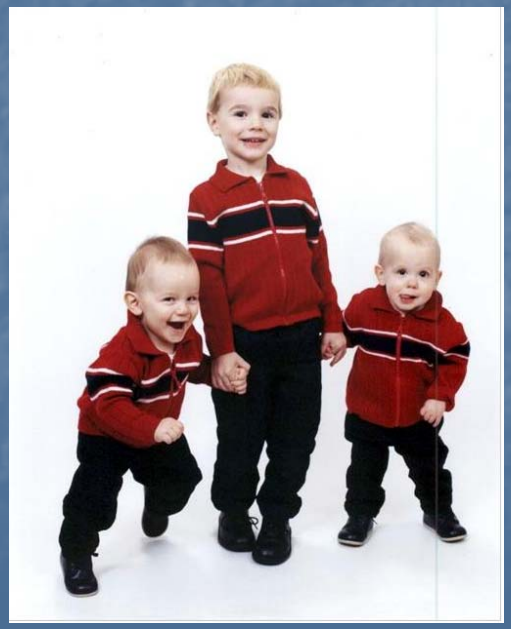
SCTE
Home Electronics
102

Who Am I?

- Operations Manager at The Little Guys
- Ex-Installer at The Little Guys
- Ham Radio Operator
- Father



Who are “The Little Guys”?

- Chicagolands Finest Home Theater AV Store
- Since 1994
- 15 installers, 2 programmers, 2 project managers, ISF certified video calibrator, and on……
- Comcast Installer!
- Comcast proving Grounds!

Home Electronics 102 Covers:

- HDTV vs. EDTV
- Video Interconnects
  - RF (Channel 3)
  - Composite
  - S-Video
  - Component
  - DVI
  - HDMI- Super Expanded!!!
  - IEEE 1394 Firewire
  - Cat 5

Home Electronics Covers:

- Audio Interconnects
  - Analog Stereo
  - Toslink
  - Digital Coax
- Video Setup
  - Hookups and Settings, Right and Wrong
  - Color, Contrast, Brightness, Sharpness, Tint
- Q & A

HDTV vs. EDTV

- HDTV- Many Formats!
- Minimum is 540p or 1080i
- Then there is 720p
- How about 1080p!
- 2K and beyond

HDTV vs. EDTV

- EDTV- The Great Equalizer!
- 1079i (539p) or less
- 480p vs. 480i
- Why does it exist? $$$
- Can it show HDTV sources?

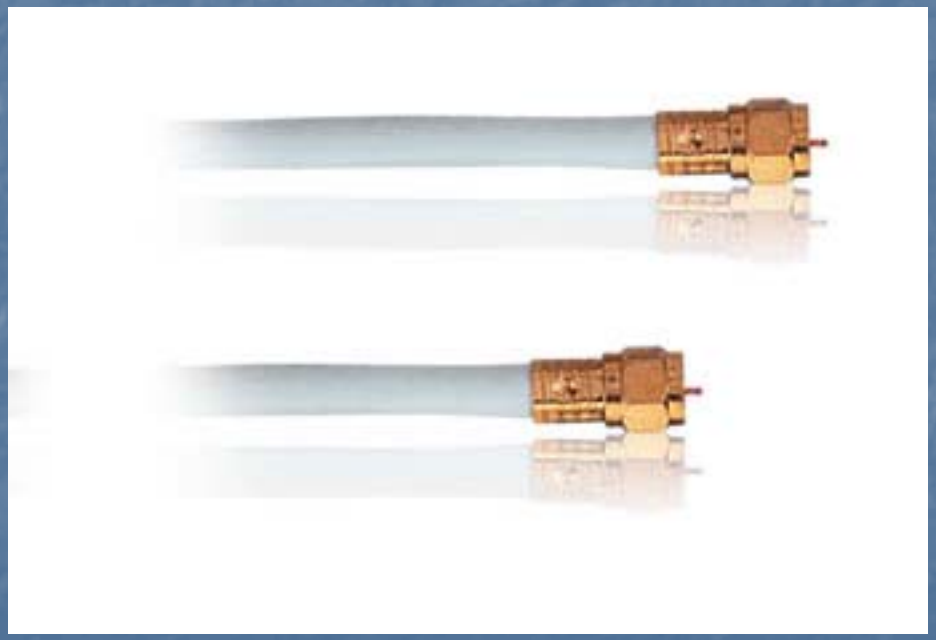
It’s About Time to….

Go To Lunch!!!

See you in 1 Hour!

Video: RF

- Good old Channel 3!
- Pro's
- Con's
- The Verdict:

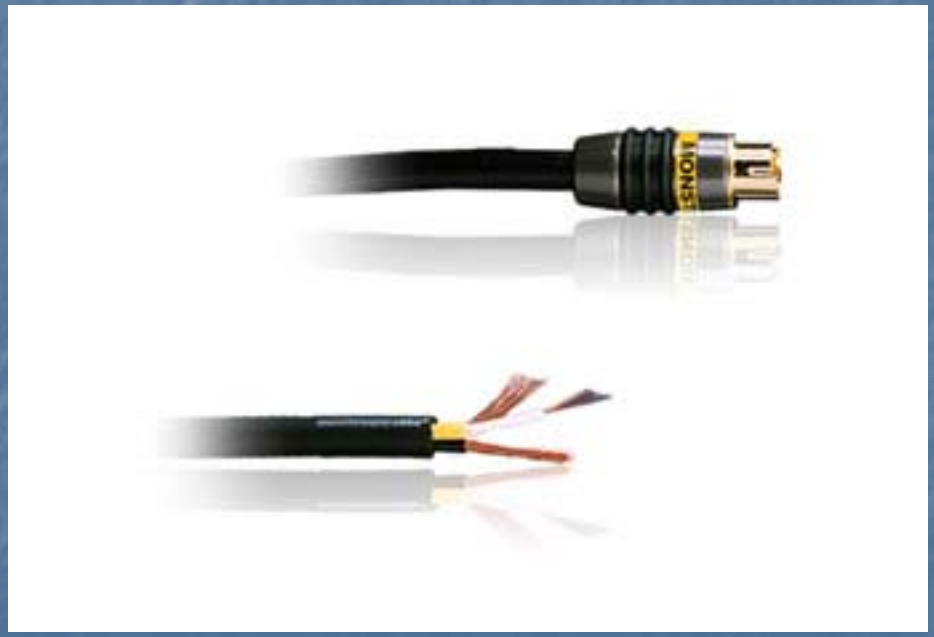


Video: Composite

- The “yellow” plug
- Pro’s
- Con’s
- The Verdict:

Video: S-Video

- The plug that falls out!
- Pro's
- Con's
- The Verdict:



Video: Component

- Red, Green, and Blue
- Pro's
- Con's
- The Importance of Green
- The Verdict:

Video: DVI

- That's a big plug!
- Pro's
- Con's
- The Verdict:

Video: HDMI

- The new plug that falls out!
- Pro's
- Con's
- The Verdict:

Video: DVI & HDMI

- Totally interchangeable- to a point

2 Different HDMI Connectors

Video: HDMI 1.3 Standard

SUNNYVALE, Calif., June 22, 2006 — The seven HDMI Founder companies (Hitachi, Ltd., Matsushita Electric Industrial Co., Ltd. (Panasonic), Royal Philips Electronics, Silicon Image, Inc., Sony Corp., Thomson, Inc. and Toshiba Corp.) today released a major enhancement of the High-Definition Multimedia Interface™ (HDMI™) specification, the de facto standard digital interface for high definition consumer electronics. HDMI 1.3 will enable the next generation of HDTVs, PCs and DVD players to transmit and display content in billions of colors with unprecedented vividness and accuracy.

The HDMI 1.3 specification more than doubles HDMI's bandwidth and adds support for Deep Color™ technology, a broader color space, new digital audio formats, automatic audio/video synching capability ("lip sync"), and an optional smaller connector for use with personal photo and video devices. The update reflects the determination of the HDMI founders to ensure HDMI continues evolving ahead of future consumer demands.

With the adoption of Deep Color™ and the xvYCC color space, HDMI 1.3 removes the previous interface-related restrictions on color selection. The interface will no longer be a constraining pipe that forces all content to fit within a limited set of colors, unlike all previous video interfaces.

- **New HDMI 1.3 capabilities include:**
- **Higher speed:** HDMI 1.3 increases its single-link bandwidth from 165MHz (4.95 gigabits per second) to 340 MHz (10.2 Gbps) to support the demands of future high definition display devices, such as higher resolutions, Deep Color™ and high frame rates. In addition, built into the HDMI 1.3 specification is the technical foundation that will let future versions of HDMI reach significantly higher speeds.
- **Deep color:** HDMI 1.3 supports 30-bit, 36-bit and 48-bit (RGB or YCbCr) color depths, up from the 24-bit depths in previous versions of the HDMI specification.
  - Lets HDTVs and other displays go from millions of colors to billions of colors
  - Eliminates on-screen color banding, for smooth tonal transitions and subtle gradations between colors
  - Enables increased contrast ratio
  - Can represent many times more shades of gray between black and white. At 30-bit pixel depth, four times more shades of gray would be the minimum, and the typical improvement would be eight times or more
- **Broader color space:** HDMI 1.3 removes virtually all limits on color selection.
  - Next-generation “xvYCC” color space supports 1.8 times as many colors as existing HDTV signals
  - Lets HDTVs display colors more accurately
  - Enables displays with more natural and vivid colors

- **New mini connector:** With small portable devices such as HD camcorders and still cameras demanding seamless connectivity to HDTVs, HDMI 1.3 offers a new, smaller form factor connector option.
- **Lip Sync:** Because consumer electronics devices are using increasingly complex digital signal processing to enhance the clarity and detail of the content, synchronization of video and audio in user devices has become a greater challenge and could potentially require complex end-user adjustments. HDMI 1.3 incorporates an automatic audio/video synching capability that allows devices to perform this synchronization automatically with accuracy.
- **New lossless audio formats:** In addition to HDMI's current ability to support high-bandwidth uncompressed digital audio and currently-available compressed formats (such as Dolby® Digital and DTS), HDMI 1.3 adds additional support for new, lossless compressed digital audio formats Dolby® TrueHD and DTS-HD Master Audio™.
- Products implementing the new HDMI specification will continue to be backward compatible with earlier HDMI products.

Video: HDMI

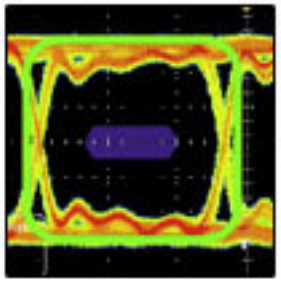
"Joel Silver recommended I purchase a Runco plasma for my own home theater. I was calibrating it and reported that it was defective since I saw green microblocking in near-black content. He told us it was a defective interconnect! We are video engineers-we did not expect that digital cables would create artifacts. Digital cables are expected to be good or not good. Joel said that buying a Monster ISF digital cable would eliminate the video noise-it did! The Runco is now gorgeous, as expected! Thank you Monster Cable!" Jeff Murray, Director of Home Theater Engineering, Sencore, Inc.

The analysis [by Joel Silver]: The ISF calibration field report from Jeff Murray at Sencore was of great interest to us. Jeff Murray is a professional trained observer, and has helped teach ISF certification classes. He works with test patterns and color analyzers in an engineering environment every day. When he reports a problem, we can be 100% positive we have an issue. He had worked with Runco products alongside us at ISF sessions in multiple cities, and knew he was buying a product with high-end video processing that effectively minimizes digital artifacts. The plasma in question was his own Runco in his own home theater. He was immediately alarmed by what he observed. The artifacts Jeff observed were subtle-and might be missed as "digital artifacts" by a casual observer buying an inexpensive flat panel HDTV. They were indeed digital artifacts-but as Jeff's installation proved, the artifacts were not caused by his HDTV source or his Plasma, but were from mishandled fragile digital interconnects. Installing a durable design for his on-wall PDP installation was an obvious solution-but in this case the problem was reported so it was easily resolved. Both Plasma and front projection installations call for long digital paths and often troublesome cable routings-and all interconnects must be designed to be durable enough to insure clean signal paths. Durable component interconnects have been a requirement since 1998. As this field report illustrates, durable HDMI interconnects are even more important than with Component Video. As we raise the bar on installation complexity, we will need better diagnostic tools, better silicon on both source and display components, and durable interconnects.

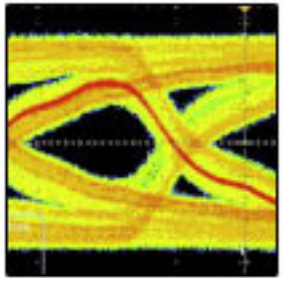
Reporting from the field, Joel Silver, ISF.

Eye-Pattern Test for Guaranteed Performance

Today, many cable manufacturers claim their HDMI cables pass a high-definition "eye pattern test." This, however, doesn't mean that all HDMI cables are created equal. For one, not all HDMI cables are eye-pattern tested for guaranteed compliance with the HDMI 1.3 specification. Many manufacturers also only test up to 720p/1080i resolution. Monster cables pass a rigorous 1080p eye pattern test at speeds above 165 MHz. twice the bandwidth necessary for 720/1080i.



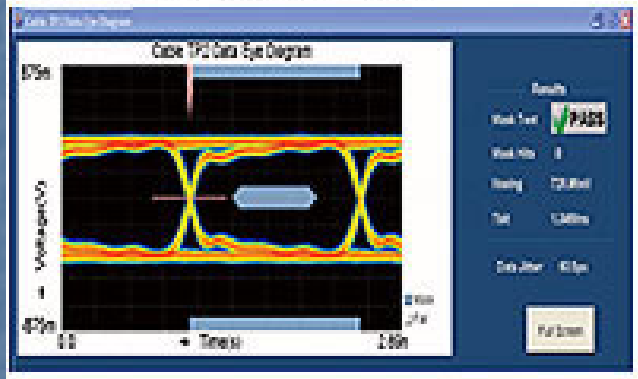
Monster Cable® for HDMI Pure digital signal for full high-defintion picture and sound.



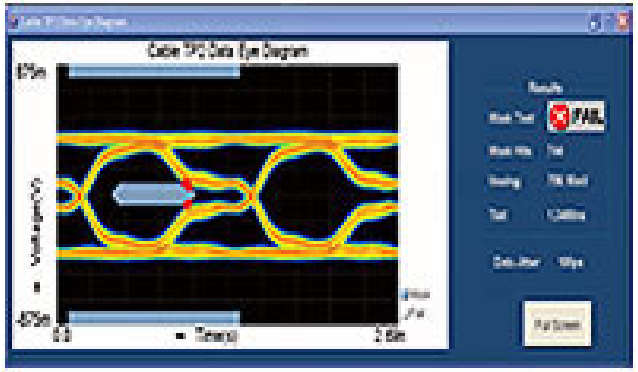
Generic HDMI Digital signal with distortion and interference

Many "tested" cables also do not pass without errors. The culprit: inferior materials and construction. Cable and connector durability is critical to HDMI compliance and 1080p video reproduction since the slightest imperfections reduce cable performance. See the Eye Pattern Test illustrations below. Notice the number of errors or "mask hits" in the "Generic HDMI" test.

Monster for HDMI™



Generic HDMI



Monster HDMI is error-free—no signal in the eye.
Not so with the competition. It's signal hits the eye or "mask" 744 times!

Inferior construction and manufacturing matters outside the lab in demanding high-performance home theaters. Under less than ideal circumstances, poorly constructed cables can introduce artifacts into your picture, which are often wrongly attributed to the display. Bit error often appears as color blocking, dropped pixels, flashing pixels, streaks, and other visual aberrations.

It's also important to note that roper testing for HDMI performance can be a very difficult task. Each manufacturer must use specific test equipment and follow specific test methodologies set up by Silicon Image, one of the founders of HDMI.

The equipment is extremely expensive ($250,000 minimum up to $600,000). The test standards themselves are very new, and very few labs are capable of accurately testing. Those who claim to have tested cables typically do so with casual visual testing, and not with the proper test equipment and processes. Monster has always used state-of-art measurements. We have found that the difference in cables varies widely, with many cables being sold that do not meet HDMI cable specifications. Monster tests 100% of its HDMI cables for quality so you know the cable will always work the first time and every time you use it.

Proper eye pattern testing requires sophisticated and costly measurement equipment, measuring of variety of electrical parameters, including attenuation, impedance, crosstalk, and EM and RF interference.

Video: IEEE 1394

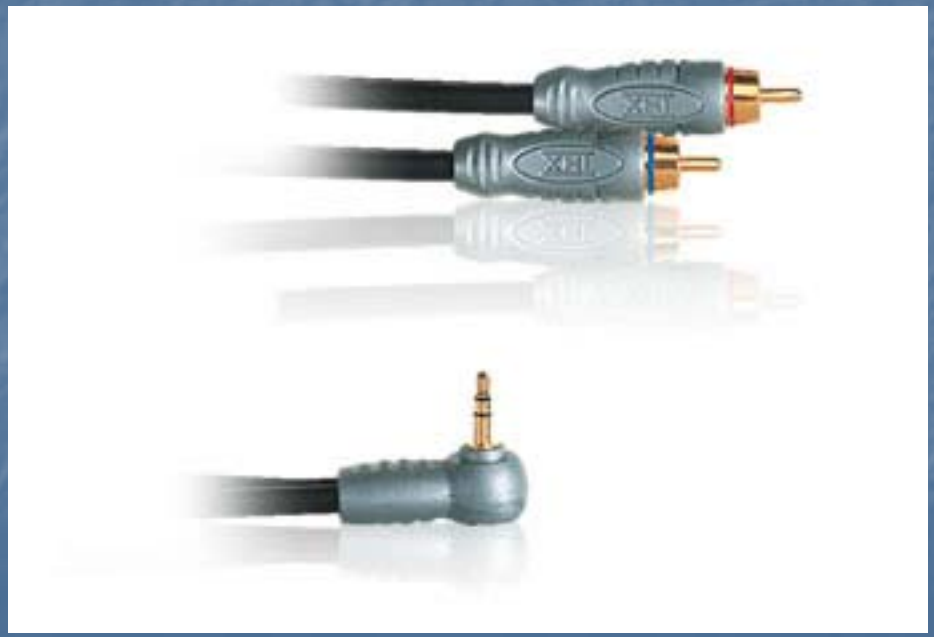
- A.k.a Firewire
- Pro's
- Con's
- The Verdict:

Cat 5

- The great problem solver!
- Composite Video
- Analog Audio
- S-Video
- RF
- Component Video
- Digital Audio
- Several Combos!
- Control- IR and RS-232
- HDMI Coming Soon!

Audio: Analog Stereo

- 2 RCA type connectors
- 1 1/8” mini plug
- Pro’s
- Con’s
- The Verdict:



Audio: Toslink

- Also called Digital Optical
- Pro's
- Con's
- The Verdict:

Audio: Digital Coax

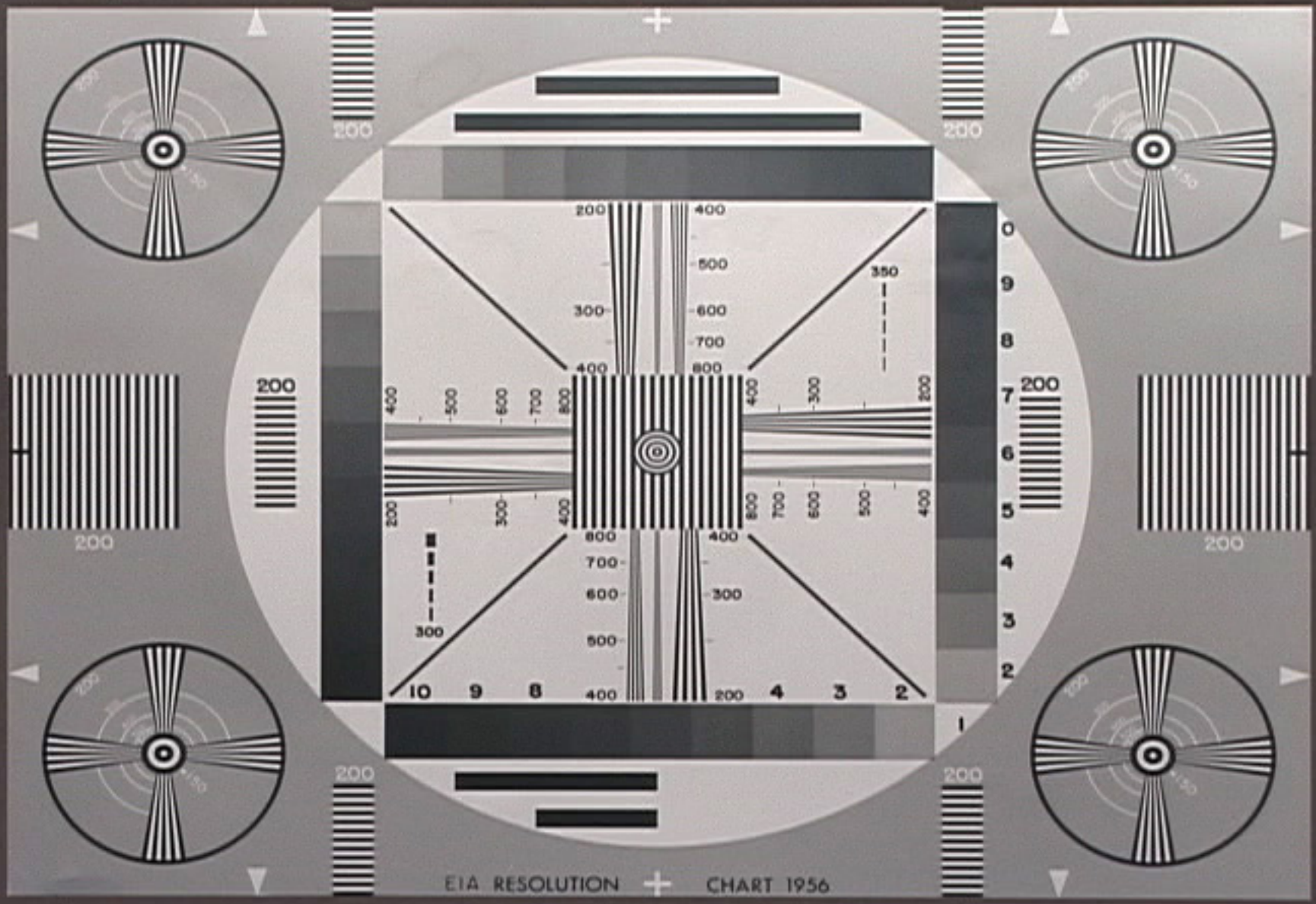
- Looks like a regular RCA type connector
- Pro's
- Con's
- The Verdict:

Video Setup

- What's the right interconnect?
- What's the right resolution?
- What are the issues that can come up?
  - HDCP!
  - Stretch/shrink
  - No Sync!

Video Setup

- The right picture settings- and why they are important
- What is Color, Brightness, Contrast, Tint?
- The Dreaded sharpness Control
- Live Demo!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EIA RESOLUTION CHART 1956

It’s Your Turn!

- First things First: Credits To: HDMI.org and monstercable.com
- Q & A- Ready, Set Go!

Thanks!

- E-Mail me anytime! tomg@thelittleguys.com!