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What is E-paper Technology in Amazon\xe2\x80\x99s Kindle?

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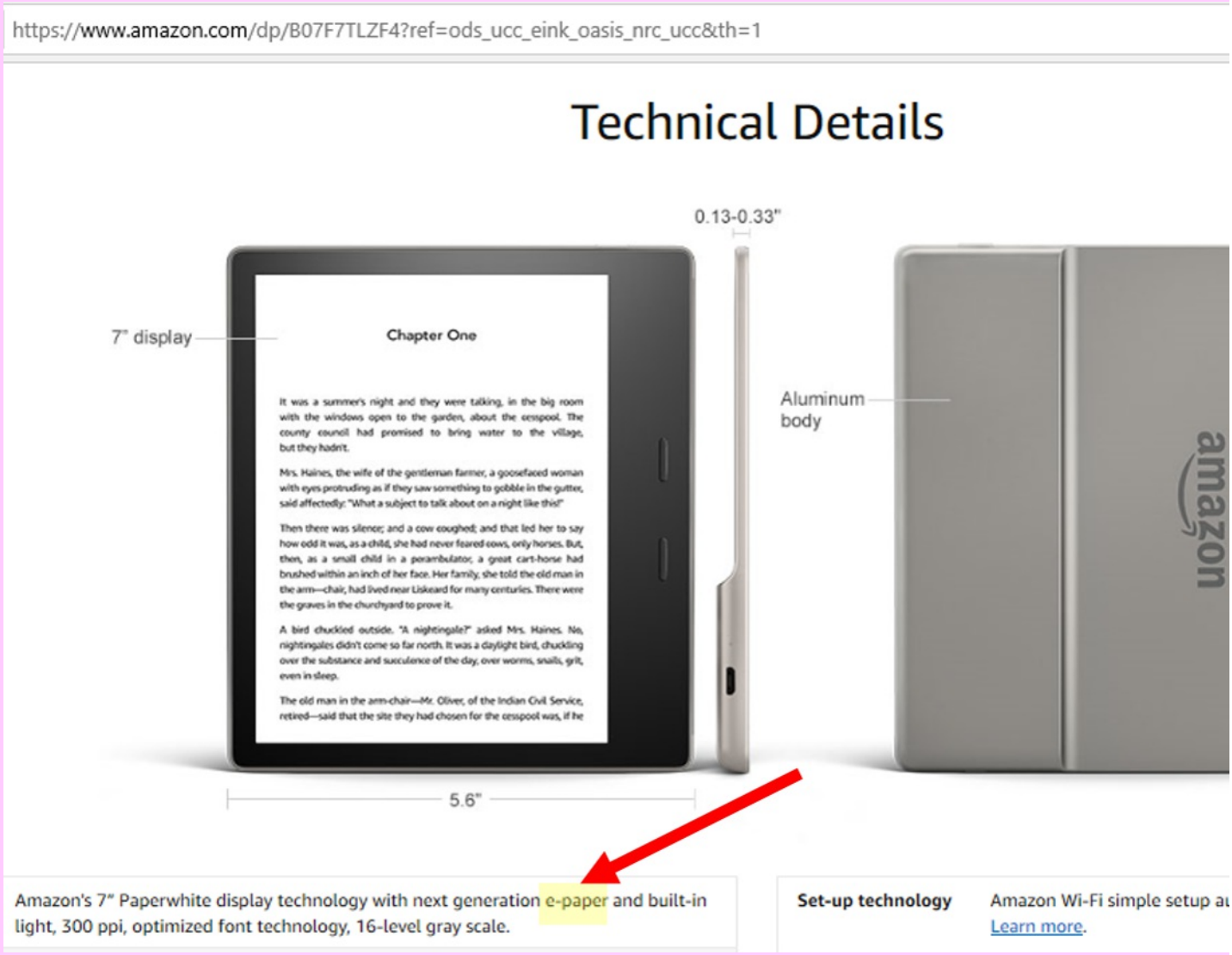
Amazon is one of the most famous IT companies in the world. It had launched a product called Kindle (2007), aimed at book lovers who could now read several books with new technology. **E-paper** or Electronic paper, aka Electronic Ink Display (EID), is the representation of ink on paper with the use of technology. Unlike other similar technologies that use back-light, E-paper follows the principle of reflection of light.\xc2\xa0



History

Gyricon was the first kind of E-paper and was developed by Xerox. Gyricon uses polyethylene spheres of 2 colors, black and white. The black part is negatively charged while the white part is positively charged. The application of voltage decides which color is visible to us. These spheres are suspended in oil so they can rotate freely when voltage is applied and placed in a transparent silicone sheet.\xc2\xa0

E-paper technologies are several such as *Gyricon, Electrophoretic Displays, Electrowetting displays, Electrofluidic display, Mirasol*, etc. Here, we would be talking only about the technology used in Amazon Kindle, i.e. Electrophoretic Displays.\xc2\xa0

Electrophoretic Displays

In Electrophoretic Displays, titanium oxide particles are placed in oil which is mixed with blue-black colored dye. When a negative voltage is applied, the particles move away from the viewer and are hidden behind the dye, which results in the viewer seeing the color of the dye. A positive voltage on the other hand makes light scattering particles move towards the viewer and he can see the color scattered by the light.\xc2\xa0

Advantages

1. We can view E-paper in sunlight as well as in normal light (same readability as paper).
2. High resolution and high contrast are seen in E-paper.
3. It has a wide viewing angle of 180 degrees, we can view the screen with ease from any position (unlike LCD which is better viewed only from the center front).
4. E-paper is very thin and flexible.
5. It has very minimal power consumption (4 hours charge of Kindle can last up to 4 weeks).
6. It has a reflective display, so no need for a backlight.
7. They do not strain the users\xe2\x80\x99 eyes.
8. It is more suited to e-learners due to lower power drainage.

Disadvantages

1. It has a low refresh rate. It cannot be used in products with high user interaction.
2. It has a ghosting effect, the images may be refreshed but their shadow may still be visible.
3. There is a lot of competition in the market. Other technologies have become industry standards and inventions in those, have also addressed the power drainage issue.
4. This works just like a normal book, hence, it becomes very difficult to read it in the dark.
5. Some sort of room lighting is always needed to read (it is unreadable in the dark).

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