Signals and cables cheat sheet

SDI, HDMI, NDI, HDBaseT, fibre and audio networks on an event

VIRTUAL STUDIO EVENTS

SDI over coax

Format	Standard	Bit rate	Carries	Typical run on RG6 (1694A class)
SD-SDI	SMPTE ST 259	270 Mb/s	576i, 480i	About 400 m
HD-SDI	SMPTE ST 292	1.485 Gb/s	720p, 1080i, 1080p25/30	About 110 m
3G-SDI	SMPTE ST 424 / 425	2.97 Gb/s	1080p50/60	About 80 m
6G-SDI	SMPTE ST 2081	5.94 Gb/s	2160p25/30	Check the cable maker's chart
12G-SDI	SMPTE ST 2082	11.88 Gb/s	2160p50/60	Short: use 12G-rated cable or fibre

Run lengths are cable loss only, from the published table for Belden 1694A. Every patch, barrel and joint takes some of it back, and receivers differ. Above about two-thirds of the figure, test with a pattern at show resolution before you trust it.

HDMI

- HDMI 2.1 (Ultra High Speed cable) carries up to 48 Gb/s. HDMI.org gives no maximum length.
- Treat passive HDMI as a desk-length cable. For anything longer, convert to SDI or HDBaseT at the source.
- HDCP: laptops playing protected video can refuse to output to a capture card or switcher. Find out at the tech check, not on the night.
- Lock the presenter laptop's output resolution and refresh rate, and turn off sleep and notifications.

HDBaseT over Cat cable

- Video, audio, Ethernet, control and power down one category cable.
- Version 1.0: 1080p to 100 m on Cat5e or better, 4K to 70 m.
- Version 2.0: 4K to 100 m on Cat6. Version 3.0: uncompressed 4K60 4:4:4 to 100 m, Cat6a U/FTP recommended.
- Both ends must be the same HDBaseT version. Shielded cable near dimmers and power.

NDI on the network

- Full-bandwidth NDI at 1080p60 runs up to about 150 Mb/s a stream. NDI says a gigabit network is essential and to plan on average use, because NDI traffic is not constant.
- NDI HX2 at 1080p60: up to 16 Mb/s (H.264) or 11 Mb/s (H.265).
- A gigabit link holds a handful of full-bandwidth streams, not dozens. Keep NDI on its own switch or VLAN, never on venue Wi-Fi.
- Sources appear by machine and source name. Name them before the show ("GALLERY-PC1 (PGM)") or you will pick the wrong one live.

Fibre

- Single-mode (yellow jacket, OS2) for long runs and SDI converters; multimode (aqua OM3/OM4) for short data links. Don't mix them on one link.
- Know the connector before you order: LC on most converters and SFPs, opticalCON or SMPTE hybrid on tactical drums.
- Carry a cleaning pen and caps. A dirty connector is the usual cause of a dead fibre.

Audio over the network

- **Dante:** devices are routed in Dante Controller, which is free from Audinate. Default latency is 1 ms; lower settings need a gigabit-only network with capable devices.
- Agree who owns the Dante network: the house audio team, the AV supplier or you. Two people routing one network is how a mic disappears mid-session.
- **AES67:** the interoperability standard. Dante devices with AES67 mode can exchange streams with other makers' AES67 kit.
- **SMPTE ST 2110:** video, audio and data as separate IP streams on one timing reference: -10 timing, -20 video, -30 audio (AES67), -40 ancillary data. ST 2022-7 adds seamless switching between two copies of a stream.

Connectors at a glance

Connector	Used for	Watch for
BNC (75 ohm)	SDI, genlock, timecode	50 ohm BNCs look the same and cost you distance at 3G and above
XLR3	Mic and line audio, AES3	AES3 wants 110 ohm cable; mic cable works over short runs only
etherCON / RJ45	Network, Dante, NDI, HDBaseT, comms	Label which network each run is on
powerCON / TRUE1	Mains to equipment	Original blue and grey powerCON must not be unplugged under load; TRUE1 can be
opticalCON / LC	Fibre	Caps on, every time

Habits that save shows

- [ ] Label both ends of every run with the run number from the cable schedule
- [ ] Run a spare to every camera and screen position
- [ ] Test each route with a pattern at show resolution and frame rate
- [ ] Keep signal away from power and dimmer cables; cross at right angles
- [ ] Know where every converter is powered from
- [ ] Photograph the patch before doors

Sources. Canford: maximum transmission distances · HDMI 2.1 · NDI bandwidth · HDBaseT · Audinate Dante Controller. Checked 9 November 2026.

Watermarked preview. Get the clean file free at www.virtualstudio.events/tech-signal-cable-cheat-sheet.html