SATA (SERIAL ADVANCED TECHNOLOGY ATTATCHMENT)

→ is a computer bus interface that connects host bus adapters with mass storage devices like optical drives and hard drives.

→ is based on serial signalling Technology, where data is transferred as a sequence of individual bits.

→ This interface is commonly used to connect hard disk drives to a host system such as a computer mother board.

→ First version at 150 megabytes/second, the standard was soon upgraded to 300 MBps & 600 MBps.

→ FEATURES:

LOW VOLTAGE REQUIREMENT:

↳ operates on 500mV peak to peak signalling.

↳ Low interference and cross talk between conductors.

HOT PLUGGING:

↳ Helps users to change (or) remove storage devices even when the computer is running.

STAGGERED SPIN UP:

↳ Allows sequential hard disk drive start up, which helps power load distribution uniformly during system booting.

NATIVE COMMAND QUEUING (NCQ):

↳ The commands reach a disk for reading (or) writing from different locations on the disk.

↳ If drives ~~are~~ uses an algorithm to identify the most effective order to carry out commands.

↳ Helps to reduce mechanical overhead and improve performance.

PORT MULTIPLIERS:

↳ Allows the connection of up to 15 drives to a SATA controller.

PORT SELECTORS:

↳ Facilitates redundancy for two hosts connected to a single drive, allowing the second host to take over in the event of a primary host failure.

DIFFERENTIAL SIGNALLING:

↳ is a technology which uses two adjacent wires to simultaneously inphase and out of phase signals.

↳ is possible to transfer high speed data with low operating voltage and low power consumption by detecting the phase difference between the two signals at the receiver's end.

HIGH DATA TRANSFER RATE:

↳ SATA has a high data transfer rate of 150/300/600 MBs/second.

→ Faster program loading, better picture loading and fast document loading.

LARGE CABLE LENGTH:

Length (up to 1 meter) (SATA cable length) whereas PATA cable length of maximum 18 inches.

Operating modes:

→ SATA operates on two modes:

* IDE mode: (Integrated drive electronics):

↳ is used to provide backward compatability with older hardware, which runs on PATA at low performance.

AHCI (Advanced Host controller Interface):

↳ is a high performance mode that also provides support for hot swapping.

SATA bus is defined over two connections → Data lines
→ power lines.

SATA DATA pinout:

Pin #	Signal Name	Signal description
1	GND	Ground
2	A+	Transmit +
3	A-	Transmit -
4	GND	Ground
5	B-	Receive -
6	B+	Receive +
7	GND	Ground

SATA power pinout:

Pin #	Signal Name	Signal Description
1	V33	3.3V power
2	V33	3.3V power
3	V33	3.3V power, precharge, 2nd mate
4	Ground	1st mate
5	Ground	2nd mate
6	Ground	3rd mate
7	V5	5V Power, pre charge, 2nd mate
8	V5	5V power
9	V5	5V power
10	Ground	2nd mate
11	Reserved	-
12	Ground	1st mate
13	V12	12V power, precharge, 2nd mate
14	V12	12V power
15	V12	12V power.