

BENQ X12000 ULTRA HD PROJECTOR

BENQ HAS INTRODUCED
THE X12000 ULTRA HD PROJECTOR.
STEPHEN DAWSON INVESTIGATES
WHAT IT OFFERS THAT THE
W11000 DOESN'T.



Was it only the last issue where we looked at the BenQ W11000 Ultra High Definition projector? You will recall that this managed to do full UHD resolution at a relatively low price, way under that of any UHD front projector alternatives. Not that there are many of them.

Now BenQ has introduced the X12000 Ultra High Definition projector. Costing \$2,000 more, what might it give you that the W11000 doesn't?

WHAT IT IS

At first glance, it's hard to see any difference at all. Physically, they look identical apart from model numbers. They have the same connections, the same lens arrangements, the same bodies with the same dimensions, the same rear-to-front straight-through air cooling path.

Where they differ is the light source. The BenQ W11000 uses a conventional Ultra High Pressure lamp rated to last several thousand hours. The BenQ X12000 uses a new LED lamp solution from Philips, called ColorSpark HLD LEDs. I shall return to what that is soon, but it does have a couple of practical implications.

First, the projector has a much, much longer lamp life. You can look forward to never replacing the lamp since by the time its brightness reduces to a degree prompting a replacement, so many years will have passed that you'll be wanting a new projector ... assuming we're even still using such technology then.

Second, the projector could potentially be instant on and instant off since the lamp requires no warm up time. In practice, the projector electronics aren't instant on.

When you switch the unit on they have to boot up. I timed the projector as taking around 14 seconds before switching on its internal fan, and 31 seconds in total before switching on the lamp.

But once switched on, it was instantly at full brightness and retained a steady intensity without ramping up over time.

The projector has a 1.5:1 zoom lens with 14 elements along with vertical and horizontal lens shift. A 100" screen the projector must be placed at a distance between 3m and 4.5m from the screen. The projector also supports output aspect ratios to work with anamorphic lenses for those who like constant image height widescreen.

The only analogue input is a D-SUB15 PC-style. There are two HDMI inputs, one of which supports full HD signals while the other is suitable for UltraHD, including UltraHD Blu-ray since it supports the HDCP 2.2 copy protection standard.

What aren't supported are High Dynamic Range (HDR) signals and, apparently, Wide Colour Gamut signals. Your UltraHD Player will recognise this and provide a standard dynamic range signal.

The light source is the special thing here. It uses long-lasting and super bright LEDs. The problem with LEDs has been that it's difficult to make green ones of sufficient brightness. Well, you can, but only bundling several of them together, whereupon they have too much surface area to make a good controllable light source.

That's where the Philips ColorSpark HLD LED comes in. Standard high output red and blue LEDs are used for those colour components, and a newly developed rod containing a specially chosen phosphor generates the green. Blue LEDs are

attached to the side of the rod and it's their light which stimulates the phosphor to glow. In a sense, the rod is converting blue light to green. The green light emerges from the end of the rod, in sufficiently small area to be effective as a light source in a DLP projector.

Flicking through the menus I found that there's still a lamp timer display. In fact, the menu system is only different from that of the W11000 in details specific to their operation. The timer display showed the time in 'Normal Mode' and 'Economic Mode', along with an 'Equivalent Lamp Hour' total, which turned out to be the two numbers added together. BenQ's lamp-based projectors use a formula that

SPECIFICATIONS

Display technology:	1 x 2,716 by 1,528 pixel Digital Micromirror Device (size not stated) 3,840 x 2,160 pixel output resolution
Lamp:	Philips ColorSpark HLD LEDs
Lamp life:	20,000 hours
Brightness:	2,200 ANSI lumens
Contrast ratio:	50,000:1
Inputs:	2 x HDMI (1 with Ultra High Definition support) 1 x D-SUB15
Other:	1 x RS-232C 1 x USB 2 x 12V trigger Ethernet 1 x IR In
Dimensions:	471 x 225 x 565mm
Weight:	18.5kg

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takes into account the longer lamp life provided by 'Economic Mode'.

It's unclear whether the lamp life is extended. The manual says it is, but explains that the same factor is used for both modes to calculate 'Equivalent Lamp Life'.

You can set the lamp mode in the 'Advanced' section of the picture menu. 'Economic' reduces brightness noticeably, as well as power consumption and cooling fan speed.

XPR – A RECAP

I went into, in perhaps exhaustive detail, BenQ's process for creating an UltraHD image from a less than UltraHD digital micro-mirror device when I reviewed the W11000. So I'll just give a thumbnail sketch here.

The trick is to take the 2,716 by 1,528 pixels of the digital micromirror device used in this projector and produce 3,840 by 2,160 pixels output. I was able to confirm that it truly does this – I checked again with this projector. To be certain I used my test pattern in which, in sections of the screen, white lines alternate with coloured ones or black ones. In each case, the widths of the lines are one pixel at UHD resolutions.

On this projector each line was clearly reproduced about as clearly as it was with the W11000. Which means, not quite as clearly as with a UHD TV in which each output pixel is produced by a physical display pixel, but nonetheless with clear discrimination of each pixel.

The trick is Texas Instruments' technology called XPR for 'eXpanded Pixel Resolution'. What this does is shift pixels diagonally using an 'optical actuator'. This is much better than the usual pixel shifting technology because the projector starts with double the native resolution in its Digital Micro-mirror Device – 4.15MP rather than 2.07MP. That's slightly more than half of the 8.29MP of UHD. Smaller pixels permit greater detail.

Also, since DLP projectors switch their pixels on and off much faster than competing technologies the positions of the pixels can be more precisely controlled.

WATCHING

The projector has a problem with 50Hz content – such as most Australian DVDs (on a small minority of Australian Blu-ray discs) and all free to air content. Clearly with the pixel shifting a lot of fine tuning has taken place with the timing of the whole system. Nothing is left over for adjusting to the timing of the source material.

So 50Hz content is converted by the projector to 60Hz. That means repeating every fifth frame. That in turn creates visible jumps during what are supposed to be smooth pans.

I remarked on that with the W11000 as well, but what I didn't quite understand then was that this also applies to 24 frame per second material. The projector runs at 60fps and that's all there is to it. So 24fps content – virtually all Blu-ray and UltraHD Blu-ray content – is converted to 60fps. That's done by taking one frame and showing it twice, then showing the next frame three times, the one after twice, and so on. 12 times three plus 12 times two equals 60.

Forget about regular judder from material with poor cinematography (ie, the jumping from overly sharp frame to overly sharp frame), due to this 2-3-2-3 cadence the projector introduces judder on material that should be silky smooth. At the start of Chapter 8 of *The Martian* on UltraHD Blu-ray the Earth is shown rising up through the frame against the black of space, and it does so going chunk, chunk, chunk. Immediately following that is a horizontal pan across white crosses against a green field at a funeral. Chunk, chunk, chunk, 12 times a second.

Of course, there is no frame interpolation motion smoothing either.

While complaining, I shall note that there appeared to be more rainbow effect than I have seen from a BenQ projector for years. This was mostly confined, though, to test patterns and not obvious in movies. Finally, while the black levels were better than one usually experiences in a cinema, they seemed to fall well short of state of the art in home cinema.

Yet, yet, yet. I'd be very tempted indeed to ignore those issues because the

other side of things are this projector's strengths. Almost unbelievably glorious colour and sharpness in the image that has to be beheld to be fully understood.

When I try to bring it down to facts and figures, it's hard to explain. There's nothing really that's measurable with instruments I have to hand. There aren't details in the image clearly visible that would be absent with a full HD front projector.

But what there is an overall sense of higher clarity, as though a subtle, almost invisible layer of the sheerest of fabrics has been removed from the picture. You can't really see jaggies or other resolution limitations with full HD, but they do seem to be lurking there just under the surface, just below a put-your-finger-on-it level of identification, while still working to reduce the reality of the image.

Even though the projector apparently does not support Wide Colour Gamut in the signal, it does cover 95% of the colour space of the DCI-P3 used in digital cinematography. It has a DCI-P3 picture mode with attempts to replicate that colour space. That involves the projector trying to work out what colours to map to the new space and, well, as usual with these things, it's probably not something that should be done.

To be sure, it produces a rich and bold result, but the red of the Red Planet was far richer than it had appeared at the cinema when I saw *The Martian* there, and it carried through to some extent to Jeff Daniel's face. He wasn't red, but more hyper-real rather than natural. In the end, after enjoying the boldness of this picture mode for a while, I went back to the 'Cinema' setting for the extremely natural picture it produced.

CONCLUSION

So the BenQ X12000 has some amazing strengths and an excellent price. But some weaknesses as well. But in the end, when it comes to affordable UltraHD on the big screen, it and the X12000 are the only games in town. So far.

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*The BenQ
X12000 has
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strengths and an
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