# “Radon” proposal



Document number RAD270012

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Fall 2006

**Table of contents**

## Abstract

This proposal aims to justify an investment of $110 million in our video game division towards the development of a handheld portable video game device, code-named "Radon". The new device will run proprietary game discs. Radon will also be able to link up with our current console, the Xbox 360, to download original Xbox games directly to itself for a small fee (micro transactions). This proposal provides the economic breakdown of the intended investment, as well as a brief technological overview of the project.


## Technology

Microsoft is currently an active player in the seventh-generation console wars with our product, the Xbox 360. We are at this time interested in allowing the gamer to take this experience on the road with a new portable device, code-named "Radon". An early mock-up of Radon is shown below (final design subject to change):


**Figure 1 - Mock-up**

With current advances in graphics processors and ultra-low voltage cores, it is possible to “emulate” original Xbox games on a portable device. To ease this transition, Radon is completely compatible with the Xbox 360, which enables Radon users to download Xbox games for a small fee through a proven micro transaction system. Additionally, after studying the market response, an external drive that will interface with Radon and allow the users to play original Xbox discs is planned for release. However, given the size of the drive, portability will be reduced somewhat.

Following the trend of our Zune audio player, Radon will have wireless connectivity to wi-fi hotspots, as well as to other Radon devices for multiplayer gaming and data transfer. There will, of course, be ample security offered by digital rights management (DRM) to alleviate the fears of content protectors. Multiplayer gaming will be limited to 16 players in the immediate vicinity, and will be achieved using Adhoc piggyback-networking based on the IEEE 802.11b networking. Understandably, the critically acclaimed Xbox Live matchmaking will not be implemented, instead being substituted by in-network play. The data sharing involves DRM-protected movies, as well as music. Both these items will have play restrictions and expiry control to provide content providers with maximum flexibility and protection.

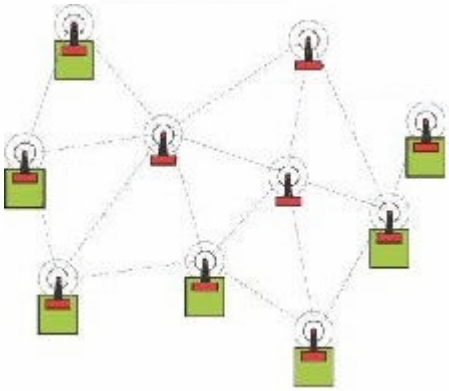

**Figure 2 - Adhoc networking**

**Setup costs**

Here is a chart showing the breakdown of the setup costs, and a detailed justification of them.

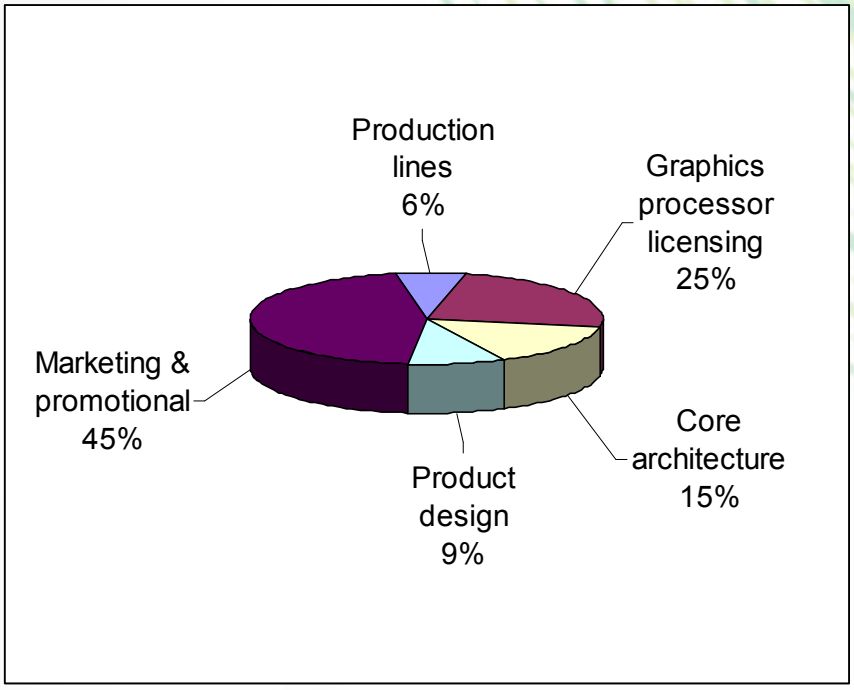


**Figure 3 - Setup cost breakdown chart**

| Type of cost | Amount (in millions of $) |
|---|---|
| Production lines | 7 |
| Graphics processor licensing (ATI) | 27 |
| Core architecture (in-house) | 16 |
| Product design / feature integration | 10 |
| Marketing / promotional | 50 |

*Production lines*: We are going to use our existing Zune production lines to manufacture Radon. Because this infrastructure already exists, it would only cost $7 million to repurpose the production lines to accommodate production of the Radon.

*Graphics processor*: It is common knowledge that the original Xbox was powered by a licensed ATI graphics processor. In order to effortlessly play the same games on Radon, it will be necessary to once again license the graphics technology from ATI. After extensive negotiation, ATI have settled for $27 million to utilize their technology for a ten year product cycle.

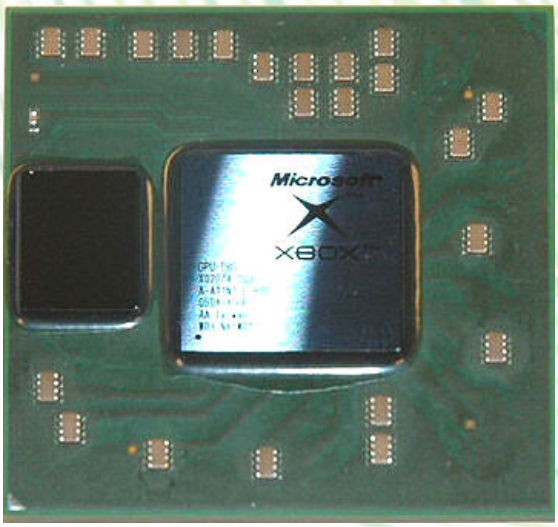

**Figure 4 - ATI's graphics processor in the Xbox 360**

*Core architecture*: We created our own processor for the Xbox 360, and with this new expertise at hand, we can do away with the Intel Mobile Celeron required for the original Xbox, and instead develop a much faster, better processor for Radon at a cost of $16 million. Additionally, because the technology is developed in-house, we need to pay no royalties or licensing fees.

*Product design*: The Xbox 360 had an amazing, intuitive user interface, as well as an easy-to-use product design. Having the same core design team design Radon ensures that the same great quality of the Xbox brand will come to Radon. Additionally, the team will have to hammer down wireless connectivity and file sharing issues that are prevalent in the Zune. Cost: $10 million.

*Marketing*: Going up against the market leaders (Sony and Nintendo) is not going to be easy. Sony's PSP has a 7% market share, while Nintendo's DS has over 90%. However, Sony's product is so flawed that it should be easy to attract their users. Taking on Nintendo is a completely different story, and this is why 45% of our initial expenditure goes towards creating a brand name that will be easily identifiable. Using a combination

of media adverts and viral campaigning will go a long way towards having our target demographic (the 18-34 year old male) remember us. Cost: $50 million initially. $10 million every year throughout product cycle.

**Product life cycle**

We estimate a 9 year product cycle. Unfortunately, our product will not be profitable for the first two years, because the cost of manufacturing the product is more than the price we will enter the market at. This is required to ensure market penetration, and to remain competitive. Once the product does start to become profitable (and this will happen due to the falling prices of our core components), it is advisable to pass on some of these savings to the customer, in order to remain competitive. The perceived salvage value of the production plant is $22 million (towards our next generation product).

This following chart shows the expected costs of manufacturing Radon.

| Year | # of units sold | Cost price / unit | Selling price / unit | Profit / unit | Inflow | Outflow | Net flow |
|---|---|---|---|---|---|---|---|
| 0 | 0 | $0 | $0 | $0 | $0 | $110,000,000 | -$110,000,000 |
| 1 | 8,000,000 | $569 | $499 | -$70 | $3,992,000,000 | $4,562,000,000 | -$570,000,000 |
| 2 | 10,000,000 | $529 | $499 | -$30 | $4,990,000,000 | $5,300,000,000 | -$310,000,000 |
| 3 | 12,000,000 | $489 | $499 | $10 | $5,988,000,000 | $5,878,000,000 | $110,000,000 |
| 4 | 13,000,000 | $429 | $479 | $50 | $6,227,000,000 | $5,587,000,000 | $640,000,000 |
| 5 | 13,000,000 | $379 | $449 | $70 | $5,837,000,000 | $4,937,000,000 | $900,000,000 |
| 6 | 15,000,000 | $349 | $449 | $100 | $6,735,000,000 | $5,245,000,000 | $1,490,000,000 |
| 7 | 12,000,000 | $299 | $399 | $100 | $4,788,000,000 | $3,598,000,000 | $1,190,000,000 |
| 8 | 9,000,000 | $249 | $349 | $100 | $3,141,000,000 | $2,251,000,000 | $890,000,000 |
| 9 | 6,000,000 | $199 | $299 | $100 | $1,794,000,000 | $1,204,000,000 | $590,000,000 |
| 10 | 0 | $0 | $0 | $0 | $22,000,000 | $0 | $22,000,000 |

## Return on investment

Our $110 million initial investment, coupled with our losses during years one and two means that Radon will not profit our company until year 5. However, everything beyond year 5 is nearly completely profit (we must not neglect factoring in taxes of $5 million per year, plant maintenance costs of $1 million a year, and marketing costs of $4 million a year).

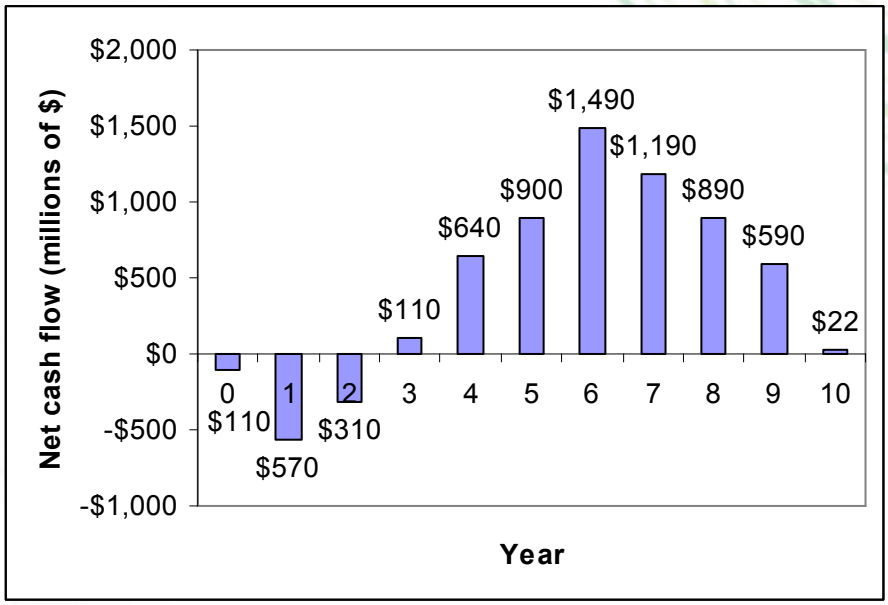


**Figure 5 - Project net cash flow diagram**

Present worth of cash inflows (in millions) at i% interest =

```
0*(P/F, i%, 0) + 3992*(P/F, i%, 1) + 4900*(P/F, i%, 2) +
5988*(P/F, i%, 3) + 6227*(P/F, i%, 4) + 5837*(P/F, i%, 5) +
6735*(P/F, i%, 6) + 4788*(P/F, i%, 7) + 3141*(P/F, i%, 8) +
1794*(P/F, i%, 9) + 22*(P/F, i%, 10)
```

Present worth of cash outflows (in millions) at i% interest =

```
110*(P/F, i%, 0) + 4562*(P/F, i%, 1) + 5300*(P/F, i%, 2) +
5878*(P/F, i%, 3) + 5587*(P/F, i%, 4) + 4937*(P/F, i%, 5) +
5245*(P/F, i%, 6) + 3598*(P/F, i%, 7) + 2251*(P/F, i%, 8) +
1204*(P/F, i%, 9)
```

Setting PW (inflows) = PW (outflows) and solving for i% yields a ***42% return on investment.***

**Payback period**

Utilizing conventional payback period, it can be seen from the net cash flow diagram that at the end of year 4, an amount of $240 million from our investment has still not been recovered. However, in year 5, we generate a profit of $900 million. Therefore, we would recover our remaining $240 million in approximately 4 months into year 5. ***The total conventional payback period is then 4 years and 4 months***.

**Present worth**

The net present worth of this project, at our established minimum attractive rate of return (MARR) of 18% can be calculated from the net cash flow diagram to be =

```
-110*(P/F, 18%, 0) - 570*(P/F, 18%, 1) - 310*(P/F, 18%, 2) +
110*(P/F, 18%, 3) + 640*(P/F, 18%, 4) + 900*(P/F, 18%, 5) +
1490*(P/F, 18%, 6) + 1190*(P/F, 18%, 7) + 890*(P/F, 18%, 8) +
590*(P/F, 18%, 9) + 22*(P/F, 18%, 10)
```

***Net Present Worth = $1274.27 million***

## Future worth

On the other hand, the future worth of this project at the end of its life (10 years) will be

**= Present Worth * (F/P, MARR, Lifespan) = 1274.27*(F/P, 18%, 10)**

***Net Future Worth in 10 years = $6669.34 million***

## Summary

The handheld gaming market is a several billion dollar market – one that we must take advantage of. While our competitors have a startling grasp on the market, it is not an impossible feat to make a dent in the market; we did it with the original Xbox, and we can certainly utilize the hard-earned lessons from that endeavor. Once this project gets under way, talks with internal software studios (Rare, and Bungie), as well as third-party publishers (EA, Activision, Atari) can begin. Eventually, our target demographic can be extended to 6-60, similar to what the Nintendo DS has.

From the information presented in this proposal, it is clear that the management must not delay our entry into this lucrative market. A successful entry into this market means that we will be able to take over a significant chunk of market share in the *next* generation.

## References


Figure 1 - Microsoft Handheld IPod Killer Planned. UtahSaint. 25 Nov. 2006

http://www.utahsaint.com/technology/115

Figure 2 - Wireless Ad Hoc Network Security Protocols & Architectures. Queens University Belfast, ECIT. 25 Nov. 2006

http://www.ecit.qub.ac.uk/Research/System-on-ChipSoC/HighPerformanceSoCArchitectures/WirelessAdHocNetworkSecurityProtocolsArchitectures/

Figure 4 - Xenos. Wikipedia. 25 Nov. 2006 http://en.wikipedia.org/wiki/Xenos