

# **An overview on Video Ports**

The following video Adapter ports are found in computers, monitors and various other video equipment, 5

1. VGA
2. DVI
3. HDMI
4. Display Port
5. Thunderbolt

## VGA

VGA stands for Video Graphics Array. It is an older port which has been developed in 1987 by IBM as display hardware.



- It is widely recognized by people as the 15-pin D-Sub connector on the desktop machines which comes with screws to lock the connector with the VGA port.
- It has 15pins divided into 3rows.
- The end Adapter typically has a blue colour.

- VGA can support a video resolution of 1080p (and higher)
- It is the oldest display connector and has started to lose its place on various devices for more advanced technologies for some obvious reasons. HDMI is used as an alternative in most cases.
- It only uses analog signals to carry video from the source to the receiving device. And because it only carries analog data the quality of the video may degrade at higher resolution and at longer cable lengths.
- It was used on CRT monitors and can still be found on new equipment such as new LCD monitors.

## **DVI**

DVI stands for Digital Visual Interface. It succeeded VGA port which was developed in 1999 and created by the Digital Display Working Group.

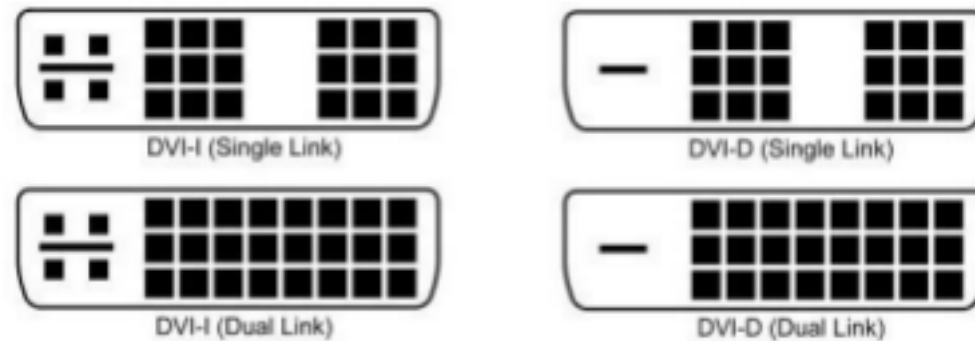


- The 29-pin connector shares visual traits with VGA connector and sports the screw locks.
- DVI interface can provide uncompressed high-quality digital video streams to the receiving device such as LCD monitors.
- The end adapter typically has a white colour.

There are 3 different versions of the DVI port standard,

1. DVI-A (Used to send only Analog signals)
2. DVI-D (Used to send only Digital signals)
3. DVI-I (Used to send both analog and digital signals)

- On the ports that send digital signals which are DVI-D, DVI-I, there are two different options in DVI standard: single link & dual link.



- The Dual link option has 6 extra pins that allow higher resolution than a single link.
- Dual link DVI doubles the video resolution bandwidth which has a max resolution of 2560x1600, whereas single link DVI has a max resolution of 1920x1200
- DVI also supports analog video output which makes it backwards compatible (using an adapter) with the VGA interface. DVI might be relatively newer than VGA, it has mainly found its place on computer monitors. However, technology is also on the verge of extinction.

## HDMI

HDMI stands for high definition multimedia interface. It was developed in 2002 and has become the



dominantly used video port.

- HDMI has a broad range of use in electronic products such as TVs, monitors, laptops, mobile devices and so on.
- It was designed for transmitting uncompressed video and audio data through a single cable.
- It is one of the best standards for high definition in consumer electronics delivering crystal clear video as well as audio.
- In 2009, HDMI 1.4 was released. It added another channel to HDMI for data which has the capability for network communication.

- Hence in addition to video and audio on a single cable, it has the ability of Ethernet networking (capable of transferring data at 100Mbps).
- With HDMI 1.4 it also added support for 4k video at 30Hz. • In 2017, HDMI 2.1 was released which
  - Added support for higher resolution and refresh rates.
  - 4k video at 120Hz
  - 8k video at 60Hz.
- An HDMI hub or splitter can be used to deliver video output to multiple monitors. But daisy chaining in the case of HDMI is not an easy task in comparison to DisplayPort.
- Another notable HDMI feature is ARC(Audio Return Channel) which enables the transfer of audio from a source (television etc) to a receiver (for instance, connected speakers). Earlier, it was done using a separate audio cable.

### **Display Port**

The display port was developed in 2006. It is primarily designed to be used for video. In addition to video, it can also be used to carry USB and audio data as well.



- It is a high-performance interface that is meant to replace older VGA and DVI interfaces. It can also connect by using adapters to older DVI, VGA and HDMI ports.
- One of the main advantages that it has over HDMI, is that it has multi-monitor capabilities.
- Display port allows you to use multiple monitors by connecting them in a daisy chain configuration.
- For example, 3 working monitors can be connected using a display port on the computer. For this, you can connect a cable from the display port on your computer and the other end to the 1<sup>st</sup> monitor. Then 1<sup>st</sup> monitor can be connected directly to the 2<sup>nd</sup> and 2<sup>nd</sup> to the 3<sup>rd</sup>. This is why the display port is focused on computer use rather than other equipment such as televisions.
- Another advantage of a display port is that unlike HDMI it has a locking mechanism that keeps the cable locked in



place.

- In March 2016, Display port 1.4 was released which has a max resolution of 8k at 60Hz.

### **Thunderbolt**

Thunderbolt was developed in 2011. It was mainly used for apple products and now it has become available for computers as well.



- It's an Intel-designed multipurpose interface which is intended for video output as well as connecting storage devices. Other than the display, you can find a number of hard drives and SSDs using Thunderbolt port for connection.
- Earlier versions of Thunderbolt (1 & 2) interface utilized the mini DisplayPort connector.

- In the case of Thunderbolt 3, USB Type-C is used as the connector.
- Thunderbolt 3 supports a maximum theoretical bandwidth of 40Gbit/s, capable of pushing video streams on two 4K displays at the same time.
- A single Thunderbolt port can connect up to 6 devices via daisy chaining or a hub. By using the Type-C connector, it can also leverage the USB Power Delivery feature which can be used to charge a connected device using up to 100 watts of power.