141	Applicant(s)/Patent Under Reexamination YEAGER, C. DOUGLAS	
	Examiner HEE SONG	Art Unit 2433	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-8,081,060	12-2011	Saarisalo et al.	340/10.1
*	B	US-2010/0207742	08-2010	Buhot et al.	340/10.51
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

EAST Search History**EAST Search History (Prior Art)**

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	0	"20100207742".pn. and NFC with (writer interrogat\$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/05/20 10:38
L2	0	"20100207742".pn. and NFC same (writer interrogat\$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/05/20 10:40
L3	0	"20100207742".pn. and (interrogat\$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/05/20 10:40
L4	2	"20100207742".pn. and (nfc)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/05/20 10:40
L5	1	(smart with token\$2 smart\$1card\$2 bank\$1card\$2 smartphone\$2) same (NFC with (interrogator reader) with writer) and @ad < "20070125"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/05/20 10:55

EAST Search History (Interference)

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5/ 20/ 2013 10:58:01 AM**C:\ Users\ hsong2\ Documents\ EAST\ Workspaces\ 13403141.wsp**

Receipt date: 03/01/2013

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

13403141 - GAU: 2433

Approved for use through 07/31/2012. OMB 0651-0031

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 contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	13403141
	Filing Date	2012-02-23
	First Named Inventor	YEAGER, Douglas C.
	Art Unit	3621
	Examiner Name	
	Attorney Docket Number	63766.C1

U.S. PATENTS							Remove	
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
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Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
/H.S./	1	20100207742	A1	2010-08-19	Buhot et al.			
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FOREIGN PATENT DOCUMENTS							Remove	
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ² j	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.						T ⁵

Receipt date: 03/01/2013 INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		13403141	13403141 - GAU: 2433
	Filing Date		2012-02-23	
	First Named Inventor	YEAGER, Douglas C.		
	Art Unit	3621		
	Examiner Name			
	Attorney Docket Number	63766.C1		

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If you wish to add additional non-patent literature document citation information please click the Add button Add			
EXAMINER SIGNATURE			
Examiner Signature	/Hee Song/		Date Considered 05/17/2013
<p>*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.</p>			
<p><small>¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.</small></p>			

<i>Index of Claims</i> 	Application/Control No. 13403141	Applicant(s)/Patent Under Reexamination YEAGER, C. DOUGLAS
	Examiner HEE SONG	Art Unit 2433

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant				☐ CPA		☐ T.D.		☐ R.1.47	
CLAIM		DATE							
Final	Original	09/30/2012	05/20/2013						
	1	✓	✓						
	2	✓	○						
	3	✓	○						
	4	✓	○						
	5	✓	○						
	6	✓	✓						
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	32		✓						
	33		○						
	34		✓						
	35		○						
	36		✓						

<i>Index of Claims</i> 	Application/Control No. 13403141	Applicant(s)/Patent Under Reexamination YEAGER, C. DOUGLAS
	Examiner HEE SONG	Art Unit 2433

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant				☐ CPA		☐ T.D.		☐ R.1.47	
CLAIM		DATE							
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	61		O						
	62		O						
	63		O						
	64		✓						
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	67		✓						
	68		O						
	69		O						
	70		O						
	71		O						
	72		O						

<p align="center"><i>Index of Claims</i></p> 	Application/Control No. 13403141	Applicant(s)/Patent Under Reexamination YEAGER, C. DOUGLAS
	Examiner HEE SONG	Art Unit 2433

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant				☐ CPA		☐ T.D.		☐ R.1.47	
CLAIM		DATE							
Final	Original	09/30/2012	05/20/2013						
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	74		O						
	75		O						
	76		O						
	77		✓						
	78		✓						
	79		O						
	80		O						
	81		O						
	82		O						
	83		O						
	84		O						
	85		O						
	86		O						
	87		O						

Search Notes 	Application/Control No. 13403141	Applicant(s)/Patent Under Reexamination YEAGER, C. DOUGLAS
	Examiner HEE SONG	Art Unit 2433

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
726	9, 20	9/30/2012	HS
235	380, 375, 439, 492	9/30/2012	HS
713	165	9/30/2012	HS
710	313	9/30/2012	HS
705	65	9/30/2012	HS

SEARCH NOTES		
Search Notes	Date	Examiner
EAST Inventor Name Search	9/28/2012	HS
EAST Class/Subclass Search	9/28/2012	hs
EAST Keyword Search	9/28/2012	HS
Google Keyword Search	9/28/2012	HS
IEEE/ACM NPL Search	9/28/2012	HS
updated EAST keyword Search	5/20/2013	HS

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

	/BRANDON HOFFMAN/ Primary Examiner. Art Unit 2433
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 13/403,141
Applicant: YEAGER, C. Douglas
Filing Date: 02/23/2012
Confirmation No.: 6813
Title: SELF-AUTHORIZING TOKEN
Examiner: SONG, Hee K.
Group Art Unit: 2433

AMENDMENT AFTER FINAL PURSUANT TO 37 C.F.R. § 1.116

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Final Office Action dated 5/30/2013, Applicant respectfully requests that the following amendments and remarks be considered under Rule 116 on the grounds that they place the application in condition for allowance.

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this submittal.

Remarks begin on page 16 of this submittal.

In the Claims:

This listing of claims replaces all prior versions and prior listings of claims in the application:

Listing of Claims:

What is claimed is:

1. (Original) A token comprising:

a mounting structure having a communication connector configured to connect to a computer terminal;

a secure element affixed to the mounting structure, the secure element comprising a data file,

a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire transaction information from the data file by exchanging a plurality of transaction data communications only between the secure element and the secure element interrogator; and

a communications controller affixed to the mounting structure and configured to receive the data from the secure element interrogator and to transmit the transaction information as a single data communication to the computer terminal through the communications connector.
2. (Original) The token of Claim 1 wherein the plurality of transaction data communications comprises communications formatted according to ISO 7816-4.
3. (Previously Presented) The token of Claim 1 wherein the secure element comprises an encryption algorithm, an encryption key, and a transaction counter.
4. (Original) The token of Claim 1 wherein the secure element interrogator exchanges the plurality of transaction data communications with the secure element only within libraries or memory space residing on the mounting structure.

5. (Original) The token of Claim 1 wherein the secure element comprises a payment card application and the single data communication to the computer terminal comprises track data.
6. (Previously Presented) A token comprising:
 - a mounting structure having a communication connector configured to connect to a computer terminal;
 - a secure element affixed to the mounting structure, the secure element comprising a payment card application and a data file;
 - a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire transaction information from the data file by exchanging a plurality of transaction data communications only between the secure element and the secure element interrogator; and
 - a communications controller affixed to the mounting structure and configured to receive the data from the secure element interrogator and to transmit the transaction information as track data to the computer terminal through the communications connector.
7. (Original) The token of Claim 6 wherein the plurality of transaction data communications comprises communications formatted according to ISO 7816-4.
8. (Previously Presented) The token of Claim 6 wherein the secure element comprises an encryption algorithm, an encryption key, and a transaction counter.
9. (Original) The token of Claim 6 wherein the secure element interrogator exchanges the plurality of transaction data communications with the secure element only within libraries or memory space residing on the mounting structure.
10. (Previously Presented) The token of Claim 6 wherein the communications controller creates a random unpredictable number and sends it to the secure element.

11. (Previously Presented) The token of Claim 6 wherein the transaction information comprises a dynamic card verification code.
12. (Original) A token comprising:
 - a mounting structure having a communication connector configured to connect to a computer terminal;
 - a secure element affixed to the mounting structure, the secure element comprising a data file,
 - a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire transaction information from the data file by exchanging a plurality of transaction data communications only between the secure element and the secure element interrogator; and
 - a communications controller affixed to the mounting structure and configured to receive the data from the secure element interrogator and to transmit the transaction information to the computer terminal through the communications connector.
13. (Original) The token of Claim 12 wherein the plurality of transaction data communications comprises communications formatted according to ISO 7816-4.
14. (Previously Presented) The token of Claim 12 wherein the secure element comprises an encryption algorithm, an encryption key, and a transaction counter.
15. (Original) The token of Claim 12 wherein the secure element interrogator exchanges the plurality of transaction data communications with the secure element only within libraries or memory space residing on the mounting structure.
16. (Previously Presented) The token of Claim 12 wherein the secure element comprises a payment card application and the transaction information comprises track data.
17. (Original) A token comprising:
 - a mounting structure having a communication connector configured to connect to a

computer terminal;

a secure element affixed to the mounting structure, the secure element comprising a data file,

a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire transaction information from the data file by exchanging at least one transaction data communication only between the secure element and the secure element interrogator; and

a communications controller affixed to the mounting structure and configured to receive the data from the secure element interrogator and to transmit the transaction information as a single data communication to the computer terminal through the communications connector.

18. (Original) The token of Claim 17 wherein the at least one transaction data communication comprises communications formatted according to ISO 7816-4.
19. (Previously Presented) The token of Claim 17 wherein the secure element comprises an encryption algorithm, an encryption key, and a transaction counter.
20. (Original) The token of Claim 17 wherein the secure element interrogator exchanges the at least one transaction data communication with the secure element only within libraries or memory space residing on the mounting structure.
21. (Original) The token of Claim 17 wherein the secure element comprises a payment card application and the single data communication to the computer terminal comprises track data.
22. (Previously Presented) A token comprising:

a mounting structure having a communication connector configured to connect to a computer terminal;

a secure element affixed to the mounting structure, the secure element comprising a payment card application and a data file;

a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire transaction information from the data file by exchanging at least one transaction data communication only between the secure element and the secure element interrogator; and

a communications controller affixed to the mounting structure and configured to receive the data from the secure element interrogator and to transmit the transaction information as track data to the computer terminal through the communications connector.

23. (Original) The token of Claim 22 wherein the at least one transaction data communication comprises communications formatted according to ISO 7816-4.
24. (Previously Presented) The token of Claim 22 wherein the secure element comprises an encryption algorithm, an encryption key, and a transaction counter.
25. (Original) The token of Claim 22 wherein the secure element interrogator exchanges the at least one transaction data communication with the secure element only within libraries or memory space residing on the mounting structure.
26. (Previously Presented) The token of Claim 22 wherein the communications controller creates a random unpredictable number and sends it to the secure element.
27. (Previously Presented) The token of Claim 22 wherein the transaction information comprises a dynamic card verification code.
28. (Original) A token comprising:

a mounting structure having a communication connector configured to connect to a computer terminal;

a secure element affixed to the mounting structure, the secure element comprising a data file,

a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire transaction information from the data file by

exchanging at least one transaction data communications only between the secure element and the secure element interrogator; and

a communications controller affixed to the mounting structure and configured to receive the data from the secure element interrogator and to transmit the transaction information to the computer terminal through the communications connector.

29. (Original) The token of Claim 28 wherein the at least one transaction data communication comprises communications formatted according to ISO 7816-4.
30. (Previously Presented) The token of Claim 28 wherein the secure element comprises an encryption algorithm, an encryption key, and a transaction counter.
31. (Original) The token of Claim 28 wherein the secure element interrogator exchanges the at least one transaction data communication with the secure element only within libraries or memory space residing on the mounting structure.
32. (Currently Amended) The token of Claim 1 wherein communications to and from the secure element consist of communications from and to ~~[[the]]~~ a secure element reader.
33. (Previously Presented) The token of Claim 1 further comprising an antenna that transmits data to and from the secure element, wherein the secure element is interrogated by an external reader.
34. (Currently Amended) The token of Claim 6 wherein communications to and from the secure element consist of communications from and to ~~[[the]]~~ a secure element reader.
35. (Previously Presented) The token of Claim 6 further comprising an antenna that transmits data to and from the secure element, wherein the secure element is interrogated by an external reader.
36. (Currently Amended) The token of Claim 12 wherein communications to and from the secure element consist of communications from and to ~~[[the]]~~ a secure element reader.

37. (Previously Presented) The token of Claim 12 further comprising an antenna that transmits data to and from the secure element, wherein the secure element is interrogated by an external reader.
38. (Currently Amended) The token of Claim 17 wherein communications to and from the secure element consist of communications from and to ~~[[the]]~~ a secure element reader.
39. (Previously Presented) The token of Claim 17 further comprising an antenna that transmits data to and from the secure element, wherein the secure element is interrogated by an external reader.
40. (Currently Amended) The token of Claim 22 wherein communications to and from the secure element consist of communications from and to ~~[[the]]~~ a secure element reader.
41. (Previously Presented) The token of Claim 22 further comprising an antenna that transmits data to and from the secure element, wherein the secure element is interrogated by an external reader.
42. (Currently Amended) The token of Claim 28 wherein communications to and from the secure element consist of communications from and to ~~[[the]]~~ a secure element reader.
43. (Previously Presented) The token of Claim 28 further comprising an antenna that transmits data to and from the secure element, wherein the secure element is interrogated by an external reader.
44. (Previously Presented) The token of Claim 6 wherein the secure element comprises a plurality of payment card applications from different card associations and the secure element interrogator interrogates one of the payment card applications.
45. (Previously Presented) The token of Claim 22 wherein the secure element comprises a plurality of payment card applications from different card associations and the secure element interrogator interrogates one of the payment card applications.

46. (Previously Presented) A token for transmitting a communications data package to a host device, the token comprising:

a mounting structure;

a secure element affixed to the mounting structure, the secure element including a data file containing transaction information;

a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire the transaction information from the data file by exchanging at least one transaction data communication between the secure element and the secure element interrogator and to generate the communications data package based on the transaction information; and

a communications controller affixed to the mounting structure and configured to receive the communications data package from the secure element interrogator and to transmit the communications data package to the host device.

47. (Previously Presented) The token of Claim 46 wherein the at least one transaction data communication comprises a plurality of transaction data communications between the secure element and the secure element interrogator, the plurality of transaction data communications being formatted according to ISO 7816-4.

48. (Previously Presented) The token of Claim 46 wherein the secure element comprises an encryption algorithm, an encryption key, and a transaction counter.

49. (Previously Presented) The token of Claim 46 wherein the secure element interrogator exchanges the at least one transaction data communication with the secure element occurs only within libraries or memory space residing on the mounting structure.

50. (Currently Amended) The token of Claim 46 wherein all communications to and from the secure element consist of communications from and to [[the]] a secure element reader.

51. (Previously Presented) The token of Claim 46 wherein the secure element comprises a microprocessor and the transaction information comprises a dynamic card verification code calculated from an unpredictable number by the microprocessor.
52. (Previously Presented) The token of Claim 46 further comprising an antenna that transmits data to and from the secure element, wherein the secure element is interrogated by an external reader.
53. (Previously Presented) The token of Claim 46 wherein the secure element comprises a plurality of payment card applications from different card associations and the secure element interrogator interrogates one of the payment card applications.
54. (Previously Presented) The token of Claim 46 wherein the host device comprises a cellular network device and the cellular network device comprises the secure element, the interrogator and the communications controller. .
55. (Previously Presented) The token of Claim 46 wherein the host device comprises a cellular network device and the cellular network device comprises the secure element, the interrogator and the communications controller and the host device has the physical form of a mobile phone or a PDA.
56. (Previously Presented) The token of Claim 46 wherein the mounting structure comprises a substrate.
57. (Previously Presented) The token of Claim 46 wherein the mounting structure comprises a packaging case.
58. (Previously Presented) The token of Claim 46 wherein the token has the physical form of a payment card.
59. (Previously Presented) The token of Claim 46 wherein the token has the physical form of a fob.
60. (Previously Presented) The token of Claim 46 wherein the token has the physical form of a cartridge.

61. (Previously Presented) The token of Claim 46 wherein the token has the physical form of a dongle.
62. (Previously Presented) The token of Claim 46 wherein the token has the physical form of a secure digital (SD) chip.
63. (Previously Presented) The token of Claim 46 wherein the host device comprises a cellular network device and the cellular network device is configured to transmit the data communications package over a wireless network.
64. (Previously Presented) A cellular network device comprising:
- a mounting structure;
- a secure element affixed to the mounting structure, the secure element including a data file containing transaction information; and
- a secure element interrogator affixed to the mounting structure and configured to interrogate the secure element to acquire the transaction information from the data file by exchanging at least one transaction data communication between the secure element and the secure element interrogator and to generate a communications data package based on the transaction information.
65. (Previously Presented) The token of Claim 64 wherein the at least one transaction data communication comprises a plurality of transaction data communications between the secure element and the secure element interrogator, the plurality of transaction data communications being formatted according to ISO 7816-4.
66. (Previously Presented) The token of Claim 64 wherein the secure element interrogator exchanges the at least one transaction data communication with the secure element only within libraries or memory space residing on the mounting structure.
67. (Currently Amended) The token of Claim 64 wherein all communications to and from the secure element consist of communications from and to [[the]] a secure element reader.

68. (Previously Presented) The token of Claim 64 wherein the secure element comprises a microprocessor and the transaction information comprises a dynamic card verification code calculated from an unpredictable number by the microprocessor.
69. (Previously Presented) The token of Claim 64 further comprising an antenna that transmits data to and from the secure element, wherein the secure element is interrogated by an external reader.
70. (Previously Presented) The token of Claim 64 wherein the secure element comprises a plurality of payment card applications from different card associations and the secure element interrogator interrogates one of the payment card applications.
71. (Previously Presented) The token of Claim 1 wherein:
- the secure element comprises an executable application; and
- the secure element interrogator is configured to interrogate the executable application to acquire the transaction information from the data file.
72. (Previously Presented) The token of Claim 6 wherein:
- the payment card application comprises an executable payment card application; and
- the secure element interrogator is configured to interrogate the executable payment card application to acquire the transaction information from the data file.
73. (Previously Presented) The token of Claim 12 wherein:
- the secure element comprises an executable application; and
- the secure element interrogator is configured to interrogate the executable application to acquire the transaction information from the data file.

74. (Previously Presented) The token of Claim 17 wherein:
- the secure element comprises an executable application; and
- the secure element interrogator is configured to interrogate the executable application to acquire the transaction information from the data file.
75. (Previously Presented) The token of Claim 22 wherein:
- the payment card application comprises an executable payment card application; and
- the secure element interrogator is configured to interrogate the executable payment card application to acquire the transaction information from the data file.
76. (Previously Presented) The token of Claim 28 wherein:
- the secure element comprises an executable application; and
- the secure element interrogator is configured to interrogate the executable application to acquire the transaction information from the data file.
77. (Currently Amended) The token of Claim [[6]] 72 wherein the executable payment card application includes an application level protocol for authentication of the secure element.
78. (Currently Amended) The token of Claim [[22]] 75 wherein the executable payment card application includes an application level protocol for authentication of the secure element.
79. (Previously Presented) The cellular network device of Claim 64 further comprising a communications controller affixed to the mounting structure and configured for receiving the communications data package for transmission by the cellular network device over a wireless network.

80. (Previously Presented) The cellular network device of Claim 64 wherein:
- the secure element comprises a payment card application;
- the secure element interrogator is configured to interrogate the payment card application;
- and
- the communications data package comprises card-present data.
81. (Previously Presented) The token of Claim 1 wherein:
- the secure element comprises a payment card application;
- the secure element interrogator is configured to interrogate the payment card application;
- and
- the transaction information comprises card-present data.
82. (Previously Presented) The token of Claim 6 wherein the transaction information comprises card-present data.
83. (Previously Presented) The token of Claim 12 wherein:
- the secure element comprises a payment card application;
- the secure element interrogator is configured to interrogate the payment card application;
- and
- the transaction information comprises card-present data.
84. (Previously Presented) The token of Claim 17 wherein:
- the secure element comprises a payment card application;
- the secure element interrogator is configured to interrogate the payment card application;
- and
- the transaction information comprises card-present data.

85. (Previously Presented) The token of Claim 22 wherein the transaction information comprises card-present data.
86. (Previously Presented) The token of Claim 28 wherein:
- the secure element comprises a payment card application;
- the secure element interrogator is configured to interrogate the payment card application;
- and
- the transaction information comprises card-present data.
87. (Previously Presented) The token of Claim 46 wherein:
- the secure element comprises a payment card application;
- the secure element interrogator is configured to interrogate the payment card application;
- and
- the transaction information comprises card-present data.

Remarks

The Final Office Action dated 10/11/2012 recorded the following status of claims in this application. Claims 1 – 87 were pending in the application. Claims 1, 6, 12, 17, 22, 28, 32, 34, 36, 38, 40, 42, 46, 50, 64, 67, 77, and 78 were rejected. Claims 2 – 5, 7 – 11, 13 – 16, 18 – 21, 23 – 27, 29 – 31, 33, 35, 37, 39, 41, 43 – 45, 47 – 49, 51 – 63, 65, 66, 68 – 76, and 79 – 87 were objected to. This amendment amends Claims 32, 34, 36, 38, 40, 42, 50, 67, and 77 – 78. Reconsideration of this application is requested in view of these changes and the remarks presented below.

Information Disclosure Statement

In the Final Office Action, the Examiner states that “[t]he information disclosure statement (IDS) submitted on 01 March 2013 *is being* considered by the examiner.” Emphasis added. However, the copy of the IDS attached to the Final Office Action indicates that the reference submitted by Applicant was considered by the Examiner on 5/17/2013. Thus, Applicant notes that it presumes that the Examiner meant to write that the IDS “has been considered by the examiner.”

Claim Rejections 35 USC § 112

Claims 32, 34, 36, 38, 40, 42, 50, 67, and 77 – 78 were rejected as including insufficient antecedent basis for certain limitations in these claims. In response, Applicant has amended these claims to provide proper antecedent basis. Accordingly, Applicant respectfully requests withdrawal of the § 112 rejections to these claims.

Double Patenting

Claims 1, 6, 12, 17, 22, 28, 46, and 64 were rejected on the ground of nonstatutory obviousness-type double patenting based on co-owned U.S. Patent No. 8,151,345. In response, Applicants submit herewith a Terminal Disclaimer to obviate the double patenting rejections. It should be understood that this Terminal Disclaimer is being filed to expedite prosecution and should not be construed as an admission that the Terminal Disclaimer is necessary.

Conclusion

The Office Action findings have been carefully reviewed and in view of this submittal the Applicant believes that the claims are in a form requiring allowance, and such action is earnestly requested.

If the Examiner believes that a telephone call would expedite the early disposition of this application, a call to the undersigned is respectfully requested.

In the event this response is not timely filed, the Applicant hereby petitions for the appropriate extension of time and the Applicant requests that the fee for the extension along with any other fees which may be due with respect to this filing be charged to our Deposit Account No. 12-2355.

Respectfully submitted,

LUEDEKA NEELY GROUP, P.C.

By: s/WadeROrr

Wade R. Orr

Registration No. 59,390

Date: June 21, 2013

P.O. Box 1871

Knoxville, Tennessee 37901

(865) 546-4305

TERMINAL DISCLAIMER TO OBTAIN A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	Docket Number (Optional) 63766.C1
<p>In re Application of: YEAGER, Douglas C.</p> <p>Application No.: 13/403,141</p> <p>Filed: 2012-02-23</p> <p>For: SELF-AUTHORIZING TOKEN</p> <p>The applicant, <u>Douglas C. Yeager</u>, owner of <u>100</u> percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of prior patent No. <u>8,151,345</u> as the term of said prior patent is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for any during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.</p> <p>In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the prior patent, "as the term of said prior patent is presently shortened by any terminal disclaimer," in the event that said prior patent later:</p> <ul style="list-style-type: none">expires for failure to pay a maintenance fee;is held unenforceable;is found invalid by a court of competent jurisdiction;is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;has all claims canceled by a reexamination certificate;is reissued; oris in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer. <p>Check either box 1 or 2 below, if appropriate.</p> <p>1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.</p> <p>I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.</p> <p>2. ☒ The undersigned is an attorney or agent of record. Reg. No. <u>59390</u></p> <div style="display: flex; justify-content: space-between; margin-top: 20px;"><div style="width: 60%; text-align: center;"><p>_____ /Wade R Orr/ Signature</p><p style="margin-top: 20px;">_____ Wade R. Orr Typed or printed name</p><p style="margin-top: 20px;">_____ Attorney for Applicant Title</p></div><div style="width: 35%; text-align: center;"><p>_____ 2013-06-21 Date</p><p style="margin-top: 20px;">_____ 865-546-4305 Telephone Number</p></div></div> <p>☒ Terminal disclaimer fee under 37 CFR 1.20(d) included.</p> <p style="text-align: center; margin-top: 10px;">WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.</p>	

This collection of information is required by 37 CFR 1.321. 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 12 minutes 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.**

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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.
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Electronic Patent Application Fee Transmittal				
Application Number:		13403141		
Filing Date:		23-Feb-2012		
Title of Invention:		SELF-AUTHORIZING TOKEN		
First Named Inventor/Applicant Name:		C. Douglas Yeager		
Filer:		Wade Russell Orr/Jennifer McDonald		
Attorney Docket Number:		63766.C1		
Filed as Small Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
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:				
Statutory or Terminal Disclaimer	1814	1	160	160
Total in USD (\$)				160

Electronic Acknowledgement Receipt	
EFS ID:	16111976
Application Number:	13403141
International Application Number:	
Confirmation Number:	6813
Title of Invention:	SELF-AUTHORIZING TOKEN
First Named Inventor/Applicant Name:	C. Douglas Yeager
Customer Number:	408
Filer:	Wade Russell Orr/Jennifer McDonald
Filer Authorized By:	Wade Russell Orr
Attorney Docket Number:	63766.C1
Receipt Date:	21-JUN-2013
Filing Date:	23-FEB-2012
Time Stamp:	12:22:52
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$160
RAM confirmation Number	10003
Deposit Account	122355
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Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)					
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		63766c1-topto-20130621-AmendmentAfterFinal.pdf	125887	yes	17
			a834325db885dff0df2a4b1b6fceab04f34e69		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Amendment After Final		1	1	
	Claims		2	15	
	Applicant Arguments/Remarks Made in an Amendment		16	17	
Warnings:					
Information:					
2	Terminal Disclaimer Filed	63766c1-topto-20130621-TerminalDisclaimer.pdf	147605	no	2
			c53e4bec38a01d2195f9b317bbe99711b5cd4b9d		
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30196	no	2
			40eaa510af5e57503e77870ce58b2af7c270bd19		
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Application Number 	Application/Control No. 13/403,141	Applicant(s)/Patent under Reexamination YEAGER, C. DOUGLAS	
Document Code - DISQ		Internal Document – DO NOT MAIL	

TERMINAL DISCLAIMER	☒ APPROVED	☐ DISAPPROVED
Date Filed : 6/21/13	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:

ANDRE ROBINSON

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 13/403,141		Filing Date 02/23/2012		☐ To be Mailed	
APPLICATION AS FILED – PART I										
(Column 1)			(Column 2)			SMALL ENTITY ☒ OR		OTHER THAN SMALL ENTITY		
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)			
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A				
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A				
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A				
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =		OR	X \$ =				
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =			X \$ =				
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).									
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
* If the difference in column 1 is less than zero, enter "0" in column 2.										
APPLICATION AS AMENDED – PART II										
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT	06/21/2013	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 87	Minus	** 87	=	0	OR	X \$ =		
	Independent (37 CFR 1.16(h))	* 8	Minus	*** 8	=	0	OR	X \$ =		
☐ Application Size Fee (37 CFR 1.16(s))										
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
					TOTAL ADD'L FEE	0	OR	TOTAL ADD'L FEE		
(Column 1)			(Column 2)			(Column 3)				
AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =	OR	X \$ =		
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =	OR	X \$ =		
☐ Application Size Fee (37 CFR 1.16(s))										
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
					TOTAL ADD'L FEE	OR	TOTAL ADD'L FEE			
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.										
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".										
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".										
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.										

Legal Instrument Examiner:
/JACQUELYN WILLIAMS/

This collection of information is required by 37 CFR 1.16. 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 1.14. This collection is estimated to take 12 minutes 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.**

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LUEDEKA NEELY GROUP, P.C.
P O BOX 1871
KNOXVILLE, TN 37901

EXAMINER

SONG, HEE K

ART UNIT

PAPER NUMBER

2433

DATE MAILED: 07/03/2013

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/403,141	02/23/2012	C. Douglas Yeager	63766.C1	6813

TITLE OF INVENTION: SELF-AUTHORIZING TOKEN

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$890	\$300	\$0	\$1190	10/03/2013

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

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If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

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II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

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PART B - FEE(S) TRANSMITTAL

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P.O. Box 1450
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or **Fax (571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

408 7590 07/03/2013
LUEDEKA NEELY GROUP, P.C.
P O BOX 1871
KNOXVILLE, TN 37901

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/403,141	02/23/2012	C. Douglas Yeager	63766.C1	6813

TITLE OF INVENTION: SELF-AUTHORIZING TOKEN

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$890	\$300	\$0	\$1190	10/03/2013

EXAMINER	ART UNIT	CLASS-SUBCLASS
SONG, HEE K	2433	705-065000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
- 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see form PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. 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 1.14. This collection is estimated to take 12 minutes 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, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/403,141	02/23/2012	C. Douglas Yeager	63766.C1	6813

408	7590	07/03/2013
LUEDEKA NEELY GROUP, P.C.		
P O BOX 1871		
KNOXVILLE, TN 37901		

EXAMINER	
SONG, HEE K	

ART UNIT	PAPER NUMBER
2433	

DATE MAILED: 07/03/2013

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

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.

Notice of Allowability	Application No. 13/403,141	Applicant(s) YEAGER, C. DOUGLAS	
	Examiner HEE SONG	Art Unit 2433	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 6/21/2013.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 1-87. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
Certified copies:
a) ☐ All b) ☐ Some *c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)	5. ☐ Examiner's Amendment/Comment
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____	6. ☒ Examiner's Statement of Reasons for Allowance
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material	7. ☒ Other <u>Deailed Action</u> .
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____	

/Brandon S Hoffman/ Primary Examiner, Art Unit 2433	
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DETAILED ACTION

This is in response to amendment to claims, and Remarks filed 21 June 2013. No new claims have been added. Claims 32, 34, 36, 38, 40, 42, 50, 67, 77, 78 have been amended. No claims have been cancelled. Claims 1-87 are pending in this application, in which claims 1, 6, 12, 17, 22, 28, 46, and 64 are in independent form.

Terminal Disclaimer

The terminal disclaimer filed on 21 June 2013 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of prior patent No. 8,151,345 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Response to Arguments

Applicant's arguments filed 21 June 2013 have been fully considered and they are persuasive.

Allowable Subject Matter

1. Claims **1-87** are allowed.
2. The following is an examiner's statement of reasons for allowance: prior arts of record and further search does not teach/suggest the following claim limitation, "*a secure element* affixed to the mounting structure...; *a secure element interrogator* affixed to the mounting structure and configured to interrogate the secure element..."

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HEE SONG whose telephone number is (571)270-3260. The examiner can normally be reached on Mon - Fri, 7:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey Pwu can be reached on (571)272-6798. The fax phone number for the organization where this application or proceeding is assigned is 571-273-7291.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Application/Control Number: 13/403,141
Art Unit: 2433

Page 4

/HEE SONG/
Examiner, Art Unit 2433

/Brandon S Hoffman/
Primary Examiner, Art Unit 2433

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	112087	RFID reader\$2 same ISO with 7816-4 and @ad < "20070125"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/26 16:19
L2	14	secur\$4 near3 element\$2 same3 (iso adj "7816") and @ad < "20070125"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/26 16:20
L3	13	secur\$4 near3 element\$2 same interrogator\$2 and @ad < "20070125"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/26 16:20
L4	15	(smart with token\$2 smart\$1card\$2 bank\$1card\$2 smartphone\$2 mobile near4 phone\$2) same (NFC with (interrogator reader) with writer) and @ad < "20070125"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/26 16:21
L5	351	secur\$4 near3 element\$2 same (interrogator\$2 reader\$2) and @ad < "20070125"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/26 16:21
L6	194825	(smart with token\$2 smart\$1card\$2 bank\$1card\$2 smartphone\$2 mobile near4 phone\$2) and @ad < "20070125"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/26 16:23
L7	83	L5 and L6	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/26 16:23
L8	2140	726/9,20.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/26 16:24
L9	22025	235/380,375,439,492.ccls.	US-PGPUB; USPAT;	OR	OFF	2013/06/26 16:24

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
L10	1882	713/165.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/26 16:24
L11	1388	710/313.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/26 16:24
L12	27315	L8 L9 L10 L11	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/26 16:24
L13	808	705/65.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/26 16:24
L14	27926	L12 L13	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/26 16:24
L15	13	L7 and L14	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/26 16:24
L16	2140	726/9,20.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/26 16:29

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L17	11474	235/380,375,439,492.ccls.	USPAT; UPAD	OR	OFF	2013/06/26 16:29
L18	1359	713/165.ccls.	USPAT; UPAD	OR	OFF	2013/06/26 16:30
L19	895	710/313.ccls.	USPAT; UPAD	OR	OFF	2013/06/26 16:30
L20	558	705/65.ccls.	USPAT; UPAD	OR	OFF	2013/06/26 16:30

EAST Search History

L21	1247	726/9,20.ccls.	USPAT; UPAD	OR	OFF	2013/06/26 16:31
L22	15246	L17 L18 L19 L20 L21	USPAT; UPAD	OR	OFF	2013/06/26 16:31
L23	1	(token same (mounting near3 structure) same secur\$5 near3 element\$2 same secur\$5 near3 element with (reader\$2 interrogator)).clm.	USPAT; UPAD	OR	OFF	2013/06/26 16:33

6/ 26/ 2013 4:37:03 PM

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<i>Index of Claims</i> 	Application/Control No. 13403141	Applicant(s)/Patent Under Reexamination YEAGER, C. DOUGLAS
	Examiner HEE SONG	Art Unit 2433

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant					☐ CPA					☐ T.D.					☐ R.1.47				
CLAIM		DATE																	
Final	Original	09/30/2012	05/20/2013	06/25/2013															
	1	✓	✓	=															
	2	✓	O	=															
	3	✓	O	=															
	4	✓	O	=															
	5	✓	O	=															
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	7	✓	O	=															
	8	✓	O	=															
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	12	✓	✓	=															
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	33		O	=															
	34		✓	=															
	35		O	=															
	36		✓	=															

<i>Index of Claims</i> 	Application/Control No. 13403141	Applicant(s)/Patent Under Reexamination YEAGER, C. DOUGLAS
	Examiner HEE SONG	Art Unit 2433

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
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☐ Claims renumbered in the same order as presented by applicant
 ☐ CPA
 ☐ T.D.
 ☐ R.1.47

CLAIM		DATE							
Final	Original	09/30/2012	05/20/2013	06/25/2013					
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	68		O	=					
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<i>Index of Claims</i> 	Application/Control No. 13403141	Applicant(s)/Patent Under Reexamination YEAGER, C. DOUGLAS
	Examiner HEE SONG	Art Unit 2433

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=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant				☐ CPA		☐ T.D.		☐ R.1.47	
CLAIM		DATE							
Final	Original	09/30/2012	05/20/2013	06/25/2013					
	73		O	=					
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	86		O	=					
	87		O	=					

Search Notes 	Application/Control No. 13403141	Applicant(s)/Patent Under Reexamination YEAGER, C. DOUGLAS
	Examiner HEE SONG	Art Unit 2433

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
726	9, 20	9/30/2012	HS
235	380, 375, 439, 492	9/30/2012	HS
713	165	9/30/2012	HS
710	313	9/30/2012	HS
705	65	9/30/2012	HS

SEARCH NOTES		
Search Notes	Date	Examiner
EAST Inventor Name Search	9/28/2012	HS
EAST Class/Subclass Search	9/28/2012	hs
EAST Keyword Search	9/28/2012	HS
Google Keyword Search	9/28/2012	HS
IEEE/ACM NPL Search	9/28/2012	HS
updated EAST keyword Search	5/20/2013	HS
INTERFERENCE SEARCH - CLAIM TEXT SEARCH WITH CLASS/SUBCLASS SEARCH	6/26/2013	HS
ACM/IEEE NPL Search		

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

	/BRANDON HOFFMAN/ Primary Examiner. Art Unit 2433
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INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
726	9, 20	6/26/2013	HS
235	375, 380, 439, 492	6/26/2013	HS
713	165	6/26/2013	HS
710	313	6/26/2013	HS
705	65	6/26/2013	HS

	/BRANDON HOFFMAN/ Primary Examiner.Art Unit 2433
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- ☐ 1.C
IEEE Std 100-2000
2000.
Source: IEEE Electronic Library Online
- ☐ 2.F
IEEE Std 100-2000
2000.
Source: IEEE Electronic Library Online
- ☐ 3.R
IEEE Std 100-2000
2000.
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- ☐ 4.S
IEEE Std 100-2000
2000.
Source: IEEE Electronic Library Online
- ☐ 5.T
IEEE Std 100-2000

2000.

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☐ 6. IEEE Guide to the Use of the ATLAS Specification

IEEE Std 771-1998 (0-7381-0195-8)

1998. p.0_2

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☐ 7. IEEE Standard Test Language for All Systems - Common/Abbreviated Test Language for All Systems (C/ATLAS)

IEEE Std 716-1995 (1-55937-518-3)

1995. p.i-592

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☐ 8. IEEE Guide to the Used of the ATLAS Specification

IEEE Std 771-1989

1989. p.0_3

Source: IEEE Electronic Library Online

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☐ 9. IEEE Standard C/ATLAS Test Language

IEEE Std 716-1989

1989. p.0_1

Source: IEEE Electronic Library Online

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☐ 10. 1979-1980 Conference Index

Aerospace and Electronic Systems, IEEE Transactions on (0018-9251)

1981. Iss.5;p.736-a-736-148

Source: IEEE Electronic Library Online

☐ 11. The Military and Air Traffic Control

McColl, D.

Communications, IEEE Transactions on (0090-6778)

1973. Vol.21,Iss.5;p.501-516

Source: IEEE Electronic Library Online

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Last modified 04/26/2013 10:35:00

OK TO ENTER: /H.S./

Attorney Docket No. 63766.C1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 13/403,141
Applicant: YEAGER, C. Douglas
Filing Date: 02/23/2012
Confirmation No.: 6813
Title: SELF-AUTHORIZING TOKEN
Examiner: SONG, Hee K.
Group Art Unit: 2433

AMENDMENT AFTER FINAL PURSUANT TO 37 C.F.R. § 1.116

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Final Office Action dated 5/30/2013, Applicant respectfully requests that the following amendments and remarks be considered under Rule 116 on the grounds that they place the application in condition for allowance.

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this submittal.

Remarks begin on page 16 of this submittal.

Issue Classification 	Application/Control No. 13403141	Applicant(s)/Patent Under Reexamination YEAGER, C. DOUGLAS	
	Examiner HEE SONG	Art Unit 2433	

CPC			Type	Version
Symbol				

CPC Combination Sets				
Symbol	Type	Set	Ranking	Version

/HEE SONG/ Examiner.Art Unit 2433 (Assistant Examiner)	6/26/2013 (Date)	Total Claims Allowed: 87	
/BRANDON HOFFMAN/ Primary Examiner.Art Unit 2433 (Primary Examiner)	06/27/2013 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 16

Issue Classification 	Application/Control No. 13403141	Applicant(s)/Patent Under Reexamination YEAGER, C. DOUGLAS
	Examiner HEE SONG	Art Unit 2433

US ORIGINAL CLASSIFICATION						INTERNATIONAL CLASSIFICATION														
CLASS		SUBCLASS				CLAIMED					NON-CLAIMED									
705		65				G	0	6	Q	20 / 00 (2012.0)										
CROSS REFERENCE(S)																				
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)																			
726	9	20																		
235	375	380	435	492																
713	165																			
710	313																			

/HEE SONG/ Examiner.Art Unit 2433 (Assistant Examiner)	6/26/2013 (Date)	Total Claims Allowed: 87	
/BRANDON HOFFMAN/ Primary Examiner.Art Unit 2433 (Primary Examiner)	06/27/2013 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 16

Issue Classification 	Application/Control No. 13403141	Applicant(s)/Patent Under Reexamination YEAGER, C. DOUGLAS
	Examiner HEE SONG	Art Unit 2433

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	31	17	7	33	63	49	80	65	9	81				
2	2	32	18	16	34	64	50	81	66	21	82				
3	3	33	19	17	35	65	51	82	67	30	83				
4	4	34	20	27	36	66	52	83	68	39	84				
5	5	35	21	28	37	67	53	84	69	51	85				
10	6	40	22	36	38	68	54	85	70	59	86				
11	7	41	23	37	39	69	55	8	71	78	87				
12	8	42	24	46	40	70	56	19	72						
13	9	43	25	47	41	71	57	29	73						
14	10	44	26	56	42	72	58	38	74						
15	11	45	27	57	43	73	59	49	75						
22	12	52	28	18	44	74	60	58	76						
23	13	53	29	48	45	75	61	20	77						
24	14	54	30	60	46	76	62	50	78						
25	15	55	31	61	47	77	63	86	79						
26	16	6	32	62	48	79	64	87	80						

/HEE SONG/ Examiner.Art Unit 2433 (Assistant Examiner)	6/26/2013 (Date)	Total Claims Allowed: 87	
/BRANDON HOFFMAN/ Primary Examiner.Art Unit 2433 (Primary Examiner)	06/27/2013 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 16

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** **Mail Stop ISSUE FEE**
Commissioner for Patents
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LUEDEKA NEELY GROUP, P.C.
P O BOX 1871
KNOXVILLE, TN 37901

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

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I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/403,141	02/23/2012	C. Douglas Yeager	63766.C1	6813

TITLE OF INVENTION: SELF-AUTHORIZING TOKEN

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$890	\$300	\$0	\$1190	10/03/2013

EXAMINER	ART UNIT	CLASS-SUBCLASS
SONG, HEE K	2433	705-065000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a **Customer Number is required.**

2. For printing on the patent front page, list

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- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Luedeka Neely Group, P.C.

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

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(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☒ Individual ☐ Corporation or other private group entity ☐ Government

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- ☒ Publication Fee (No small entity discount permitted)
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☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

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NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature /Wade R Orr/

Date 2013-08-27

Typed or printed name Wade R. Orr

Registration No. 59,390

This collection of information is required by 37 CFR 1.311. 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 1.14. This collection is estimated to take 12 minutes 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, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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Electronic Patent Application Fee Transmittal				
Application Number:		13403141		
Filing Date:		23-Feb-2012		
Title of Invention:		SELF-AUTHORIZING TOKEN		
First Named Inventor/Applicant Name:		C. Douglas Yeager		
Filer:		Wade Russell Orr/Jennifer McDonald		
Attorney Docket Number:		63766.C1		
Filed as Small Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl Issue Fee	2501	1	890	890
Publ. Fee- Early, Voluntary, or Normal	1504	1	300	300

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1190

Electronic Acknowledgement Receipt	
EFS ID:	16693254
Application Number:	13403141
International Application Number:	
Confirmation Number:	6813
Title of Invention:	SELF-AUTHORIZING TOKEN
First Named Inventor/Applicant Name:	C. Douglas Yeager
Customer Number:	408
Filer:	Wade Russell Orr/Jennifer McDonald
Filer Authorized By:	Wade Russell Orr
Attorney Docket Number:	63766.C1
Receipt Date:	27-AUG-2013
Filing Date:	23-FEB-2012
Time Stamp:	10:35:41
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$1190
RAM confirmation Number	12026
Deposit Account	122355
Authorized User	
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Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)					
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			c33278b1b1a4dfa93aa39670798f0dbc57a528e6		
Warnings:					
Information:					
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Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	32124	no	2
			b3e68eb2394cfa3ad89624f9808457f90bdcd5b		
Warnings:					
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Total Files Size (in bytes):			2080678		
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 13/403,141
Applicant(s): YEAGER, C. Douglas
Filing Date: 02/23/2012
Confirmation No.: 6813
Title: SELF-AUTHORIZING DEVICES
Examiner: SONG, Hee K.
Group Art Unit: 2433

**COMMENTS ON STATEMENT OF REASONS FOR
ALLOWANCE**

Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

These comments are in response to the Examiner's Statement for Reasons for Allowance mailed 7/3/2013, with the Notice of Allowance and Fee(s) Due.

It is noted with much gratitude that the Examiner allowed all of the pending claims in this case. In so doing, however, the Examiner also issued a somewhat extended statement regarding the Examiner's interpretation of the scope of the prior art and the Examiner's views with regard to certain purported distinctions between the allowed claims and the disclosure of the prior art. While Applicant agrees that the claims patentably distinguish over the prior art, Applicant submits that the rationale for Allowance put forward by the Examiner may not be the only basis on which the claims might be said to distinguish over the art. In other words, the Examiners'

Reasons of Allowance are not acknowledged by Applicant to be an exhaustive list of all the patentable distinctions between the present claims and the teachings of the prior art or all or even the only sufficient reasons why the claims define patentable subject matter under the law, and the Applicant reserves the right to note other, further, and/or different reasons why the scope of the present claims patentably distinguishes over the prior art, should the need arise to do so. Simply put, Applicant's claims and the disclosures of the prior art speak for themselves, and the differences between the two are, upon issuance of a patent from this application, statutorily presumed under law to meet the conditions for patentability under all relevant provisions of the Patent Act, Title 35 of the United States Code, as amended.

Applicant respectfully requests that these observations be placed in the official file for this case.

Respectfully submitted,

LUEDEKA NEELY GROUP, P.C.

By: s/WadeROrr/

Wade R. Orr
Registration No. 59,390

Date: August 27, 2013
P.O. Box 1871
Knoxville, Tennessee 37901
(865) 546-4305



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www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/403,141	10/01/2013	8548924	63766.C1	6813

408 7590 09/11/2013
LUEDEKA NEELY GROUP, P.C.
P O BOX 1871
KNOXVILLE, TN 37901

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

C. Douglas Yeager, Austin, TX;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

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NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA/82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	13/403,141
Filing Date	02-23-2012
First Named Inventor	C. Douglas Yeager
Title	SELF-AUTHORIZING TOKEN
Art Unit	2433
Examiner Name	SONG, HEE K
Attorney Docket Number	116546-900UT1

SIGNATURE of Applicant or Patent Practitioner

Signature	/Noel C. Gillespie/	Date (Optional)	
Name	Noel C. Gillespie	Registration Number	47596
Title (if Applicant is a juristic entity)	Attorney of Record		
Applicant Name (if Applicant is a juristic entity)	NEOLOGY, INC.		

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☐

*Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. 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 3 minutes 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.

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I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

☒ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above:

OR

27189

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:

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OR

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OR

Firm or Individual Name				
Address				
City	State	Zip		
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I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

NEOLOGY, INC.

- ☐ Inventor or Joint Inventor (title not required below)
- ☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)
- ☒ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)
- ☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature

Date (Optional)

6-25-2015

Name

FRANCISCO MARTINEZ DE VELASCO CORTINA

Title

CEO

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. 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 3 minutes 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.

Electronic Acknowledgement Receipt	
EFS ID:	27684911
Application Number:	13403141
International Application Number:	
Confirmation Number:	6813
Title of Invention:	SELF-AUTHORIZING TOKEN
First Named Inventor/Applicant Name:	C. Douglas Yeager
Customer Number:	408
Filer:	Noel C. Gillespie/cindy guido
Filer Authorized By:	Noel C. Gillespie
Attorney Docket Number:	63766.C1
Receipt Date:	02-DEC-2016
Filing Date:	23-FEB-2012
Time Stamp:	21:10:26
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Assignee showing of ownership per 37 CFR 3.73	373B_Statement_116546_900 UT1.PDF	119343 864f7ff1d7c9b65dae600736fc5d8fcabd1cae62e	no	3

Warnings:

Information:					
2	Power of Attorney	POA_116546_900UT1.PDF	348095	no	2
			d903771b8383ad3995fd0c469f82d9d6cf62b67e		
Warnings:					
Information:					
Total Files Size (in bytes):			467438		
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: NEOLOGY, INC.
Application No./Patent No.: 8,548,924 Filed/Issue Date: 10-01-2013
Titled: SELF-AUTHORIZING TOKEN
NEOLOGY, INC., a corporation
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.
2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):
- ☐ The extent (by percentage) of its ownership interest is ____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.
- ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

- A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.
- B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: YEAGER, C. DOUGLAS To: U.S. Encode Corporation

The document was recorded in the United States Patent and Trademark Office at
Reel 040024, Frame 0179, or for which a copy thereof is attached.

2. From: YEAGER, DOUG, U.S. ENCODE CORPORATION To: NEOLOGY, INC.

The document was recorded in the United States Patent and Trademark Office at
Reel 040423, Frame 0761, or for which a copy thereof is attached.

[Page 1 of 2]

This collection of information is required by 37 CFR 3.73(b). 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 12 minutes 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.

STATEMENT UNDER 37 CFR 3.73(c)

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

4. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☐ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Noel C. Gillespie/

December 2 2016

Signature

Date

Noel C. Gillespie

47596

Printed or Typed Name

Title or Registration 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.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY.DOCKET NO./TITLE	REQUEST ID
13/403,141	02/23/2012	C. Douglas Yeager	116546-900UT1	29882

Acknowledgement of Loss of Entitlement to Entity Status Discount

The entity status change request below filed through Private PAIR on 12/06/2016 has been accepted.

CERTIFICATIONS:

Change of Entity Status:

☒ Applicant changing to regular undiscounted fee status.

NOTE: Checking this box will be taken to be notification of loss of entitlement to small or micro entity status, as applicable.

This portion must be completed by the signatory or signatories making the entity status change in accordance with 37 CFR 1.4(d)(4).

Signature:	/Noel C. Gillespie/
Name:	Noel C. Gillespie
Registration Number:	47596



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/403,141	02/23/2012	C. Douglas Yeager	116546-900UT1

CONFIRMATION NO. 6813

POA ACCEPTANCE LETTER

27189
PROCOPIO, CORY, HARGREAVES & SAVITCH LLP
525 B STREET
SUITE 2200
SAN DIEGO, CA 92101



Date Mailed: 12/08/2016

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 12/02/2016.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/Itaba/



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/403,141	02/23/2012	C. Douglas Yeager	63766.C1

408
LUEDEKA NEELY GROUP, P.C.
P O BOX 1871
KNOXVILLE, TN 37901

CONFIRMATION NO. 6813
POWER OF ATTORNEY NOTICE



Date Mailed: 12/08/2016

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 12/02/2016.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/Itaba/

STATEMENT UNDER 37 CFR 3.73(c)

First Named Inventor/Patent Owner: NEOLOGY, INC.

Application No./Patent No.: 13/403,141 Filed/Issue Date: February 23, 2012

Titled: SELF-AUTHORIZING TOKEN

NEOLOGY, INC., a corporation

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.
2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):
- ☐ The extent (by percentage) of its ownership interest is ____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.
- ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

- A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached*.
- B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: C. Douglas Yeager To: Doug Yeager; U.S. ENCODE CORPORATION

The document was recorded in the United States Patent and Trademark Office at
Reel 40024, Frame 0179, or for which a copy thereof is attached*.

2. From: Doug Yeager; U.S. ENCODE CORPORATION To: NEOLOGY, INC.

The document was recorded in the United States Patent and Trademark Office at
Reel 40423, Frame 0761, or for which a copy thereof is attached*.

[Page 1 of 2]

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0031. Public burden for this form is estimated to average 15 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. 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.

STATEMENT UNDER 37 CFR 3.73(c)

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached*.

4. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached*.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached*.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached*.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ *As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Noel C. Gillespie/

Signature

Noel C. Gillespie

Printed or Typed Name

November 25, 2025

Date

47596

Title or Registration 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. The United States Patent and Trademark Office (USPTO) collects the information in this record under authority of 35 U.S.C. 2. The USPTO's system of records is used to manage all applicant and owner information including name, citizenship, residence, post office address, and other information with respect to inventors and their legal representatives pertaining to the applicant's/owner's activities in connection with the invention for which a patent is sought or has been granted. The applicable Privacy Act System of Records Notice for the information collected in this form is COMMERCE/PAT-TM-7 Patent Application Files, available in the Federal Register at 78 FR 19243 (March 29, 2013). <https://www.govinfo.gov/content/pkg/FR-2013-03-29/pdf/2013-07341.pdf>

Routine uses of the information in this record may include disclosure to: 1) law enforcement, in the event that the system of records indicates a violation or potential violation of law; 2) a Federal, state, local, or international agency, in response to its request; 3) a contractor of the USPTO having need for the information in order to perform a contract; 4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record; 5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record; 6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations; 7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals; 8) 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)); 9) the Office of Personnel Management (OPM) for personnel research purposes; and 9) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA/82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	13/403,141
Filing Date	February 23, 2012
First Named Inventor	C. Douglas Yeager
Title	SELF-AUTHORIZING TOKEN
Art Unit	2433
Examiner Name	Hee K. Song
Attorney Docket Number	N5429-3092

SIGNATURE of Applicant or Patent Practitioner

Signature	/Noel C. Gillespie/	Date (Optional)	
Name	Noel C. Gillespie	Registration Number	47596
Title (if Applicant is a juristic entity)	Patent Practitioner		
Applicant Name (if Applicant is a juristic entity)	NEOLOGY, INC.		

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.



*Total of 1 forms are submitted.

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0035. Public burden for this form is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS.** If filing this completed form by mail, 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.

POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)



I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above:

62993

OR



I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:



The address associated with the above-mentioned Customer Number

OR



The address associated with Customer Number:

OR



Firm or
Individual Name

Address

City

State

Zip

Country

Telephone

Email

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

NEOLOGY, INC.



Inventor or Joint Inventor (title not required below)



Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)



Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)



Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature

Bradley H. Feldman

Date (Optional)

8/27/2025

Name

Bradley H. Feldman

Title

Chairman and CEO

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.



Total of forms are submitted.

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0035. Public burden for this form is estimated to average 3 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS.** If filing this completed form by mail, 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.

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.

**CHANGE OF
CORRESPONDENCE ADDRESS
Patent**Address to:
Mail Stop Post Issue
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Patent Number	8548924
Issue Date	October 1, 2013
Application Number	13/403,141
Filing Date	February 23, 2012
First Named Inventor	C. Douglas Yeager
Attorney Docket Number	N5429-3092

Please change the Correspondence Address for the above-identified patent to:



The address associated with Customer Number:

62993

OR**Firm or
Individual Name****Address****City****State****ZIP****Country****Telephone****Email**

This form cannot be used to change the data associated with a Customer Number. To change the data associated with an existing Customer Number use "Request for Customer Number Data Change" (PTO/SB/124).

This form will not affect any "fee address" provided for the above-identified patent. To change a "fee address" use the "Fee Address Indication Form" (PTO/SB/47).

I am the:



Patentee.



If the Patentee was not the applicant for patent (37 CFR 1.42), then a Statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is enclosed or was filed on _____. See 37 CFR 3.71.



Attorney or agent of record. Registration Number 47596



Patent practitioner acting in a representative capacity whose correspondence address is the correspondence address of record. Notice has been given to the patentee or owner. Registration Number 47596

Signature /Noel C. Gillespie/

Typed or
Printed Name Noel C. Gillespie

Date November 25, 2025

Telephone 619-219-5335

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.



*Total of 1 forms are submitted.

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0035. Public burden for this form is estimated to average ** hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. If filing this completed form by mail, 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.

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. The United States Patent and Trademark Office (USPTO) collects the information in this record under authority of 35 U.S.C. 2. The USPTO's system of records is used to manage all applicant and owner information including name, citizenship, residence, post office address, and other information with respect to inventors and their legal representatives pertaining to the applicant's/owner's activities in connection with the invention for which a patent is sought or has been granted. The applicable Privacy Act System of Records Notice for the information collected in this form is COMMERCE/PAT-TM-7 Patent Application Files, available in the Federal Register at 78 FR 19243 (March 29, 2013). <https://www.govinfo.gov/content/pkg/FR-2013-03-29/pdf/2013-07341.pdf>

Routine uses of the information in this record may include disclosure to: 1) law enforcement, in the event that the system of records indicates a violation or potential violation of law; 2) a Federal, state, local, or international agency, in response to its request; 3) a contractor of the USPTO having need for the information in order to perform a contract; 4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record; 5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record; 6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations; 7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals; 8) 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)); 9) the Office of Personnel Management (OPM) for personnel research purposes; and 9) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

Additional Uses

Additional USPTO uses of the information in this record may include disclosure to: 1) the International Bureau of the World Intellectual Property Organization, if the record is related to an international application filed under the Patent Cooperation Treaty; 2) the public i) after publication of the application pursuant to 35 U.S.C. 122(b), ii) after issuance of a patent pursuant to 35 U.S.C. 151, iii) 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 inspections, or an issued patent, or iv) without publication of the application or patent under the specific circumstances provided for by 37 CFR 1.14(a)(1)(v)-(vii); and/or 3) the National Archives and Records Administration, for inspection of records.

"FEE ADDRESS" INDICATION FORM**Address to:**

**Mail Stop Maintenance Fee
Director of the United States
Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450**

-OR-**Fax to:****571-273-6500**

INSTRUCTIONS: The issue fee must have been paid for the application(s) listed on this form. In addition, only an address represented by a Customer Number can be established as the fee address for maintenance fee purposes (hereafter, fee address). A fee address should be established when correspondence related to maintenance fees should be mailed to a different address than the correspondence address for the application.

When to check the first box below: If you have a Customer Number to represent the fee address.

When to check the second box below: If you have no Customer Number representing the desired fee address, in which case a completed Request for Customer Number (PTO/SB/125) must be attached to this form. For more information on Customer Numbers, see the Manual of Patent Examining Procedure (MPEP) § 403.

For the following listed application(s), please recognize as the "Fee Address" under the provisions of 37 CFR 1.363 the address associated with:

Customer Number: **62993****OR**

The attached Request for Customer Number form (PTO/SB/125)

PATENT NUMBER
(if known)

APPLICATION NUMBER

8548924

Completed by (check one):



Applicant/Inventor

Attorney or Agent of record **47596**

Reg. No.



Assignee of record of the entire interest. See
37 CFR 3.71. Statement under 37 CFR 3.73(c)
(Form PTO/AIA/96) is enclosed or was filed on

(Date)

/Noel C. Gillespie/

Signature

Noel C. Gillespie

Typed or printed name

619-219-5335

Requester's telephone number

November 25, 2025

Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. If the assignee is a juristic entity, this form must be signed by a patent practitioner (attorney or agent) of record. Submit multiple forms if more than one signature is required, see below*.

*Total of **1** forms are submitted

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0016. Public burden for this form is estimated to average 5 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS.** SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION # 13/403,141	RECEIPT DATE / TIME 11/25/2025 04:03:09 PM Z ET	ATTORNEY DOCKET # 116546-900CT1
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Title of Invention

SELF-AUTHORIZING TOKEN

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	8548924
CONFIRMATION #	6813	FILED BY	Leslie Park
PATENT CENTER #	73334316	FILING DATE	02/23/2012
CUSTOMER #	27189	FIRST NAMED INVENTOR	C. Douglas Yeager
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	NOEL GILLESPIE

Documents

TOTAL DOCUMENTS: 4

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
N5429-3092 2025-11-25 Maintenance Fee Address Change.pdf	2	Maintenance Fee Address Change	264 KB
N5429-3092 2025-11-25 3.73 Statement.pdf	3	Assignee showing of ownership per 37 CFR 3.73	205 KB
N5429-3092 2025-11-25 POA.pdf	2	Power of Attorney	365 KB
N5429-3092 2025-11-25 Change of Correspondence Address.pdf	2	Change of Address	270 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
N5429-3092 2025-11-25 Maintenance Fee Address Change.pdf	48C18F74D1C3D43C27090100F0F79BA1248EAFB48383DFE48 5885767A8107AAFB6981771C665C4A03CF2F213C48A30AB9E 96B4DE28AE58D46FB15FA571E5CCA0
N5429-3092 2025-11-25 3.73 Statement.pdf	C736A237036D3B9076D074CE65254CC277DEE4654E7A9DB25 F811EC79FEC8EFA0ABDBDEEC7A1BD0ACE0EFEBBC87E36C9 847FEE20C6ACBC8973EA105B0826490C9
N5429-3092 2025-11-25 POA.pdf	62F36B3C2DBDE147D5C4218742D990CBA6A13B943607DB08 ADABA83C9CBCD988D04243F2695C43FE7C46677FE62DD45E C86A98CEAE7CF3AE23680CCC6E383E05
N5429-3092 2025-11-25 Change of Correspondence Address.pdf	663A3E543DCF5114ABFC599AD2121E1B5333AF91156629796 9C2DE981F8D21D41631A0AC8834839D91364F722CBBDCF9A 8016C3F60866663EC3B72B0C4CA3D0D

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

AO 120 (Rev. 08/10)

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Western District of Texas, Midland Division on the following

☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO. 7:26-cv-00075	DATE FILED 3/4/2026	U.S. DISTRICT COURT Western District of Texas, Midland Division
PLAINTIFF MOBILITY IP HOLDINGS, INC.		DEFENDANT APPLE INC.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 8,151,345	4/3/2012	
2 8,548,924	10/1/2013	
3 8,766,772	7/1/2014	
4 8,933,807	1/13/2015	
5 10,235,513	3/19/2019	
6 10,706,412	7/7/2020	
7 10,762,187	9/1/2020	

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
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Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
 Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/403,141	02/23/2012	C. Douglas Yeager	116546-900CT1

CONFIRMATION NO. 6813

62993
BUCHALTER
18400 VON KARMAN AVE.
SUITE 800
IRVINE, CA 92612

POA ACCEPTANCE LETTER



OC000000105144335

Date Mailed: 04/28/2026

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 11/25/2025.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/wrhopkins/



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/403,141	02/23/2012	C. Douglas Yeager	116546-900CT1

CONFIRMATION NO. 6813

27189

PROCOPIO, CORY, HARGREAVES & SAVITCH LLP
525 B STREET
SUITE 2200
SAN DIEGO, CA 92101

POWER OF ATTORNEY NOTICE



OC000000105144346

Date Mailed: 04/28/2026

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 11/25/2025.

- The Power of Attorney to you in this application has been revoked by the applicant. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/wrhopkins/