

## **Executive Summary**

These memory sticks appear to be counterfeit, and not 8GBs. It appears that Chinese counterfeiters have been relabeling iCreate 64-128MB memory sticks as 8GB, and using software to modify the drive parameters to trick Windows and the users into thinking they are buying a 8GB memory stick. There is a utility available to reset the memory sticks to their proper size.

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## **Part 1 - Original analysis of dead USB thumb drives**

### **Background**

On Thursday, November 17<sup>th</sup>, 2005, I was approached by client LG. LG indicated that she had purchased 4 memory sticks in China that were labeled as "Sony 8GB Micro Vault USB 2.0". She had the seller remove them from the packaging and insert them into a computer, and displayed their properties. They all indicated approximately "7.98 GB" according to the client. LG indicated that she had paid approximately 100 dollars US for each stick..

Upon her return to Korea, she sold 2 of them to friends, and were using the other 2 drives. LG's husband wanted to test the sticks, inserted them into a computer and transferred 8 GB of data to them. Due to the amount of time, he went to sleep before the transfer was completed. In the morning, the drives were unreadable.

LG's friends have been using the memory sticks and have not reported any problems, however, she says that they have only been using them for small documents.

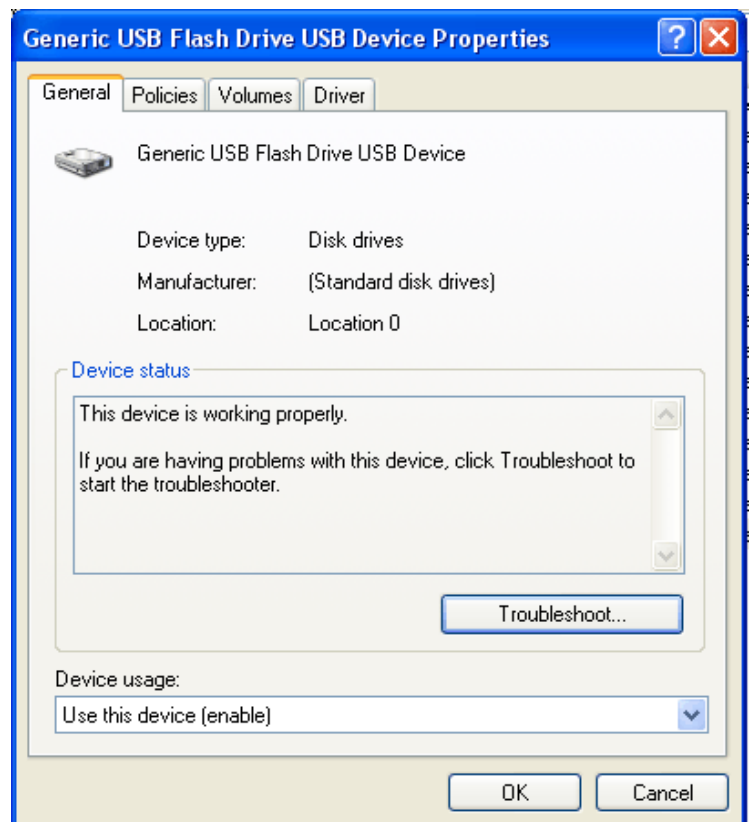
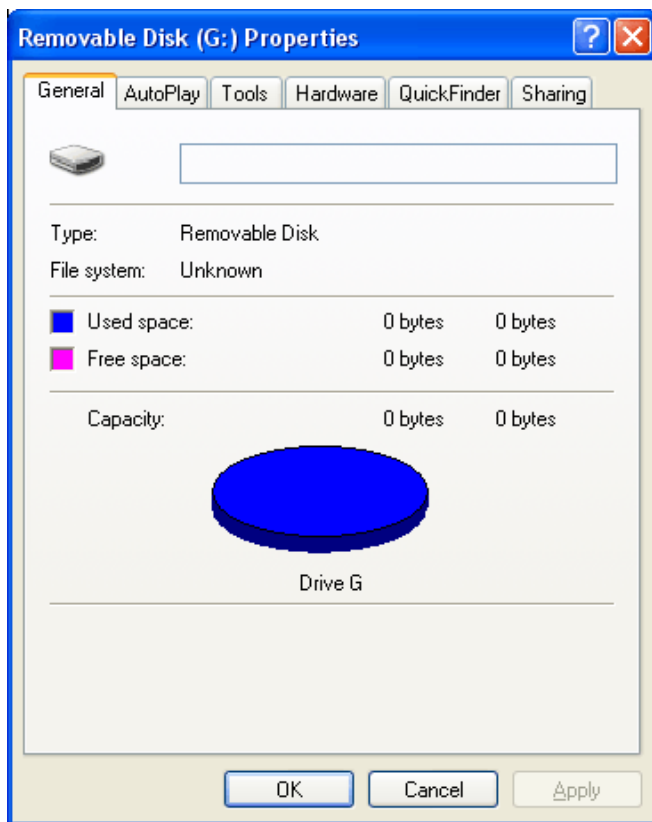
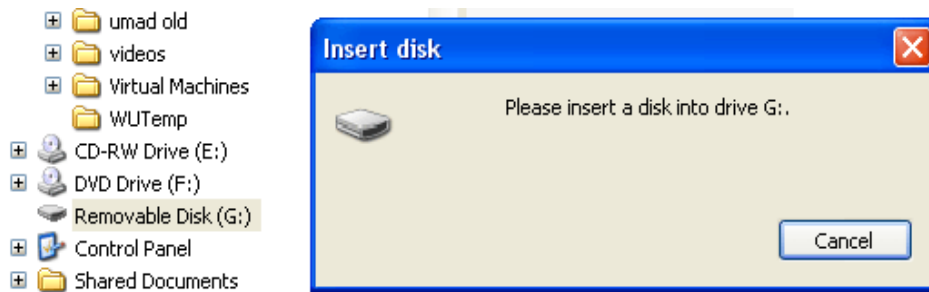
LG brought the 2 chips (one BLUE and one RED) to me hoping I could fix them.

### **Investigation**

Both sticks appear to be well made, and of modern "Sony" style. The font appears to be correct. However, there are different manufacturing molds used for each. The center place lip between the 2 color covers are a different width (the RED is slightly smaller than the blue). In addition the lip on the BLUE stick seems to be a bit long, which results in extra movement inside the case of the USB plug and circuit board - this doesn't seem to meet Sony's manufacturing quality standards.

Inside the translucent lip, there is a sticker on both sticks labeled "8GB". These stickers are slight askew, but not by the same amount, indicating that they were possibly placed by hand.

Upon insert the memory sticks into the computer, they are recognized as a "USB mass storage device" and assigned a drive letter. On the test machine, that drive letter was "G:". Attempts to access the drive resulted in the following error message:



The properties of the G: drive show a removable disk with an Unknown file system. The hardware properties show that this is a "Generic USB Flash Drive USB Device" and the manufacturer is "(Standard disk drives)". It is expected that Sony manufactured memory sticks would have show Sony as the manufacturer, however, this could be the result of the chips being damaged..

I checked Sony's website, but the largest USB memory stick was listed as 5 GB micro hard drive, and a 2GB flash stick (<http://www.sony.net/Products/Media/Microvault/product.html>).




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## Products Line up



USM512EX (512MB)  
USM1GEX (1GB)  
USM2GEX (2GB)

### USM-EX Turbo

Stylish MICROVAULT can transfer data at ultra-high speed incorporating the cutting-edge technology.



### USM-D Plus

Compact & stylish! Pre-installed Sony's unique file compression software.  
\* Color availability may vary by region.



### USM-E Plus

Slim & stylish! Pre-installed Sony's unique file compression software.



### USM-F

More stylish, more convenient! New MICRO VAULT with fingerprint sensor.



### USM-D

A compact & stylish MICRO VAULT.  
\* Color availability may vary by region.



### USM-E

Available in 128MB, 256MB, 512MB & 1GB. A large-volume data can be in a sleek body.



### USD

The 1-inch HDD lets you store 5GB of data.

**MICROVAULT PRO**



### USM-C

A convenient and secure portable storage with fingerprint sensor.



USM128BMS (128MB)

### USM-B

MICRO VAULT with a built-in "MEMORY STICK" reader & writer.



### USM-S[A]

A "Mini" style with a convenient USB docking station.



### USM-U2

USB2.0/USB1.1. Up to 512MB large volume data can be stored in a pocket size.



### USM

The first-generation MICRO VAULT, USB1.1.

Production finished

There doesn't seem to be any reference to an 8GB memory stick. The style of the memory sticks also appear to be significantly different design.

I did find several 8GB memory sticks for sale from other vendors, but the price ranges were 600 to 1300 dollars. Super Media Store <http://www.supermediastore.com/8gb-usb-flash-drive-pen-drives.html> lists two different drives:

## 8GB USB Flash Drive, USB Pen Drive, Flash Drives

HOT PRODUCT	
 <b>FlashDrive 8GB USB 2.0 USB Flash Drive</b> MEY03X0312-001	<b>Sale Price: \$799.00</b> <span>coming soon</span>
 <b>Super Flash 8GB USB2.0 USB Flash Drive - Free Ground Shipping</b> MEY03X0401-001 <b>Small in Size, Big in Capacity!</b>	<b>After Coupon: \$599.00</b> Apply \$100 off code: <b>usb100doff</b> at checkout. Coupon Help? Expire: 11/21/2005 Quantity: <input type="text" value="1"/> <b>ADD TO CART</b>

I was able to find the counterfeit memory sticks on Ebay being sold by various vendors. The prices varied. The one pictured here had a starting bid of 1,00 euro and a "Buy it now" price of 179,00 euros.



The packaging and accessories (lanyard, instructions, and mini cd) for these memory sticks all appear to be legitimate. The client confirms the memory sticks they bought came in these cases.

It appears that the actual USB drives are sold by a company called Shenzhen Gold East Technology Co. Their model is the F012 and comes in blue and red.

## Product Details

### USB Flash Disk (F012)

Product Group: USB Flash Disks

Model: F012

#### Product Description

##### Features:

- 1)No physical driver required, hot plug and play, easy to install;
- 2)Storage capacity:32M, 64M, 128M, 256M;
- 3)USB 1.1 compliant;
- 4)High reliability and access rate;
- 5)Small dimensions, lightweight, moisture-proof and anti-shock;
- 6)Supports multi-partition and password access;
- 7)Supports BIOS booting as USB-ZIP or USB-HDD;
- 8)At least 10 years of data retention.
- 9)Size:70 x 25 x 10mm;
- 10)Weight:20g/piece



USB Flash Disk (F012)

Using the Phrase "Sony 8GB usb" in Google found several interesting comments in discussion forums. Some of the relevant details are highlighted.

Comments found on <http://forums.whirlpool.net.au/forum-replies-archive.cfm/413654.html>

User #42957 432 posts Glen, Forum Regular

[These are] Fake, I purchased a supposed 4GB Sony Microvault, looked like the real thing, was packaged like the real thing, but the build quality was terrible, and it only worked for the first 800mb, i returned it and got my money back. The ebay seller was most apologetic, saying he beleived his supplier was at fault and he offered the goods in good faith. Not convinced of this . . .

User #7423 2545 posts Center Link, Whirlpool Forums Addict

SONY 8G Model USM8024 appears to be a FAKE. There are loads of these selling on EBAY, but they do not work (atleast with Windows XP Pro) When I contacted SONY support they told me the model was not valid and that the unit was likely a counterfeit. Hope this sways others away so they don't get burned like I did. Buyer beware !

User #34568 70 posts icicle, Forum Regular

Hi all i can definitely assure you that it is fake. I bought a 4"gb" one in china in july, looked EXACTLY the same except blue. You plug it into windows, shows a 4 gig, but i pulled it a apart checked the ram codes and it was only 64mb :). I think they do something tricky with the way the size is reported to windows.



User #39671 61 posts Linkaloon, Forum Regular

I am almost certain these are fakes but can't say with 100% certainty because I have never had one in my possession. However, I saw this person recently selling these 8G Sony USB flash drives on eBay and decided to watch what feedback he/she received. I wasn't surprised to see they were negative and they even put their feedback information on private to hide what was being said - how obvious! The ID was also new without any feedback score, so that's another thing to look out for. As one of the posters said already, **I think they use a technique to trick Windows into believing there is 8GB, but you end up saving data into thin air after its true limit.** Do NOT buy them, you will never get your money back if it's a scam, although I have even seen Power Sellers selling these (I think they believe it's the real thing though). **This other guy in the USA (from memory) was selling these drives on eBay and wrote on his advertisement that these drives are not designed to be formatted ever again and doing so will kill them.** He would not issue any refund if anyone did this.

Comments found on

<http://forums.ebay.com/db2/thread.jspa?threadID=1000078865&tstart=40&mod=1130262822566>

gringo\_nb (0 ) View Listings | Report Sep-27-05 06:50 PDT 20 of 60

HERE is the answer you need. I am a Canadian who is in china right now. **I just bought the same 8G usb drive in a market for \$10 US yes that was ten dollars. the package looks really good if it in a knock off, and the compter reads it as 8 Gb.** who knows if it will actually hold that much , i have not tried laoding it yet. I bought it assuming it is a fake, and not sony and i think you should do the same.

zzzngr (50 ) View Listings | Report Sep-29-05 12:12 PDT 24 of 60

I bought one of these a couple of weeks ago. **My computer (xp pro) recognized it as a Sony drive and it showed 8 gig capacity. Worked flawlessly - for the first week - but then quit! It's now recognized as a generic usb drive with ZERO capacity - and I get a message asking me to insert a disc when I try to use it!** I've seen several others complain of this happening too. Fortunately I complained to paypal after noting the seller was no longer a registered ebay user and didn't answer my emails; he didn't answer theirs either and I received my money back. I see someone is selling what are supposed to be 8 gb Sandisk cruiser usb drives - but Sandisk doesn't have them on their web site.

stephen053 (117 ) View Listings | Report Oct-02-05 04:25 PDT 26 of 60

**If you have brought a SONY 2,4, 8GB pen drive that uses the CREATE i5062 chip it is a fake.** Any data written above 128MB is LOST. It fools windows into thinking it is bigger drive. All data above 128MB is returned as "FF". To format you fake SONY pen drive use the manufacturers utility to show corret drive size! [http://www.icreate.com.tw/img/soc/i5062/User%20Utility/iFormat\\_v418.exe](http://www.icreate.com.tw/img/soc/i5062/User%20Utility/iFormat_v418.exe)

ange2047 (7 ) View Listings | Report Oct-15-05 07:56 PDT 34 of 60

Hey Guys, Im an Australian who just returned from a holiday in China, while there i purchased a 2GB sony memorstick for about 12 AUD = 8-9 USD. I actually had the dealer test the stick and it appeared to have a formatted volume of 2GB but of course when it came time to transfer some data the drive became corrupt and doesnt work. Apparently these sony knockoffs are really common through asia right now so whatever you do, dont purchase one no matter how cheap.(you always get what you pay for) **These fake drives can usually be charecterised by their bright blue or red casing. Oh and remember any drive or storage device with the VAIO markings is almost certainly fake.** Happy shopping ebayers, just remember it's Buyer Beware when dealing with these ripoff merchants so follow your gut instinct and only buy things that are 100% original.

I just returned from China and I bought 3 SONY (depository type) 8 GB flash drives for \$30USD. I knew that 8GB flash drives were not being made and that I was in shark infested waters. We tested it at the hotel (it reports 8024Mb capacity) and it took and played back 697Mb of MP3 songs. (Not every song was tried) So we thought it was a legitimate deal. But after returning to USA, we found data corruption. Some of the songs still played and some with chinese names were inaccessible. We loaded the thing up with over 4GB of things like the WINXP directory and accessed the files sucessfully. There were weird things happening - like the data copying error with some large files, inability to delete directories. Then the thing would not allow safe removal from XP and we had no choice but to reboot. After that the flash drive was reported as a removable disk and asks to have a disk put in. The software that came on the CD is worthless. There is no way to reformat the flash drive. None of the software works, or has nothing to do with this drive. Let me say here that the packaging, printing and 2.5" CD is professional looking. But after thinking about it - the drive itself is cheaply made for a cutting edge technology and there is no LED to indicate activity. The printed directions state there is a Sony warrantee - but no term is given. My congratulations to the Chinese counterfeiters. So we took it apart - and the controller chip is made by ICreate - their website offers no downloads for reformatting. The single flash chip indicates 33DS5120???? - so I assume it is a 512 Mb. I am currently looking for a way to reformat this thing - but I would not hold your breath. Let me give all travelers to China a tip - in the flea markets and street side vendor shops, it is typical to sell the items that have been returned as defective to the foreigners at a cheap price - in hopes that they will not test them before leaving the country. I insisted on un-opened packages. We saw a guy buying one for \$150USD - my sympathy to him - good luck all.....

Hello to All, I had a mail-contact with Sony and have informed them about this fakes on ebay.com and as well now on ebay.de. Result: Sony doesn't seems to be interested to protect the good name of Sony and prohibitive all the offers here. How many uninformed Ebayers will buying a "Sony" branded USB-Pen that won't working? Won't they think then, "never more a Sony"? I'm sure, this fakes are really expensive for Sony, because that sticks ruins the good name of Sony. Here in Germany noone knows about that fakes, no infos in Google.de or in any other german search-engines are available. So this thread was my only way to become informations about.

## Actions Taken

I downloaded the [http://www.icreate.com.tw/img/soc/i5062/User%20Utility/iFormat\\_v418.exe](http://www.icreate.com.tw/img/soc/i5062/User%20Utility/iFormat_v418.exe) program, but was not able to get it to run on 2 different systems that I tried. It appeared to run on the a third system, but did not correct the problem. This leads me to believe that these thumb drives are either damaged beyond repair, or not created by iCreate.

I tried several other utilities (Partition Magic, FDISK, Drive Manager, etc) to no avail. It appears that these memory sticks have been damaged beyond repair. This could have been caused by the modifications made by the counterfeiters to make the memory sticks appear larger than they actually were.

## **Preliminary Conclusions**

It appears that these memory sticks appears to be counterfeit, and not 8GBs. It appears that Chinese counterfeiters have been relabeling 64-128MB memory sticks as 8GB, and using software to modify the drive parameters to trick Windows and the users into thinking they are buying a 8GB memory stick.

These drives appear to be fairly common, and may have other counterfeit labels on them to pass them off as being created by other manufacturers. They are being sold in China at various markets, as well as on eBay. Other buyers have reported similar experiences.

These chips may have been manufactured by iCreate, a Taiwanese electronics firm. On their website they have a utility that may be useful to reformat these chips to their correct size, however, it did not work in this case.

Sony appears to be aware of these counterfeit memory sticks, but do not seem interested in taking any action.

## **Further Investigation**

To investigate this any further, it would be necessary to take the unit apart and examine the actual chips inside the unit. Due to the nature of the construction, this would results in the destruction of the actual unit, and would not be done without the client's permission.



## Part 2 - Analysis of disassembled USB thumb drive

### Investigation

After contacting the client, I was told that I could take a unit apart and see what was inside of it. Using a pen knife I was able to separate the casing from the lip. Inside was a single circuit board with 2 major integrated circuit (IC) chips on it. One chip is the controller, and the other is memory. I started the analysis with the memory chip since that was a major point of interest.

### The Memory Chip

The 48-pin surface mounted memory chip is labeled "Infineon HYF33DS512800ATC G1 SUU 3121".

Infineon is the memory chip manufacturer, and their website is <http://www.infineon.com>. The "HYF33DS512800ATC" is the production code of the chip, and contains information about the chip. Their data sheet decodes the chip number.

HYF	33	DS	512	80	0	A	T	C	(Example)			
									Temperature Range	C	=	Commercial (0 °C – +70 °C)
									Package	T	=	TSOP I 48-P-1220-0.5
									Process Technology	A	=	170 nm Process Technology
										B	=	170 nm Process Technology (Enhanced Write Speed)
									Product Variation	0	=	Standard Product (Tape & Reel Packing)
										2	=	Stacked Die (Tape & Reel Packing)
									Organization	80	=	x 8
									Memory Density	512	=	512 Mb
										16	=	1024 Mb
									Memory Type	DS	=	Data SLC: TwinFlash Single-Level Cell (2 bit/ cell)
									Supply and I/O Voltage	33	=	3.3V core and 3V I/O
										31	=	3.3V core and 1.8V I/O
									Prefix	HYF	=	Flash Memory Components

The most important number is the 512 which indicates that the chip has a memory density of 512Mb. Notice the "Mb". This indicates MegaBITS not MegaBYTES. The chips holds 512,000,000 bits. To determine the number of bytes, we have to divide that number by 8 to get 64,000,000 bytes or 64MB.

Density	Organization	Page Size
512 Mb	64 M x 8	512 + 16 Bytes

The datasheet shows that the 512Mb is organized as 64 M x 8, which means that this is a 64 Megabyte memory stick.

## The Controller Chip

The controller chip is labeled "icreate i5062-ZD L540 CE5910.0"

The manufacturer is iCreate Technologies Corporation based in Hsinchu, Taiwan, and their website is <http://www.icreate.com.tw>.

The thumb drive is controlled by the 32 pin surface mounted iCreate i5062-ZD USB Flash Disk Controller. From the datasheet, "i5062-ZD is a single-chip USB flash disk controller which can handle up to four NAND type flash memory chips. It is compatible with USB 1.1 and also compliant with USB 2.0." This controller supports 128Mb (16 MB) to 8Gb (1GB) NAND-type flash. That means that this controller ship in not capable of handling more that 1 gigabyte of memory. This controller can not handle 8 gigabytes of memory as advertised by the sellers..

In section 5 of the datasheet, the compatible memory devices are listed.

Infineon	
256Mbit (32MByte)	HYF33DS256800ATC
512Mbit (64MByte)	HYF33DS512800ATC
1Gbit (128MByte)	HYF33DS1G800ATC

The Infineon chip is listed, with the notation of 512Mbit (64MByte). Again, this confirms that the physical thumb drive is only capable of handling 64 MB of data.

As far as I can tell, this controller chip has no compression algorithms to compress more data into less memory. Even if it did, most compression algorithms can only average about a 2 to 1 compression ratio, which at most would "double" the capacity of the chip to 128 MB, but even this would be nowhere near the advertised size of 8GB.

## Part 3 - Analysis of live USB thumb drive

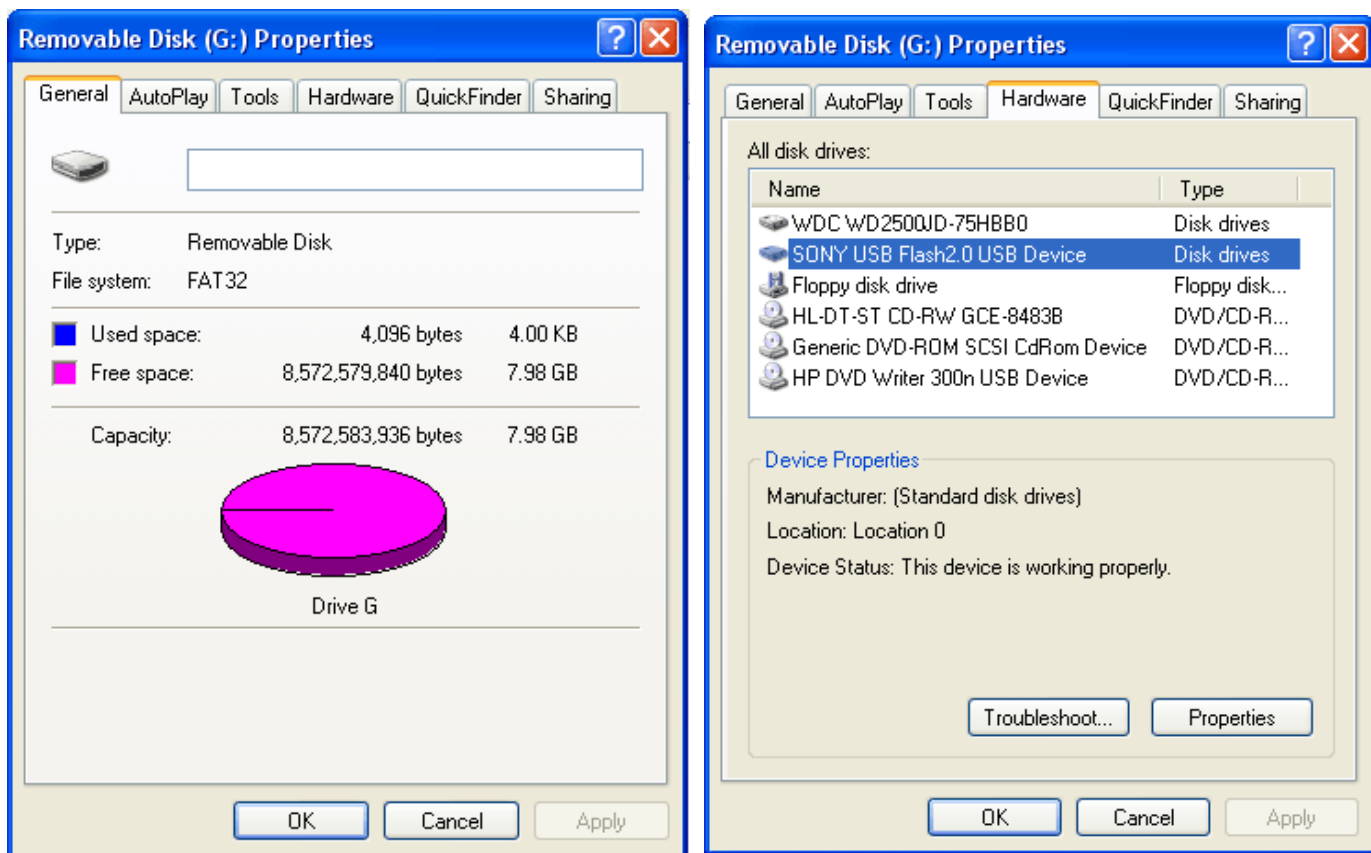
### Background

When discussing this case with a colleague KG on Friday, November 19<sup>th</sup> 2005, he informed me that he had received one of the "Sony 8GB Thumb Drives" as a gift from a co-worker who just returned from China. I asked him if I could exam it. He gave it to me, and told me he had not used it. The device was physically the same of the BLUE drive from LG. The drive from KG had a "Sony" lanyard on it to distinguish it from the one from LG.

### Investigation

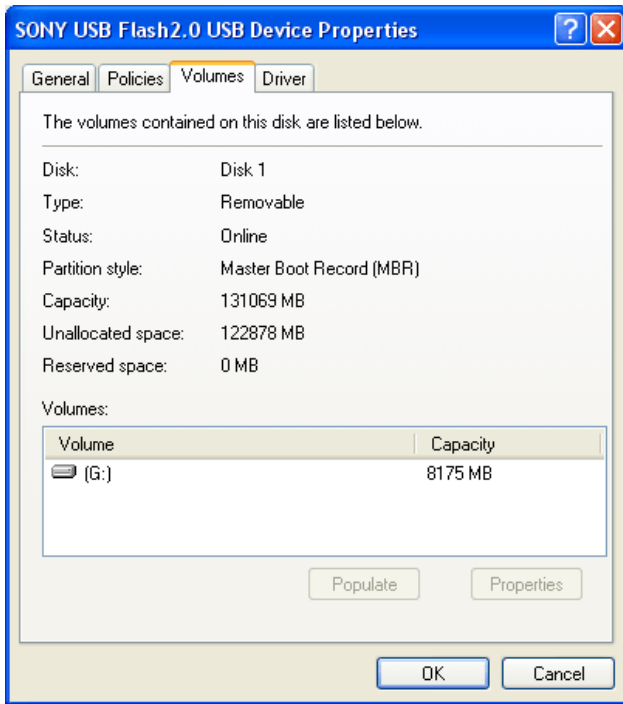
The live stick appear to be well made, and of modern "Sony" style. The font appears to be correct. It appears to be identical to the LG blue drive, except that the KG drive has a smaller lip, like the RED one, which means that the KG blue drive connector doesn't move inside the casing. However, the KG drive is also lacking the internal "8GB" label.

Upon insert the KG memory stick into the computer, it is recognized as a "USB mass storage device" and assigned a drive letter. The properties now show an 8GB drive. This confirms what LG saw when she tested the drives she bought.



The hardware screen indicates that this is a "Sony USB Flash2.0 USB Drive".

However, things start to get strange when we start to examine the drive in more depth. Accessing the properties



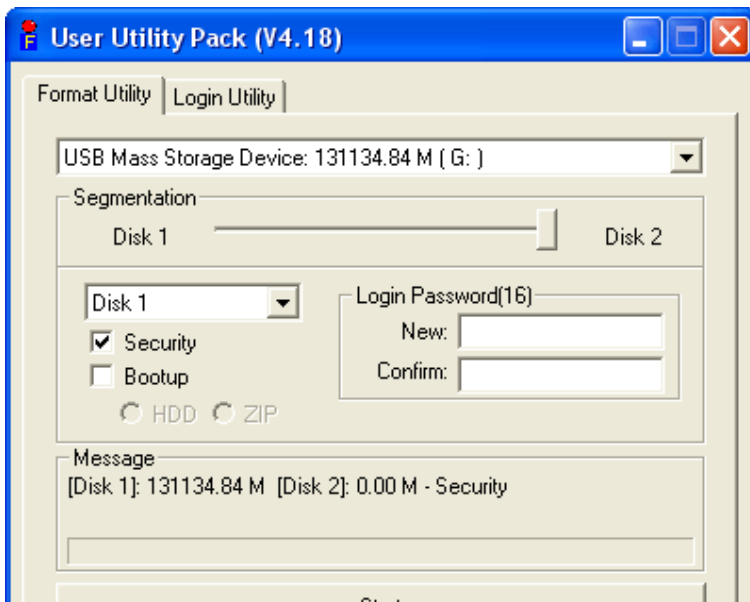
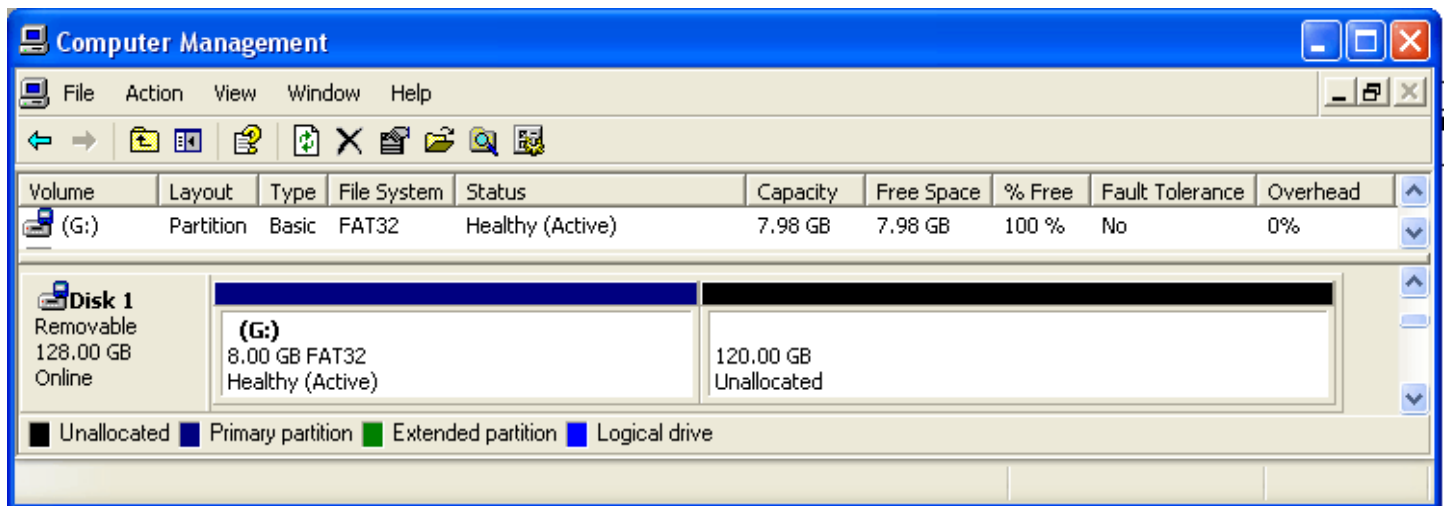
page for the hardware, and selecting the Volumes tab, we see some odd numbers:

According to this, the drive is 131,069MB, and has 122,878MB unused. The drive utility confirms this information.

This indicates that the memory stick is actually 128GB, and there is a single 8GB partition on the stick.

Needless to say, there is no such thing as a 128GB thumb drive, and it certainly would not be sold for 100 dollars.

It is clear that the counterfeiters are modifying the partition table or modifying the code of the i5062-ZD USB controller unit to make the drive appear bigger than it actually is.



With the working memory stick, the formatting utility from iCreate actually works, however, it also display incorrect information about the drive. There doesn't appear to be a function in the software to reset the memory stick to the proper size.

I tried to use some more advanced forensic tools on the KG drive, but it was too late. I started to receive the "Please insert is disk in Drive G:" error, the same as I got with the original drives.

## Part 4 - Resetting the USB Thumb Drive

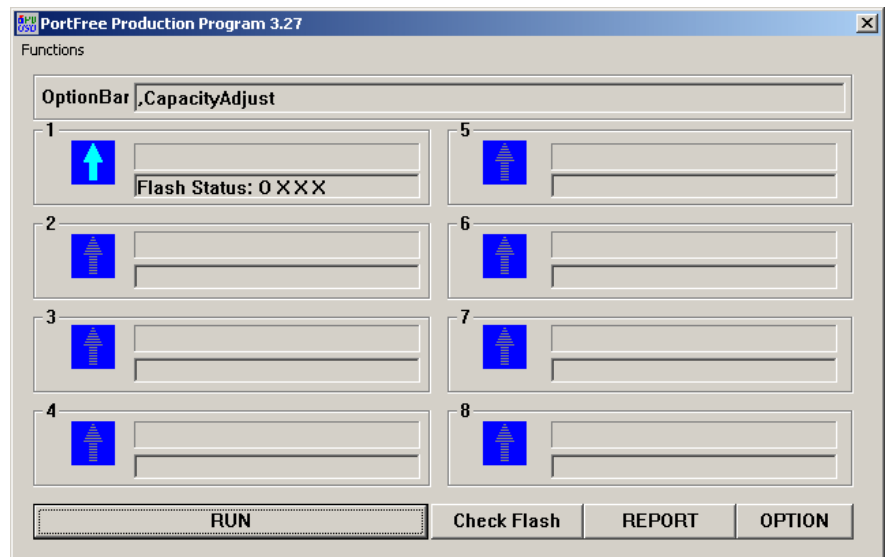
After continued searching, a utility was found that would reset the thumb drive to their actual size. The utility, pdx8\_2k\_v327 found in the <http://www.everythingusb.com> forums, has been posted to the Seoul Computer Club's website, <http://seoulcc.org>.

This is a complex utility, and the author has only been able to get it to work on a Windows 2000 system with a USB 1.1 port. The thumb drive is only a USB 1.1 device (not 2.0 as advertised on the packages), and the reprogramming utility doesn't appear to work on USB 2.0 ports.

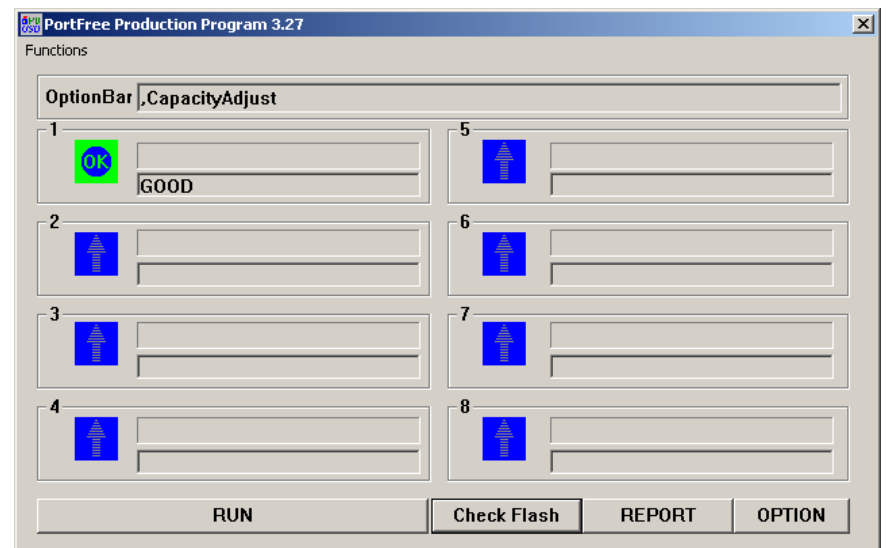
This technique appears to work on the memory sticks even if they generate the "Please insert a disk into drive" error message.

To use the utility, follow these steps:

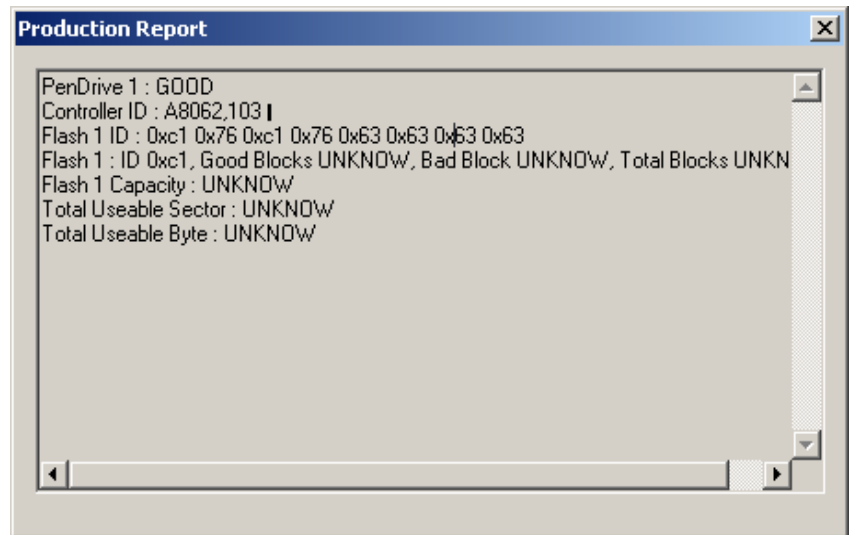
1. Download the utility from [http://seoulcc.org/pdx8\\_2k\\_v327.zip](http://seoulcc.org/pdx8_2k_v327.zip) and unzip into a new folder.
2. Insert the memory stick into a USB port.
3. Double-click on PDx8\_2k\_v327.exe
4. The program should detect the flash and display a status message.



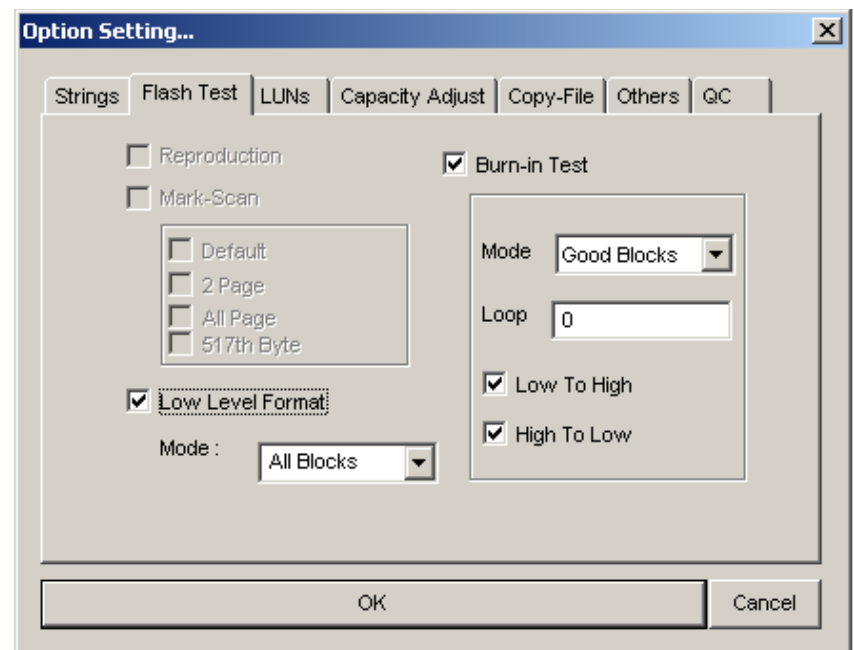
5. Click on "Check Flash", the program should display "OK" and "Good"



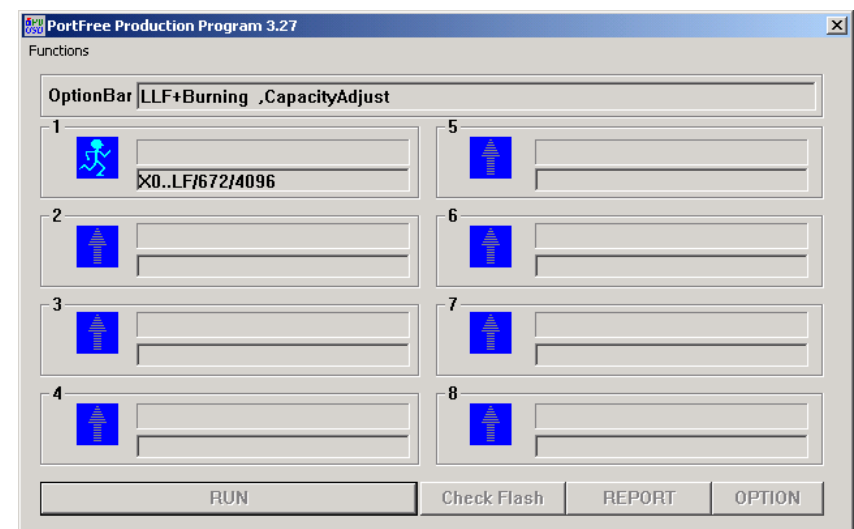
6. Click on "REPORT", the following should be displayed.



7. Click on "OPTION", and select tab "Flash Test". Set the options as show below.

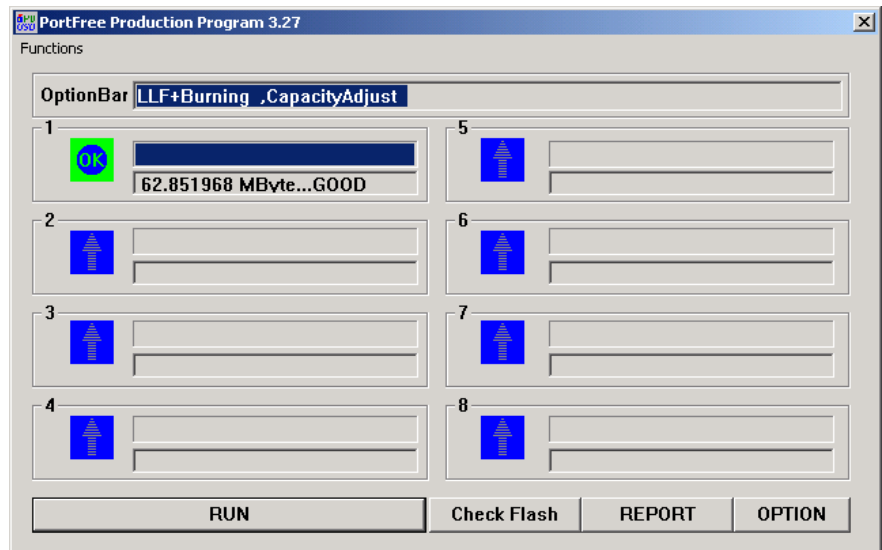


8. Click OK to ext the option screen
9. Remove the memory stick, wait a few seconds, and reinsert it.
10. Click "RUN". The icon next to the drive should change to a running stick figure, and numbers should start flashing in the text box. If it doesn't try removing and reinserting the drive again, or a different machine.

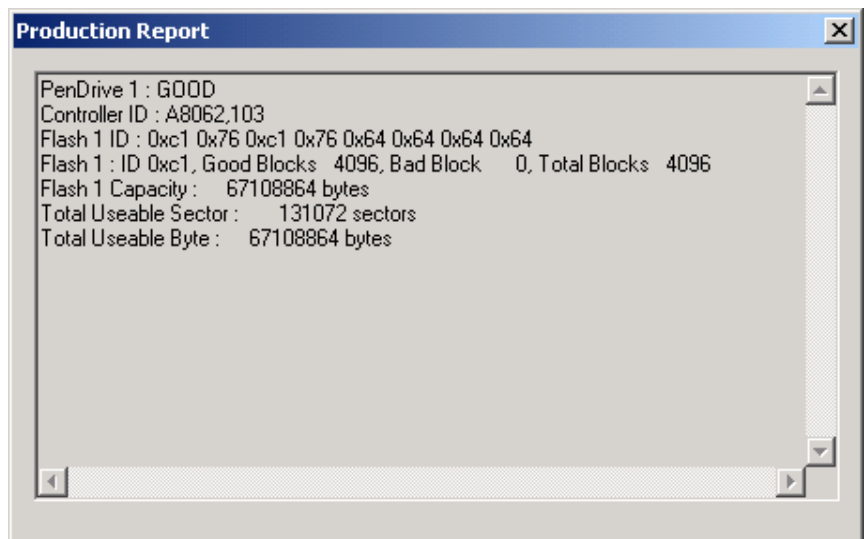




11. It will take the utility a few minutes to finish, and when it is done, you will see:

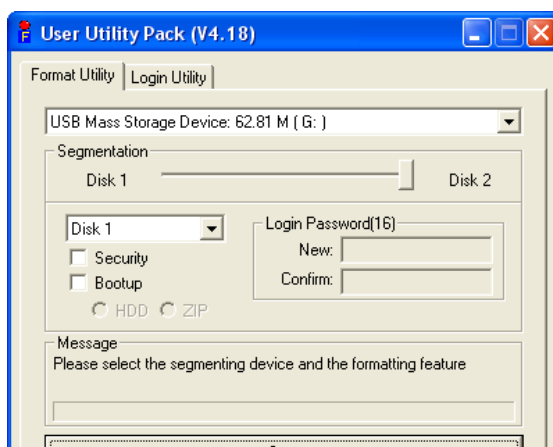
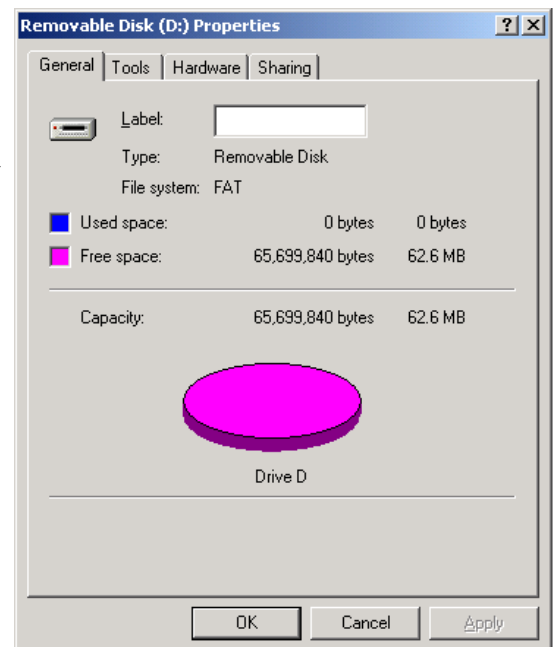


12. Click "report" to see the complete status of the thumb drive.



13. Exit the utility
14. Remove and reinsert the flash
15. You should now see a generic flash removable drive, and here are it's properties:
16. Congratulations - you are now the proud owner of a 64MB memory stick.

In addition, the icreate format utility will now work properly, and show the proper memory size.



## Final Conclusion

It appears that these memory sticks appears to be counterfeit, and not 8GBs. It appears that Chinese counterfeiters have been relabeling 64MB iCreate memory sticks as 8GB, and using software to modify the drive parameters to trick Windows and the users into thinking they are buying a 8GB memory stick.

These drives appear to be fairly common, and may have other counterfeit labels on them to pass them off as being created by other manufacturers. They are being sold in China at various markets, as well as on ebay. Other buyers have reported similar experiences.

These chips appear to have been manufactured by iCreate, a Taiwanese electronics firm. The software on their website doesn't appear to be able to reset these memory sticks back to their original sizes. Even without writing data to the drive, the KG drive eventually failed, in the same way as the other drives.

It appears that the actual USB drives are sold by a company called Shenzhen Gold East Technology Co. Their model is the F012 and comes in blue and red.

The modifications made to the data on the drives make it appear as a 128GB drive with a single 8GB partition on it.

According to iCreate, "i5062-ZD is designed with iCreate flash interface technology to provide wear-leveling and on-the-fly error-correction coding, which enhance the life time of the disk." The wear-leveling technique means that the data is constantly written across the entire memory drive, so at some point the data will try to be written past the physical 64MB boundary, at which point the drive fails. This could be the cause of the "Please insert is disk in Drive G:" - the drive wrote to that address previously, and when it tries to read it, the memory is not there, so it asks the user to insert the disk.

Physically, these drives contained a 64MB memory chip, and a controller that could only handle up to 1 GB, and therefore, would never be able to hold the advertised "8GB".

Real 8GB thumb drives are on the market, and cost significantly more than what these units have sold for.

In my opinion, this is fraud, plain and simple. These counterfeiters are using Sony's name to sell 64MB thumb drives that have been deliberately modified to appear to something they are not.

With the proper utility, these memory sticks can be reverted back to their proper size (around 64MB).