# SUPPLEMENTARY SPECIFICATION

*Dual-Alarm AM/FM Clock Radio*

## Introduction

This document is the repository of all requirements of the Dual-Alarm AM/FM Clock Radio not captured in the use cases.

## Functionality

This device has several functions that should be carried out for the efficiency of the product and the satisfaction of the customer:

- An operational power switch. Everything but the time counter components and the stored alarm data are deactivated.

- The ability to manually set the time if time signatures in radio transmissions cannot be received.

- The ability to set the time and type (buzz or radio station) of a number of 2 alarms and cancel them at will.

- The ability to power off and on the radio receiver.

- The ability to delay or deactivate an activated alarm (Snooze/Sleep).

- Controls to the radio receiver (Band/Tuning).

- The ability to manipulate the volume of alarms and radio.

- The ability for the software to translate the crystal oscillator frequency into counting time and manipulate the LED display accordingly.

- The ability to change the color and brightness of the LED lights.

## Usability

### Human Factors

The user uses this product as a time-telling, radio device. Therefore, this device should:

- Create a precise, calibrated clock signal for digital integrated circuits.

- Stabilize frequencies for radio receiver.

- Provide a large, bright digital representation of time that is easily visible from at least 15 feet.

- Produce a max volume of 70-80dB and a minimum volume of 0db (mute).

Satisfaction of product performance and capabilities is essential in the reputation of the engineers, the funding company, and the product itself. The device should be operational on any setting that the user may select.

## Reliability

### Recoverability

If the AC power source is unavailable, either by outage or disconnection, the backup battery included should keep the operating counter running and preserve the data for saved alarms to prevent the need to reset time and alarms upon the return of external power. This battery is steadily changed back to its potential upon this return.

## Performance

As noted in Usability, satisfaction of product performance and capabilities is essential in the reputation of the engineers, the funding company, and the product itself. The device should be functional continuously on any setting or configuration on the user's part. Any change instigated by the user should be nearly instantaneous.

## Supportability

### Configurability

Based on different customer preferences on the prefect alarm clock, the device is configurable on several levels. The display color can be changed and its brightness heightened or lowered to the customer's comfort, as well as volume. The alarms are easily set and offer the option of producing a buzzer sound or a choice of radio station. The inclusion of a radio receiver gives the luxury of various station on AM and FM radio waves.

## Design Constraints

### Manufacturing and Economic Constraints

The constraints on the production of this device depends on the economy and performance around the production and sale of the components, and the cost of assembly and transport. Production should continue and increase if production cost remains steady and within acceptable budget of the product's income.

### Timing Constraints

As this device is currently in the Elaboration Iteration of this device, there is still a significant amount of time to account for in this development. A schedule will be developed on the authorization of this product.

### Aesthetic Constraints

The product should have an appealing and efficient outer design for customer appreciation.

## Purchased Components

- All hardware required for the production of this product (See *Interfaces*).

## Interfaces

### Noteworthy Hardware and Interfaces

- AC Plug for 120V 60Hz AC power only.
- Seven-segment LED for each of four digits and two LED for time colon.
- Prefboard.
- 32,768Hz crystal oscillator and clock IC.
- Twelve buttons, three knobs, two wheels, and one switch, all of plastic material and of varying sizes.
- Two stereo speakers.
- A radio receiver and antenna
- Transistors, resistors, voltage regulator, and uF caps.

### Software Interfaces

- Programmed single-chip microcontroller.

## Legal Issues

The components necessary for the production must be credited and documented for any possible failures, disputes, or accidents that may occur while the product is in use.