

Software Modeling
Modeling and Implementation Phase

“Radio Simulation”

- Diagrams -

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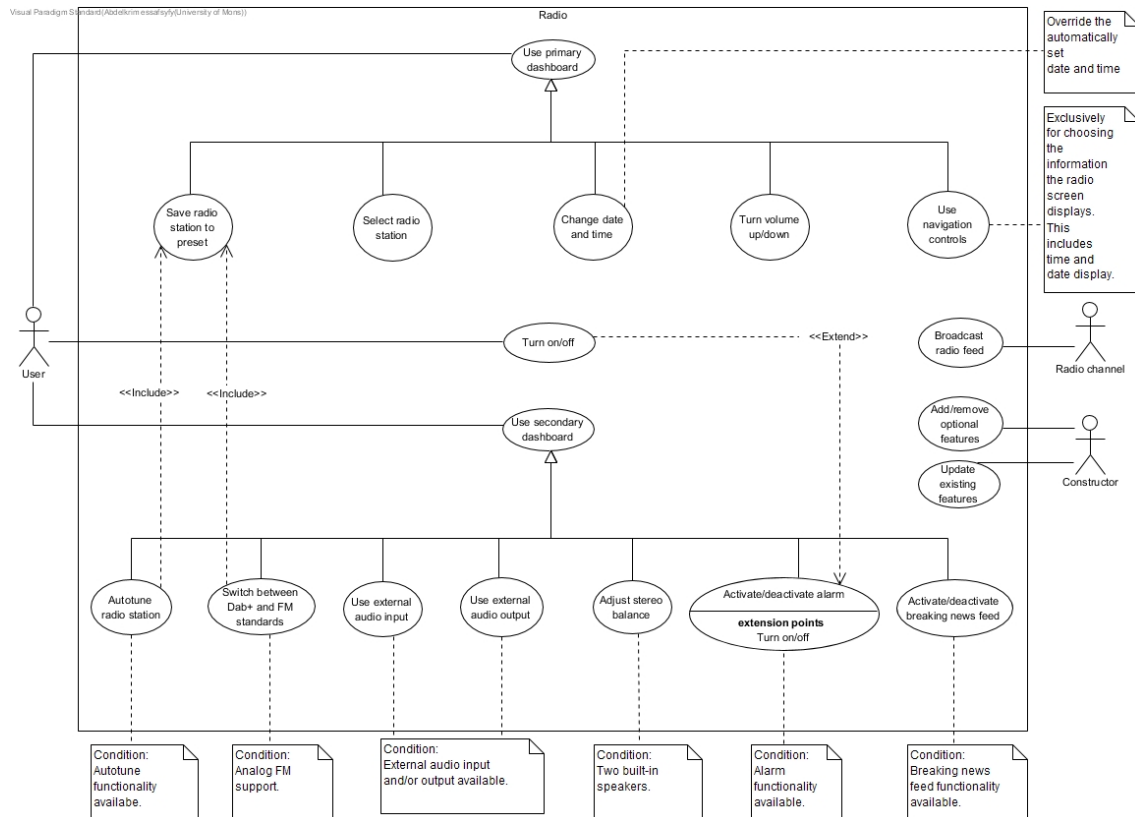
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1 Use case diagram

1.1 Diagram



1.2 Use cases' description

1.2.1 Turn on/off

Use case name: Turn on/off

Summary: Allows the user to turn the radio on or off.

Actors: User.

Assumptions: Radio has access to a power source.

Preconditions: Radio is plugged in.

Basic course of action:

1. User presses power button on.
2. Radio is powered on.

Postconditions: The power button is functional.

Alternate courses :

2a : Radio is powered off.

1.2.2 Use primary dashboard

Use case name: Use primary dashboard

Summary: An abstract use case that allows the user to use the primary radio functionalities. Every specialization of this use case inherits its actors, assumptions, preconditions and postconditions.

Actors: User.

Assumptions: Radio is plugged in.

Preconditions: Radio is powered on.

Basic course of action:

1. User chooses to use one of the available functionalites.

1.2.3 Turn volume up/down

Use case name: Turn volume up/down

Summary: Allows the user to turn the radio's volume up or down.

Actors: User.

Assumptions Same as parent.

Preconditions: Radio is powered on.

Basic course of action:

1. User turns the know left or right to adjust the volume.
2. Radio changes the volume accordingly.

Alternate courses:

- 2a. The knob is damaged, the radio does not change the volume.

1.2.4 Select radio station

Use case name: Select radio station

Summary: Allows the user to select a radio station using a knob

Actors: User

Assumptions: Same as parent

Preconditions: Radio is powered on

Basic course of action:

1. User turns knob until signal is good enough to produce sound
2. Radio plays radio station according to frequency

Alternate courses:

- 1a. User clicks one of the preset buttons
 - 1a1. No station is saved into the pressed preset
 - 1b. Signal received is not good enough
 - 1c. Preset button is damaged, the radio doesn't play
-

1.2.5 Use navigation controls

Use case name: Use navigation controls

Summary: Allows the user to change the display's content depending on its size.

Actors: User

Assumptions: Same as parent

Preconditions: Radio is turned on

Basic course of action:

1. User uses navigation controls (Up, down, left, right) to choose what type of information is displayed on the screen.
2. Radio changes the display's content accordingly

Alternate courses:

- 1a. The navigation controls are damaged, the user is unable to choose the type of information the screen displays
-

1.2.6 Change date and time

Use case name: Change date and time

Summary: Allows the user to change the date and time of the radio

Actors: User

Assumptions: Same as parent

Preconditions: Radio is turned on

Basic course of action:

1. User changes date and time using navigation controls (see use case: navigation controls)

Alternate courses:

- 1a. Navigation controls are damaged, the user is unable to change the date and time.
-

1.2.7 Save radio station to preset

Use case name: Save radio station to preset

Summary: Allows the user to save the currently playing radio station to one of the free 9 available presets

Actors: User

Assumptions: Same as parent

Preconditions: Radio station is playing

Basic course of action:

1. User clicks on a preset button
2. Radio saves the currently playing station to the selected preset

Alternate courses:

- 1a. The selected preset already has a saved station
 - 1a1. The radio overrides the old station with the new one
 - 1b. The selected preset is damaged, the station is not saved
 - 1c. No free presets are available
-

1.2.8 Use secondary dashboard

Use case name: Use secondary dashboard

Summary: An abstract use case that allows the user to use the secondary (optional) radio functionalities. Every specialization of this use case inherits its actors, assumptions, preconditions and postconditions.

Actors: User.

Assumptions: Radio is plugged in.

Preconditions: Radio is powered on.

Basic course of action:

1. User chooses to use one of the available functionalities.

1.2.9 Use external audio input

Use case name: Use external audio input

Summary: Allows the user to plug in an external audio input allowing the radio to receive sound from an external device.

Actors: User

Assumptions: Same as parent

Preconditions: External audio input functionality present

Basic course of action:

1. User establishes connection (USB, audio jack or bluetooth, ...) with the radio
2. Radio detects the external audio input
3. Radio starts playing audio from external device

Alternate courses:

- 1a. User's device is damaged, unable to establish connection
- 2a. External audio input connector is damaged, the radio is unable to detect the device.
- 3a. External device has no audio stored within, the radio doesn't play any sound.

1.2.10 Use external audio output

Use case name: Use external audio output

Summary: Allows the user to plug in an external audio output allowing the radio to redirect the sound to external speakers

Actors: User

Assumptions: Same as parent

Preconditions: External audio output functionality present

Basic course of action:

1. User establishes connection (audio jack or bluetooth) with the radio
2. Radio detects the external audio output
3. Audio is played in the external device from the radio

Alternate courses:

- 1a. User's device is damaged, unable to establish connection
 - 2a. External audio output connector is damaged, the radio is unable to detect the device.
 - 3a. External device is damaged, unable to play audio from the radio
-

1.2.11 Adjust stereo balance

Use case name: Use external audio output

Summary: Allows the user adjust stereo balance by turning a knob which controls the output volume between the left and right speaker

Actors: User

Assumptions: Same as parent

Preconditions: Radio has two built-in speakers

Basic course of action:

1. User turns the knob left or right
2. Radio adjusts the stereo balance accordingly

Alternate courses:

- 2a. Stereo balance knob is damaged, no audio change will result
-

1.2.12 Activate/deactivate breaking news feed

Use case name: Activate/deactivate breaking news feed

Summary: Allows the user to enable or disable current station's breaking news display

Actors: User

Assumptions: Same as parent

Preconditions: Breaking news functionality available

Basic course of action:

1. User enables/disables breaking news functionality
2. Radio stations is playing and sudden breaking news are received
3. Radio displays breaking news if the user has set it to do so

Alternate courses:

- 2a. No breaking news are received
 - 3a. Breaking news functionality encounters an issues, thus the information is not received
 - 3b. Breaking news functionality encounters an issues, thus the information is not displayed
-

1.2.13 Switch between DAB+ and FM

Use case name: Use external audio output

Summary: Allows the user to switch between DAB+ and FM radio standards

Actors: User

Assumptions: Same as parent

Preconditions: Radio has analog FM support

Basic course of action:

1. User switches between DAB+ and FM standards using a switch
2. Radio switches to the selected standard

Alternate courses:

- 1a. The switch is damaged, the user is stuck with the default (or last used) standard
-

1.2.14 Autotune radio station

Use case name: Autotune radio station

Summary: Allows the user to use autotune functionality which will automatically search for all available radio stations and will store them in its internal memory in the order they were found until all memory locations are filled or until no more radio stations are found

Actors: User

Assumptions: Same as parent

Preconditions: Radio has autotune functionality

Basic course of action:

1. User activate autotune functionality using a button
2. Radio scans for all the stations available with good quality
3. Radio stores the fetched stations into its internal memory

Alternate courses:

- 1a. Autotune button is damaged, the functionality is unavailable
- 2a. No stations with good enough quality is found
- 2b. Radio's search functionality is damaged, it is unable to search for any station
- 3a. Radio's internal memory is damaged, no stations are stored

1.2.15 Activate/deactivate alarm

Use case name: Activate/deactivate alarm

Summary: Allows the user to set, activate and deactivate the alarm functionality

Actors: User

Assumptions: Same as parent

Preconditions: Radio has alarm functionality

Basic course of action:

1. User sets alarm time
2. User activate the alarm
3. Alarm rings at the programmed time, when the radio is on
4. User deactivates the alarm

Alternate courses:

- 1a. Alarm functionality is damaged, the user cannot set, activate or deactivate it
- 2a. Same as '1a'
- 3a. Radio turns on at the programmed time, when the radio is idle
 - 3a1. Last selected radio station starts playing
 - 3a2. Normal alarm sound

1.2.16 Broadcast radio feed

Use case name: Broadcast radio feed

Summary: Allows the radio channel to broadcast its radio feed

Actors: Radio channel

Preconditions: Radio channel is active

Basic course of action:

1. Radio channel broadcasts its feed via a certain frequency
2. All radios tuning into said frequency receive the radio broadcast

Alternate courses:

- 1a. The chosen frequency is unavailable (already reserved by another radio station, ...)
 - 2b. The signal is weak, few to no radios receive the signal
-

1.2.17 Add/remove optional features

Use case name: Add/remove optional features

Summary: Radio constructor adds or removes radio optional features

Actors: Constructor

Preconditions: Current radio version has not been abandoned

Basic course of action:

1. Constructor adds/removes one or more optional features
2. Constructor test the change and verifies radio integrity
3. New radio version is commercialized

Alternate courses:

- 2a. No testing is done, resulting in issue within the radio
 - 3a. Radio has flaws and is then submitted to testing (2.)
-

1.2.18 Update existing features

Use case name: Update existing features

Summary: Radio constructor updates radio firmware which in return updates functionalities.

Actors: Constructor

Preconditions: Current radio version has not been abandoned

Basic course of action:

1. Constructor updates firmware
2. One or more features are updated
3. Constructor test the change and verifies radio integrity
4. New radio update is uploaded
5. Radio automatically updates to the latest firmware

Alternate courses:

- 2a. No features have been updated (beta testing, improved other aspects, ...) 3a. No testing is done, resulting in issue within the radio
- 3b. Radio has flaws and is then submitted to testing (3.)

2 Class diagram

DESCRIPTION HERE.

3 Object diagram

DESCRIPTION HERE.

4 State diagrams

INTRODUCTION HERE

4.1 Diagram 1

DESCRIPTION HERE.

4.2 Diagram 2

DESCRIPTION HERE.

4.3 Diagram 3

DESCRIPTION HERE.

5 Sequence diagrams

INTRODUCTION HERE.

5.1 Diagram 1

DESCRIPTION HERE.

5.2 Diagram 2

DESCRIPTION HERE.

6 Activity diagram

DESCRIPTION HERE.

If need be, a link to the git repository used for this project:

<https://github.com/Virtuosek/Radio>