



## HDMI 1.3

We already know that HDMI is very misunderstood by many dealers and other people within the AV industry. This means end users also do not fully understand it, and when they have questions, are often not being given the correct answers -often preventing the sale of the correct equipment. We have already produce a basic guide to HDMI to help. This is available to download from <http://www.yamaha-uk.com/pdf/hdmi.pdf>

However, this paper is designed as a quick reference to HDMI 1.3 , what it can offer, and what you can expect from HDMI 1.3.

The main differences between HDMI versions are summarised in the table below:

	v1.0	v1.1	v1.2	v1.3
Max Video Resolution	1080p	1080p	1080p	1440p
xvYCC Support	x	x	x	✓
Max Colour Depth	24bit	24bit	24bit	30/36/48bit
MLP	x	✓	✓	✓
DSD	x	x	✓	✓
HD Audio Bitstream	x	x	x	✓

HDMI v1.0 supports video (up to 1080p) and audio (using PCM or AC3 or DTS bitstreams)

HDMI v1.1 supports as v1.0 but also supports the transport of MPL (Audio DVD digital data)

HDMI v1.2(a) supports as v1.1 but also supports the transport of DSD (SACD digital data)

HDMI v1.3 supports as 1.2(a) and has the following additional support:

Deeper colour - potential to transport up to 48 bit colour depths

Alternative colour space - potential to carry the xvYCC colourspace

Automatic Lip-sync adjustment - potential to automatically sync audio to video

Higher video resolution - potential to transport up to 1440p video signals

HD Audio Bitstream - potential to carry the digital bitstreams from Dolby and DTS HD audio formats

You will notice that in all of the cases above the differences between the versions are all quoted as what they can POTENTIALLY offer - NOT what having a device with HDMI v1.3 can actually provide. It's essential that consumers realise that just having a product with HDMI v1.3 does not mean they will get better video or sound! Perhaps the best example of this is the video resolution potential. Everyone is talking about 1080p. 1080p is now regarded as the pinnacle of HD video (that's another issue though!). No one would suggest that by having a device with HDMI v1.3 that you automatically increase your video resolution to 1440p - but *will* assume that having a device with HDMI v1.3 will mean they do get auto lip-sync, do automatically get higher colour depths and do automatically get the ability to carry HD audio bitstreams - **NONE** are true. HDMI v1.3 just means the cable *could* carry this data if it's available and if both source and sink (receiving device) can handle it.

HDMI v1.3 is very much ahead of the technology that will be using it. To date, no displays can use xvYCC colourspaces (only RGB or YUV) and no displays can use more than 24bit colour. These facilities have been allowed for in v1.3 for future use.

One of the most talked about and consequently most misunderstood improvement is the ability for HDMI v1.3 to carry HD audio bitstreams. On the next page we will look at exactly what these issues are and why HDMI v1.3 is not quite as people expect.

Dolby and DTS have both each recently announced two new HD audio formats Dolby's are Dolby Digital Plus (a lossy format) and Dolby True HD (a lossless format) DTS have released DTS HD High Resolution (lossy) and DTS HD Master Audio (lossless). These formats are stored on the discs (either HD DVD or Blu-ray, but NOT standard DVD's) in a compressed format. The name of the format is the compression system that is used in each case (ie, Dolby True HD uses Dolby True HD compression). For us to hear compressed data, two processes must happen. The first is the data must be decompressed (using a decoder). The second is the data must be converted to analogue (using DAC's). Once both these processes have happened, we can hear the audio.

In order for these processes to happen, we need two devices, a decoder and a DAC (Digital to Analogue Converter). These devices can either exist in an AV amp, or the HD DVD/Blu-ray source or both. If both have one of these devices only one will be used - a bit like if a CD player is connected to an amp with an optical cable, we would be using the DAC in the amp and the player's DAC would not be used.

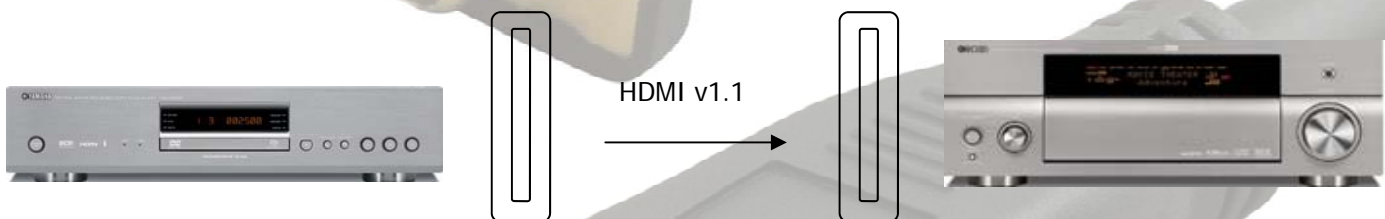
With HD Audio, we have three possible connection methods to allow the audio data to be heard. We can not use optical or coaxial digital connections at all, due to the bandwidth requirements of these formats.

The first option is to transfer the HD audio bitstream from source to amp. This means the following is required; HD audio HDMI v1.3 source (ie Blu-ray or HDDVD, an HDMI v1.3 repeater equipped AV amp with HD audio decoder and an HD disc which does NOT restrict bitstream transfer (almost none exist!))



The example above shows how most people believe HD audio will work. And it may do at a later date, but currently, film studios are requesting that all discs be authored in Advanced Content Mode. This will prevent the HD audio bitstream from being output from the HD player, rendering HDMI 1.3's ability to carry this data as useless. This means another transfer method is needed as this example will not work for most HD DVD or Blu-ray discs.

The next method is the standard most people will need to use - most interestingly and importantly, it requires HDMI v1.1 - version 1.3 is NOT required:



The example above uses a single HDMI connection to carry the HD audio data to the amp. The HDMI cable carries digital data, so the amp's DAC's are used to convert this digital data to analogue. The reason the HD audio can be transferred using HDMI v1.0 is that the player, knowing it can not output the HD bitstream, uses another popular digital transfer method instead - PCM. This does not result in any quality loss, just simply means the data is transferred differently. The player actually decodes the data so there's no need for the amp to have HD audio decoders either.

The final method of transfer is to use the player to both decode and convert the digital data to analogue. This then requires one cable per audio channel (typically 6 or 8) to carry the signals from player to the amp. The player must also have the facility to output multi channel analogue signals and the amp you use must also be able to accept them. Most amps can, but are unlikely to be able to add any processing to these signals. For this reason, the digital transfer method tends to be preferred.

All this means you are best choosing an amp according to it's quality rather than it's version of HDMI