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ihack∴iam

Sunday, September 5, 2010

Web Laundry (In)Security

Disclaimer: This article is for informational purposes only. The author shall not be liable for any misuse or misconduct resulting from the use of the information provided within.

My apartment building recently switched from coin-op laundry machines to a stored value system using smartcards. The way it works is they have a central dispensing machine that you can use to purchase a card as well as fill up existing cards using a credit card. Each washer/dryer then has a reader interface that will decrement the stored value after starting the machine.

Being the curious type I stuck the card into my smartcard reader to see what chip they were using. A quick google search of the ATR revealed it was a member of the Atmel CryptoMemory family, AT88SC0404C. After pulling the datasheet from Atmel. I began exploring the security mechanisms they had in place.

Before I go any further I should explain that the remaining portion of this article doesn't explain an attack on the Atmel CryptoMemory parts in any way. If that is what you're after I recommend reading Tarnovsky's blog or an attack on the CryptoMemory algorithm here. With that out of the way let's forge on.

After reading through the datasheet I found that this card had a configuration page and 4 user-pages each consisting of 128bytes. I dumped the config using the following APDU.
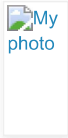
Command	CLA	INS	P1	P2	P3	DATA
Read Config	00	B6	00	00	F0	

After spending some time hand parsing the response I came up with this config.

```
<resp>
3B B2 11 00 10 80 00 04 // ATR
40 40 FF FF FF FF FF FF // Fab Code  |  MTZ  |  Card Manufacturer
94 CE 70 AF 24 2C 40 40 // Lot History Code
BF 00 00 00 45 00 11 22 // DCR  |  Id Number Nc
DF 08 DF 08 DF 58 DF 58 // AR0 | PRO | AR1 | PR1 ...
FF FF FF FF FF FF FF FF // Reserved
FF FF FF FF FF FF FF FF // Reserved
FF FF FF FF FF FF FF FF // Reserved
FF FF FF FF FF FF FF FF // Issuer Code
FF FF FF FF FF FF FF FF // Issuer Code
FF 5D 24 8C 62 69 55 45 // AAC0 | Cryptogram C0
27 27 27 27 27 27 27 27 // Session Key S0
FF 91 06 89 50 61 FF DD // AAC1 | Cryptogram C1
27 27 27 27 27 27 27 27 // Session Key S1
FF FF FF FF FF FF FF FF // AAC2 | Cryptogram C2
27 27 27 27 27 27 27 27 // Session Key S2
FF FF FF FF FF FF FF FF // AAC3 | Cryptogram C3
27 27 27 27 27 27 27 27 // Session Key S3
27 27 27 27 27 27 27 27 // Seed G0
27 27 27 27 27 27 27 27 // Seed G1
27 27 27 27 27 27 27 27 // Seed G2
27 27 27 27 27 27 27 27 // Seed G3
FF 27 27 27 FF 27 27 27 // PAC  |  Write0 pw | PAC | Read0 pw
FF 27 27 27 FF 27 27 27 // PAC  |  Write1 pw | PAC | Read1 pw
FF 27 27 27 FF 27 27 27 // PAC  |  Write2 pw | PAC | Read2 pw
FF 27 27 27 FF 27 27 27 // PAC  |  Write3 pw | PAC | Read3 pw
FF 27 27 27 FF 27 27 27 // PAC  |  Write4 pw | PAC | Read4 pw
FF 27 27 27 FF 27 27 27 // PAC  |  Write5 pw | PAC | Read5 pw
FF 27 27 27 FF 27 27 27 // PAC  |  Write6 pw | PAC | Read6 pw
FF 27 27 27 FF 27 27 27 // PAC  |  Write7 pw | PAC | Read7 pw
```

By looking at the above we can pick out a few things. First of all the 0x27 fill is probably a security measure because we haven't authenticated in any way. Secondly, bit 4 of the

DCR byte tells us that we only have 4 attempts to verify any of the eight passwords before we're locked out. Also, by looking at AR registers [0,3] we can see that all user pages do not require a password but they do require authentication. Here is another interesting tidbit from the datasheet:

```
4.      Detailed Description
        To enable the security features of Atmel® CryptoMemory®, personalize the device by setting up registers and loading
        appropriate passwords and keys. Do these by programming the configuration memory using simple write and read
        commands. Gain access to the configuration memory by successfully presenting the secure code (Write 7 password).
        After writing and verifying data in the configuration memory, blow the security fuses to lock this information in the
        device. For additional information on personalizing CryptoMemory, please see the examples in the protocol sections of
        this specification on page 44.
```

Seems simple enough, verify the write 7 password, program the configuration, then blow a one time programmable fuse to prevent anyone from changing the data. So, let's read the fuse byte!

```
Command         CLA     INS     P1      P2      P3      DATA
----------------------------------------------------------------
Read Fuse       00      86      01      00      01

< 90 00 --> Ok. Normal processing >   27 ...oops someone forgot to set the fuse byte.
```

This is where things start to fall apart. According to the datasheet a fuse byte of 0x27 means only the SEC bit is blown which is done by Atmel during manufacturing to lock the lot code. With the proper write 7 password we can change the configuration (HINT: maybe removing the authentication enable bits from AR bytes?)

Ok, now we just need to guess the write 7 password. The password is 24 bits... That gives us 16,777,216 attempts to brute force it. At 4 attempts per card that will take 4,194,304 cards or 2,097,152 cards on average... There must be an easier way... My next idea was to sniff the traffic between the reader and card to get an idea of what kind of data is being passed back and forth, then after wading through the paper above, implement the algorithm to crack the cipher itself. Then I found this little diddy in the datasheet:

Device	ATR	Fab Code	Lot History code	Write 7 Password (Secure Code)
Atmel AT88SC0404C	3B B2 11 00 10 80 00 04	40 40	Variable, locked	60 57 34

Surely you would think the engineer(s) implementing this weren't negligent enough to leave the default password... you would be wrong.

```
Command             CLA     INS     P1      P2      P3      DATA
----------------------------------------------------------------
Verify Wrt 7 pw     00      BA      07      00      03      605734

< 90 00 --> Ok. Normal processing >

Now read the config...

3B 82 11 00 10 80 00 04 // ATR
40 40 FF FF FF FF FF FF // Fab Code  |  MTZ  |  Card Manufacturer
94 CE 70 AF 24 2C 40 40 // Lot History Code
BF 00 00 00 60 00 11 22 // DCR | Id Number Nc
DF 08 DF 08 DF 58 DF 58 // AR0 | PR0 | AR1 | PR1 ...
FF FF FF FF FF FF FF FF // Reserved
FF FF FF FF FF FF FF FF // Reserved
FF FF FF FF FF FF FF FF // Reserved
FF FF FF FF FF FF FF FF // Issuer Code
FF FF FF FF FF FF FF FF // Issuer Code
FF 5D 24 8C 62 69 55 45 // AAC0 | Cryptogram C0
CE 47 A4 28 62 68 82 58 // Session Key S0
FF 91 06 89 50 61 FF DD // AAC0 | Cryptogram C1
FF FF FF FF FF FF FF FF // Session Key S1
FF FF FF FF FF FF FF FF // AAC0 | Cryptogram C2
FF FF FF FF FF FF FF FF // Session Key S2
FF FF FF FF FF FF FF FF // AAC0 | Cryptogram C3
FF FF FF FF FF FF FF FF // Session Key S3
C0 07 E3 E2 6F BD A4 71 // Seed G0
11 0D 42 6C 46 2F 12 1C // Seed G1
FF FF FF FF FF FF FF FF // Seed G2
FF FF FF FF FF FF FF FF // Seed G3
FF FF FF FF FF FF FF FF // PAC | Write0 pw | PAC | Read0 pw
FF FF FF FF FF FF FF FF // PAC | Write1 pw | PAC | Read1 pw
FF FF FF FF FF FF FF FF // PAC | Write2 pw | PAC | Read2 pw
FF FF FF FF FF FF FF FF // PAC | Write3 pw | PAC | Read3 pw
FF FF FF FF FF FF FF FF // PAC | Write4 pw | PAC | Read4 pw
FF FF FF FF FF FF FF FF // PAC | Write5 pw | PAC | Read5 pw
FF FF FF FF FF FF FF FF // PAC | Write6 pw | PAC | Read6 pw
FF 60 57 34 FF FF FF FF // PAC | Write7 pw | PAC | Read7 pw
```

Now that we can read/write the config page all we have to do is set AR bits 4-7 to disable the password and authentication check then we can dump the user pages. I found a few things by dumping the user pages. Page 0 contains some string constants and doesn't look to be related to the stored value in any way. Page 1 looks to have all the goodies.

By dumping the card before and after use I can see the bytes that change. There appears to be a sequence of 36 bytes that differ between dumps starting at 0x5c. There is also a 1 byte counter that increments by 1 as the stored value is decremented. I've yet to decode how the stored value is encoded on the card so I'll leave that as an exercise for the reader.

At this point an attacker could fill up the card and dump the contents. Then after using the card until there is no value left they could restore the dump rather than paying to refill the card. I don't want to promote fraud (or get sued) so I will not provide dumps of the user pages. Below is a proof of concept video to prove how easily it can be done.

I wrote the application below in C# to assist in working with the Atmel CryptoMemory line. Although I've only tested it on a AT88SC0404C it should work with any chipset in the family. The software provides the ability to dump the config to the terminal, read the fuse byte, and backup and restore the entire card including the config and user pages. Be warned! Since the fuse byte is completely unlocked all fields in the config page are writable. Even the ATR! On a few occasions I overwrote the ATR to all zeros accidentally (due to a bug in the application.) This caused the cards to respond with all zero ATRs which broke ISO-7816-3 compliance so they no longer work in my reader. It may be possible to recover them using the synchronous 2-wire serial interface but I haven't tried yet. The software should work with any compatible PC/SC reader.
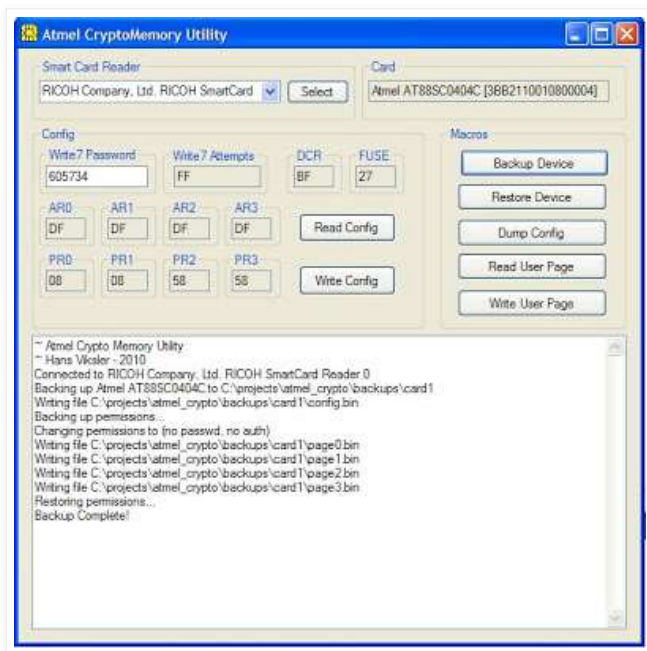

Web Laundry claims 40,000 installations on there website. I can only assume that there are millions of cards in service with the same configuration. I'm unsure why they would pay ~$1.05/pc (qty 5k) for a part that has moderate security measures but then leave the default password set when you could buy an SLE4442 for $0.39/pc (qty 10k). Furthermore, the cost to change the password is effectively nothing since they are writing the ID (+0x19) bytes when they dispense the card from the machine. I can only imagine it was the marketing department that came up with the slogan on the card: "Unmatched Security and Cutting Edge Technology".
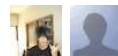
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AtmelCrypto.zip

This software is provided free of charge under the creative commons license. If you find this software useful please consider making a secure donation using the link to the right to support future research.

Posted by Hans Viksler at 4:49 PM

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63 comments:

YaBa September 8, 2010 at 1:29 AM

That's a nice piece of work :)
But tell a newbie one thing, how do you manage to find which chip it was using?
What kind of software do you use to explore the card? ToolSet Pro ???
Thanks.
Keep up the good work.

Reply

The mad engineer. September 8, 2010 at 4:57 AM

Out of curiosity, how would one run the software that you had posted yesterday?

Reply

haywire September 8, 2010 at 5:51 AM

So does the fuse byte "blow" the fuse when set to something, or is it merely an indicator of whether the fuse has been physically blown?

Reply

YaBa September 8, 2010 at 6:05 AM

Don't answer my first post.
RTFM I know :D
Is this the right APDU command?
80 C0 02 A4 0D Chip Inf | GEMPLUS MPCOS-EMV | Get Info

? thnx

@mad engineer: Compile, download visual C# Studio Express 2010 <- NOT 2008, it will give errors

Reply

Hans Viksler   September 8, 2010 at 8:56 AM

@YaBa - Yeah I used Toolset pro to do the initial analysis and proof of concept. After sticking the card in the reader scard toolset pro will show the ATR, 3b b2 11 00 10 80 00 04. Googled that to get the family (Atmel CryptoMem) then pulled the datasheet.

@haywire - The fuse byte can both be read or written. When writing it (1->0) it will blow and cannot effectively be reversed. I recommend the tarnovsky blog link above. He was able to reset the fuse (0->1) by decapping and using UV light (on another chipset in this family).

@mad - YaBa is right, i used c# vs express 2010.

Reply

troll September 8, 2010 at 12:37 PM

Can you publish an executable version also?

Reply

YaBa September 8, 2010 at 1:26 PM

This might help some people:
smartcard-atr.appspot.com
Given the ATR, it will help to identify the card.

Reply

Hans Viksler   September 8, 2010 at 5:19 PM

@troll - I won't publish the binary for liability reasons. I'm currently trying to figure out if I can safely publish the source which is why I took it down. This is all new to me :) You shouldn't have any trouble compiling in visual studio express 2010 though.

Reply

William Neal September 8, 2010 at 8:10 PM

Hans Viksler Can i get the source please? thanks

Reply

Hans Viksler   September 8, 2010 at 9:03 PM

Added the source back by popular demand :)

Reply

YaBa September 9, 2010 at 3:51 AM

@Hans
You can't just give the candy and then take it back :D lol ;)

Reply

Anonymous September 14, 2010 at 6:47 AM

/* Look for smartcard reader */
string[] readers = iCard.ListReaders();

"Exception was unhandled: SCardEstablishContext error: -2146435043"

If you are going to release the source make sure it compiles as is first.

Reply

Hans Viksler　　　　September 14, 2010 at 9:00 AM

@markermanx5 - It does compile, that is a run-time error. Is your reader plugged in and PC/SC compatible? Please read the blob above about NO expressed or implied warranties. In other words, no support :) However, if you want to provide better error handling I'd be happy to pick up the changes and re-post?

Reply

YaBa September 17, 2010 at 11:40 AM

Some people never learn...
U get this for free, and still complain?!?! duh

@Hans, are you familiar with Bus Pirate!? It can read those kind of cards too, among other stuff.

Reply

Hans Viksler　　　　September 19, 2010 at 8:13 PM

@YaBa - Yeah, I own a bus pirate. I've used it to read the synchronous memory cards like the stored value card from fedex/kinkos. I haven't tried reading this card in sync mode though.

Also, I found an old card that was originally sent from Web Laundry when they installed it and it was properly locked down with the fuse set to 0x20. Seems like it is just the cards stocked in this machine that aren't properly configured.

Reply

YaBa September 22, 2010 at 7:53 PM

@Hans - I need your help, i've spent the last 2 hours looking for the technical specs of Gemplus GemClub Memo card.
I just know a few APDU commands. I would like to learn more about this type of card.
Any help would be great.
(Note: The card is in user mode, I don't know how to auth)
I'm considering in buying a season 2 interface to study, but some PDF would really be great.
Thanks in advance.

Reply

Anonymous September 22, 2010 at 11:43 PM

I'm getting an odd error.

I've got a computer with a "Broadcom Corp Contacted SmartCard reader". I can read the config. When I try to backup, I get "SCardTransmit error: -2146435025".

Reply

Hans Viksler　　　　September 23, 2010 at 3:11 PM

@YaBa - http://jwamicha.files.wordpress.com/2010/09/gemclubmemo.pdf

Hope this helps! Have you found a nice season 2 interface? I was looking for one some time back but couldn't find what I wanted. Ideally I'd like a board with a passthrough to a card slot with a pic micro attached to the CLK RST DAT lines to sniff traffic as well as drive the lines (if there is no card inserted). From what I've seen it sounds like I'll need to roll my own...

Reply

Hans Viksler　　　　September 23, 2010 at 3:17 PM

@dividebyzerowned - Step through each APDU sent using visual studio express. By looking at the return code from the card you can get a good idea of what might be failing.

Reply

YaBa September 23, 2010 at 3:27 PM

@Hans: Thanks a lot, but, I insisted on Google, and found a DocStoc version. And then, asked on that blog about the file, the author posted it today. But hey, I really apreciate your help and work.
Regarding Season 2, i'm still looking around in sat foruns and shops (electronicasuiza.com might help).
However... my "tests" card is now almost dead, i've locked CSC0, CSC1 and CSC2 :| :| :|
Can read it, but nothing else.
Can it be unlocked with some mumbo jumbo magic code? or is it trashed forever?
thnx

Reply

Anonymous September 24, 2010 at 4:57 PM

@Hans

The controller for the card reader I'm using is actually integrated into this computer's TPM; apparently it's not fully PC/SC compliant.

Reading the config is fine, but the data pages are 128-byte strings of null bytes.

Reply

Daniel September 24, 2010 at 7:48 PM

My card has all four fuses blown (security byte 0x20). Wondering if you could help me understand the authentication process and how does one compute the challenge and get a good verify crypto command going? If it isn't possible and its just a fancy name for a password please tell me... I've been trying to understand ATMEL's idea of authentication, but cannot seem to get a good grasp on it.

Thanks in advance!

Reply

A September 26, 2010 at 11:31 PM

This comment has been removed by the author.

Reply

awk September 26, 2010 at 11:33 PM

So i have the problem of always getting SW=6E00 (command class is not supported). I get it with your application as well as my c# ports of SMACADU and my APDU scanner. Now matter what value I use for the class I always get the same SW=6E00 response. Have any of you ran into this problem or any ideas on something I may be over looking?

Reply

svg1234 July 1, 2011 at 12:37 AM

The fill byte (for bytes not allowed to be accessed) equals the fuse byte. So as soon as you see a $27 as the fill byte, you know your fuse is good to go. ;)

Reply

A.L. July 27, 2011 at 12:55 AM

Well I have a problem. When I use gscriptor default password is working fine. But when I use your program it gives me "Access Denied" Ans Fuse shows "20"
Any help?

Reply

kolob August 6, 2011 at 9:27 PM

If somebody has a working HexDump of Web laundry card could you send it to kolob at ukr.net
Thanks a lot

Reply

Chris Malter August 17, 2011 at 2:51 AM

My card looks same as yours but ATR revealed it's a Gemplus GemClub Memo.

I compile your app but it won't select the card; has an error Failed to get ATR: SW=6D00. I read the PDF specs on my card, but it's like Greek to me. I even got the ToolSet pro demo. Am I supposed to do a scan to get the hex values? Kinda hard with a demo version. I'm trying to see if they left the default password and fuse unblown like yours.

And then would I modify your AtmelCryptoMem.cs file for my card?

I'm so lost... yet I feel I'm walking down the right path. It would probably help if I had basic knowledge of smart card technology.

Reply

Replies

cheruvian January 28, 2012 at 2:25 AM

Hey, just curious. Did you ever find a solution to this? I have the same type of card and am trying to see if I can accomplish this.

Reply

y November 7, 2011 at 5:41 PM

what is the program you used?

Reply

Unknown January 2, 2012 at 8:32 AM

@Hans Viksler

Hi!
Why don't you blow only the FAB and CMA fuses so you won't overwrite the ATR and FAB configuration?

Thanks for this article

Reply

DingDing February 4, 2012 at 11:35 AM

I am getting this error..

SCardConnect error: -2146434970

Reply

RunFrugal March 8, 2012 at 10:52 PM

When I compile and try to install, it keeps throwing errors on Windows. It compiles fine without errors, and installs fine as well, but will not run for the life of me. I've tried on Windows 7 64 and XP 32 with no luck. Using Visual C# 2010. If anyone is willing to share the executable please contact me runfrugal at gmail.com

Reply

Amarjeet June 22, 2012 at 10:18 PM

Sound good..
phoenix smartcard readers
Jcop cards

Reply

Kyle Smith July 22, 2012 at 6:05 PM

@Hans, awesome work on this and thanks for the utility.

Like a few others, I have multiple cards and they all have a fuse state of 0x20 (totally blown).

I've found a company where I can buy a few SCs with the exact same chipset and I'm wondering what your thoughts are on finding a dump of a card and loading it onto one of these empty cards. Do you see any problems with this working? The idea is to build-a-card that I can start playing around with.

If so and you're not too busy, would you mind sending me one of your dumps?

Thanks for your time!

Reply

Kevin Funk October 6, 2012 at 12:13 AM

Has anyone been able to get this software to work with a fuse of 20?

I'm getting an 'Access denied'.

kevincfunk at gmail

Reply

Kyle Smith October 6, 2012 at 1:10 PM

@Kevin, after sending that message a few months back I messed around with it but never got anywhere.

Lately I've been trying to find / buy someone's older card with the unblown fuse (all the new ones at my complex are blown).

If you make any headway hit me up-- I think we're in the same boat.

knksmith57 [at] gmail

Reply

Media streamer October 26, 2012 at 6:55 AM

It compiles with success only on winxp 32 bits visual C# express 2010 and the compile version works in all platforms .

The question is : how you have to deal with the non-iso compliant C8 pin ?

Reply

joseph offen February 11, 2013 at 7:27 AM

could readd the compiled exe again

Reply

jonas Cramm June 8, 2013 at 8:15 AM

This comment has been removed by the author.

Reply

ITSoftwareCommunity techwebonlineevents October 10, 2013 at 8:55 AM

This comment has been removed by the author.

Reply

ITSoftwareCommunity techwebonlineevents October 11, 2013 at 9:42 AM

i think i see the problem that im facing. i see that the program uses GEMCARD info. i have been using a normal iso programmer 3.68 i guess that will not work and i need to get a programmer like the ones in the video ?

Reply

teja ul January 6, 2014 at 4:43 AM

Thanks for sharing this article. you can also refer *Laundry Machine Manufacturers In Hyderabad*

Reply

star whites January 17, 2014 at 2:44 AM

Excellent post! I must thank you for this informative read. I hope you will post again soon.*Laundry Machine Manufacturers In Hyderabad*

Reply

Gold Trinitron April 4, 2015 at 5:11 PM

Hi there
I just tried but my write7 password is not the default do any know of a way to pick the password up.

Reply

John Diesel September 9, 2015 at 11:01 PM

I have enjoyed reading your articles because this is blog which there is the description about security.

Car Removal | **Scrap My Car** | **Get Cash for Junk Cars**

Reply

Juane Weg October 15, 2015 at 7:12 PM

marc jacobs bags
ghd
nike outlet store
prada sunglasses
mbt shoes
uggs sale
under armour sale
north face jackets
discount nike
columbia sportswear outlet
timberland boots
michael kors cheap
the north face jackets
nike air jordan shoes
abercrombie and fitch outlet
new balance outlet
north face rain jackets
ferragamo shoes
red sole shoes christian louboutin
ralph lauren polo shirts
cheap michael kors handbags
kate spade sale
christian louboutin shoes
abercrombie & fitch
ray ban sunglasses outlet
salvatore ferragamo belt
fendi bags
lebron james basketball shoes
cheap converse shoes
hermes outlet online
cheap coach purses
fitflops sale
coach handbags online outlet
the north face sale
celine handbags
cheap michael kors
north face coats for women
gucci outlet
abercrombie coupon
canada goose coats
womens north face jackets sale
kate spade
jordan retro 11
coach outlet
20151016yxj-1

Reply

Juane Weg October 15, 2015 at 7:14 PM

cheap gucci belts
coach factory outlet
hollister outlet store
jordan 3
fitflop shoes
rolex watches prices
nike outlet store
nike shoes
jordan 11
celine outlet
dior outlet
cheap nike shoes
canada goose sale online
michael kors outlet online sale
nike clearance
north face outlet
vans shoes sale
abercrombie outlet
hermes outlet
rolex watches for men
michael kors handbags clearance 75% off
michael kors outlet
air jordan 13
fitflop sandals for women
cheap nfl jerseys
burberry sale
michael kors handbags
ghd hair
coach diaper bag
nike factory store
hermes outlet
canada goose discount
jordan retro 6
ferragamo sale
jordan 13
clarks outlet
cheap nike air max
cheap nike air max
prada outlet
coach handbags outlet
air jordan 6
christian louboutin shoes
chanel bags
coach sale
20151016yxj-2

Reply

historypak October 21, 2015 at 10:26 PM

Love to read it,Waiting For More new Update and I Already Read your Recent Post its
Great Thanks.
Chaffey Cleaners

Reply

Astro pay January 18, 2016 at 2:52 AM

Very inspirational to hear about someone pursuing their dream and becoming successful
instead of following the traditional path.
Astropay

Reply

sirking January 21, 2016 at 4:33 AM

It proved to be Very helpful to me and I am sure to all the commentators here!
Rancho Cucamonga dry cleaners found at Chaffey Cleaners

Reply

limonaseery February 11, 2016 at 8:47 PM

We are the honored guests who visit blog locales like yours is extraordinary, thanks a lot.This is One of the best posts. This gives a great deal of data uniquely those heading for informist Thanks for sharing this post.
Cms website

Reply

Jack Stevens February 29, 2016 at 3:27 AM

I think mimicking popular posts on other blogs is one of the best ways to get a good idea which will be popular.Such a lovely blog you have shared here with us. Really nice. My security services 1300 788 828 is security monitoring company that provides cheap venue security, business security, Alarm systems, event security, building construction site security, crowd control services and helps to hire friendly personal security officer, security technician, private bodyguard in Sydney, Brisbane, Canberra and The Gold Coast Australia.

Reply

Baker Axton March 7, 2016 at 5:12 AM

Thanks for the valuable feedback. I think that strategy is sound and can be easily replicable.Great posts. I love this article.
Visit - White card

Reply

vpn keys March 17, 2016 at 10:15 PM

Awesome blog post nice quality . Best VPN A good VPN provider will offer servers in a large range of different countries.

Reply

Jack Stevens March 31, 2016 at 10:18 AM

Such a lovely blog you have shared here with us. Good line, nice image this post and will be effectively. Thanks for sharing.

Outdoor security cameras

Reply

Tech chat January 27, 2017 at 7:10 AM

hello the application keeps giving me an error:
Connected to Dell Smart Card Reader Keyboard 0
Failed to get ATR: SW=6D00
Any help?

Reply

Unknown February 24, 2017 at 10:50 AM

HIello

I have 3 Miele self service laundry where clients pay for the service, using SLE4442 cards.
Miele sells those cards, but in a very high price.
I've already tried cards with the same SLE4442 chip but the payments machine doesn't accept them because the only ones that work are the ones sold by Miele… I read and read and read and find out the ATR code for the cards that work. My question is if it is possible having the machine recognition codes do "format" blank cards that can be used on the machine

Reply

Rabya Atif March 19, 2017 at 7:52 AM

Very informative and well written post! Quite interesting and nice topic selected for the post.
Also checkout Security services Melbourne

Reply

Atticus Asher April 11, 2017 at 6:58 PM

Hey,

Thanks for the great post. Does anyone have a working executable? After I build and compile the source I am always getting an error. atticusasher at gmail

Reply

Mukesh Mali May 13, 2018 at 10:05 PM

Welcome to Express Laundry Kenya. We are the best and professional laundry services in Kenya. Learn How TLaundry services in Kenyao Use Self Service Laundry. It involves simple steps for you to enjoy a hassle-free experience to clean your clothing. You will love the freshly clean and soft feel of your clothes cleaned by Express Laundry Services.Express laundry

Reply

Bernie2020 February 5, 2019 at 4:15 PM

For anyone looking for a compiled binary, here it is: https://file.globalupload.io/vDNL2HXUNk.zip

I compiled it without installing Visual Studio by following https://stackoverflow.com/questions/18286855/how-can-i-compile-and-run-c-sharp-program-without-using-visual-studio#

Seems like the write 7 password for my card was changed from the default 605734. Anyone have an idea how to brute force the password?

Reply

All in One 2019 March 4, 2019 at 9:42 PM

Thanks for info
for more info please visit here:-
https://www.sparklelaundry.co.in/
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