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D-pad - The directional buttons on the clock's remote.

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1.5 Overview

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 main screen is the standby screen and it prominently displays the time in a large font in the center of the screen. 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.

In the alarm menu, the alarm is set or deleted //remember to finish the alarm menu tomorrow!!!

//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 main menu.

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

!!insert block diagram!!

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 in limited to 10 radio stations.

The systems 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 that buttons listed in section 2.1.3 of this document.

2.5 Assumptions and dependencies

2.6 Apportioning of requirements

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 will be 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 customer is in their bed. The communications protocol interface offered by the third-party system `and that we determined and well it will offer and what features it will provide has yet to be determined and what features it will provide. This interface will be used when deciding if alarms and/or radio should be turned on to wake up or notify the customer 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
Precondition	The clock is asleep and displaying the time.
Basic Path	The customer is presented with the settings main menu
Alternative Paths	None
Postcondition	None
Exception Paths	None
Other	None

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

3.2.5 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.X.X 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.X.X 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.X.X 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.X Menu Screen

3.2.X.X Alarm Settings

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

Use Case Name	Navigating to the Alarm Settings
XRef	
Trigger	The user selects the Alarm Settings button from the main menu.
Precondition	The clock must be in the main menu.
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.X.X Radio

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

Use Case Name	Navigating to the Radio
XRef	
Trigger	The user selects the Radio button from the main menu.
Precondition	The clock must be in the main menu.
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.X.X 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 main menu.

Use Case Name	Navigating to the Set Time and Date screen
XRef	
Trigger	The user selects the Set Time and Date button from the main menu.

Precondition	The clock must be in the main menu.
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.X.X 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 main menu.

Use Case Name	Setting the alarm tone
XRef	
Trigger	The user selects the Alarm Tone button from the main menu.
Precondition	The clock must be in the main menu.
Basic Path	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.X.X Sleep Mode

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

Use Case Name	Getting back to Standby Mode
XRef	
Trigger	The user selects the Sleep Mode button from the main menu.
Precondition	The clock must be in the main menu.
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.X Alarm Settings Screen

3.2.1 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	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

3.2.2 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	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.X Set Time and Date Screen

3.2.6 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	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	● 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

3.3 Performance requirements

Number of user customizable radio presets and alarms

3.4 Logical database requirements

The Clock

Data	Use
Time / Date	The Time and Data will be called and display by the clock on the main screen and at the top of the screen when not on the main 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 can 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

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 things like time, date, alarm setting and radio setting. The Clock will then go into standard mode and stay in 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 main menu at all times. When in other menus the time will be displayed at the top of the screen. The Time is initially set in the setup mode. The time can be changing by going into the options and selecting set time.

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 in the main menu to the left 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 setting and choosing alarm settings. In the Alarming settings you can specify the day and time you want the alarm to go off. When the alarm goes off the Clock screen changes the the alarm screen as seen in /* Picture of alarm screen reference */ . The user will then have the option to either snooze or turn off the alarm by pressing either the /* Can't remember what button is for snooze */ to snooze or Cancel button to turn off the alarm. If the snooze option is selected it will then go back to the main screen until the alarm goes off again. The snooze length is set in advanced alarm options in the settings menu. If the user chooses cancel the alarm will be turned of and the clock will return to the main 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. /* I forget how to select station */. 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 that need to be set. Time will be initially set, data will be initially set as well as some alarm options. It will take the user on a brief tour of the system and tell them how the system works.

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 of the buttons on the remote. The Clock will also respond to the 3rd party bed sensor. In the main menu the up and down arrows will adjust the volume, the numbers 0-9 will change the radio station to the preset radio station and 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 be scan on 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 and 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 main screen. It displays the time and date. It also has the volume, radio station and alarm indicator on the top of the screen // Screen picture. The next screen is the settings menu. The settings menu has all the different sub menu, like alarm settings and radio settings // Setting pic. The next screen is the radio screen. The radio screen has the radio station that it is currently set to in the center info about the song playing below (if available by the radio station). It also has the time volume and alarm indicator on the top of the screen. Another screen is the alarm screen. The alarm screen display a box the asks you if you want to dismiss the alarm.

3.8 Additional comments

Appendixes

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