Connecting Interactive Whiteboards

Interactive whiteboards (IWBs) are an integral component of modern classrooms as learning becomes more advanced through interaction and collaboration. According to Department of Education statistics on teachers' use of educational technology in public schools, almost one fourth of teachers report having an IWB in the classroom for everyday use.

IWBs are essentially a large display panel that is connected to a computer and a projector. Once connected, the projector transmits the content from the desktop display of the computer onto the whiteboard panel. Teachers and students then interact with the whiteboard through the use of special pens, touch controls or other customized device.

Using IWBs is similar to operating a standard computer mouse. When a user points the mouse to a specific area of the screen and clicks a button, an action occurs – a video starts, a document opens or a web page is displayed. The same idea is true for interactive whiteboards. Instead of using a computer monitor and a mouse, a projector is used to project an image onto a blank board, while a pen collects user inputs. When a user presses the tip of the pen on the projected screen area, the pen's location is identified and then sent back to the computer for interpretation.

Similar to a computer mouse, a connection back to the computer is required to interpret user inputs. In earlier interactive whiteboard models, RS232 technology, also known as serial control, was used as a means of connectivity. Although RS232 can satisfy the distances inherent to classroom installations, it possesses a few limitations. RS232 can only send user inputs back to a computer and cannot be used for sending audio information to attached speakers using the same cable. As a result, installers must use a separate audio cable from the computer to the speakers or amplifier. RS232 also does not carry power that can be used for the operation of the interactive board itself. Because of this limitation, a separate power connection has to be made from the IWB and a wall outlet. The need for a separate power connection increases installation time and reduces the number of available power outlets for other equipment in the classroom.

USB technology has features that overcome the limitations of RS232 and simplify the installation process. Instead of running a separate cable for audio, USB can be used to carry audio information to speakers attached to the side of interactive whiteboards. The 5 volts of DC power inherent to USB is also beneficial for supplying power to the board without the need for an external power adapter. Although USB has great benefits for today's classroom installation, there is one drawback. A typical USB connection has a maximum distance of approximately five meters.

Since the computer used for the interactive board is often located near the instructor's desk, it is out of reach from USB's maximum range. To overcome the length limitations of USB technology, there are two solutions. First, active extension cables can extend a USB connection anywhere from 17 meters (56ft) to 36 meters (117ft) away. They accomplish this by using the 5 volts of DC power to help regenerate weakened signals. Up to three extensions can be chained together to achieve distances up to 36 meters total. This solution is best for high bandwidth applications such as whiteboards with attached speakers. With these active extension solutions, the larger physical size of the USB connectors can present challenges when installing in confined spaces such as conduit and raceway.

For longer cable runs, USB can be converted using a transmitter and receiver unit to allow transmission over standard network cabling such as Cat5e or Cat6. This type of solution is referred to as a "USB over Cat5 solution" and provides connectivity up to 45 meters (150ft) away. The use of Cat5 cabling allows it to fit in very small spaces such as conduit and raceway.

Examples of interactive whiteboard installations in classrooms