2016

Brennan JB7 SRS Document

GROUP 16

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1 - Introduction

1.1 – Purpose

The purpose of this document is to list the specifications and capabilities of the Brennan JB7 CD to digital copy music converter system. The following documentation will give a broad understanding into the scope of this project and will outline the capabilities and functions designed for the music system. The product will be a cd player that will be able to convert user's CDs into digital form and store them on an internal HDD where they can be stored, played back, and backed up for long periods of time. The system will allow users to retire their old collection of CDs which take up an ample amount of space, and to instead have a portable system where all of their music is stored safely and with high quality. This SRS will cover the entirety of the system that is to be designed.

1.2 – Scope

The Brenna JB7 is an all-in one digital system that is able to store thousands of songs from different CDs and vinyl to an internal HDD. More specifically, this system provides a way for users to retire their old CD collection which takes up a lot of space, and be able to store all their songs and playlists into one machine. The system will allow for playlist creations, CD ripping, music back-ups, music storage and playback. This system is designed to offer convenience to the user and ease of use.

1.3 - Document Conventions

The typographical conventions followed in this SRS include size 11 font in Calibri (Body); a non-serif style allowing for less stressful bouts of reading. The headers of this document are outlined in bold to allow for a clearer, visual representation of the topics to be discussed. The SRS will follow this convention throughout this report.

1.4 - Intended Audience and Reading Suggestions

This document is intended for developers and testers of the web forum product. Developers can receive a clear understanding of the scope of the project by reading this document so that the CD reader interface may be designed and implemented as intended and with minimal errors. This document will serve as a manual for developers who will build the software system. Testers of the system may also review this document to understand the different capabilities and functions that must be tested to ensure proper functionality of the product. Project managers may also wish to utilize the SRS when assigning tasks to different developers and to ensure the product is designed efficiently according to specifications.

1.5 – Product Overview

1.5.1 – Product Perspective

The Brenna JB7 system utilizes both hardware and software to copy and play music from CDs and to store them onto its internal HDD. Traditional CD players only allow the user to play a CD, but the JB7 will allow the user much more options. The hardware portion of the system will read music files from CDs at varying speeds. Hardware will also control the volume of the music playback, the stop/play features, the eject feature, and the skipping of tracks all controlled through knobs and switches on the front panel of the system. A digital display will also be on the front panel that will show the time of the day, or the name of the track, or the name of the playlist. The software portion of the system will allow it to rip off music from the CDs and to store them as high quality MP3 files onto the internal HDD. The software will also allow the user to create custom playlists from different songs and to name them for future reference.

The software has the following constraints:

- Database to store music files, playlists, and names
- Send proper information to digital display to keep track of time and display necessary information to user
- Sorting system to sort and search for playlists and songs efficiently and with fast speeds
- Control songs using software (play/stop/skip/pause)
- Store data efficiently to take up least amount of space
- Make timely back-ups of the database to ensure security of songs and playlists
- Compress back-up files to save HDD storage space
- Copy over music files from the HDD out through the USB output

1.5.2 – Product Functions

This section of the SRS will outline all major functions that the JB7 software portion of the system will be able to do:

- Read the music files read by the CD player and save them to the HDD in a temporary location
- Normalize audio to ensure all of the songs have the same volume throughout
- Convert the music files to .MP3 high quality files
- Store mp3 files into folders and save all information into database (Artist, song name, etc.)
- Present track information to the digital display interface
- Allow the user to stop/play/pause/skip/fast-forward songs
- Create playlists with user chosen songs
- Allow user to create names for each playlist and save the names into the database
- Retrieve specific songs or playlists chosen by the user for playback or for transferring to USB output

1.5.3 – User Characteristics

The user of the JB7 is expected to have a very basic knowledge of CD players and electronics. Instructions set on the digital display will allow users to follow step by step instructions on how to rip their music collection and to make playlists.

1.5.4 – Limitations

- The CDs must contain only audio CD files which can be read and interpreted by the software
- The MP3 file coding requires the LAME MP3 encoder
- The files must be saved to a temporary location and then be converted to MP3 which will take up more space and take a longer amount of time to complete
- The database must be organized and sorted for quick retrieval
- Database cannot be password protected since the device does not have a keyboard

1.6 – Definitions

- This section contains some definitions of different components of software that will be used in the JB7
    - JB7: Juke Box 7
    - Database: Ordering and storing data in tables that can all be uniquely identified and retrieved from
    - MP3 – Digital music file which compresses music and stores its attributes (Artist, name, etc.)
    - Playlist: A collection of songs which may not be from the same artists or album. Playlists are custom made from songs by the user

2 - Overall Description

2.1 - Product Perspective

This piece of software will be a self-contained product; however, also acting as a replacement for other third party applications such as CD burners (Nero), CD content players (VLC media player), et cetera. The interface will be ran on top on the user's existing computer system with the help of drivers as a seamless bridge between the hardware components.

2.2 - Product Functions

Necessary Functionalities:

- Allow the user to burn content from an inserted disk to their computer.
- Allow the user to playback content from an inserted disk.
- Offer the user a prompt to eject the disk from the drive.
- If the disk is rewritable (CD-RW or DVD-RW), allow the user to add or delete content.
- Offer an encryption/decryption feature to keep content protected.

2.2 - User Classes and Characteristics

Since the application will be installed on individual, local computer systems without the need for an online component, the only user class will be regular users – who will have access to every feature included on with the software. In addition, since the software pertains to all audiences who own a CD drive, the user interaction level will be made seamless and non-intuitive – no need to fetch through lengthy user documentation to find instructions.

2.4 - Operating Environment

The programming will be conducted using the Java language as it is based on its own virtual machine and will be decoupled from the operating system and interfering with other applications the user may have on their system. The only component needed to interact between the software and hardware is the driver – which will be designed to be compatible with any system on which the user may want to run the interface.

2.5 - Design and Implementation Constraints

Developers may run into difficulty designing a driver interface which is universally compatible with various user operating systems and kernels. However, the application itself should offer no constraints as Java already enables cross platform functionality.

2.6 - User Documentation

While we have confidence in the non-intuitive interaction between the user and the software, a user manual will be provided on our website for easy access as a safeguard in case a user has difficulty using a feature.

2.7 - Assumptions and Dependencies

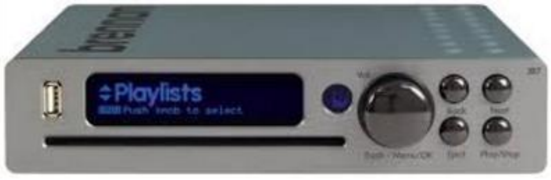
As previously stated in the operating environment, the application will be completely decoupled from the user's operating system; thus, there aren't any dependencies or assumptions to take into account other than designing the driver interface.

2.8 – References

IEEE Recommended Practice for Software Requirements Specifications - http://www.math.uaa.alaska.edu/~afkjm/cs401/IEEE830.pdf

3 – Specific Requirements

3.1 – External Interfaces



The digital display of the JB7 is pictured above. The display sits above the CD slot centered to the top left of the machine beside the USB port. The display is capable of showing all the information about a CD such as song name or artist name, and can also show similar information regarding playlists. The interface is simple and easy to use and can be used by novice and expert users alike. The display will only output information and will not accept any input (not a touch screen display.) Database software and music conversion software will also be mini-components of the overall software design.

3.2 – Functions & Usability Requirements

To function properly the device will need a continuous supply of power while the CD is being read and/or while the software is converting/reading data. While the software is not being used, the power can be turned off however. The database must also be compacted and repaired once a month, since this will ensure that the data will be stored efficiently and not be corrupted resulting in loss of data.

3.3 – Performance Requirements

A well maintained database is all that is needed for the software to perform as efficiently as possible. The software will hinder if the hardware is not performing correctly.

3.4 – Design Constraints

As database grows in size, retrieval and storing of data will slow down imminently. The sorting algorithms must be able to optimally store data that can be retrieved at fast speeds. A noSQL approach could be used if a SQL based database will not suffice for the large amount of data. SQL should give no such problems as long as the data is organized efficiently and the database is repaired every month.

3.5 – Software System Attributes

- Reliability: The software should never crash or hang, other than as a result of a hardware error. The software should display appropriate errors when certain functions are not able to be completed
- Availability: There are no specific requirements
- Security and privacy: There are no specific security and privacy requirements.