The PHINIX+ System Architecture Documentation
Volume 0: Foreword

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https://discord.gg/EFKDF3VE9C

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1 About the Documentation

This volume discusses the nature of the documentation itself, the scope and aim of the PHINIX+ project, and about the author as an individual and their motives. As a result, the use of the first person in the following chapters is unavoidable. The formal specification begins at Volume 1 if such details are irrelevant for the reader.

The purpose of the documentation is to describe with maximum possible detail all the features of the PHINIX+ system. It therefore tries to conform to the typical requirements expected from technical documentation. The most important details to be transparent about regarding the documents themselves are thus the decisions about the look of the documents (styling) and about the licensing around the documents.

1.1 Styling Decisions

This documentation was written using the "Typst" typesetting program. If the source code of the used template is not available or the reader is not aware of Typst's syntax, the decisions made regarding styling are hereby given:

- Pages are A4 sized with 25mm of vertical and 20mm of horizontal margins.
- For the bulk of the text, the serif font "IBM Plex Serif" was used.
- For the headings and for the title, the sans serif font "IBM Plex Sans" was used.
- For the code blocks the Nerd Fonts variant of the monospace font "Inconsolata" was used.
- Internal links (references) are in blue color with the exception of the contents page and footnotes.
- External links (hyperlinks) are underlined and in blue color (as shown above).

In addition, the hereby given names for the varying-sized collections of text have been adopted:

- **Documentation** refers to the sum of the documents of the work.
- **Volume** refers to an individual, specific document of the work.
- **Chapter** refers to a collection of text under a first-level heading within a volume.
- **Section** refers to a collection of text under a second-level heading within a chapter.
- **Subsection** refers to a collection of text under a third-level heading within a section.

1.2 Licensing Decisions

2 About the Author

This section talks about me, the author and individual who's behind the majority of the work behind PHINIX+. This section will come off as the most informal due to its nature but I believe knowing the person behind it all might provide additional context. I will try to lay out my past as it relates to the project and my aspirations for the future.

2.1 On Hardware Engineering

I knew my passion was computer engineering since high school. Since then I have been researching about the inner workings of computers and their operating principles. Even though I am in the process of attending a computer engineering course at a polytechnic university, most of my knowledge had been acquired before university. In other words, as I am writing this, I do not currently possess any formal experience or certification on the topic, and instead am self-taught.

2.1.1 Sources of Info and Inspiration

Most of my knowledge about the topic has been acquired from online sources, mostly Wikipedia and YouTube, and from direct assistance and guidance from people I met online, mostly on Discord. I would like to use this opportunity to point out a few of the exceptional people that have directly or indirectly helped me progress in this field:

- **Ben Eater**: The original homebrew computing youtuber. His series on building a CPU on breadboards was the catalyst that got me interested in the first place almost 10 years ago. He has since moved on to other interesting topics in the field.
- **James Sharman**: His advanced homebrew computer series captured the imagination of many, myself included. His design explores more complex topics in the field, such as pipelining and bus timings, as well as portrays the immense software development effort that follows a completed build.
- **Open Redstone Engineers**: It might seem silly at first, but a Minecraft community of all places, ORE, has been the single most important gateway to people whose contributions to my journey cannot be understated. I joined this community about the same time as Ben Eater was creating his breadboard computer series.
- **Clamentos**: A member of ORE, he was the person that took time out of his days to explain to a stranger on the internet, me, the principles behind and operation of pipelining, cache memory and branch prediction better than any professor at my university could.
- **LordDecapo**: A member of ORE, he recognized the potential in me and taught me how to program in SystemVerilog, thus allowing me to escape the virtual realm of Minecraft's simulated wiring system. Later, as per his suggestion, I bought the very DE0 Nano FPGA development board that will ultimately be used to host PHINIX+.

2.2 On Typesetting

Typesetting is also an activity which I have had to teach myself. Even though my university did provide a lesson on technical document writing, it was not as useful as one would hope. Regardless, I was already trying to learn myself before I even took that lesson. And as per my choice of the typesetting program, I chose Typst simply because it was the easiest one for me to get into while providing a wide range of features and an expansive, complete syntax. I did look into LaTeX but I quickly got overwhelmed and decided to not use it.

Since I am not confident in my writing abilities, I'd like to point out that if you would like to suggest something regarding the documents, don't hesitate to reach out on our Discord server or make a pull request on the documentation's GitHub repository.