

COMPUTER INTERCONNECTIONS IV

As a major geek, I probably spend more time looking at the back of a computer than I do the front of a television. Even so, having the gadget freak side of a geek in me too, I just had to buy the family one of those new flat panel TVs.

If you think the back of your computer has a confusing assortment of connectors on it, look at the dark side of a recent model television and be prepared to be confused. This article will sort out this confusion, and in the process, we'll note that more and more of the connections on computers are showing up on TVs and vice versa.

This piece addresses only the actual video connections. Then there is HDTV in so many formats it will make you blind. We'll have to save discussion on formats for another Tech Tip.

What Are We Up Against?

Just as our computers are hooked up to everything under the sun, televisions are expected to interface to lots of electronic goodies - including our computers! As we progress from the over-the-air analog TV that was designed pre-World War II, to the latest digital video medium of HDTV, the interface for these signals (and their connectors) have to change to keep up.

Here's a list of the video connections you will find on a Typical High-End TV.

- F Connector
- Composite
- S-Video
- Component
- D-Sub (VGA)
- DVI
- HDMI

If you are building a full-on home theater, you might use a Video Projector that adds more controls, such as an RS-232 connector, infrared remote control and even a jack to control curtains over your projection screen for normal or wide-screen modes!

F Connector

Let's start with the most basic: the F connector is the most rudimentary type of interface used on televisions. It's threaded, with a single contact in the middle, and the cable that connects to it is usually very stiff. This is the signal that comes from the antenna or the cable TV company, usually from a similar connector mounted on the wall. The video rides on a radio signal on one of the television channels.

The cable is stiff because it has a metallic shield right under the plastic jacket. It's a coaxial cable (commonly called "coax" pronounced co-ax), meaning it has one regular wire in the middle, then that metal shield that surrounds it. This is a good conductor of those very high frequency radio signals that carry broadcast television or cable TV. You want to be careful not to kink your coax or even bend it too tightly.



Those F connectors are a bear to screw in when you have to reach around behind a TV. First, you want to get that center conductor of the plug lined up and poked into the hole in the jack. Then, you need to carefully align the plug and push it against the jack as you turn the rotating part of the plug. Don't twist the cable, just the little nut on the plug. The trick to smooth threading of the plug onto the jack is to have it lined exactly up with no sideways pressure.

Computers have been seen with F connectors on them too. Check out this TV Tuner Card that can turn your PC into a television or even FM radio.

Composite

The first improvement in video interconnection for home electronics was the composite video interface. It uses a single RCA jack, usually colored yellow, and carries the video signal from a piece of equipment, like a Camcorder, to the TV. The audio signal is carried by separate cables, usually color-coded red and white (sometimes black). The composite video signal is limited by that fact that all the elements that make up the video are crammed into one wire.



If you must use a composite interface, don't use any old audio cable with RCA plugs on it, especially if you have to make a long run. Get a decent video cable to keep the quality of the signal up.

S-Video

Having all the video elements on one wire causes some interaction between those elements, especially the color (“chrominance”) and brightness (“luminance”) signals. S-Video (for Super Video, after the Super VHS decks where S-Video connectors first appeared) runs the color and brightness signals on separate wires in a cable terminated with a 4-pin circular DIN plug. Low-end computer video cards with TV Out use an S-Video format.



Component Video (RGB)

Your video screen is made up of tiny dots of light called pixels (“picture elements”), and pixels come in red, green and blue. The color of the pixels can be individually varied to combine into millions of different colors. You get the best image quality when the signals for each of the three component colors are kept separate. Don’t confuse component video with composite video, even though they sound very similar. They have the RCA connector in common, but component video uses three separate connectors usually color coded red, green, and blue.



If you are doing a DVD to TV hookup and component, S-Video and composite interfaces are available - use the component! It will show a noticeable improvement. For HDTV, it’s the entry-level interface.

D-Sub (VGA)

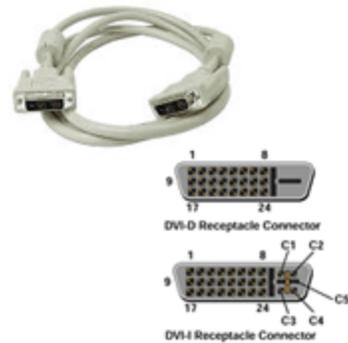
The standard VESA (Video Electronics Standards Association) computer video interface is really a component analog interface like component video, except instead of having three separate plugs, it uses a single D-sub connector with 15 pins just like your computer. Many newer TVs include the D-sub input so they can be used as a computer display. How about hanging a 32 inch TV over your desk that can double as a huge computer monitor? Play DVDs on your computer while eating lunch and relax!



Even though the Cheapest Computer Video Card has a D-sub video interface, don’t think it’s low-end performance. Good computer monitors have requirements beyond even HDTV and the D-Sub interface can deliver for computer type displays.

DVI

Computers generate images on a pixel-by-pixel basis. LCD (Liquid Crystal Display) panels, plasma TVs and DLP (Digital Light Projection) projectors are all digital image devices. Digital television, including HDTV, operates on individual pixels. The conversion to analog, even high-end component video can degrade the performance of these digital images.



For the best digital-to-digital connection for your video, get a DVI connection. DVI stands for Digital Visual Interface. A High-end Computer Video Card would have a DVI connector. It may come with an adapter to other video formats so you can jack your PC into just about any television or computer display.

To make things interesting, there are three types of DVI interconnects: one that does digital-only called DVI-D; one that does analog-only that is referred to as DVI-A; and the other that can do either digital or analog video called DVI-I with the “I” standing for “integrated.”

There are six different types of DVI pin-outs. The most common have 24 pins in 3 rows. The digital version has a blank area on one side with a flat key. The combo type has the 24 pins plus it has four more pins arranged in a square with a flat blade ground contact in the middle. DVI-A and DVI-D cannot be crossed over, but either can plug into a DVI-I equipped gear.

HDMI

Suppose you just bought a new DVD Player with an HDMI digital interface on the back. If the above video interfaces aren't enough (especially the DVI-x confusion), there is a new digital video interface that's relatively new on the market called HDMI for High Definition Multimedia Interface. It's so new that most people have to use a DVI to HDMI cable to hook up any existing DVI equipment to a unit with an HDMI connector on it.



HDMI uses a small flat connector that has two rows of pins surrounded by a shell that protects the pins from getting bent. This connector and the cable that goes with it are a lot easier to route in a tight home entertainment center, and you probably can plug it into the back of a piece of equipment just by feel, a definite improvement over other video connection systems. In addition to carrying High Definition digital video, HDMI cables also carry up to 8 channels (7.1) of digital audio, unlike any other cable here, making them true integrated digital A/V cables. Many video equipment manufacturers are jumping on the HDMI bandwagon and it's bound to become the most popular.

By the way, if you must plug in a video connector on the back of a PC or other equipment and you can't see the back of the device, get out a small hand mirror and a flashlight. It's much easier and you won't bend as many pins when you can see what you are doing.

Adapters



As you go about chasing the latest and greatest geek toys, there are bound to be instances when you have to hook up one type of video connection to a different type. Fortunately, many of the video interfaces can be converted with the use of an adapter. For the latest gear, you can use a dedicated DVI to HDMI cable as mentioned above, or you can use an existing cable with an HDMI to DVI Adapter. If you want to put your PC with a DVI jack on the back up on your big screen TV, you might have to use a DVI to Component Video Adapter if the TV doesn't support DVI. Some video conversions require only these simple and inexpensive adapters. Others need more expensive converter boxes and probably aren't a good idea as the image will suffer.



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