Software/Hardware Requirements Specification

for

Retro Pi Gaming

Version 1.0 approved

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Table of Contents

Revision History

Name	Date	Reason For Changes	Version

1. Introduction

1.1 Purpose

This specification covers the details related the Retro Pi Gaming (R.P.G). This release of the R.P.G relates to version 1.0. Within the specification, the features of the R.P.G such as the hardware and software are covered throughout this specification.

An overview of the hardware covered in this documentation will describe the Raspberry Pi 3+ b. It details why the Raspberry Pi 3 +b is important to the R.P.G. The methods of customization that the R.P.G can implement through the use of accessories. As well as the use of the USB controllers and keyboard that are included with the R.P.G console.

Software introduced in this functional specification describes the use of the RetroPi OS. The role that RetroPi OS plays in recreating older consoles which the R.P.G can mimic. The flexibility of the RetroPi OS that allows a greater customization of the console.

1.2 Document Conventions

N/A

1.3 Intended Audience and Reading Suggestions

N/A

1.4 Product Scope

The Retro Pi Gaming system is a video game console geared for playing classic style video games like the original Super Mario Bros. Our product boasts open-sourced software that our customers can use and build on to create their own modifications. They can also easily download new games onto the console since our console uses SD cards instead of game cartridges. In the first generation, the console's hardware is semi-modular. This means that users can add more storage or change cases to suit their tastes.

The customizable features of our product align with our business plan to target the early adopters market. In the current scope, we aim to release a product that is perfect for people who enjoy tinkering as well as classic video games. This version 1.0 release focuses on implementing the following features.

- Customizable hardware and software
    - Expandable storage
    - Easy to change cases
    - Open-source code

- Easy to learn
    - Obvious ways to change parts (engineers tend to be kinesthetic/visual learners)
        - Hardware parts that snap in place for kinesthetic learners
        - Visual icons for where things connect for visual learners
        - Manuals and documentation for reading/write learners
    - The product **does not** have to be tinkered with to have the full experience
        - Will function as a classic video game console with modern hardware right out of the box
        - Comes with 4500 titles installed on the storage card
- Supports old school style game features
    - 8-bit graphics will run smoothly on our graphics chips
    - A relatively large amount of RAM(random access memory) will allow developers to recreate classic games and add more game mechanics without being limited to 640k like before

1.5 References

N/A

2. Overall Description

2.1 Product Perspective

The R.P.G console offers a new take to the current selection of classic video gaming consoles. Most classic consoles sold at stores come with a limited selection of games to choose from, and only one retro console type.The release of R.P.G version 1.0 comes with 4,500 games

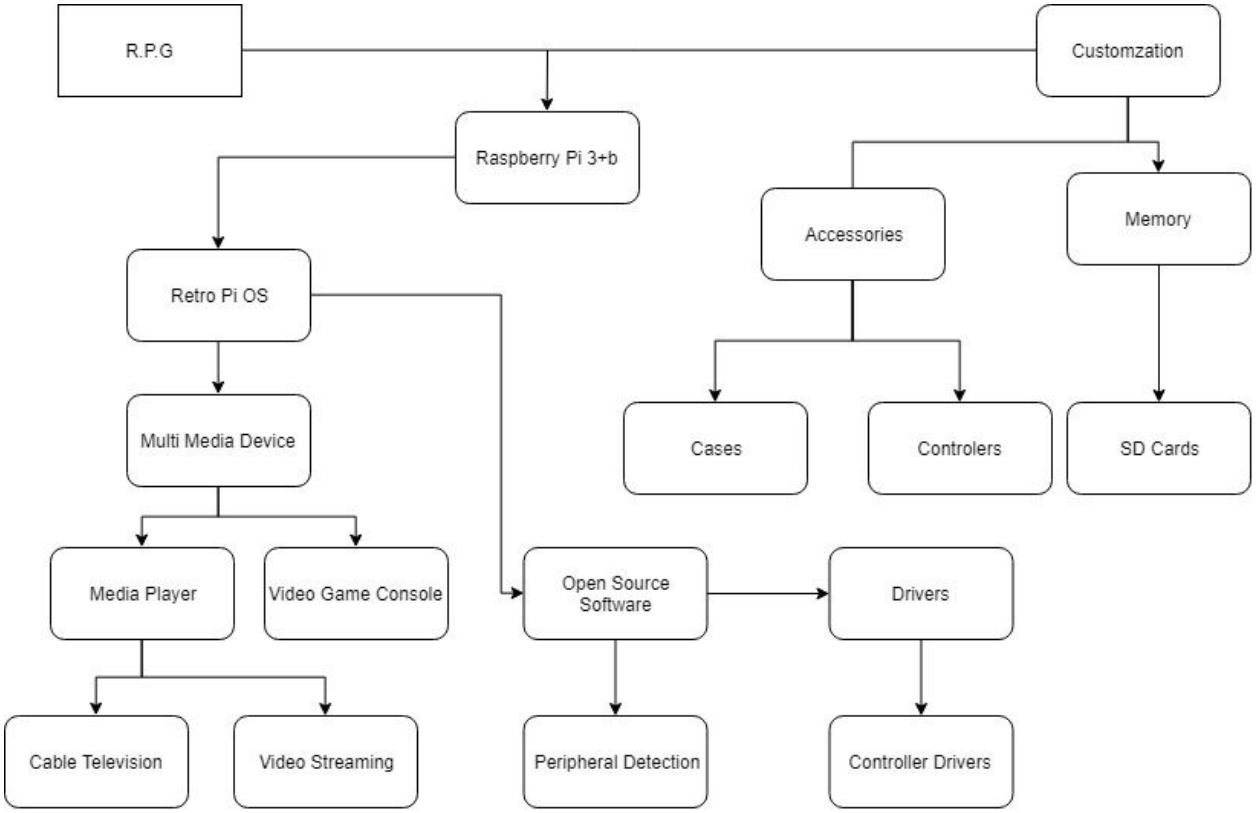
pre-installed from different classic consoles such as SNES, NES, and PS1. There's no other video game console for sale, that gives the user such a diverse selection of games. The game's output transfers to a TV by using an hdmi cord, which allows for easy playability of console to be without much setup.

R.P.G is also an open source project, which allows tech savvy users to customize their own console however they want. This is done by using SSH, which will allow you access into your R.P.G console. The operating system for R.P.G is RetroPie, which is based in linux. Since the OS is linux based, this makes editing files and installing outside packages to your console very easy. All customization is done wirelessly on a computer, while your R.P.G console only has to be turned on.

The cost of hardware to assemble the console is cheap, which allows the R.P.G console to be sold at a reasonable price. This allows consumers who are on a budget looking to get the most for their dollar. Making the R.P.G the best option to play all their childhood games without having to buy multiple old consoles and games.

2.2 Product Functions

- All in one classic video gaming console
- Media Player
- Simple to use (Plug and Play)
- Customizable for tech savvy users



2.3 User Classes and Characteristics

David Faust

David is a 38 year old, proud father of two who works as a software engineer at Sony but also enjoys tinkering with small Internet of Things projects. He grew up in Los Gatos, California

playing classic video games on his SNES(Super Nintendo Entertainment System) and at local arcade. Sometimes, he still visits old school arcades scattered around the Silicon Valley with his friends. In his free time, he contributes to open source projects on GitHub and likes to watch movies and video game competitions with his son and daughter.

He is not worried about his kids playing video games but he wants them to be able to learn practical skills from it. Trendy STEM toys are usually too expensive or focused on younger kids. Andrea is 11 years old and is getting ready for high school while Steven is 10 years old and is in his gaming phase. David believes that his kids would be interested in technology and engineering since they're already obsessed with their devices.

On Saturday mornings, David will usually start his day at 9 AM by playing with a small side project that he's been working on while drinking some coffee. He is usually able to get a new feature working after an hour or two. Just in time for when his kids wake up and come downstairs for breakfast. Andrea and Steven see their dad's toy project and excitedly ask him about the new feature while putting food on their plate. David happily tells them about it and lets them play with it, however, after they finish eating, they leave to play games or watch shows.

Erin Knudson

Erin is a 22 year old, full time college student, who is majoring in computer science. She attends the University of Riverside, and lives in an apartment close to campus. To avoid paying for a parking permit, Erin bikes to class and around town to save on money. She also enjoys having fun with her roommates and friends on a budget. On the weekends Erin sends most of her time hanging out with her boyfriend Pete. They mostly go to the local bowling alley to play classic arcade games such as Space Invaders.

Erin wakes up, runs downstairs to have her morning coffee before heading to class. She sits at the dinner table checking her phone for news, since their is no cable in her apartment. After finishing her morning routine, she bikes down to campus where she'll be there from 9am - 4pm. The majority of time spent on campus is spent in class or studying in the library to maintain her good grades. Erin is exhausted after a full day of school and biking back home, after her last class.

Once home the last thing Erin wants to think about is school. She begins to prepare dinner with her roommates, while sharing a few beers. After dinner Erin and her roommates enjoy watching tv together however they've started to want to watch other content that Netflix

doesn't provide, but Netflix is a cheap alternative for cable. After watching a few shows Erin goes up to her room, where she prepares for bed, until her boyfriend calls. After her phone call she sets her alarm for 8am tomorrow morning.

Robert Rodriguez

Robert Rodriguez is a 54-year-old, high-school graduate who became an O&M (Operations and Maintenance) Technician for the Metropolitan Water District of Southern California (MWD). Robert has spent his life living in southern California. Spending his childhood with the neighborhood kids, playing video games occasionally since his family was couldn't afford game consoles. He's a father of three daughters, 29-year-old Janet, 22-year-old Maydeli, and 17-year-old Amalia. As well as a grandfather to Janet's two children, 5-year-old Enrique, and 3-year old Sebastián.

Robert spends most of time working during the weekdays. During his time off, he spends his time doing chores around the house with his wife Rosa Rodriguez. Robert is handy when it comes to doing manual labor, but has trouble adapting new technology. Having infected the home computer with viruses, unable to navigate the options on his smartphone, and constantly sets off his home's newly installed security system.

Robert sees his grandchildren very often. However, he has trouble interacting with Enrique and Sebastián. As they have gotten older, they have started to use devices like tablets and smartphones. The time Robert spends with his grandchildren becomes difficult since he has difficulties interacting with these types of devices.

2.4 Operating Environment

N/A

2.5 Design and Implementation Constraints

N/A

2.6 User Documentation

N/A

2.7 Assumptions and Dependencies

N/A

3. External Interface Requirements

3.1 User Interfaces

N/A

3.2 Hardware Interfaces

N/A

3.3 Software or Hardware Interfaces

N/A

3.4 Communications Interfaces

N/A

4. System Features

Function Scale 1-5; 1 = highest priority

4.1 Power Switch

4.1.1 Description and Priority

4.1.1 Description

Priority: 1

What:
Long black micro sd power cord, that has a two prong outlet. The cord also has one switch that that can be turned in two positions “on” and “off”. Any microSD cable will be able to power the Retro Pi, however.

Why:
Easy to use design made from mass produced parts. Only two options gives the Robert the the impression that R.P.G is easy to use console. Micro sd power cords can be bought in bulk at a discounted price.

How:
The micro sd power cord is connected to the console and the wall. Next Erin toggles the switch into the on position and waits for the console to load. The R.P.G console logo appears.

What Could Go Wrong?

Power cord could cause excess heat to the system if David increases the power voltage intake to the console. This could cause a the motherboard of R.P.G to be destroyed, or the power cord to overheat. Heat sinks that are to be included in all of our consoles to prevent overheating. Extra power cords and fan options for console cases are also available for sale.

4.1.2 Stimulus/Response Sequences

Action	Result
Robert presses the textured side of the switch (“on” side)	The system begins to power on and initiates the **System Start** (see 4.3) feature
Robert presses the smooth side of the switch (“”off” side)	The system begins to power of and initiates the **System Shutdown** (see 4.4) feature

4.1.3 Functional Requirements

REQ-1: It is necessary for the power cord to be connected to a power source.
REQ-2: The console should project a green led light when the console it’s on.
REQ-3: The button should click when flipped into either the “on” or “off” state.

4.2 USB Input

4.2.1 Description and Priority

Priority: 1

What:

A set of two side-by-side universal serial bus(USB) input ports that are located on the outside face of the device. USB 2.0 and USB 3.0 devices are able to be plugged into the port and Robert should feel a tactile click feedback when the plug is fully connected. The top of the ports should also have an icon that says USB or has the USB icon for clarity.

Why:
This is the main way that controllers can be connected to the system. We want to implement some kind of tactile feedback so Robert knows if he's successful in connecting the device. The icon above the ports serve to prevent confusion and provide direction to Robert.

How:
Robert wants to connect his USB controller to the console. He sees the USB icon above the port and plugs in the the controller. He feels the click and knows that the controller is fully connected.

What Could Go Wrong?
USB input could be swapped due to software error. Robert might plug in an incompatible device(micro-usb, usb-c, etc.). If this occurs, the Retro Pi should notify Robert via a notification to the display that the device inserted is invaild.

4.2.2 Stimulus/Response Sequences

Action	Result
Robert plugs in a USB controller	RPG console reads the input from the new device. The software and games on the console now can detect the input coming from the controller and can respond to all the buttons and sticks.
Robert plugs in an incompatible input device.	The device does not connect with the port and does not return the tactile feedback.
Robert plugs in a USB cable to the front of the console but is trying to charge it.	The console will divert the electrical current being received from the USB port and the screen will display an error message. "This is not a charging port"

4.2.3 Requirements

REQ-1: It is necessary for the system to be powered on.
REQ-2: It is necessary for the port to be connected to a proper USB device.
REQ-3: It can not be a charging cable.
REQ-4: The port should use a blue LED so that Robert knows that the device is plugged in.
REQ-5: The system needs to be able to read input from a USB enabled controller.

4.3 System Start

4.3.1 Description and Priority

Priority:1

What:
A series of executions that starts the Retro Pi Operating System. Allows for BIOS files to be loaded during boot.

Why:
This allows the system to begin any necessary processes and obtain any necessary files that will bring the system into the main menu.

How:
Robert presses the **Power Switch** (see 4.1) to start the system. While the system begins to power on, and the system boots, Robert does not have to worry about initializing the system.

What Could Go Wrong?
As the system the begins to power on, there could be loss of power that interrupts the loading process. Any interruption to the system's power begins a shut down. A restart of the starting processes does occur if power is reconnected, ensuring that the R.P.G can continue to function after a sudden failure.

4.3.2 Stimulus/Response Sequences

Robert flips the **Power Switch**(see 4.1) to the "On" position.	R.P.G console receives initial voltage from the power cord, which tells the system to start reading the BIOS files. R.P.G's official console logo will be shown to Robert. The system is in startup reading the console files. This process should take about 25-30 seconds. Emulation Station software will begin taking Robert to the home screen for R.P.G.

4.3.3 Functional Requirements

REQ-1: The **Power Switch** must be placed in the "On" position.
REQ-2: The console must be connected to a display in order to verify the startup process has started..
REQ-3: The console must have an LED that will light to green when the system starts up.

4.4 System Shutdown

4.4.1 Description and Priority

Priority: 1

What:
This process ends all current running process, and begins a shutdown of the various components in the Retro Pi. The shutdown is started through the **Power Switch** (see 4.1) which sends a kill signal to the chip, starting the shutdown operation.

Why:
This begins a graceful shutdown of the Retro Pi that allows for the system to close all running operations, and ensuring that the Retro Pi powers down successfully.

How:
If the Retro Pi is not going to be used, Erin can flip the **Power Switch** in to the "Off" position in order to power down the console.

What Could Go Wrong?

The Retro Pi could lose connection to power during the shutdown processing causing a failure to close all current processes. If this occurs, the system checks if any memory is still allocated to the failed shutdown when connected to power. Clearing the memory to free any processes.

4.4.2 Stimulus/Response Sequences

David flips the **Power Switch**(see 4.1) to the "Off" position.	R.P.G console receives a low voltage signal which tells the system to stop power to the system. If programs are still running, the system exits all programs before stopping power. The lights on the console will turn off indicating that system has shutdown..

4.4.3 Functional Requirements

REQ-1: The **Power Switch** must be placed in the "Off" position.
REQ-2: The LED lights that signal the power must change to red.

4.5 Power Input

4.5.1 Description and Priority

Priority: 1

What:
Micro-USB port on the rear of the console to connect power supply units with a micro-USB cable. There is a power icon on top the port with an LED light that is off by default.

Why:
This is how the system receives power.

How:
Erin is setting up the RetroPi console and sees the power icon. She connects the micro-USB cable to the port and plugs the power supply unit into the wall. The LED light will turn green as soon as the system begins receiving power.

What Could Go Wrong?
Too much power. Not enough power. Power suddenly cut off while system is running. If there is too much power, the circuit board resists the overage. It is unlikely that there is not be enough power to the system itself. If there is not enough power being supplied the system software will prompt the user that they need a higher voltage or amps. In the event of a sudden power failure, the system cuts power to non-essential components first (LEDs and input/output). While the non-essential components are being powered off, the system will save any data, that can be saved, to the SD card.

4.5.2 Stimulus/Response Sequences

Action	Result
Erin plugs in the power cable to the console.	The system begins receiving power. The LED light on top of the outlet turns green.
A third-party charging device is supplying too much amps or volts	The system will be able to adjust resistance and ground the surplus.
The power goes out while the system is on.	The system will save all data to a temporary file before force quitting all applications.

4.5.3 Requirements

REQ-1: The system needs to be able to take in AC currents
REQ-2: It must be a micro-USB port
REQ-3: The system can not short-circuit
REQ-4: The LED above the power inlet will turn green when system receives power

4.6 Clip on Case

4.6.1 Description and Priority

Priority: 3

What:
A customizable case for the Retro Pi console. The case can come off to reveal the circuit board inside. Different styles of cases can be clipped on to protect the board inside and personalize the console. The sides of the casing will have indentations and arrows.

Why:
To protect the circuit board inside. Allows David to easily give his console a personal touch.

How:
David sees the indentations and arrows on the side of the case and squeezes. He feels a release in the clips holding the case in place and removes the case.

What Could Go Wrong?
David could squeeze too hard on the case. If this is the case, the interior shell of the Retro Pi should be made of a sturdier material in order to ensure that the board does not suffer damage.

4.6.2 Stimulus/Response Sequences

Action	Result
David squeezes the two indentations on the side of the case	The clips release the top part of the casing completely. David feels a release in tension.
David keeps squeezing after the clips release the case	Our cases is made of a flexible plastic material that can flex.

4.6.3 Requirements

REQ-1: Case needs to have clips that hold top and bottom halves in place
REQ-2: Clips must release when squeezed
REQ-3: Casing must be made of plastic that can flex when squeezed

4.7 3.5 mm analogue audio-video jack

4.7.1 Description and Priority

Priority: 2

What:
An jack for audio or video output. This is mainly used for audio devices like speakers or headphones.

Why:
To provide a way for sound devices to be connected since our device does not have built in speakers.

How:
David plugs in a speaker with to the audio jack. The system can now send audio signals to the speaker for output.

What Could Go Wrong?
The input could not be plugged in all the way. If this is the case, the Retro Pi should have display a audio jack icon symbolized by speakers/headphones on the screen if there is a failure in a connection.

4.7.2 Stimulus/Response Sequences

Action	Result
David plugs in an audio device into the jack	The screen displays that something has been connected and sends a sound signal. The sound signal will not do anything if it is not a speaker or headphones.
David partially plugs in an audio device	Sound produced will have static

4.7.3 Requirements

REQ-1: The jack must be able to output audio signals
REQ-2: Gives David a notification that a device has been successfully plugged in

4.8 System Reboot

4.8.1 Description and Priority
Priority:1

What:
A display button that after being selected will shutdown the R.P.G console and then power back on the system.

Why:
After changing a theme or adding a game on the R.P.G console, Erin will have to restart the system to be able to see the effect.

How:
Erin presses the start button on the controller and the moves down the option screen and selects the “system restart” option.

What Could Go Wrong?
The console could not update after restarting, or fail to power back on after shutdown.

To help prevent this the R.P.G system files must be tested fully, and the power connection to the system must be high quality. This is to ensure the system is protected if it's suddenly disconnected from power.

4.8.2 Stimulus/Response Sequences

Action	Result
Erin presses the start button on the controller	R.P.G console displays the system options screen.
Erin presses the restart button	The system begins the function **System Shutdown** (see 4.4) After being completed the system begins to power on and initiates the **System Start** (see 4.3) feature. While updating any files that are needed.

4.8.3 Functional Requirements

REQ-1: It is necessary for the controller to be connected and recognized by the console.
REQ-2: The console should fully shutdown and then start.
REQ-3: All files that were updated should be changed in the console after restart.

4.9 Connecting to Wifi

4.9.1 Description

Priority: 2

What:
The ability to connect to local wifi by selecting an option on the R.P.G system options screen.

Why:
After connecting to wifi Erin is able to watch movies or download outside packages to her console.

How:
Erin selects the option on the home screen for R.P.G setting and then moves down to the enable wifi option. After selecting the option Erin will choose her network and enter her wifi password if she has one.

What Could Go Wrong?
The console could be unable to connect to the internet which prevents the ability to stream media. The console would also be unable to change any themes or games on the console. To help prevent this the R.P.G console will come installed with a highly tested and quality wifi chip embedded in the system

4.9.2 Stimulus/Response Sequences

Action	Result
Erin presses the R.P.G system options on home screen.	R.P.G console changes display screens from the home screen to system options. The console displays all options available to be altered.

Erin presses the enable wifi button	The system begins to search for all local internet connections available to be connected to. The system will display the information found to the screen.
Erin selects her wifi and enters her password followed by pressing the enter button on the screen.	The system recognizes which wifi is selected and then checks if a password is needed. If a password is need a screen for the Erin to enter her password is displayed to the screen. After the input is given the system will compare input string to the wifi password string and determine if they're the same. If the strings are the same Erin is returned to the system options page. If the string is not the same an error message is displayed to the screen and asks for another password.

4.9.3 Functional Requirements

REQ-1: It is necessary for the console to be able to recognize local wifi.
REQ-2: The console should be able to connect to local wifi after entering password.
REQ-3: Console should save network setting for next start up

4.10 Kodi Open Source Media Player

4.10.1 Description and Priority

Priority: 4

What:
An open source software that allows for a variety of different various files types (such as mp3, mp4, AAC, flac … etc) to be played through the Retro Pi.. It also allows for different types of streaming media such as video, podcasts, and music.

Why:
Gives Robert the ability be able watch all of his favorite movies and tv shows through the Retro Pi.

How:
The Retro Pi runs the application begins during **System Start** (see 4.3) and can be selected with the menu options..

What Could Go Wrong?
The application fails to connect to the internet, streaming media will be halted and the application buffers the requested media. If this happens, an error message will appear to David saying that an a connection was interrupted/failed to connect.

4.10.2 Stimulus/Response Sequences

Action	Result
David selects the Kodi application from the main menu	The screen opens up the Kodi application, showing David the options available for media playback, and streaming media.
David exits the Kodi application pressing the **Home Icon**(see 4.12) from the menu.	The Kodi is paused and David is taken back to the main menu screen of the Retro Pi.

4.10.3 Requirements

REQ-1: The Kodi requires a constant connection to the **Wifi** (see 4.9) to play any of the streaming media.
REQ-2: Gives a notification that a device has connection to the internet.
REQ-3: Gives a notification when the device has lost connection to the internet.
REQ-4: The Kodi application must have access to the memory of the Retro Pi to play files stored in memory.

4.11 Downloading Theme

4.11.1 Description
Priority: 4

What:
The ability to connect to the Retro Pi server and download alternate themes for the R.P.G console.

Why:
Erin wants the ability to choose which theme see wants displayed instead of the standard one pre installed.

How:
Erin selects the option on the home screen for R.P.G setting and then moves down to the change theme option. Next Erin selects the download theme option. After selecting the theme she wants, the console downloads the correct package.

What Could Go Wrong?
The console could be interrupted from the internet during the download causing the file to be corrupted. To help reduced this problem the system while compare the bits from the selected file to the one downloaded. If they aren't the same the system outputs an error message to the screen saying "Download Failed".

4.11.2 Stimulus/Response Sequences

Action	Result
Erin presses the R.P.G system options on home screen.	R.P.G console changes display screens from the home screen to system options. The console displays all options available to be altered.
Erin presses the change theme option	R.P.G console changes display screens from the system options to change theme. The console displays all options available for changing the console's themes.
Erin presses the download theme option	The system begins to search for all themes available to be download for Retro Pi server. The system will display the information found to the screen.

Erin selects which theme she wants to download.	The system recognizes the request and begins to download the file from the server. After the file has been success download a message saying “download completed” is output to the screen.

4.11.3 Functional Requirements

REQ-1: It is necessary for the console to be connected to the wifi (see **4.9)**
REQ-2: The console must have enough storage space available for the downloaded file.

4.12 Home Icon

4.12.1 Description and Priority

Priority: 1

What:
A menu icon that helps ease navigation from the various programs on the Retro Pi.

Why:
Robert is able to easily change from his video streaming to video games by selecting the home icon.

How:
This home icon designed to look like a small house takes Robert from his current application, and pauses that process. It returns to the main menu where Robert can select any other application.

What Could Go Wrong?
The home icon could fail to return to the main menu while loading an application. In this case the system should queue the request and allow for the application to finish loading before returning to the main menu.

4.12.2 Stimulus/Response Sequences

Action	Result
Robert selects the home icon.	The current running application is paused. The Retro Pi is set to a transition screen that moves back to the main menu.

4.12.3 Requirements

REQ-1: The home icon should have a sound notification when selected.
REQ-2: The home icon should be able to be selected at any moment.

4.13 Changing Console Theme

4.13.1 Description
Priority: 4

What:
The ability to change the current theme for the R.P.G console.

Why:
Erin wants the ability to choose which theme see wants displayed instead of the standard one pre installed.

How:
Erin selects the option on the home screen for R.P.G setting and then moves down to the change theme option. Next Erin selects the my themes option. After selecting the theme she wants, the console will switch the files for the current and selected theme.

What Could Go Wrong?
The console could not switch from the current theme to the desired one. This could result from the selected themes file being corrupted. If the selected file is corrupted the system outputs an error message to the screen saying “Corrupted File”.

4.13.2 Stimulus/Response Sequences

Action	Result

Erin presses the R.P.G system options on home screen.	R.P.G console changes display screens from the home screen to system options. The console displays all options available to be altered.
Erin presses the change theme option	R.P.G console changes display screens from the system options to change theme. The console displays all options available for changing the console's themes.
Erin presses the my theme option	The system will display all themes that are downloaded to the console to the screen.
Erin selects which theme she wants to displayed.	The system recognizes the request and swaps the files for the current console theme. After completed an output message is displayed saying "Finished".
Erin presses reboot system.	The system restarts and will begin displaying the new theme on startup.

4.13.3 Functional Requirements

REQ-1: It is necessary for the console to be able to download themes (see **4.9)**
REQ-2: The console must be able to restart and display desired theme (see **4.8)**

4.14 Secure Digital Card (SD Card) Input

4.14.1 Description and Priority

Priority: 1

What:
An SD card port on the front of the console that can read from SD cards for games.

Why:
This is the main way that games will be read.

How:
David puts an SD card into the SD card slot.

What Could Go Wrong?
The card can't be read due to system connection error. Robert inserts Micro-SD instead of standard SD. In the first case we have a system setting that allows for the SD card to be mounted/unmounted in order to refresh the connection between the SD card and the Retro Pi. If Robert attempts to insert a Mirco-SD card into the SD slot, the insert slot should be big enough that the Micro-SD card can move freely. Allowing Robert to tilt the console and have the Micro-SD card slide right out.

4.14.2 Stimulus/Response Sequences

Action	Result
David puts the SD card in the console	The system can start reading information that is on the card
David puts in a micro-SD card	The micro-SD can't be detected and David must flip the console on it's face to slide the card out.

4.14.3 Requirements

REQ-1: The card being used must be a standard SD card
REQ-2: The system must be powered on in order to read from the card
REQ-3: The system must be able to see files that are on the SD card

4.15 System Settings

4.15.1 Description and Priority

Priority: 1

What:
A menu icon that manages the different customizable settings for the Retro Pi..

Why:
David wants to change a variety of systems such as volume, brightness, language, display sizes ...etc.

How:
The settings icon houses a menu that allows David to alter system settings by changing the preset values assigned to different options listed in the menu.

What Could Go Wrong?
Menu options might not be able to be changed given a incompatibility with different devices. For example a tv display might not support a particular resolution. In this case it should default to the devices listed setting and alert David that issues exist with the particular device.

4.15.2 Stimulus/Response Sequences

Action	Result
David selects the settings icon	A menu pops up that allows for navigation of the different settings..
David changes a settings within the menu	A bar representing the current value and arrows appears.

4.15.3 Requirements

REQ-1: The System Settings should be designed to look like a gear..
REQ-2: Choosing the menu icon should display all the menu options, but not display their current value until selected.
REQ-3: Altering a system setting should be verified with an accept option.
REQ-4: If the system setting does not want to be changed, the cancel option should reset the value back to the original value.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

N/A

5.2 Safety Requirements

N/A

5.3 Security Requirements

N/A

5.4 Software or Hardware Quality Attributes

N/A

5.5 Business Rules

N/A

6. Other Requirements

N/A

Appendix A: Glossary

N/A

Appendix B: Analysis Models

N/A

Appendix C: To Be Determined List

N/A