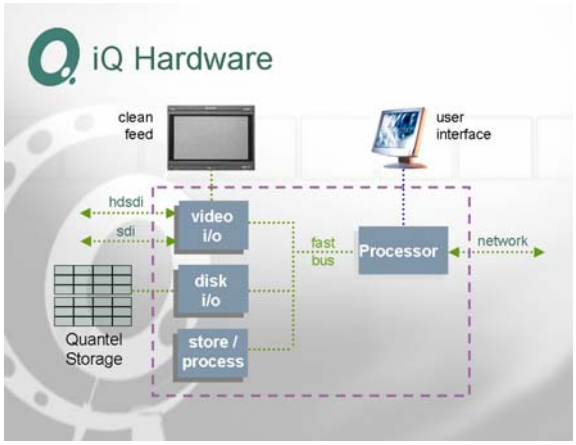
# iQ - an idea turns into reality

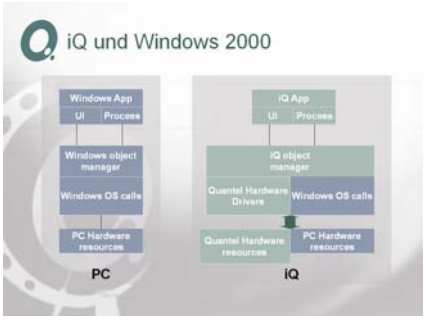
Monty, the pseudonymous name of iQ while it was under wraps in its initial development phase, aroused considerable curiosity in the post-production and broadcast communities. Now, following the official launch of iQ in Germany, all secrets have been lifted. iQ, as an integrated production system, handles all commonly used TV- and film standards. From ingest through non-linear editing to the whole post-production workflow chain inside the unit - all necessary I/O interfaces are fully supported. During the development of iQ, the R & D department at Quantel focused its attention on the delivery of HD longform production tools. Users should be able to create and edit high-definition material at the same speed and interactivity as they can at SD today. The currently deliverable system will be enhanced with an FX package and Compositing toolset in the very near future.




The subsequent article will attempt to describe and present to prospective buyers and users all potentialities and possible integration solutions for iQ into an existing or new broadcast and/or post-production environment. Quantel's network of sales and support representatives either from the UK or local subsidiaries in Europe are of course able to answer any questions arising.

## Main Features

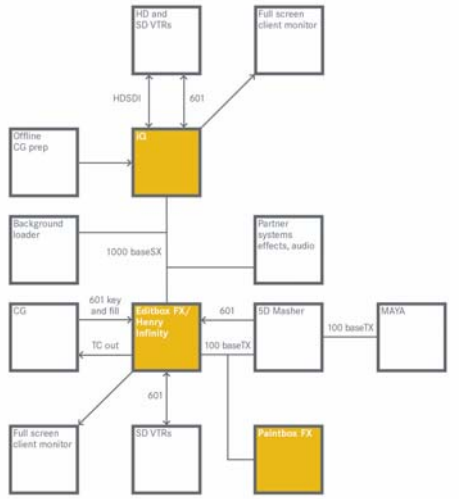
The direct comparison between linear and non-linear uncompressed post-production shows obvious advantages for non-linear. Users get all tools for quality control and quality assurance (retouch, tracking, DVE etc.) delivered interactively, including unlimited editing and re-editing capabilities. However, data rates seven times higher than for an SD signal need to be handled. Developments in the IT world over the past years have ensured that these high amounts of data (1920 x 1080 pixels, 4:2:2 @ 10 bit sample rate/resolution = 5.2 Mbit/frame ˜ 560 Gbit/h) do not cause any storage problems - provided the system has the internal bandwidth to process it in realtime. At the same time, the demands on HDTV post-production facilities have increased and the design of an HD production suite represents today very much the look of a classical SD suite.




**Block diagram of software structure**

iQ comes with nearly two TeraBytes of storage (4 hours HD) and offers enough capacity to work on longform clips. The 8U mainframe carries, besides all essential purpose-built Quantel cards and HDD's, an NT based PC and the interfaces for HD-SDI/SDI, AES/EBU audio, Clipnet Gigabit Ethernet (1000BaseSX Short Wavelength), Remote control and external control panels. Windows 2000 runs in parallel to Quantel's software as the operating system. To make the power, reliability and speed of iQ independent from a consumer product which has to obey spurious calls on its operations, significant parts of Windows 2000 have been re-programmed. There is coexistence of Windows 2000 and iQ hardware drivers. When making a command, control is initially taken by Windows 2000. This control is then directly forwarded to Quantel's OS. In fact, the reliability and speed of iQ is completely under the control of Quantel software as in the past. It can be said that the system is based on Windows 2000 but that all-important functionalities are still under control of Quantel's proprietary system. It is conceivable that there could be a Linux version in the future, too.

The system supports all commonly used computer, video- and film formats/standards, all of which are stored in their original formats and resolutions, and can be accessed as required throughout the job. Quantel calls this facility resolution co-existence. It means that the user always works with material in its original format, only converting to the required output format (in realtime, on the fly) when the job is completed, thus maintaining optimum quality. It also means that any project only has to be 'mastered' once, and then simply re-output in different formats to suit varying media requirements, making versioning a simple and fast process. Other systems on the market require the output format to be specified at the commencement of the job and original material re-formatted accordingly before the edit begins.




**Block diagram showing networking of Quantel- and third-party equipment via Clipnet and Gigabit Ethernet**

## Production aspects

iQ comes with a package of built-in software: Qedit (timeline based video and audio editing package), Qpaint (package for dustbusting, retouch and painting) and Qscribe (integrated real-time - full featured - resolution independent character generator for producing and editing stills, rolls and crawls). Because iQ is an entirely open platform, 3rd-party products can be developed to run alongside the Quantel applications, making use of the same hardware power. This means effectively any 3rd-party software solutions and tools could be ported to the system.

Specifically designed for post-production applications, iQ cannot be seen as a standard/format converter. Always this has to be kept in mind, when looking at the practical frame rate conversion. It will give the operator full control over the aspect ratio conversion on a shot by shot basis. For example, 24p material can be played out in PAL or even NTSC; the material for a 25 fr/s PAL playout will be increased in playout speed by 4%. Before the upcoming IBC, support of 2K resolution (2048 x 1556 pixels in RGB with dpx file format support) will be available.

At IBC, an extensive effects package will be presented. Qedit is endowed with Timeline Editing, fundamental effects (DVE, Keying and Colour Correction), multi channel audio (Waveforms, eight channel I/O for 5.1/DVD applications), Undo/Redo function and free format selection (in a range of standards) at the output. It supports import of OMF/AAF conform data sets and signals (the library saves clip material and clip metadata). In conjunction with additional production and creation potentials, iQ can also be seen as a network 'hub' with Editbox, Paintbox and external compositing units or tools via Gigabit Ethernet. An http browser means that all connected systems can see each others' disks, easing workflow.

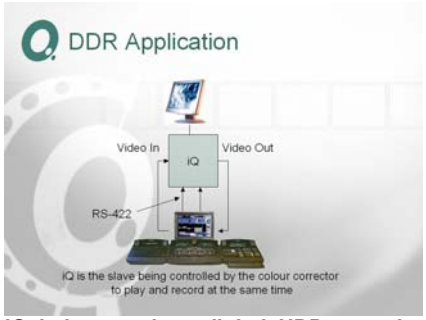
New future perspectives are opening up, which go way beyond anything seen yet. Via a Gigabit Ethernet switch LAN connections with 100BaseT networks can be established and data transfer between external PC's and the system can take place. On this high-quality production system the performance of colour corrections, key effects and wipes between HD signals is similar to the speed of SD effects. Instead of Qkey the "Primatte Keyer" (3rd-party tool from Photron) can be used, which is selectable through a convenient drop-down window. With this 3rd-party keyer the render speed of 2K frames is so incredible that the Japanese developer of it said: "I haven't seen such a performance of "Primatte Keyer" on any other machine before."

Qpaint as integrated retouch and paint system that brings together Quantel Paintbox technology and Alias' Maya paint effects. Qscribe, in partnership with Inscriber offers real-time title (rolls, crawls and sub-title) in conjunction with off-line preparation.

The working potentialities and clip playout in different resolutions are impressive. Real-time up- and downsizing from any SD to any HD format (re-sizing) and vice versa, depending on selected output format, is supported. Also, wipes from SD to HD clips and back are possible, because of iQ's real-time re-sizing capabilities. Clip editing, by drag&drop functionality, have been shown at IBC 2000 and NAB 2001 convincingly. All formats can be edited, played back and played out seamlessly.

## Workflow

Another feature is iQ's ability to work as a "Digital Disk Recorder" (DDR in HD or SD resolution). The architecture of the system allows external devices to control the internal HDD's frame-accurately like an HDD-disk recorder via the RS422 IFs. Parallel recording and playback of clips is possible, enabled by the wide bandwidth of the system. Therefore colour correction (disk/disk) is possible, where the external colour correction unit controls iQ as a slave device. Quantel has demonstrated this as a realtime process in conjunction with Pandora Pogle.




**iQ being used as digital HDD recorder with external control**

Editbox (version 8.16 or higher and Clipnet) in conjunction with iQ and the Background Loader (Image Mine) offers the ability to enhance the workflow between Quantel devices (i.e. Editbox, Henry Infinity and iQ). An external PC controls the loading of clips onto the internal storage as a background task (loading of EDLs, manual supplement of clip list, etc.) via Clipnet gigabit Ethernet, without any need of interruption of the operator's current work. Expensive work breaks and idle times waiting for the material for the next job on the system to be available, can be dropped and a much better use of capacity is guaranteed. Image Mine is a Logging-/Loader module, which includes a Media Asset Management system (MAM-) with centralized database. It monitors metadata and assets and allows searching functions on the system.

## Summary

iQ is then a combination of functionalities. It is a self-contained multi-resolution editor for SD, HD and beyond; a network 'hub' for a combined resources, streamlined workflow environment; a very powerful yet totally open 'computer-style' processor in its own right, capable of running third party applications and plug-ins at unprecedented speed. Quantel's claim that iQ represents the best of two worlds - the power of Quantel hardware combined the openness and programmability of the standard computer - seems to have been met.