Software Requirement Analysis for Digital Watch System

Project Team

T3 Team

Date

2019-10-27

Team Information

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1 Introduction

1.1 Purpose

Digital watch System에서 사용할 수 있는 SW를 구현하기 위한 요구사항을 명세한 문서입니다.

1.2 Scope

1.2.1 개발팀

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1.2.2 제한사항

손목시계와 연동까지 고려하지 않고, SW로만 구동할 수 있도록 한다.

1.2.3 제품의 활용도

개발이 완료된 후 실제 손목시계의 SWf를 개발하기 위한 프로토타입으로 삼을 수 있다.

1.2.4 개발환경

IDE: Eclipse, Text editor

Compiler: GCC (MinGW, Cygwin)

1.3 Definition, acronyms, and abbreviations

SW: Software

HW: Hardware

1.4 Reference

IEEE Std. 830-1998

1.5 Overview

2 Overall Description

2.1 Product Perspective

대상 제품은 실제 손목시계에 사용될 수 있는 제품이 될 수 있다. HW(버튼)에 의한 동

작을 처리하고, 처리한 결과는 HW(화면)에 출력한다. 실제 HW에 의한 동작은 SW및 console화면으로 처리하여, 기능의 동작 유무를 확인하도록 한다. 시계 HW는 4개의 버튼과 LCD화면을 가진 것으로 한다.

2.2 Product functions

2.2.1 Date-Time

화면에 일자와 시간을 표시한다.
오후 시간 표시는 24시로 한다.

2.2.2 Stopwatch

시간의 경과를 알려주고, 특정 순간의 시간을 알려준다.
1/100초 단위로 측정이 가능하다.
Lap time 기록이 가능하다.

2.2.3 Backlight

출력하는 문자의 색깔을 노란색으로 표시한다

2.2.4 Alarm

Alarm이 설정되면, Alarm indicator가 켜진다
정해놓은 시간에 소리(beep 음)로 알려준다.
알람은 5초간 울린다.
알람이 울릴 때 A, B, C, D 중 아무 버튼을 누르면 소리가 꺼진다.

2.3 User characteristics

2.4 Constraints

날짜의 표기법은 '월-일'이다.
초기 시간은 2019년 01월 01일 00시 00분 00초이다.
2019-1-1 부터 2099년까지 표시가 가능하다.
알람을 설정할 때 시, 분은 반드시 설정해야 한다

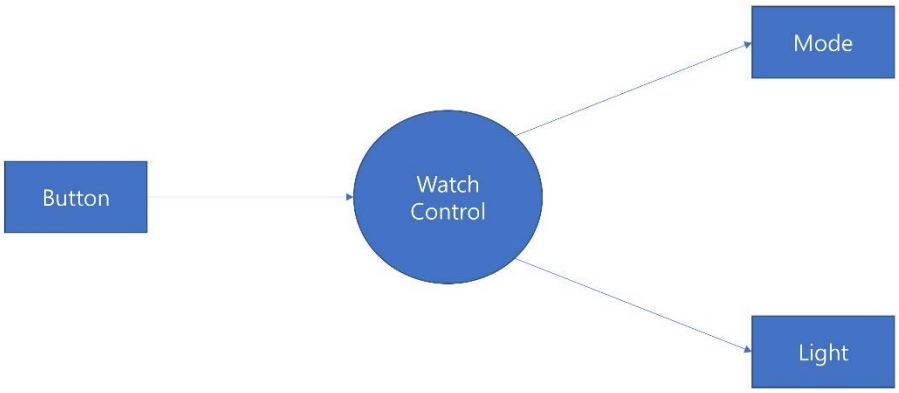
2.5 Assumptions and dependencies

버튼입력은 키보드 입력으로 대신한다.
버튼이 여러 개 입력되었을 때, 우선순위는 D>C>B>A 이다.

3 Structured Analysis

3.1 System Context Diagram

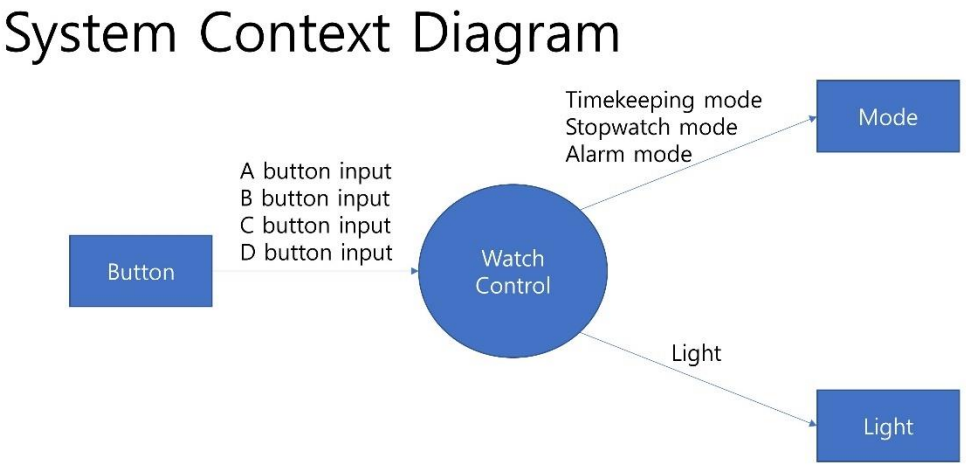
3.1.1 Basic System Context Diagram



3.1.2 Event List

Input/Output Event	Description
A Button Input	Tells whether button A is pressed
B Button Input	Tells whether button B is pressed
C Button Input	Tells whether button C is pressed
D Button Input	Tells whether button D is pressed
Timekeeping Mode	ExecuteTimekeeping Mode process
Stopwatch Mode	Execute Stopwatch Mode process
Alarm Mode	Execute Alarm Mode process
Light	Turn on Backlight for 2 seconds

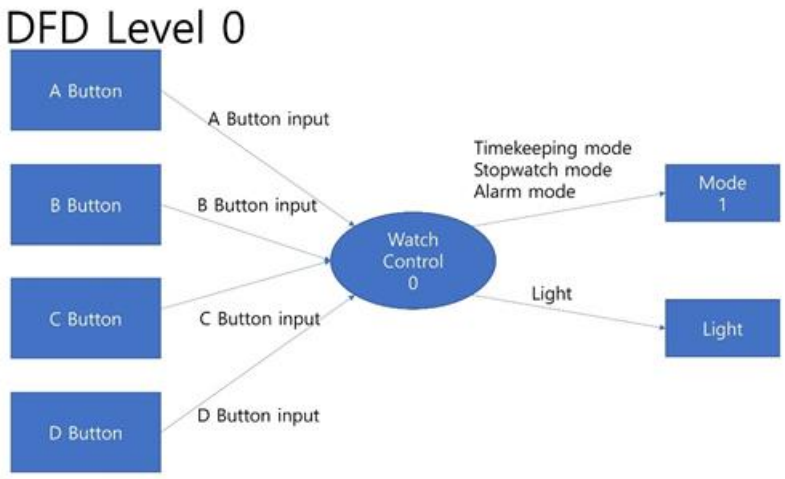
3.1.3 The System Context Diagram



3.2 Data Flow Diagram

3.2.1 DFD level 0

3.2.1.1 DFD



3.2.1.2 Process Specification

3.2.1.2.1 Process 0

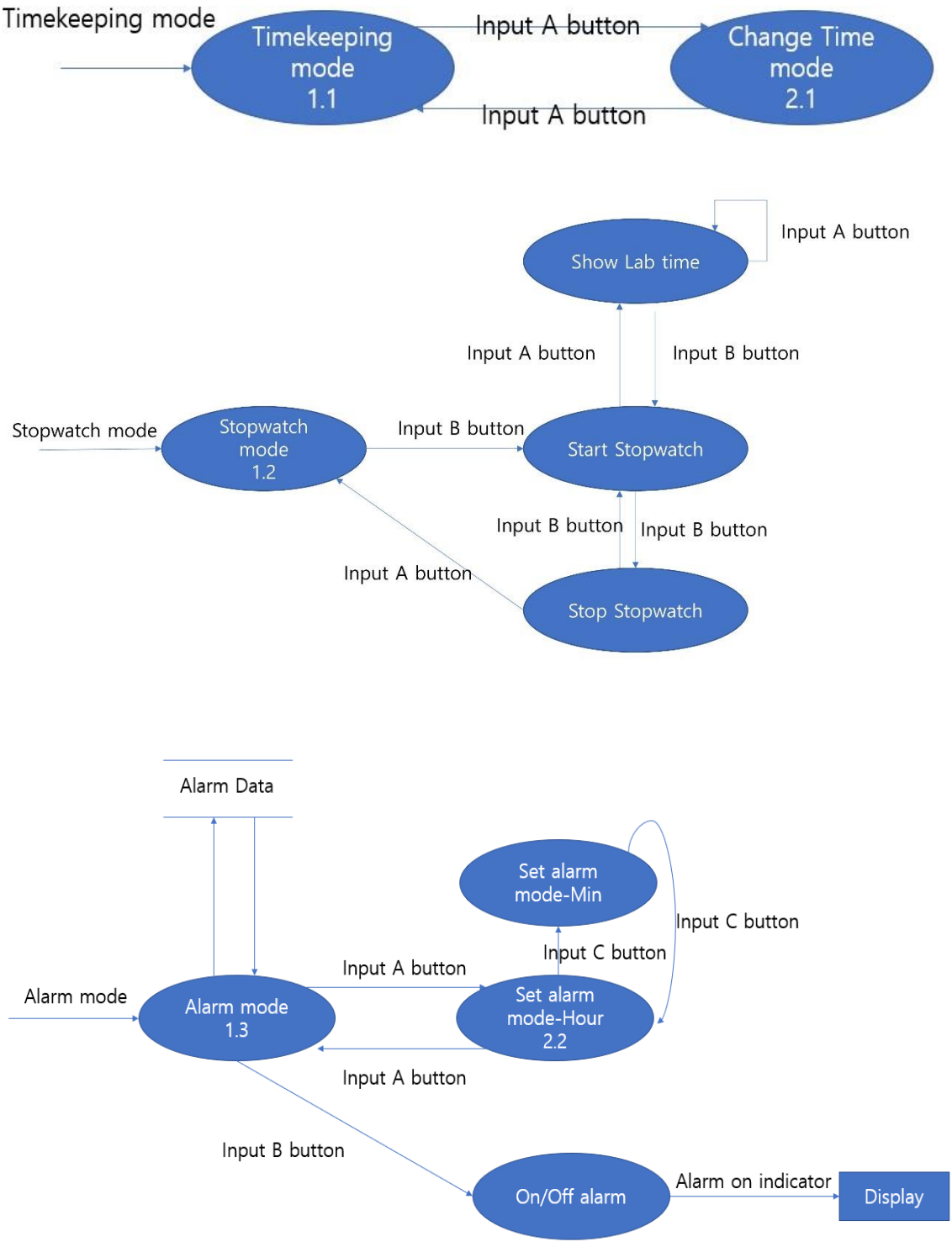
Reference No.	0
Name	Watch control
Input	A Button input, B Button input, C Button input, D Button input,
Output	Timekeeping mode, Stopwatch mode, Alarm mode, Light
Process Description	A, B, C 버튼에 알맞은 모드로 변경 D버튼에 의한 Light 동작

3.2.1.3 Data Dictionary

Input/Output Event	Description	Format/Type
A Button Input	Tells whether button A is pressed	True/false, Periodic
B Button Input	Tells whether button B is pressed	True/false, Periodic
C Button Input	Tells whether button C is pressed	True/false, Periodic
D Button Input	Tells whether button D is pressed	True/false, Periodic
Timekeeping Mode	Execute Timekeeping Mode process	Integer, String
Stopwatch Mode	Execute Stopwatch Mode process	Integer, String
Alarm Mode	Execute Alarm Mode process	Integer, String
Light	Turn on Backlight for 2 seconds	Trigger

3.2.2 DFD Level 1

3.2.2.1 DFD



3.2.2.2 Process Specification

3.2.2.2.1 Process 1.1

Reference No.	1.1
Name	Timekeeping Mode
Input	Timekeeping Mode
Output	Input A Button
Process Description	It receives button string and check if this string equals to 'A'. If right, it sends string to Change Time Mode process. It shows current time in watch device.

3.2.2.2.2 Process 1.2

Reference No.	1.2
Name	Stopwatch Mode
Input	Stopwatch Mode
Output	Input B button
Process Description	It receives button string and check if this string equals to 'B'. If right, it sends string to Start Stopwatch process. It shows Stopwatch time values in watch device.

3.2.2.2.3 Process 1.3

Reference No.	1.3
Name	Alarm Mode
Input	Alarm Mode
Output	Input A Button
Process Description	It receives button string and check if this string equals to 'A'. If right, it sends string to Set alarm mode-Hour process. It shows Alarm time values in watch device.

3.2.2.2.4 Process 2.1

Reference No.	2.1
Name	Change Time Mode
Input	Input A button
Output	Input A Button
Process Description	It receives button string and check if this string equals to 'A'. If right, it sends string to Change Time Mode process. It change time values in Timekeeping Mode.

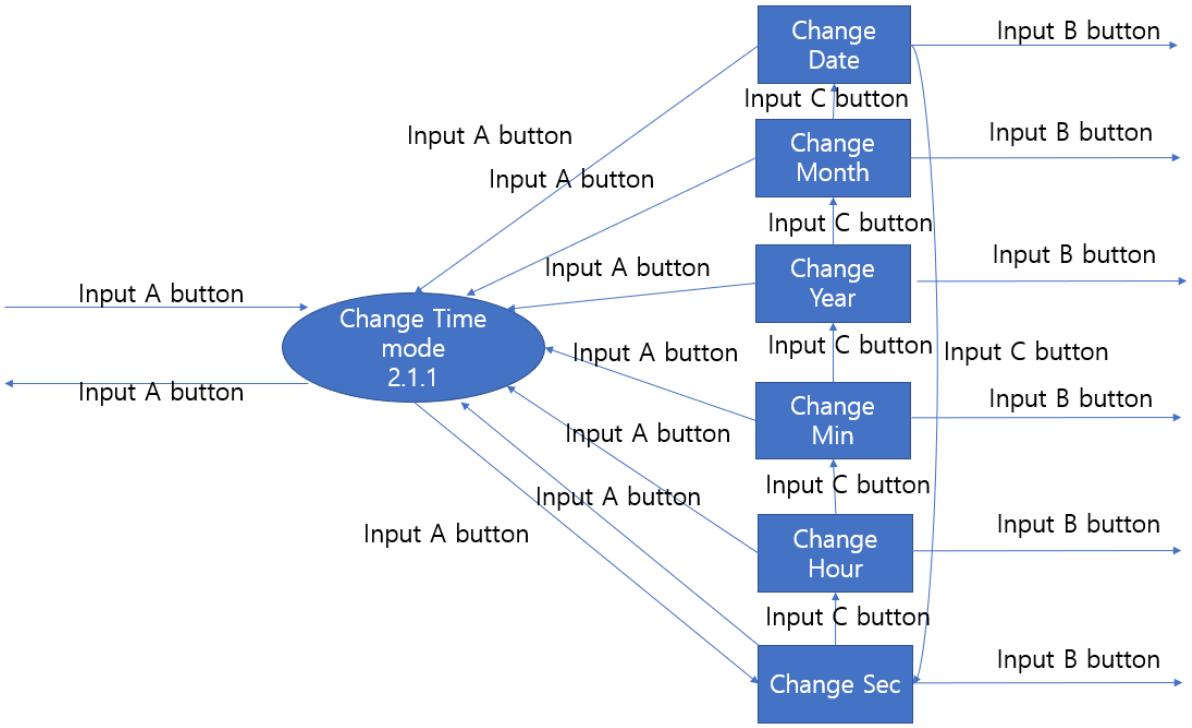
3.2.2.2.5 Process 2.2

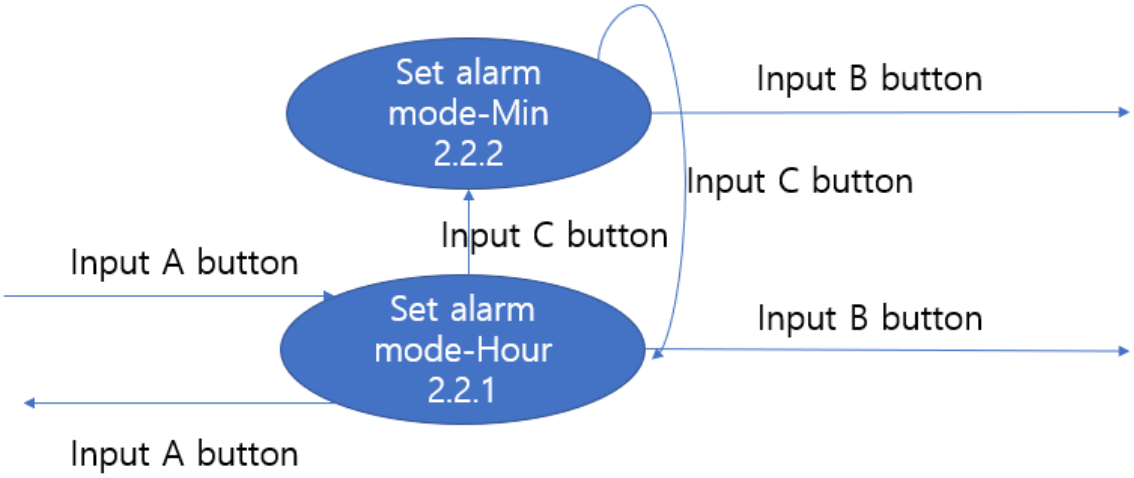
Reference No.	2.2
Name	Set Alarm Mode-Hour
Input	Input A Button
Output	Input C Button
Process Description	It receives button string and check if this string equals to 'C'. If right, it sends string to Set Alarm Mode-Min process. If Input equals to 'B', It adds 1 to value at Hour section.

3.2.2.3 Data Dictionary

3.2.3 DFD Level 2

3.2.3.1 DFD





3.2.3.2 Process Specification

3.2.3.2.1 Process 2.1.1

Reference No.	2.2.1
Name	Set Alarm Mode-Hour
Input	Input A Button
Output	Input C Button
Process Description	It receives button string and check if this string equals to 'C'. If right, it sends string to Set Alarm Mode-Min process. If Input value equals to 'B', It adds 1 to value at Hour section.

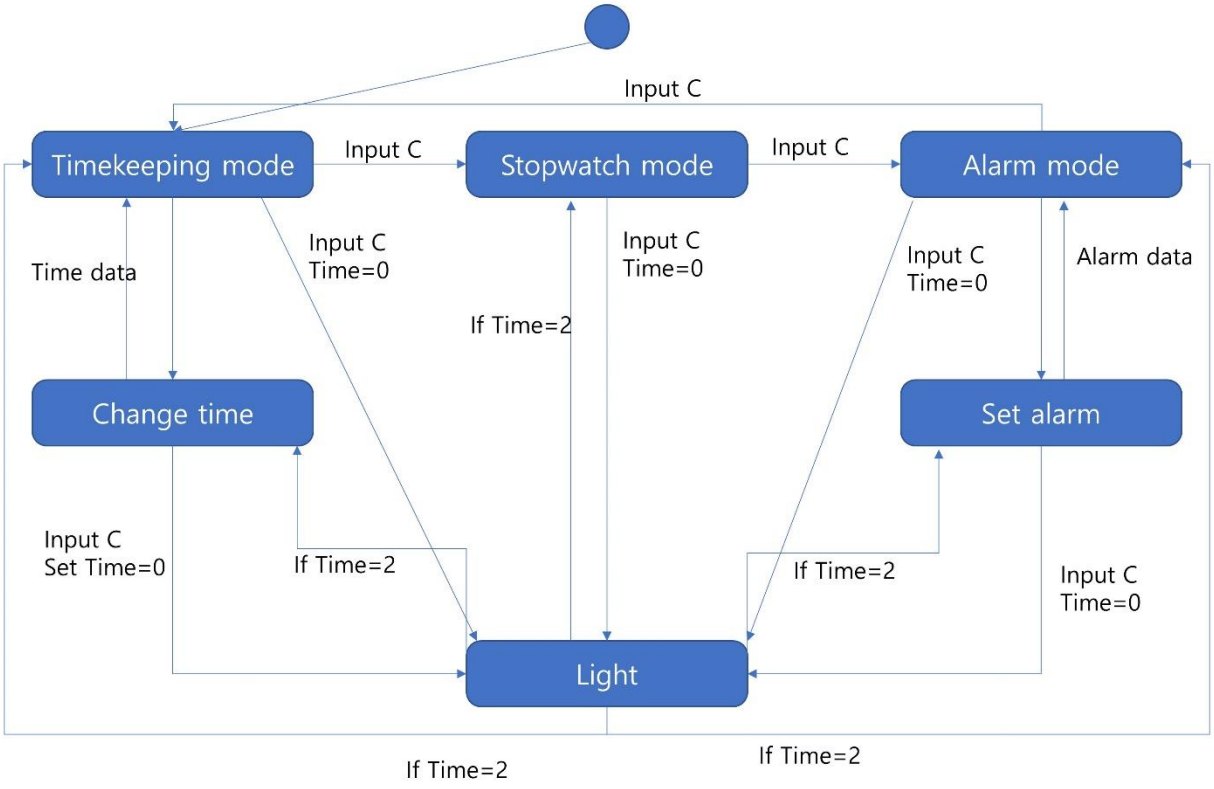
3.2.3.2.2 Process 2.2.1

Reference No.	2.1.1
Name	Change Time Mode
Input	Input A Button
Output	Input A Button
Process Description	It receives button string and check if this string equals to 'A'. If right, it sends string to Change Sec process. It shows current time.

3.2.3.2.3 Process 2.2.2

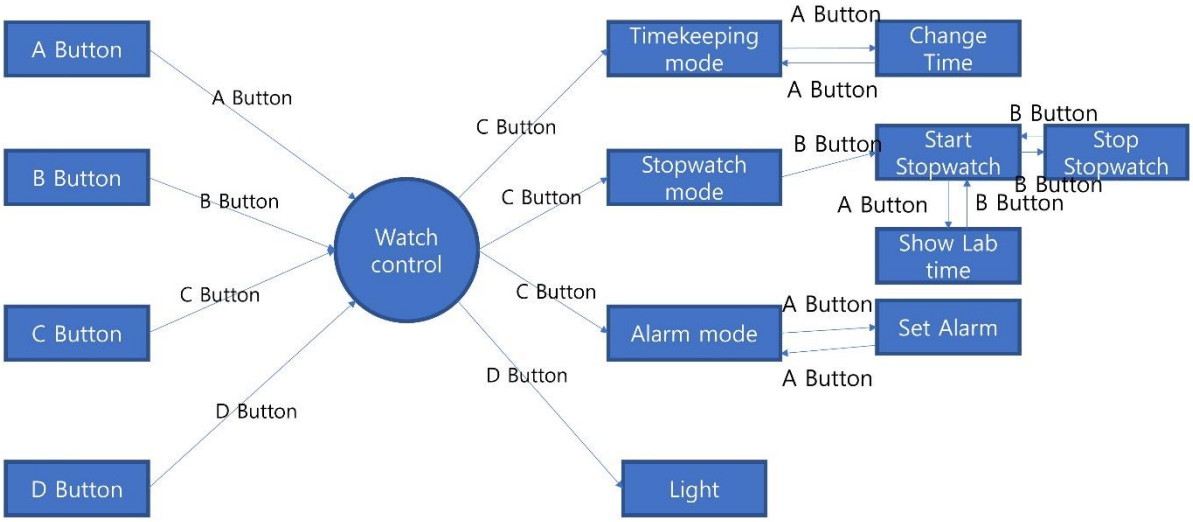
Reference No.	2.2.2
Name	Set Alarm Mode-Min
Input	Input C Button
Output	Input B Button
Process Description	It receives button string and check if this string equals to 'C'. If right, it sends string to Set Alarm Mode-Hour process. If Input value equals to 'B', It adds 1 to value at Min section

3.2.3.3 State Transition Diagram (*Name of Controller*)



3.2.4 Overall DFD

Overall DFD


A Button
B Button
C Button
D Button
A Button
B Button
C Button
D Button
Watch control
C Button
C Button
C Button
D Button
Timekeeping mode
Stopwatch mode
Alarm mode
Light
A Button
A Button
Change Time
B Button
B Button
Start Stopwatch
Stop Stopwatch
B Button
A Button
B Button
Show Lab time
A Button
A Button
Set Alarm