

Number of pictures that can be stored on a memory device
 How many pictures can my memory device hold?

The following assumptions were made to calculate the number of images per card:

MP = 1,000,000 pixels

1MB = 1,000,000 bytes, 1GB = 1,000MB

TIFF image has 24 bit color depth, one of 16,777,216 colors per pixel

JPEG 100% Quality = Visually lossless JPEG compression with 1:10 ratio of RAW image

Photos - **Compressed** (JPEG 100% quality) Images per card.

NOTE: JPEG is the most common file format for consumer cameras.

Megapixels	File size (MB)	1GB	2GB	4GB	8GB	16GB	32GB	64GB	128GB
4MP	1.2	715	1430	2861	5722	11444	22888	45776	91552
5MP	1.5	572	1144	2288	4577	9155	18310	36620	73240
6MP	1.8	476	953	1907	3814	7629	15258	30516	61032
7MP	2.1	408	817	1634	3269	6539	13078	26156	52312
8MP	2.4	357	715	1430	2861	5722	11444	22888	45776
10MP	3.0	286	572	1144	2288	4577	9155	18310	36620
12MP	3.6	238	476	953	1907	3814	7629	15258	30516
14MP	4.2	204	408	817	1634	3269	6539	13078	26156
16MP	4.8	178	357	715	1430	2861	5722	11444	22888
22MP	6.6	130	260	520	1040	2080	4161	8322	16644

Photos - **Uncompressed RAW** (24 bits per pixel) Images per card

Megapixels	File size (MB)	1GB	2GB	4GB	8GB	16GB	32GB	64GB	128GB
4MP	12.0	71	143	286	572	1144	2288	4576	9152
5MP	15.0	57	114	228	457	915	1831	3662	7324
6MP	18.0	47	95	190	381	762	1525	3050	6100
7MP	21.0	40	81	163	326	653	1307	2614	5228
8MP	24.0	35	71	143	286	572	1144	2288	4576
10MP	30.0	28	57	114	228	457	915	1830	3660
12MP	36.0	23	47	95	190	381	762	1524	3048
14MP	42.0	20	40	81	163	326	653	1306	2612

16MP	48.0	17	35	71	143	286	572	1144	2288
22MP	66.0	13	26	52	104	208	416	832	1664

SD/SDHC/SDXC memory card is write protected or locked

Why do I get a "The disk is write-protected" message when I transfer files to my SD card?

SOLUTION 1 - Unlock the memory card.

There is a **Lock** switch on the left side of the SD card. Make sure the **Lock** switch is slid up (unlock position). You will not be able to modify or delete the contents on the memory card if it is locked.



SOLUTION 2 - Toggle the lock switch.

If the lock switch is loose and moves easily It is likely the switch is sliding to the locked position as the card is placed in your host device. In this case the card will need to be replaced.

Please contact SanDisk support to check warranty status.

NOTE: If the above steps do NOT resolve the problem or if the lock switch is missing or broken, please back up your data and [request a replacement using our online web form](#).

Formatting a memory card, flash drive or device using a PC

How do I format my memory card, flash drive or device using a PC?

NOTE: All SanDisk memory cards and flash drives come pre-formatted and do not need to be formatted out of the box. Memory cards are formatted with the following standards:

SD/microSD	2GB or lower	FAT16
SDHC/microSDHC	4GB to 32GB	FAT32
SDXC/microSDXC	64GB or higher	exFAT
CompactFlash	up to 128GB	FAT32
CompactFlash	256GB	exFAT

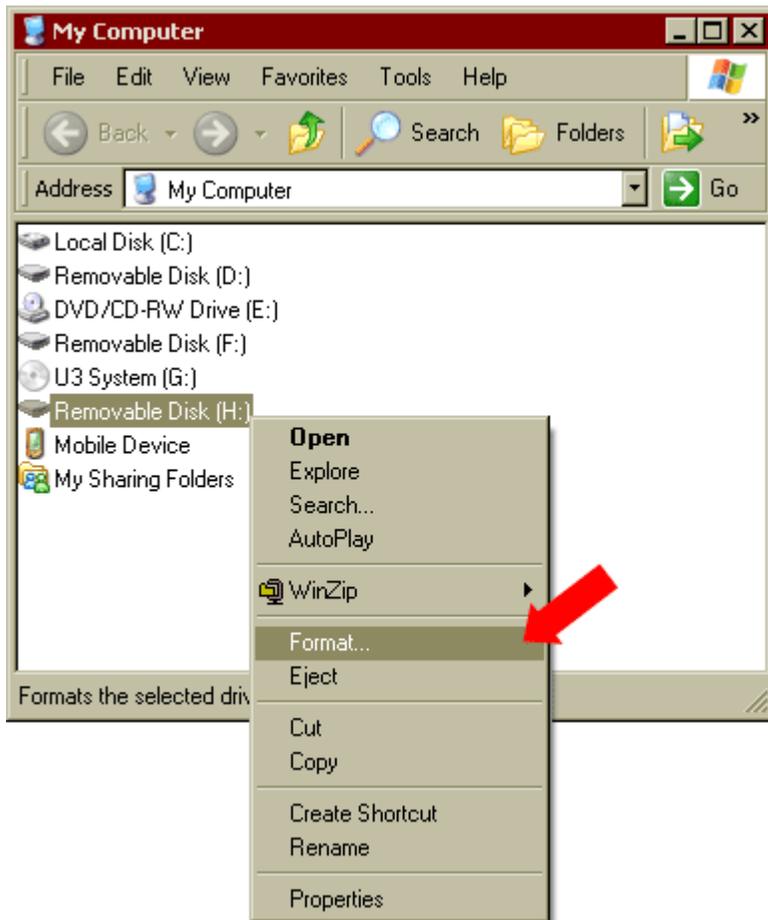
Reformatting may clear file system corruption and quickly erase everything on the device. If reformatting is needed, follow the steps below.

WARNING: Backup all your data before formatting. Formatting will erase all data on the memory device.

Formatting your memory device:

1. Double-click **My Computer**, or **Computer** (for Vista and Win7)
2. Right-click the drive letter associated with your memory device, then select **Format** (in the sample image below, we right-clicked on H:).

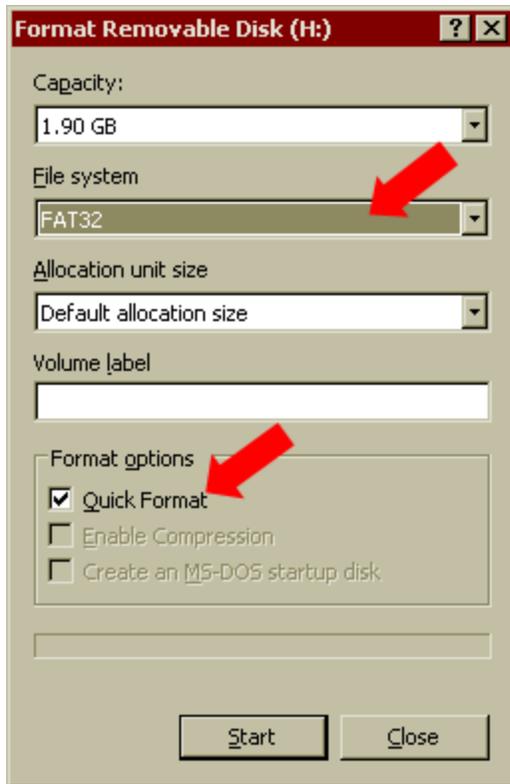
WARNING: Make sure you select the correct drive letter.



3. Select a **File system** type.

- **FAT**
- **FAT32**
- **exFAT**

4. Ensure "Quick Format" is checked



5. Click **Start**.

NOTE: exFAT is supported natively in WIN7 and WIN8. You will need to download a patch for Windows XP or VISTA to format a 64GB or larger device.

Reference: [Operating Systems that Support the exFAT File System](#)

If you have a problem formatting, you can try to [Format using Disk Management](#).

NOTE: If the above steps do NOT resolve the problem or if the lock switch is missing or broken, please back up your data and [request a replacement using our online web form](#).

Difference between Speed Class, UHS Speed Class, Speed Ratings (performance) and Video Speed Class for SD/SDHC/SDXC cards

What is the difference between Speed Class and Speed Ratings for SDTM/SDHCTM cards?

The **speed rating** measures maximum transfer speed for reading and writing images to and from a memory card, expressed as megabytes per second. However, video doesn't need as big a data pipe because the video format is a smaller "fixed stream" that uses only a portion of the data pipe.

Unlike card write speeds that measure *maximum* performance, **class ratings** measure the *minimum* sustained speed required for recording an even rate of video onto the card. The class rating number corresponds to the transfer rate measured in megabytes per second. Class 2 cards

are designed for a minimum sustained transfer rate of 2 megabytes per second (MB/s)¹, while Class 10 cards are designed for a minimum sustained transfer rate of 10MB/s².

What does this difference mean for me?

Rated Speed (e.g. 15MB/s, 30MB/s, etc.) is maximum speed of the card and also what you would expect to approximately see in typical usage of writing or reading files on the card. This measurement is pertinent to still photography, especially for taking pictures with high resolution and/or saving in RAW format where the files created are very large. The faster the card, the faster it can save the file and be ready to take another picture. You can really notice speed differences with high-megapixel DSLR cameras when using multi-shot burst mode.

Still digital images shot on high-megapixel cameras should utilize fast data throughput (a large data pipe), higher speed cards for improved performance. Higher speed cards can also improve how fast you can transfer the files to and from the card and your computer.

Speed Class is a minimum speed based on a worst case scenario test. The Speed Class is important for video mode or camcorders, where the device is actually saving a steady stream of data. The resolution and format of the video determines the amount of steady stream data. This translates to a minimum speed you need to guarantee that the video captured on the cards is recorded at an even, sustained rate with no dropped frames (which would result in lost data and choppy playback).

Compared to high-megapixel photography, video doesn't need as big a data pipe because the video format is a smaller "fixed stream" that uses only a portion of the data pipe. But you do need a minimum guaranteed speed for the SDHC card that satisfies the requirement of the data stream. Your camera's specifications should state the minimum SDHC Class Rating required.

Using a card without the proper class rating on a more advanced camera, such as a high-definition (HD) camcorder or Digital Single Lens Reflex (DSLR) camera with HD video record settings is likely to result in an error message indicating that video can only be recorded at a lower definition setting.

The current SDHC specification defines Class 2, 4, 6, 8 and 10 as follows:

Class	Minimum Speed
2	2MB/s
4	4MB/s
6	6MB/s
8	8MB/s
10	10MB/s

UHS Speed Class was introduced in 2009 by the SD Association and is designed for SDHC and SDXC memory cards. UHS utilizes a new data bus that will not work in non-UHS host devices.

If you use a UHS memory card in a non-UHS host, it will default to the standard data bus and use the "Speed Class" rating instead of the "UHS Speed Class" rating. UHS memory cards have a full higher potential of recording real time broadcasts, capturing large-size HD videos and extremely high quality professional HD.

UHS Class	Minimum Speed
1	10MB/s
3	30MB/s

Video Speed Class or "V Class", was created by the SD Association to identify cards that can handle higher video resolutions and recording features. This speed class guarantees minimum sustained performance for recording video.

The other speed classes are either not optimized or are unable to accommodate the recording of multiple video streams, 360 capture, virtual reality content or 8K and higher resolution video.

V Class	Minimum Sustained Speed
V6	6MB/s
V10	10MB/s
V30	30MB/s
V60	60MB/s
V90	90MB/s

¹ 1 megabyte (MB) = 1 million bytes

² Based on SanDisk internal testing; performance may vary depending upon host device.

Card reader not being detected by the PC
Why can't my card reader/writer be detected by my PC?

SOLUTION 1 - Verify if minimum system requirement is met.
SanDisk card readers support **Windows Vista, Windows XP SP2** and **Windows 2000 SP4, Windows 7.**

NOTE: No additional drivers need to be downloaded for the card readers as they are native to the above mentioned supported operating systems.

For Mac users, see [Troubleshooting USB device on Mac](#)

SOLUTION 2 - Verify the reader's status under Device Manager.

STEP 1 - Connect the reader to the PC

NOTE: It is recommended that you plug your card reader to the back USB port on your PC to ensure that there is enough power from the USB port for the card reader to be detected properly.

STEP 2 - Check under Device Manager

1. Right-click **My Computer**.
2. Select **Manage**.
3. On the left pane, click **Device Manager**.

NOTE: The card reader will appear in two places: Disk Drives and Universal Serial Bus controls as USB Mass Storage. If there is a yellow exclamation point (!) or question mark (?) next to the device, try to refresh the drivers.

STEP 3 - Refresh the drivers

1. Right-click the entry with the error mark, select **Uninstall**.
2. On the top menu, click **Action**, and then click **Scan for hardware changes**.

STEP 4 - Verify if the reader is detected

1. Double-click **My Computer**.
2. Look for the card reader under **Devices** with removable storage.

SOLUTION 3 - Try other USB ports.

A yellow exclamation point (!) under Device Manager usually means that the device is not receiving enough power. If the reader is not receiving ample amount of power from the USB port, it may not function properly.

SOLUTION 4 - [Change the drive letters](#)

NOTE: The SDDR-89, SDDR-189, SDDR-289 reader should show 4 drive letters under **My Computer**.