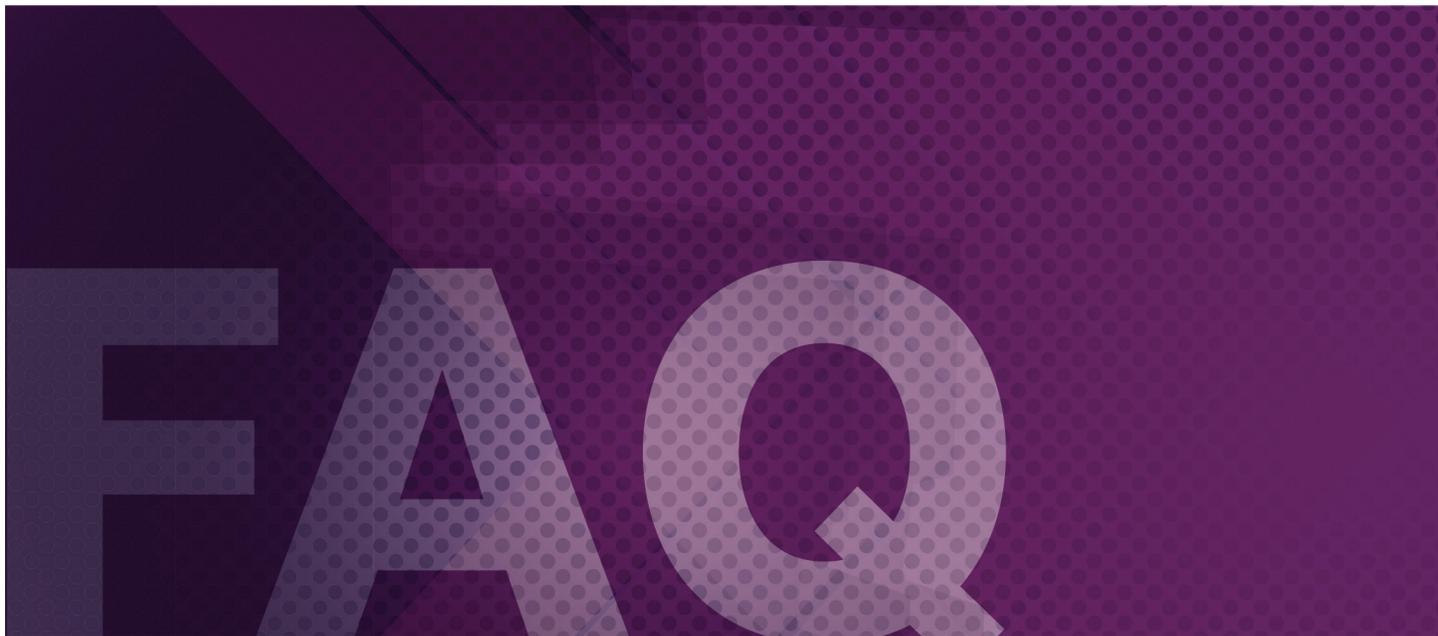




K2 Media Server & Storage Platform



1. Are K2 clients PCs with standard I/O boards?

No. K2 clients are purpose-built devices with the performance, reliability and real-time processes necessary for use in broadcast media environments. The Grass Valley K2 Summit 3G Production Client, K2 Summit TX Transmission Client and K2 Solo 3G models are designed for different user requirements.

2. Are K2 clients black boxes that do not take advantage of IT technology?

Definitely not. Since its original introduction in 2005, the K2 platform has incorporated the latest IT technologies in processing, software and storage, which is then optimized for use with broadcast media.

3. Which video formats does K2 support?

K2 supports a wide variety of common industry formats. These include the MPEG-2, DV, AVC-Intra and DNxHD. MPEG H.264 playout is also supported.

4. Does K2 Summit support 3G HD formats?

Yes. The K2 Summit 3G platform is on the forefront of the ongoing adoption of 3G HD industry formats, currently supporting the 3G HD Level A 1080p 50/60 using AVC-Intra.

5. Can K2 Summit support emerging UHD/4K standards?

Yes. Using the exceptional architectural flexibility and performance headroom, the K2 Summit 3G platform with 1080p50/60 AVC-Intra can be configured for recording and playout of material based on the emerging UHD/4K standards. 4K over 1-wire signal transport, using TICO lossless compression, will be available Summer 2016.

6. What audio formats does K2 support?

- For audio input: 48 kHz, 16- or 24-bit digital audio PCM with sample rate conversion (32 kHz to 96 kHz) to 48 kHz.
- For audio output: 48 kHz clock derived from video reference, 16- or 24-bit compliant with SD-SMPTE ST 259 or HD-SMPTE ST 292.
- Compressed audio types: AC-3 and Dolby E pass-through.

7. What are the audio channel capabilities with K2?

- 8 input and 8 output (4 AES pairs) discrete AES/EBU audio tracks per video channel.
- 16 tracks embedded audio tracks per video channel.

8. Do K2 systems offer any specialized audio capabilities?

Yes. K2 includes adjustable audio delay, set and save gain per clip, scrub audio support, audio click elimination, agile playback of clips with different supported audio formats, audio tagging and audio mapping, audio mix effects (PCM only), crossfade between tracks and fade up/down.

9. What file formats (file wrappers) does K2 support?

K2 features automated file unwrapping and wrapping on import and export. File exchange formats include MXF OP1a, GXF (SMPTE ST 360), P2 and QuickTime.

- For video import: AVC-Intra, DVCPRO 25, DVCPRO 50, DVCPRO HD and DVCAM (all with audio) and MPEG-2 program and transport streams with audio are supported (XDCAM).
- For audio import: WAV is supported.
- For graphics import: QuickTime files with two video tracks for video and key playout as QuickTime 32 with alpha RLE 32-bit raster encoding — as produced by the Apple Animation Codec — is supported.





10. How are channels implemented in K2?

K2 has extremely flexible channel capabilities. Channels are usually implemented as bidirectional. Channels are also agile for both HD and SD and can convert between resolutions. With the ChannelFlex software option, channels can be set up in software to have different features. A channel can do dual records, super slow-motion record, key and fill record or 3D left-eye/right-eye record. A channel can also do video+key playout or a 3D left-eye/right-eye playout.

11. What are the storage possibilities for K2?

K2 Solo uses only internal hard drives. K2 Summit uses either internal or external drives. There are 12 internal drives in the K2 Summit 3G Production Client and 8 internal drives in the K2 Summit TX Transmission Client. K2 Summit can use either external direct attached RAID SAS, or SAN RAID SAS storage or K2 Central TX shared storage.

12. How does K2 work with shared storage?

K2 uses a scalable data bridge server that can provide different levels of bandwidth through software licensing. The K2 server connects to an Ethernet switch via 10 Gb Ethernet connectivity to which K2 Summit media clients are also connected. The K2 media server connects to RAID-5/6 storage via 8 Gb Fibre Channel. Alternatively, the entire system can use just Fibre Channel connectivity with a Fibre Channel switch. Servers and storage modules can be added together for scaling that can provide the largest media server and storage systems available. K2 Central TX shared storage combines the network switch, file system manager and primary storage chassis in three usable storage capacities - 20 TB, 40 TB and 60 TB.

13. Are all K2 shared storage offerings the same?

No. To provide a broad range of price/performance offerings, there are three different storage configurations: highest performance on-line storage (ONL3), flexible production storage (PRO3) and general purpose near-line storage (NL3) — all based on K2 components.

14. Does K2 have any low-resolution proxy capabilities?

Yes. With a software license, a K2 Summit client can generate four or eight channels of low-resolution proxy material simultaneously with the high-resolution material. This proxy material is then available to GV STRATUS nonlinear production tools to support complete proxy workflows. Users can perform tasks such as proxy editing with EDIUS XS, log incoming video or manage ingest feeds.

15. What do K2 systems offer for monitoring?

K2 systems provide a variety of monitoring capabilities. K2 clients include a multiviewer through a VGA port. Each playout channel on a K2 client has a secondary SDI output that can be used for monitoring purposes. K2 clients also provide a low-resolution proxy stream over Ethernet that displays the video signal coming in to the record channels and the video signal coming out of playout channels. This stream can be used for monitoring and with GV STRATUS nonlinear productions tools. The AppCenter utilities that come with K2 systems can be used to monitor the status of all K2 clients remotely across a network.

16. Do K2 clients provide any effects?

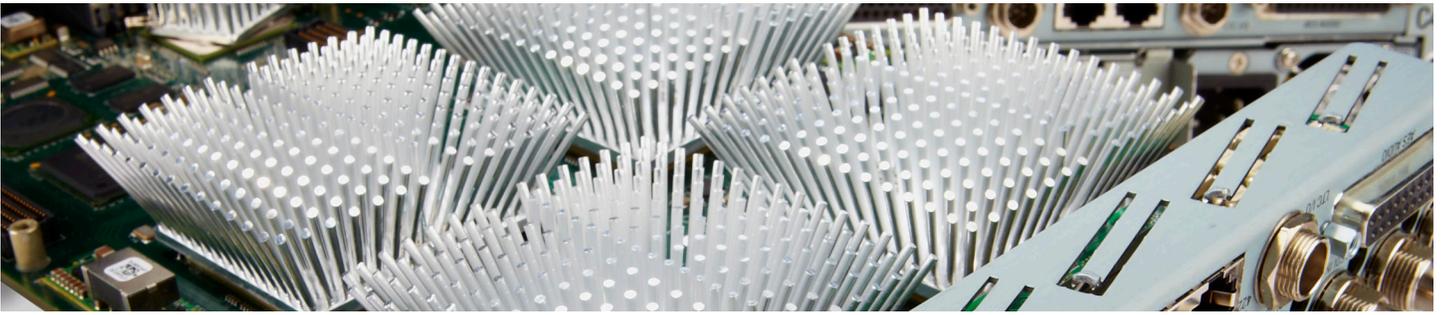
Yes. Every playout channel can be set up to do dissolves and fades with various durations. This is implemented within a single channel and does not need two playout channels to accomplish.

17. Can K2 work with streaming files?

Yes. K2 can be configured to import streaming files where client applications that are network-connected can manipulate the incoming data without waiting for the file transfer to be complete. A streaming service can also be set up to send out multiple streaming files to a target destination.

18. What protocols are supported on K2 systems for performing file transfers?

FTP and CIFS protocols can be used. In a shared storage K2 SAN system, FTP bandwidth can be scaled independently to provide a very large pipeline to match specific file transfer requirements.



19. How do K2 systems manage bandwidth?

From its initial introduction, K2 was designed to manage both media and file operations simultaneously. In a K2 client with internal storage, there is a Quality of Service that guarantees media recording and playback of all channels at maximum bit rate while also providing sustained bandwidth for file transfers that will be guaranteed at a user-designated amount. Dynamic allocation can increase this guaranteed amount when resources are available.

In a shared storage system, K2 offers an advanced Quality of Service that extends beyond media processing and file transfers. An additional level of service can be configured for edit clients to edit-in-place with a set amount of system bandwidth without affecting media operations, file transfers, or the performance of other edit clients on the system.

20. What types of redundancy do K2 systems provide?

K2 Summit clients include hot swappable fans and dual power supplies. The operating system boots from a write protected solid-state drive. Ethernet connections can be configured for teaming as part of a shared storage system. The internal storage is RAID-1/0 striped and mirrored with hot swappable drives.

In a shared storage system the clients can have connectivity to dual switches which connect to dual servers which in turn can have dual connections to RAID storage. The RAID controllers can be redundant with all storage modules. If any one of these data connections is lost, the system can still function with full bandwidth using an alternative path.

21. Are there any software utilities available to help manage K2 systems?

All K2 systems come with a set of utilities called AppCenter. The utilities provide control, configuration, simple content management and monitoring. There are different software licensing levels that enable different capabilities, such as channel modes and proxy generation.

22. Do K2 systems provide any APIs to interface with third-party products?

K2 has multiple free APIs that are documented and supported. Different APIs have been created depending on what level of integration is desired with third-party applications. The APIs not only provide basic functionality such as transport control, but also more sophisticated capabilities for applications such as content management.

23. How do K2 systems interact with editing systems?

With a standalone K2 client, a single edit system can be network mounted using CIFS protocol and access material. Editing systems can also push a finished piece back to the K2 client.

In a K2 shared storage system, editing systems can be network-mounted directly on the K2 storage with dedicated Quality of Service that prevents any editing systems from affecting the performance of media operations such as record and playout, as well as other editing systems on the system.

24. What operating systems do K2 systems use?

K2 clients use two specialized operating systems. The primary OS is an embedded version of Windows 7 that has been created by Grass Valley specifically for the K2 platform (as opposed to a general purpose implementation). In addition, there is a real-time OS running on RISC processors to enable specific media operations.

In a K2 shared storage system, the servers use the Windows Server operating system.

25. Do K2 systems provide any virus protection?

K2 clients include an embedded anti-virus application that is configured to have no impact on online, real-time performance.



26. Does K2 support off-speed play?

Yes. K2 can support high-quality slow-motion playback with replay systems such as the Grass Valley, a Belden Brand, K2 Dyno Replay System. There is also high-quality jog/shuttle.

27. What types of IT connectivity do K2 clients use?

K2 clients use 1 Gb Ethernet and USB 2.0. K2 Summit 3G uses 1 Gb Ethernet, USB 3.0 and USB 2.0.

28. Do K2 clients include GPI?

Yes, 12 in and 12 out.

29. What types of timecode support are included with K2 clients?

LTC SMPTE ST 12 at one per channel, one VITC reader/writer per video and HD ANC timecode.

30. What types of reference genlock are provided for K2 clients?

NTSC/PAL black composite analog, tri-level sync SMPTE ST 296-2001 for 1280x720p systems and SMPTE ST 274-2008 for 1920x1080.

31. What control mechanisms are available for K2 clients?

BVW, VDCP and AMP protocols over RS-422 and AMP protocol over Ethernet.

32. How is metadata supported in K2 systems?

Every K2 media asset can include a metadata packet. The metadata is formatted using XML. Metadata attached to an asset will remain associated with the file as it is transferred. Through K2's APIs, third-party applications can have access to and manipulate the metadata.

33. How does K2 support ANC and VBI data?

Existing ANC data will be preserved. ANC data is SMPTE ST 292 Record/Play for all legal packets. There is also translation between ANC data and VBI data when converting between HD and SD.