

## Dirac Pro Core Set

Westwood Rock has announced that it is releasing the first of a series of video codec cores compliant with the BBC-developed Dirac Pro compression system [recently agreed by SMPTE]. Westwood Rock's Dirac core set provides a rapid and cost effective method for deploying Dirac compression.

### A Background to Dirac

Just over six years ago the BBC identified a set of video codec requirements that it recognised as important for both a quality broadcast infrastructure and for video film production. Despite there being a wide range of compression systems and equipment on the market, the BBC was unable to source a system that addressed all its requirements.

The problem was significant enough for the BBC to embark on a programme at its internationally-respected Kingswood Warren Research Department to conceive a compression system that fulfilled all of its requirements for quality broadcasting and film production. The outcome of this extensive R&D is the compression system known as Dirac.

As the BBC is a public broadcaster, it has chosen that the Dirac specification should be an open technology, free from royalties.

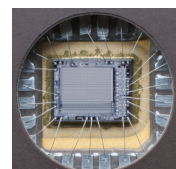
The BBC is a world-renowned broadcaster and video film originator of high-quality productions. In Dirac they have designed a complementary quality compression system which is very practical, flexible and elegant.

### Westwood Rock

The engineers at Westwood Rock have been designing video hardware and core IP for over 20 years. Besides the prevalence of Westwood Rock's designs in the broadcast and film industries, they have also taken their video expertise into aircraft, medical imaging, industrial vision and surveillance. Westwood Rock has extensive experience of FPGA design and works closely with all the major FPGA vendors. Additionally, the team includes some of the most respected ASIC designers in the industry.

The development of this exciting set of cores is a natural fit for Westwood Rock's skillset and expertise.

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## The Dirac Core Set

### Small Form Factor

The core is the smallest video codec available and has been designed to fit into FPGA vendors' cost-effective families.

### Quality

A small form factor has not resulted in a reduction in quality. As you would expect of the BBC, quality has been key to the development of Dirac technology. The main profile implementation of Dirac Pro rivals JPEG2000 and yet has a latency as low as a single frame and a very hardware-efficient form factor.

### Low Delay – only a few lines of latency

Uniquely, in the low latency profile a compression factor of 8 times can be achieved with only a few lines of delay. This means that multistandard HD-SDI (1.5Gbit/s) can comfortably be carried over an SDI (270Mbit/s) link. Alternatively, 3Gbit/s HD-SDI can be compressed to a 1.5Gbit/s HD-SDI link with very little delay and, again, in a small hardware form factor. Of course this means that signals such as 1080P60, stereoscopic 3D production, Digital Cinema or other new formats can be transported over an existing studio infrastructure.

### Visible picture information over a compressed link:

Yet another unique feature is that a real time low-level picture is visible on a standard monitor over the 'compressed' SDI link.

### Low power, low cost

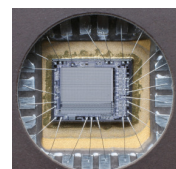
The small hardware form factor means that the power consumption of the hardware is lower and, as fewer logic cells are used, the cores can fit into smaller FPGAs. The pricing structure is competitive at all volumes and particular attention has been given to allowing low quantity usage access to the technology. At the high volume end of the market, the core will be available for ASIC designs with Westwood Rock able to offer a full turnkey solution.

### Dirac Pro over SDI, ASI and IP plus open source software

As already stated, the Dirac Pro core set will provide transport over SDI, but it can also be used over ASI and IP links. An open source software codec is available, as are over 6000 conformance test sequences

### Standardisation

All the above is covered by SMPTE and relevant standards. Westwood Rock fully supports the BBC's philosophy of making Dirac an open standard.



## High compression

Initial core releases concentrate on the low delay and main profiles. Later Westwood Rock intends to release long GOP Dirac cores that will yield considerably higher compression ratios. In comparison, the long GOP Dirac core will be a simpler alternative to H.264 and X.264, suitable for video distribution and mobile applications.

## Flexibility - any picture format

The Dirac compression system and core set is not locked to a given picture format as it is wavelet based, which makes it very flexible.

This means that Dirac can compress pictures from a QCIF format right through to UHDTV, and also has customisable picture formatting to accommodate any new picture standards. Parameters such as frame rate, chroma subsampling and bit depth are flexible. Scan formats can be progressive or interlaced.

## **Design Services**

As an established design consultancy with a great deal of experience in broadcast, communications and FPGA/ASIC design, Westwood Rock will be able to support end users of the core from concept through to finished system design or final silicon. Westwood Rock's codec experience is extensive and includes contribution quality codec design, digital cinema and set-top box design. Reference designs will be made available as cores are released. Westwood Rock is able to offer support in both hardware and software design.

## **In summary**

The BBC has designed Dirac so that it provides flexible, high quality, low latency, low form factor compression.

The BBC developed Dirac to be a truly standardised, non proprietary, royalty free and open technology.

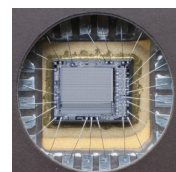
Dirac has been developed by the BBC for its own use, concentrating on the broadcast chain and video film production.

The emphasis on high picture quality, low delay and low hardware complexity makes Dirac compression suitable for a wide range of imaging applications.

Westwood Rock is excited about this technology and will champion ease and breadth of access to the full set of Dirac cores for all interested companies, using a pricing structure that encourages adoption of Dirac regardless of usage volume.

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