

**INCL.
HDMI 1.4
SPECIAL**

THE IN-AKUSTIK CABLE GUIDE

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inakustik

KABEL | LAUTSPRECHER | MUSIK

QUALITY LEVELS

First-rate materials, optimum performance – our products offer all this. And that is also reflected in the quality. There is always a little bit more with each level. From Star to Premium and Excellence to our ne plus ultra from the Reference class which is a standard for all others, we have finer, more sophisticated and intricate cable technology for every level. What do you get? More sound. More sharpness. Noticeably more passion. And above all, more pleasure.



REFERENCE – THE BENCHMARK FOR PICTURE AND SOUND – SIMPLY CAN'T BEAT IT!

The in-akustik class for perfectionists. The benchmark for an uncompromising sound and picture experience. World-wide leader in price-performance ratio. Goes right under your skin.



EXCELLENCE – FOR THE LOVERS OF PERFECT PICTURE AND SOUND EXPERIENCES

The in-akustik class for upmarket demands. Selected materials, the best workmanship. With passion, for high-end sound and picture enjoyment.



PREMIUM – PICTURE AND SOUND FOR ADVANCED USERS

The in-akustik class for finest technology. Extracts the best from the hi-fi system. For love of sound and picture performance.



STAR – THE BEST GATEWAY TO THE WORLD OF PICTURE AND SOUND

The in-akustik class for aspiring beginners. Always suitable. More performance for low prices. A necessity for luxury of sound and picture

DIFFERENCES IN QUALITY EVEN FOR DIGITAL SIGNAL TRANSMISSION!

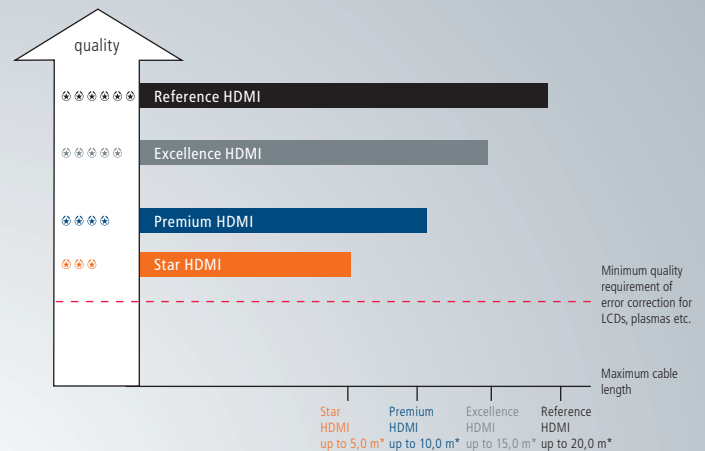
WHAT IS THE DIFFERENCE BETWEEN THE 1.0 M REFERENCE CABLE FOR 99 EUROS AND THE 1.0 M STAR HDMI CABLE FOR 12 EUROS?

Many users are under the false impression that transmitting digital data generally works without any errors. Something better or worse doesn't seem to exist. The same applies to the Internet. There the recipient keeps asking the sender for the digital data until the content has been transmitted properly (check test).

However in the audio/video sector, there is no time to compare digital data and request it again. So error correction is used for LCDs, plasmas etc. The more detailed and faster a certain picture sequence is, the higher the data rate is to be transmitted. The data rate is e.g. far higher for a camera pan over the spectators in a football stadium than for an interview after the game.

However, the higher the data rate, the more errors are caused by the HDMI cable. Compression artefacts occur even though the screen has error correction. The picture loses contour and focus. But these errors can be reduced with better cable quality. The more intricate the shielding, the more superior the materials and the less the engineering tolerances at 100 Ohm impedance are, then the lower the number of errors and better the picture quality. Even for short transmission distances.

That is why the picture quality is significantly higher with our Reference HDMI cable, than the Star HDMI cable (see Figure). Fast camera movements, detailed picture sequences and fast-moving action scenes gain in contour and picture sharpness. That is the difference.



* Full-HD 2160p; 10.2 Gbit/s transmission rate

For more information, go to www.in-akustik.de

HDMI SPECIAL

The future is digital: fast, sharp and flexible. Extremely high data rates (> 10 Gigabytes) need to be transmitted smoothly. The right cable is crucial for signal transmissions. The standard of the future is HDMI.

HDMI 1.4 (no Ethernet) In the past, digital picture and sound data were converted into analogue signals, in a DVD player for instance, transmitted to the TV and then digitalised again. The problem with this type of transmission was particularly obvious for high resolution systems. HDMI (High Definition Multimedia Interface) is a fully digital interface for AV equipment. Here the two conversions of picture and sound are not necessary. Just that alone benefits the picture quality. HDMI doesn't just transmit picture and sound digitally. It also transmits system data, which synchronises the connected equipment automatically. The latest Standard HDMI 1.4 has a separate Ethernet channel which can be used for transmitting Internet data (Fig. 1) and as an audio reverse channel (Fig. 2). HDMI 1.4 is downwards compatible to the HDMI 1.3 standards.

	HDMI 1.3	HDMI 1.4 without Ethernet	HDMI 1.4 with Ethernet
Max. data rate 10.2 Gbit/s	X	X	X
Resolution up to 1080p (Full HD)	X	X	X
Deep Color multi-bit	X	X	X
HD audio format	X	X	X
Up to 8 audio channels (24 bit/192 kHz)	X	X	X
Lip Sync	X	X	X
CEC compatible	X	X	X
HDCP compatible	X	X	X
EDID compatible	X	X	X
Resolution up to 2160p		X	X
4K x 2K video (4096 x 2160 pixels)		X	X
3D video		X	X
Enhanced colour space		X	X
Ethernet network connection (up to 100 Mbit)			X
Audio reverse channel			X

The HDMI Organisation distinguishes between the following cable qualities:

- Standard (Cat. 1)
- High Speed (Cat. 2)
- Standard (Cat. 1) with Ethernet
- High Speed (Cat. 2) with Ethernet



All in-akustik HDMI cables with this logo are certified for High Speed (Cat. 2) and support all 1.4 standards (without Ethernet).

ADDITIONAL FUNCTIONS FOR HDMI 1.4 WITH ETHERNET CHANNEL

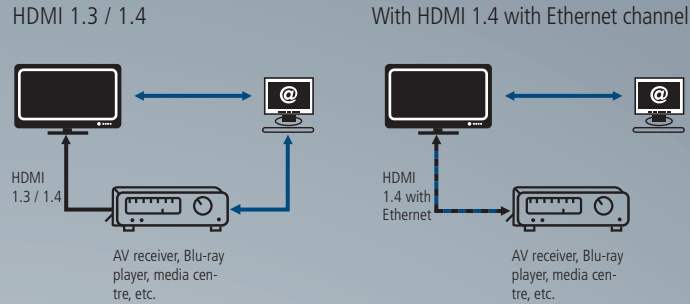


Fig. 1

No additional network cable required between Internet access and AV components.

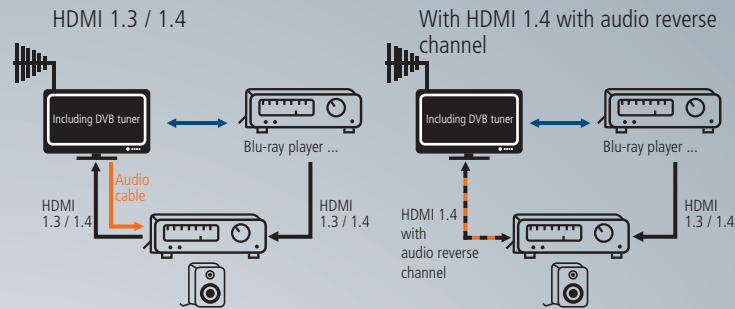


Fig. 2

No additional audio cable required between TV and AV receiver.

FULL HD | 2160p
4K + 2K Video Support

Full HD and 4K x 2K video describes the resolution capability of the individual components, such as LCD, DVD or Blu-ray player. The original PAL standard works with just about 576 lines. Devices labelled as Full HD must show a resolution of at least 1920 x 1080 pixels. Furthermore, they must be able to handle the progressive display (1080p), which is shown by the "p". This means that the entire picture content can be displayed in one picture on the screen. The advantage is the improved picture sharpness. Full HD is a further development of HD Ready.

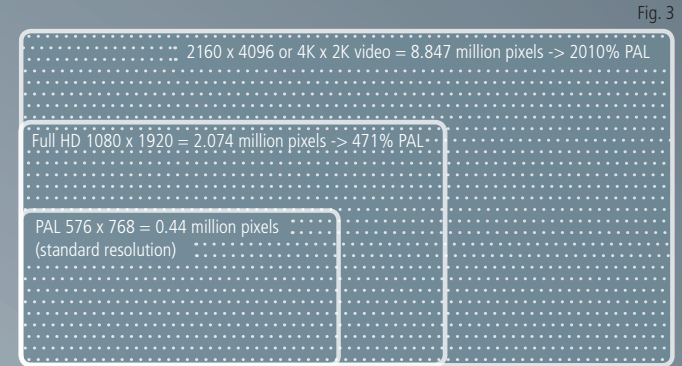


Fig. 3



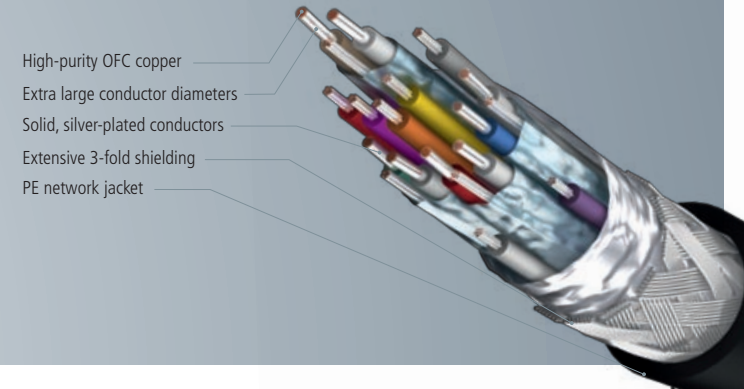
Fig. 4

Full HD and 4K x 2K video enables a larger display (Fig. 3) or far better picture quality with the same screen size (Fig. 4).



Comparison of a circle in PAL, Full HD 1080p and 2160p / 4K x 2K resolution.

REFERENCE HDMI CABLE





CABLE ABC

CAPACITANCE – Electrical capacitance is the extent to which it is able to store electrical charges. However, cables should be able to transmit the maximum energy of a signal without temporarily storing. The less capacitance a cable has, the better.

CONCENTRIC COPPER (CC) – CC stands for the concentric copper wires in a precisely-defined arrangement, as opposed to a chaotic arrangement of strangle wires. This results in a homogeneous signal flow and more precise and detailed sound.

CONSUMER ELECTRONICS CONTROL (CEC) – CEC enables several devices, such as TV or DVD player, to be operated with only one remote control. A maximum of 10 devices can be controlled by any manufacturer, provided all the connected components are CEC compatible.

DUO-PE II INSULATION – In theory, air is the best insulator, in practice polyethylene is the best. For the Reference cable, in-akustik has developed insulation which has two layers of polyethylene. The first layer is foamed with air. Then there is a second solid PE coating over that. This DUO-PE II insulation prevents high capacities and eases the work of the source.

EXTENDED DISPLAY IDENTIFICATION DATA (EDID) – With the EDID function, the display (e.g. LCD) transmits information to the source (e.g. DVD player) whose resolution formats it supports via the HDMI cable. The source, in turn, sends back the highest suitable format.

FINELY-STRANDED – Many individual wires are twisted into a braid to make the cable more flexible. The sum of the individual wires makes the total cross-section. The thinner the wires, the more flexible the cable.

GOLD-PLATED CONTACTS – The 24 carat gold-plated plugs reduce transmission resistance and ensure the best possible contact quality and optimum signal transmission.

HIGH-BANDWIDTH DIGITAL CONTENT PROTECTION (HDCP) – As the HDMI interface sound and picture content is available in absolutely perfect resolution, the film and software industry have instructed that data may only be released as copy-proof. This is the reason for using HDCP.

INDUCTANCE – Each conductor that is flowed through forms a magnetic field around it. If the flow of current changes, the strength of the magnetic field also changes. This in turn results in an inductive current which counteracts the change of current in the conductor. A frequency-dependent resistance develops (also called inductive reactance) which has a negative impact on the transmission. Special designs reduce the inductivity of a cable.

INSULATION (DIELECTRIC) – The conductors are covered in a non-conductive material to protect against short circuits, corrosion and damage. As these materials still store electrical energy (capacitance), which is not desirable for audio and video cables, in addition to the DUO PE II insulation, in-akustik has developed the first and only excellent Atmos Air Speaker cable with the best insulation of all: air.

JITTER – When serially transmitting A/V data, “one” and “zero” are coded by different impulse durations. Cable properties are affected by these impulse durations so that the data is not received properly. In the case of serious jitter, the D/A converter has to frequently correct the error and consequently the quality of playback for pictures and sound suffers.

OFC COPPER – The transmission of picture and sound signals is highly complex and susceptible to interference. Any contamination in the conductor material prevents the flow of current, impairing the conductance and increasing the background noise. Therefore, we only use especially pure-grade, oxygen-free copper (OFC) with a high conductance.

PE NETWORK JACKET – While many cables with an extra PVC coating have an unfavourable impact on the electrical parameters, the strands in the Reference cable are braided directly with the PE network jacket. The cables are comprised of just two materials, despite their sophisticated design: copper and polyethylene. The PE network jacket keeps the strands together, reduces micro-vibrations and enables the clean conversion of extreme dynamic peaks.

POLYETHYLENE (PE) – PE is a high-quality insulating material (dielectric) which is ideal as an insulator. It reduces the capacitance of a cable better by a factor of two over PVC (Polyvinylchloride). The electrical loss of PE is also very low.

SCREENING – Cables are shielded with one or more layers (for example wire mesh and a aluminium-coated mylar film) to protect against electro-magnetic interference. The impact of the screening is measured in dB and describes the reduction of any interference.

SILVER-PLATED – High frequencies are mainly transmitted on the surface of the conductor (skin effect). And as silver is the best conductor, the high frequencies are transmitted via silver-plated conductors with lower losses. Silver-plated cables accentuate the high pitch range in audio and speaker cables.

SOLID CONDUCTOR – In standard audio and video cables, the many fine wires are bundled, meaning the electrons can “jump” from one wire to another. The signals travel for different lengths of time, fast impulses are “braked”. Solid conductors prevent this by providing the same transit times and clear, strong contours. Solid conductors also provide another benefit for digital and video quality: the smooth surface allows the impedance to be precisely adjusted and the high signal frequencies which mainly move on the surface of the conductor can be transmitted perfectly.

SYMMETRICAL DESIGN – With symmetrically designed cables, two identical wires are used for the initial and return conductors. This counteracts the level of electro-magnetic interference and provides an extremely high immunity to interference. In addition, separate screening protects the signal.

S/Z STRANDING – Speaker cable with the wires arranged in the same direction tends to get twisted. This makes laying the cable and installation difficult. The cables with S/Z stranding have wires with opposite stranding to avoid this effect. Laying the cable is then much easier.