



# Computing GCSE – 1.3

## J276/01 – Storage

All basic computing functions are done using Primary Storage – but this is either *volatile RAM* or *static ROM*. To allow storage of a user’s information once the power is turned off, *non-volatile, secondary storage* is required.

### KEY VOCABULARY

Secondary Storage	Primary storage is RAM. Secondary storage refers to long term, non-volatile data storage.
Non-volatile	Memory which can retain its data when the power is turned off
Magnetic	Data is stored by altering the magnetic charge (+ or -) to represent binary information
Optical	A reflective layer or dye is marked to either reflect or not reflect a laser beam. The computer reads the reflections as binary data
Solid State	Also known as <i>Flash Memory</i> , the data is stored by forcing (or flashing) electrons through a barrier into a storage layer. Here it is read as binary information

### SECONDARY STORAGE

TYPE	CAPACITY	COST	SPEED	Pros	Cons
Magnetic	Very High	Low	Fast	Cheap and readily available. Can have very high storage capacity and is reliable	Slow read and write speeds. Moving parts make it susceptible to damage if moved. Data can be wiped if placed near a magnet
Optical	Low	Very Low	Slow	Cheap. Can be either Read or Read/Write.	Requires an optical drive to be read. Data corruption occurs over time (10+ yrs)
Flash / Solid State	Low	High	Very Fast	Much faster than magnetic drives. No moving parts, so hard to damage by movement. Silent.	Expensive and relatively low capacity. Has limited usable life – about 100,000 rewrites.

### EXAMPLE FILE SIZES

1 page text	100kb
1 photo	6mb
3 min MP3	6mb
3 min audio track (CD)	50mb
DVD film	4gb
HD film	8-15gb
Blu-Ray film	20-25gb
4k film	100gb +

### SECONDARY STORAGE SPECS

TYPE	CAPACITY	SPEED
Magnetic HDD	Terabytes	50-120 MB/s
CD	700 mb	0.146 MB/s
DVD	4.7 gb	1.32 MB/s
Blu-Ray	128 gb	72 MB/s
SD Cards	4-32 gb	50-120 MB/s
USB Drive	Up to 1 tb	45-90 MB/s
Solid State Drive (SSD)	Up to 4 tb but very expensive	200-550 MB/s

### CONSIDERATIONS WHEN SELECTING SECONDARY STORAGE

Capacity	How much data will it need to hold?
Speed	How quickly must the data be written / read?
Portability	Does the storage device need to be transported? If yes, then size, shape and weight are important. Will it require other devices to be used (eg. An optical reader).
Durability	How <i>robust</i> is the device? Can it be moved without fear of damage? Will it be used in a difficult environment? Does it need to be single use or rewritable?
Reliability	Does it need to be used over and over again without failing, or will it receive minimal reuse? Will it need to store the information for long periods of time?
Cost	Needs to be compared with the above and considered.