

Articles and whitepapers

Technology: Transporting HDMI Around the Home (5/9/2011)



By Adrian Hicks, Habitech

Three years ago HDMI was an ill-understood concept, supported by a small selection of products and distributors, and generally mistrusted but the Custom Install (CI) industry. In the eyes of some installers, very little has changed, but from our viewpoint as a distributor, the technology has evolved faster than any other sector. Certainly the training initiatives have meant that whereas the dealer may not love HDMI, they go to site at least armed with a reasonable understanding of how to implement a technology which they have no choice but to embrace. The reasons for the CI industry being dragged into the world of HDMI was twofold: firstly the removal of the component output from new Sky HD boxes rendered installations unusable; secondly the advances from the film industry with movie encryption, higher colour depth and 3D signals rendered component video as current a technology as a cassette player in a car.

With the decision to implement HDMI removed from the dealer's hands, the only consideration is choosing the best infrastructure to allow the installation to be affordable, scalable and future proof. Oh, and it needs to work.

Basic structure of cabling

The fact that the end user has approached a CI dealer should set a baseline for the size and quality of the installation - a typical system will require a central location for equipment and multiple sources (satellite boxes, Blu-ray etc) to be routed to multiple locations throughout a reasonably-sized residence.

Assuming that a location can be found, this central rack design allows the electronics to be mounted in place with decent ventilation (no more baking hot cupboards of kit) and it suits the clean lines of having only a flat screen on the wall in the room. This does require a substantial amount of work to home-run all the cabling back, and hence only really suits a new build or refit.

In this model you also need to consider which components require access - if the rack is three floors away you don't want to have to trek to put the Blu-ray disk in, and so in most cases, the players should be in the room and then routed back to the matrix as a source. You may also want the ability to remotely re-power the Sky boxes occasionally.

A simple variant of this design which is popular with the developer market is using a single source and combined splitter/transmitter. When this is installed in a property with a cheap DVD and a couple of wall-mounted TVs, the developer can show a working system, and typically the dealer will be asked back to upscale the system to a matrix when family moves in.

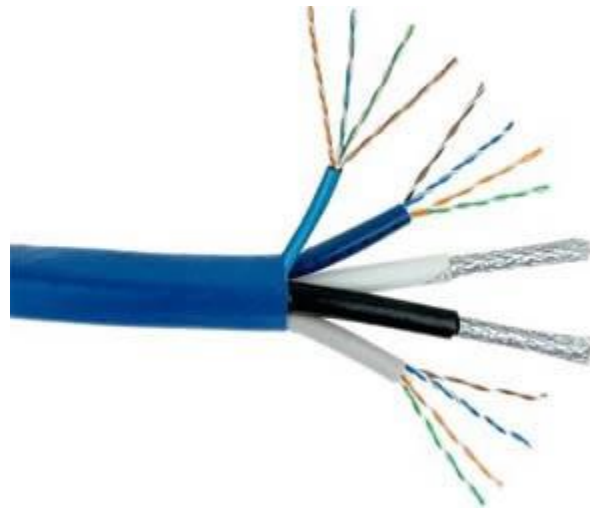


Simple HDMI to HDMI and CAT6 splitter.

Type and quantity of cabling

The type and quantity of cabling to be installed from the central rack to each TV is primarily dependent on the HDMI distribution hardware to be used. HDMI cables themselves are limited in transmission length and cannot be easily re-terminated if damaged on site, so they are not a popular choice for permanent installation.

Apart from some manufacturer-specific cables, typically the HDMI signal is routed over one or two CAT5 or CAT6 cables. In many cases these are augmented with other cables for backward compatibility (e.g. coax cabling), control (spare CAT cables) and future proofing the design. This may typically result in there being 5-8 cables and fibres now appearing at a TV location on a wall, and the industry has developed different methods of making this cabling simple and neat to implement. A typical example of this is the high quality multi-core cables dedicated to supply TV locations which are neater to sort and terminate at a rack, and provide better protection from the more heavy-handed electricians during installation.



Typical multicore cable for a central TV installation.

Whether installing multicore or single cables, it is worth bearing in mind that although it counts for less than 10% of the contract value, installation cable is the one part which cannot easily be replaced once installed. HDMI images are high-speed digital signals running at Gigabits per second. I have been to sites where the installer has spent thousands on hardware at either end, yet the cable in the wall is the cheapest spec, copper-clad aluminium CAT5 and simply does not support the data rates required.

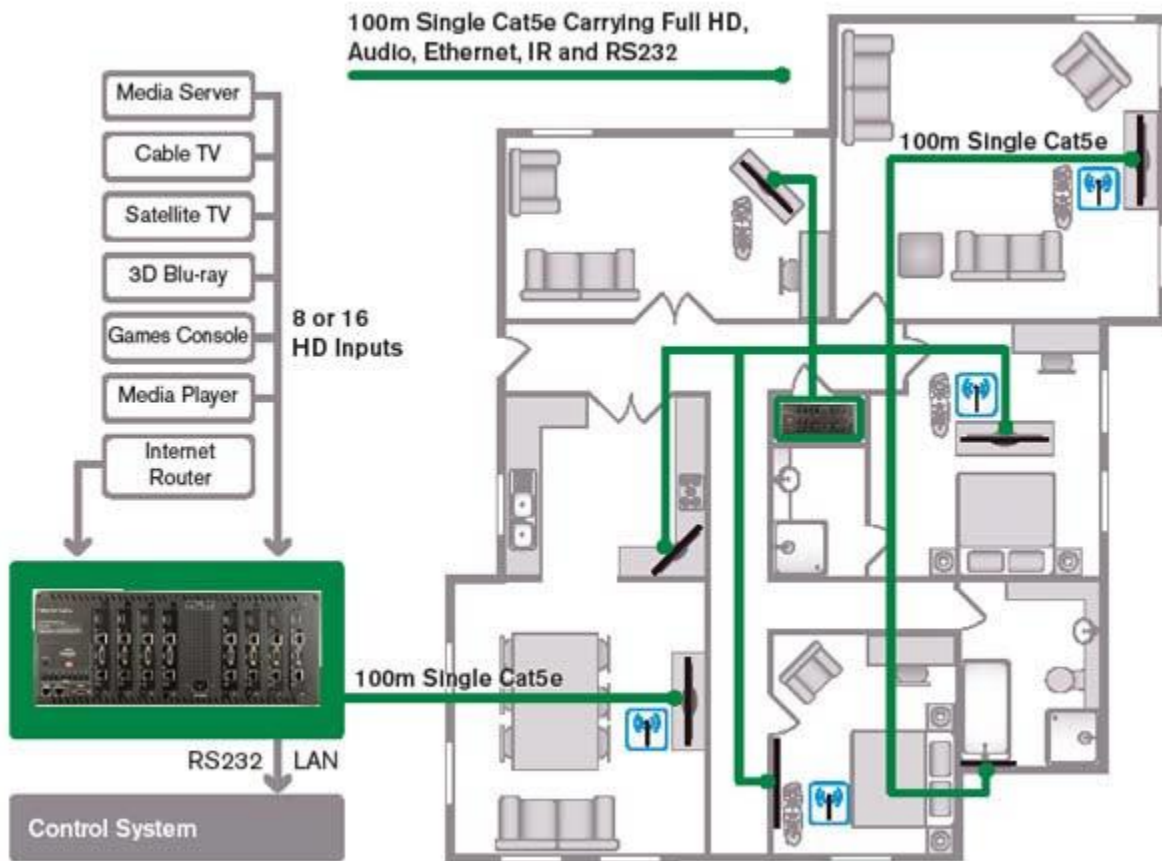
HDMI hardware

Assuming the dealer has installed a selection of cabling options, the next decision is which hardware to install. The HDMI standards and the technology behind the distribution products are evolving so quickly that it can be difficult for the dealer to understand which product supports which feature. Problems with central

distribution occur if some TVs do not support a feature such as 3D, and with Blu-ray players being relatively inexpensive, sometimes it is better to add local 3D players in key areas such as cinemas.

HDBaseT

The latest technology to be included in distribution equipment is the HDBaseT chipset, which most manufacturers are adopting in various forms, and whose release coincided with the HDMI1.4 standard. Where previously two cables were required to send a standard 1080p signal and control, HDBaseT will support deep colour, 3D and higher definitions, combined with Ethernet, IR and RS232 control down a single CAT cable. In many cases HDBaseT's higher quality of error checking and noise reduction means that it is a solution where a cheap CAT cable has been installed as above.



Example of HDBaseT distributed system.

Fibre

The ability of HDBaseT to seem to increase the technology of CAT cables calls into question of how you future-proof the design of the system. Fifteen years ago we were adding in fibre-optics to commercial designs as the only true future-proof medium, although few products existed which supported it. Currently, many of these fibres are still lying unused where the CAT cables are still running the majority of signals. Fibre still remains difficult to site-terminate and the end boxes are expensive, although we are starting to see innovative ways of installing pre-terminated fibres down installed tubes. This may radically change the way fibre can be added to most residential designs.

Conclusion

I believe it would be naive to specify a system now without HDMI distribution, and the rapid improvement in products for residential installations means that systems can be installed painlessly and profitably. For the dealer to maximise profit, it is important to minimise the time on site, and so there are a few key guidelines which I would suggest will help with this.

Firstly, you need to understand the technology behind HDMI. HDMI is a high-speed signal which is limited by various factors - changing a menu setting on a Blu-ray may raise the bitrate too high and lose the picture completely. Go on a course.

Secondly, I would recommend having some decent test equipment. For the price of a Blu-ray and a cheap TV you can buy a decent HDMI test monitor which is easily carried around site and will tell you the true state of the signal you are receiving. When you are on site, I suggest that a dealer understands the true cost of their time compared with the cost of CE source equipment. I know of dealers spending days trying to get a client's old TV to work, or trying to make 3D work across a mixed 2D/3D TV installation. In most cases the labour cost would have justified just buying an extra piece of hardware.

And finally, an HDMI transmission system is as good as the weakest part. We have seen many cases where the finest hardware is connected with the cheapest of cables, limiting the data rate and hence the picture quality.

Adrian Hicks is the Technical Director of Habitech Limited, trade distributor of residential home entertainment and automation technology. You can contact Adrian regarding HDMI issues and to contribute to the HDMI knowledgebase, via the HiddenWires LinkedIn group.

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