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1. Introduction

1.1 Purpose

This Software Requirements Specification provides a complete description of all the functions and specifications of Bedrock TV and Electronics clock radio systems. It will explain the purpose and features of the system, the interfaces of the system, what the system will do, and how it reacts to user input. This document is intended for both stakeholders of Bedrock Tv and Electronics and the developers of the system.

1.2 Scope

This software system will be a user interface for the next generation of clock radios by Bedrock TV and Electronics. This system will be designed so that it redefines waking up in the morning. It will have all normal functionality of conventional AM/FM clock radios, but it will also have a small display that will be used to show the time and other status information normally. This small display will allow the user to navigate through menus to change settings very easily, in comparison to holding down button combinations on a conventional clock radio. This design promotes a better user experience and adds the ability to customize settings.

More specifically, this system is designed to allow the user to customize alarm and radio settings.

This software will give the user a flexible and easy to use experience, by using separate menu screens for alarms, radio presents, and time/date. There will be a large number of alarms that are settable. The software has the ability to adjust the volume, radio station, and date/time that each alarm will go off. This allows the user to customize their own waking up experience by giving them complete control over their settings and allows them to program an alarm months out so, they will never wake up late again.

1.3 Definitions, acronyms and abbreviations

Term	Definition
D-Pad	The directional buttons on the clock's remote
Function	A feature of the clock systems that allows the user to perform an action.
Software Requirements Specification	A document that completely describes all of the functions of a proposed system and the constraints under which it must operate. For example, this document.
Stakeholder	Any person with an interest in the project who is not a developer.
Stand by Screen	The main screen that displays basic information and waits for user input.
User	The person, or persons, who operate or interact directly with the product.
User Interface	The means by which the user and a computer system interact, in particular the use of input devices and software

1.4 References

IEEE. *IEEE Std 830-1998 IEEE Recommended Practice for Software Requirements Specifications*. IEEE Computer Society, 1998.

1.5 Overview

The next chapter, the Overall Description section, of this document gives an overview of the functionality of the product. It describes the general factors that affect the product and its requirements. It is used to establish a context for the technical requirements specification in the next chapter.

The third chapter, Requirements Specification section, of this document is written primarily for the developers. It describes in technical terms the details of the functionality of the product and all of the requirements that must be satisfied by the software.

Both sections of the document describe the same software product, but are intended for different audiences and use different terms, language, and amounts of detail.

2. Overall description

2.1 Product perspective

This product is a stand-alone alarm clock system, though a considerably more advanced one. It is configured through an external remote and it has an external programming interface to extend it's functionality through third party accessories such as a bed occupancy sensor.

2.1.1 System interfaces

2.1.2 User interfaces

The user interface is displayed on a 7 inch by 4 inch screen with a resolution of 1024 by 768. The standby screen prominently displays the time in a large font in the center of the screen. It also displays the date in a smaller font and displays the current radio station in the top left hand corner. Tapping any button on the remote brings you to the main menu.

The main menu is where you access all the functionality of the alarm clock. The menu is navigated with the D-pad and selections are made with the enter key. The main menu allows you to access the alarm menu, the radio menu and the set date and time menu.

The alarm menu is accessed from the main menu and allows you to set, delete and modify the alarms. It is also navigated with the D-pad and selections are made using the enter key.

The set alarm menu allows you to set an alarm.

//And the radio and radio preset interface!!!!

The date and time can be set in the “Set Date and Time” menu. In the date and time menu, a new time is entered and the user is prompted to confirm the change. The user is then returned to the standby screen.

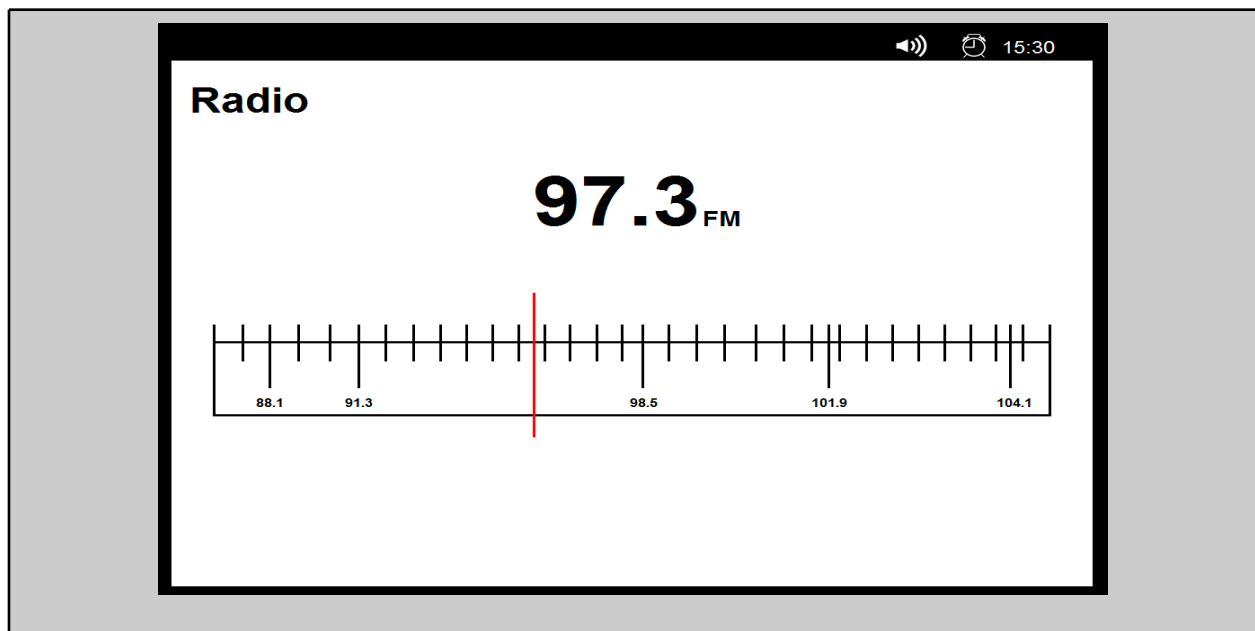
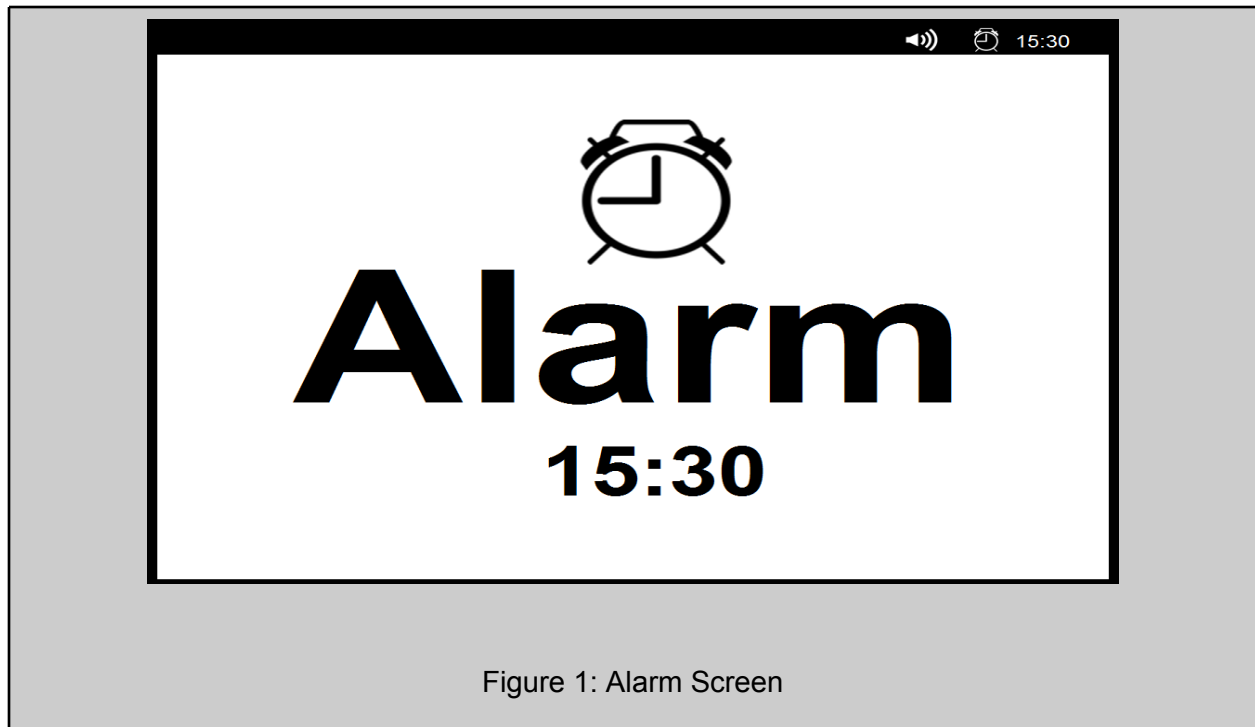


Figure 2: Radio Screen

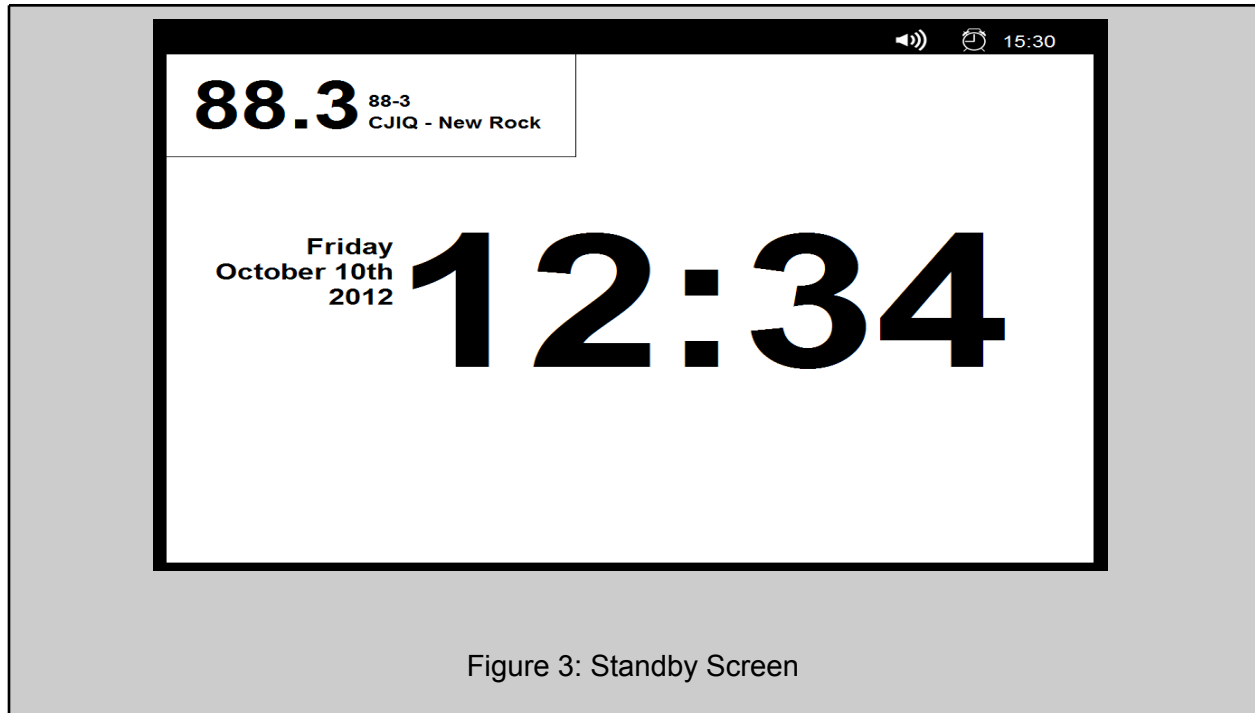


Figure 3: Standby Screen

2.1.3 Hardware interfaces

The system is controlled through an external hardware remote control. This remote contains the following buttons: a 0-9 number pad, a decimal point, a four way directional pad, a cancel and OK button.

It also will contain an external interface for communicating with third party hardware such as the bed occupancy sensor.

2.1.4 Software interfaces

The software must provide external coding interfaces so that the clock , the radio and the current volume state can be collected and displayed.

It also needs an API for the third party external interface.

2.1.5 Communication interfaces

The system has a communication interface that allows the remote to connect and control the clock.

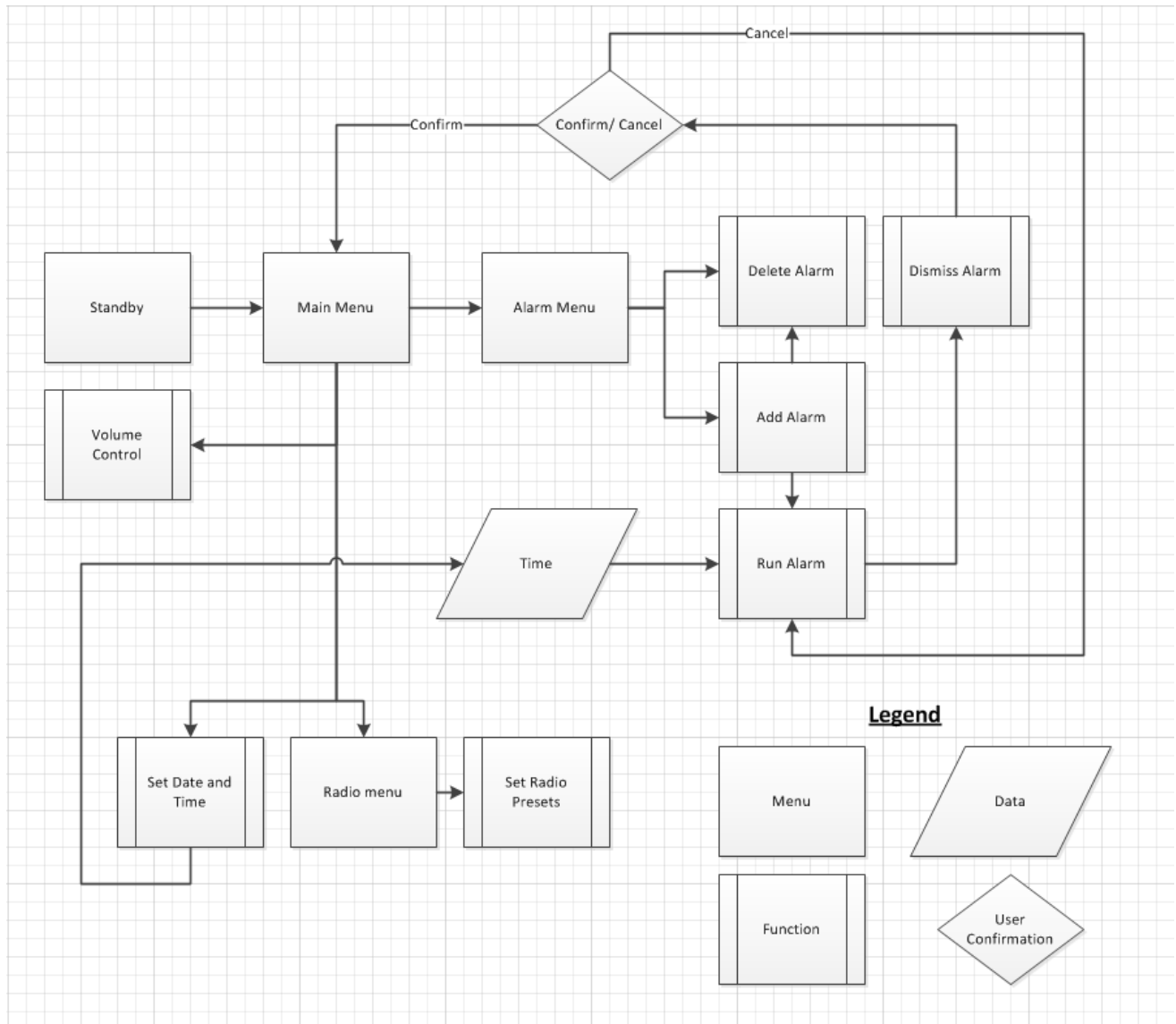
The system also has an external programmable interface for third party accessories.

2.1.6 Memory Constraints

The system is limited in hardware to having 2 gigabytes of primary memory and it uses flash memory for storage.

2.1.7 Site adaptation requirements

2.2 Product functions



2.3 User characteristics

This product is designed for users of any age and education level. However, there are no accessibility options for people with audio or visual impairments.

2.4 Constraints

The amount of radio presets is limited to 10 radio stations.

The system is running the Linux operating system.

The system is first and foremost an alarm clock, all other functions are secondary.

The controls must only contain the buttons listed in section 2.1.3 of this document.

2.5 Assumptions and dependencies

2.6 Apportioning of requirements

In future releases of this product, the USB port on the clock will allow 3rd parties to create extensions for this product. This will require APIs to allow the software on the clock to talk to the software in the accessories. A second feature in the future release is the inclusion of a touch screen interface. This will require a reworking of the user interface to make it more finger friendly.

3. Specific requirements

3.1 External interfaces

3.1.1 User interfaces

The clock shall display whatever a clock shall display on the 1024x768 display.

3.1.2 Hardware interfaces

Provided with the clock there will be a touch activated button remote control. The remotes' keys are as follows: 0-9 number pad with decimal point button, a four way directional pad for moving through menu items, adjusting volume, and scanning through radio, and a cancel and ok button. The remote will be an external piece of hardware which communicates to the clock.

Our system also links itself directly to an external interface from a commercially available third-party bed occupancy detector. This detector will be able to tell our system whether or not the user is in their bed. The communications protocol interface offered by the third-party system and what features it will provide has yet to be determined. This interface will be used when deciding if the alarm and/or radio should be turned on to wake up or notify the user that the clock has reached a specified time.

3.1.3 Software interfaces

The software must provide external coding interfaces so that the clock, the radio, and the current volume state can be collected and displayed on parts of the graphical user interface.

3.1.4 Communications interfaces

The device must provide some sort of external control communications interface so that the remote control may connect back with the clock.

3.2 Functions

3.2.1 Standby Screen

3.2.1.1 Exit Standby

The system shall exit from it's standby mode when a user presses any button on the remote.

Use Case Name	Exit standby
XRef	
Trigger	The user presses any button other than what are being used for other functions.
Precondition	The clock is asleep and displaying the time.
Basic Path	The customer is presented with the settings standby screen
Alternative Paths	None
Postcondition	None
Exception Paths	None

Other	None
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3.2.1.2 Run Alarm

The system shall trigger an alarm when a specified time has been met.

Use Case Name	Run alarm
XRef	
Trigger	A specified alarm time has been reached
Precondition	The clock must be given power and must be turned on
Basic Path	
Alternative Paths	The user can press any button other than ok to snooze the alarm
Postcondition	The alarm has now been deleted and will not trigger
Exception Paths	At the time when the confirmation dialog box comes up, the customer can press the cancel button to exit from deleting the alarm.
Other	None

3.2.1.3 Dismiss alarm

The system shall allow the user to dismiss currently triggering alarms.

Use Case Name	Dismiss alarm
XRef	
Trigger	The user presses the cancel button during a firing alarm
Precondition	The clock must have an alarm set and firing
Basic Path	A dismiss confirmation dialog will appear to ask the user if they would really like to dismiss the alarm. The user then uses the D-pad to select an ok button to dismiss the alarm
Alternative Paths	
Postcondition	The alarm is now dismissed and will no longer trigger unless the alarm has been set to repeat
Exception Paths	At the time when the confirmation dialog box comes up, the customer can press the cancel button to exit from dismissing the alarm
Other	None

3.2.1.4 Volume Up

The system shall allow the user to change the clock's volume by pressing the up on the remote's d-pad.

Use Case Name	Volume Up
XRef	

Trigger	The user presses up on the clock remote's d-pad.
Precondition	The clock must be in standby mode.
Basic Path	After pressing the button, the clock will play an audible alert to confirm the change in volume with the user.
Alternative Paths	
Postcondition	The radio will now play at the newly set volume level.
Exception Paths	There is no exception path for this function.
Other	None

3.2.1.5 Volume Down

The system shall allow the user to change the clock's volume by pressing the down on the remote's d-pad.

Use Case Name	Volume Down
XRef	
Trigger	The user presses down on the clock remote's d-pad.
Precondition	The clock must be in standby mode.
Basic Path	After pressing the button, the clock will play an audible alert to confirm the change in volume with the user.
Alternative Paths	

Postcondition	The radio will now play at the newly set volume level.
Exception Paths	There is no exception path for this function.
Other	None

3.2.1.6 Radio Presets

The system shall allow the user to switch presets by pressing a number on the remote's number pad.

Use Case Name	Radio Presets
XRef	
Trigger	The user presses down a number on the remote's keypad.
Precondition	The clock must be in standby mode.
Basic Path	After pressing the button, the radio change to the station that the preset has been configured with.
Alternative Paths	
Postcondition	The radio start playing on the newly set station.
Exception Paths	There is no exception path for this function.
Other	None

3.2.2 Menu Screen

3.2.2.1 Alarm Settings

The system shall display the Alarm Settings screen when the user selects the Alarms button from the standby screen.

Use Case Name	Navigating to the Alarm Settings
XRef	
Trigger	The user selects the Alarm Settings button from the standby screen.
Precondition	The clock must be in the standby screen.
Basic Path	After pressing the button, the clock will open the Alarm Settings.
Alternative Paths	
Postcondition	The radio will display the Alarm Setting screen.
Exception Paths	There is no exception path for this function.
Other	None

3.2.2.2 Radio

The system shall open the Radio screen when the user selects the Radio button from the standby screen.

Use Case Name	Navigating to the Radio
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XRef	
Trigger	The user selects the Radio button from the standby screen.
Precondition	The clock must be in the standby screen.
Basic Path	After pressing the button, the clock will open the Radio screen.
Alternative Paths	
Postcondition	The radio will display the Alarm Setting screen.
Exception Paths	There is no exception path for this function.
Other	None

3.2.2.3 Set Time and Date

The system shall open the Set Time and Date screen when the user selects the Set Time and Date button from the standby screen.

Use Case Name	Navigating to the Set Time and Date screen
XRef	
Trigger	The user selects the Set Time and Date button from the standby screen.
Precondition	The clock must be in the standby screen.
Basic Path	After pressing the button, the clock will open the Set Time and Date screen.

Alternative Paths	
Postcondition	The radio will display the Set Time and Date screen.
Exception Paths	There is no exception path for this function.
Other	None

3.2.2.4 Alarm Tone

The system shall allow the user to change alarm tones from a manufacturer defined set when the user selects the Alarm Tone button from the standby screen.

Use Case Name	Setting the alarm tone
XRef	
Trigger	The user selects the Alarm Tone button from the standby screen.
Precondition	The clock must be in the standby screen.
Basic Path	<ol style="list-style-type: none"> 1. The clock will display a list of predefined alarm tones for the user to choose from. Moving between tones will be handled with the d-pad. 2. The user can preview an alarm tone by navigating over top of the list item. 3. To confirm the selection of a new tone, navigate over top of the tone and press
Alternative Paths	

Postcondition	The radio will display the Alarm Setting screen.
Exception Paths	There is no exception path for this function.
Other	None

3.2.2.5 Sleep Mode

The system shall go back to standby mode when the user selects the sleep mode button from the standby screen.

Use Case Name	Getting back to Standby Mode
XRef	
Trigger	The user selects the Sleep Mode button from the standby screen.
Precondition	The clock must be in the standby screen.
Basic Path	After pressing the button, the clock will close the open menu and go back to the Standby screen
Alternative Paths	
Postcondition	The radio will display the Standby Mode screen.
Exception Paths	There is no exception path for this function.
Other	None

3.2.3 Alarm Settings Screen

3.2.3.1 Add alarm

The system shall allow the user to add alarms to go off at user configurable times.

Use Case Name	Add alarm
XRef	
Trigger	The user presses the add alarm button from the alarm setup screen.
Precondition	The system displays the alarms management window which allows the customer to edit alarms.
Basic Path	<ol style="list-style-type: none">1. the customer chooses what time they would like the alarm to be set off and what days they would like it to run.2. the customer then selects what mode they would like the alarm to run in. modes include silent, calm, and wake up.3. The customer chooses whether they would like an alarm tone or a specific radio station to come on.4. When the customer has finished filling the form, the system will add this alarm to its set of alarms in the database. The alarm will be called when the specified time and date is reached.
Alternative Paths	None
Postcondition	The alarm has now been added to the clock and will run at specified time and date.

Exception Paths	At any time, the customer can choose to cancel adding alarm by moving to the bottom and selecting the cancel button. When the cancel button is pressed, the current window will be immediately escaped and no new alarms will be added to the database.
Other	None

3.2.3.2 Delete Alarm

The system shall allow the user to delete their added alarms.

Use Case Name	Delete alarm
XRef	
Trigger	The user presses the delete alarm button from the alarm settings screen.
Precondition	The system displays the alarms management window which allows the customer to edit alarms.
Basic Path	<ol style="list-style-type: none"> 1. The customer is presented with a confirmation dialog box to confirm that they would like to delete the alarm 2. If the alarm's deletion is confirmed, the alarm is deleted and the customer is returned to the alarms management menu
Alternative Paths	None
Postcondition	The alarm has now been deleted and will not trigger

Exception Paths	At the time when the confirmation dialog box comes up, the customer can press the cancel button to exit from deleting the alarm.
Other	None

3.2.4 Set Time and Date Screen

3.2.4.1 Set time and date

The system shall provide the user the ability to change the clock date and time.

Use Case Name	Set time and date
XRef	
Trigger	The user selects the “Set time and date” menu selection in the menu
Precondition	The clock is currently displaying the menu screen
Basic Path	<ol style="list-style-type: none"> 1. The clock will change to display the “Set time and date” screen 2. The user enters a new date and time 3. The user confirms the change of time and date 4. The clock goes back to it’s standby screen
Alternative Paths	<ul style="list-style-type: none"> • The user enters only the current date; the time will be defaulted to it’s previous state • The user enters only the current time; the date will be defaulted to it’s previous state
Postcondition	Alarms will now be based off of the newly set time and date

Exception Paths	At the time when the “Set time and date” screen comes up, the customer can press the cancel button to exit from changing the date and time.
Other	None

3.2.5 Radio Screen

3.2.5.1 Volume Up

The system shall allow the user to change the clock’s volume by pressing the up on the remote’s d-pad.

Use Case Name	Volume Up
XRef	
Trigger	The user presses up on the clock remote’s d-pad.
Precondition	The clock must be in standby mode.
Basic Path	The system raises it’s volume.
Alternative Paths	
Postcondition	<ul style="list-style-type: none"> • The radio will now play at the newly set volume level. • After pressing the button, the clock will play an audible alert to confirm the change in volume with the user.
Exception Paths	There is no exception path for this function.
Other	None

3.2.5.2 Volume Down

The system shall allow the user to change the clock's volume by pressing the down on the remote's d-pad.

Use Case Name	Volume Down
XRef	
Trigger	The user presses down on the clock remote's d-pad.
Precondition	The clock must be in standby mode.
Basic Path	The system will lower it's volume.
Alternative Paths	
Postcondition	<ul style="list-style-type: none">• The radio will now play at the newly set volume level.• After pressing the button, the clock will play an audible alert to confirm the change in volume with the user.
Exception Paths	There is no exception path for this function.
Other	None

3.2.5.3 Seek Left

The system shall allow the user to seek the radio left across the RF spectrum.

Use Case Name	Seek Left
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XRef	
Trigger	The user presses left on the clock remote's d-pad.
Precondition	The clock must be in radio mode.
Basic Path	The system will seek the radio to the left.
Alternative Paths	
Postcondition	<ul style="list-style-type: none"> • The radio will now play at the newly set station. • After pressing the button, the clock will play an audible alert to confirm the change in station with the user.
Exception Paths	There is no exception path for this function.
Other	None

3.2.5.4 Seek Right

The system shall allow the user to seek the radio right across the RF spectrum.

Use Case Name	Seek Right
XRef	
Trigger	The user presses right on the clock remote's d-pad.
Precondition	The clock must be in radio mode.
Basic Path	The clock will seek the radio to the right.

Alternative Paths	
Postcondition	<ul style="list-style-type: none"> • The radio will now play at the newly set station. • After pressing the button, the clock will play an audible alert to confirm the change in station with the user.
Exception Paths	There is no exception path for this function.
Other	None

3.2.5.5 Seek to Radio Preset

The system shall allow the user to seek the radio to a preconfigured station preset.

Use Case Name	Seek to Radio Preset
XRef	
Trigger	The user presses one of the digits on the number pad of the clock remote.
Precondition	The clock must be in radio mode.
Basic Path	The radio will seek to the station preset.
Alternative Paths	
Postcondition	The radio will now play at the newly set station.
Exception Paths	There is no exception path for this function.
Other	None

3.2.5.6 Configure a Radio Preset

The system shall allow the user to set radio presets.

Use Case Name	Configure a radio preset
XRef	
Trigger	The user holds down of the digits on the number pad of the clock remote.
Precondition	The clock must be in radio mode.
Basic Path	The radio sets the currently playing radio station as the preset to the corresponding button that was pressed.
Alternative Paths	
Postcondition	After pressing the button, the clock will play an audible alert to confirm the change in station with the user.
Exception Paths	There is no exception path for this function.
Other	None

3.3 Performance requirements

The clock shall keep track of the time and date and display it when called. The clock keeps track of ten radio pre-set stations and each radio pre-set corresponds with a number from 0-9. The clock keeps track of the alarm settings such as ring tone used, snooze length, volume level, and

date/time.

3.4 Logical database requirements

Data	Use
Time / Date	The Time and Data will be called and display by the clock on the standby screen and at the top of the screen when not on the standby screen.
Radio Presets	The Clock will need to store 10 radio presets that will be use when the user press's 0-9 on the radio screen
Volume	The volume level must be stored and will be displayed on the screen in the radio menu and be displayed at the top of the screen on any other menu. The volume will be modified when the user presses the up or down keys.
Alarm	The Alarm times needs to be stored by the clock. The Alarm will be called used when the alarm is active and reaches the set time. The Alarm time can be modified in the alarm settings. The Ringtone for the alarm must also be stored and can also be modified in the Alarm settings.

3.5 Design constraints

The Clock will only have the buttons: 0 - 9, Ok, Cancel, Decimal , and, Left Right Up Down arrows. The Clock screen is a 1024x768 pixel 4 inches by 7 inches Screen. The Clock has 2GB of memory.

3.6 Software system attributes

3.6.1 Reliability

There were no explicitly stated reliability requirements.

3.6.2 Availability

Our software will be available only to those who buy the Clock.

3.6.3 Security

Our system will not feature any security.

3.6.4 Maintainability

Our software will be maintained and updated when needed.

3.7 Organizing the specific requirements

3.7.1 System mode

The Clock will feature a setup mode and a standard mode. The only time that the Clock is in setup mode is when it is first used. In setup mode the Clock will ask the user to input the time, date, alarm settings and radio settings. The Clock will then go into standard mode unless the clock is reset. In standard mode the user can use any of the clocks features.

3.7.2 User class

The Clock will only have one user profile. The clock will not respond differently for different users.

3.7.3 Objects

The Clock will have a screen 4 inches by 7 with a resolution of 1024x768 pixels. It will have a bed sensor developed by a third party. It will also have a remote with; Up, Down, Left, Right arrows, Numbers 0-9 with 1-7 also labeled with the days of the week, a decimal point, Ok and Cancel buttons.

3.7.4 Feature

3.7.4.1 Time

The Clock will have a Time feature that keeps track of the time. The time will be displayed on the Standby screen at all times. When in other menus the time will be displayed at the top of the screen and the value is initially set in setup mode. The time can be changed by using the option menu and selecting "Change Time/Date".

3.7.4.2 Date

The Clock will have a date feature that will keep track of the day, month and year. The date will be displayed on the Standby screen on the left side of the time. The data will be initially set in setup mode. The date can then be changed by going into the options and selecting change date.

3.7.4.3 Alarm

The Clock will have a alarm feature. The Alarm feature can be turned on by going into settings and choosing alarm settings. In the Alarm settings you can specify the day of the year and the time you want the alarm to go off. When the alarm goes off the Clock screen changes the to the alarm screen as seen in Figure 1 section 2.1.2. The user will then have the option to either select snooze or turn off the alarm. If the snooze option is selected it will then go back to the Standby screen until the alarm goes off again. The snooze length is set in the advanced alarm options in the settings menu. If the user chooses cancel the alarm will be turned off and the clock will return to the standby screen.

3.7.4.4 Radio

The Clock will have a radio function. To go into the radio menu the user must go into setting and then select radio. Once in the radio menu the user can Turn on the radio by pressing ok. The user can scan the channels using the left and right arrows and change the volume by using the up and down arrows. The user can also use the numbers 0 - 9 to select their radio preset and can set a new preset by holding numbers 0 - 9. You can enter a station by pressing ok then entering the station using the 0-9 and decimal key. The user can then exit the radio mode by pressing cancel. The radio will continue to play outside of radio mode but the only available functions will be volume and changing station using presets. The current station will be displayed at the top of the screen at all times.

3.7.4.5 Setup

When first used the Clock radio will be in setup mode. Setup mode will take the user through setting up the basic functions of the clock radio. the time and date will be initially set and it will take the user on a brief tour of the system explaining how many of the functions of the clock radio work.

3.7.4.6 Standard mode

The Standard mode is the mode the is always in after it has completed setup mode. In standard mode the user can go through the settings menu and use all functions of the clock.

3.7.5 Response

The Clock will respond to the user input from the buttons on the remote and to the 3rd party bed sensor. On the standby screen the up and down arrows will adjust the volume, the numbers 0-9 will change the radio station to the preset radio station of the selected number. The the ok button will take you to the settings menu.

In the radio menu the up and down arrows will adjust the volume, the left and right arrows will scan the radio, the 0-9 will be the radio presets, Ok will allow you to enter a station and cancel will take you back to settings.

In the rest of the menus, Up, down, left and right will be directional, ok will select the option, and cancel will take you back to the previous menu.

3.7.6 Functional hierarchy

The first screen in the starting menu is the standby screen which, displays the time and date. It also has the volume, radio station and alarm indicator on the top of the screen as shown in Figure 3 in section 2.1.2. The next screen is the settings menu. The settings menu has all the different sub menus' such as alarm settings, radio settings and Date/Time. The next screen is the radio screen. The radio screen has the radio station that it is currently set to in the center.

It also has the time volume and alarm indicator on the top of the screen see Figure 2 section 2.1.2. Another screen is the alarm screen. The alarm screen display a box the asks you if you want to dismiss the alarm. see Figure 1 section 2.1.2

3.8 Additional comments

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