

# Overview Document – Hollis9563426

## I) Functionality

The working functionality of the Hollis9563426 alarm-clock written in C on the PIC18F8722 architecture using the UoM IO Board is summarised in the following table:

Functionality	User access
Display time & date (default display)	SW7 - Displays date if on, else displays time
Set current time & date	SW6 - Set time function is run if on, else displays default clock display
Set manual alarm time & date	SW5 - Set alarm function is run if on, else displays default clock display
Manual alarm	SW4 - Enabled if on, disabled if off.
Automatic light triggered alarm	SW3 - Enabled if on, disabled if off.
Automatic heat triggered alarm	SW2 - Enabled if on, disabled if off
Alarm type selector	SW1 - Complex alarm if on, simple alarm if off
Basic stopwatch	SW0 - Stopwatch function is run if on, else displays default clock display

*Note: SW means the toggle switches 0 through to 7 on the UoM IO Board.*

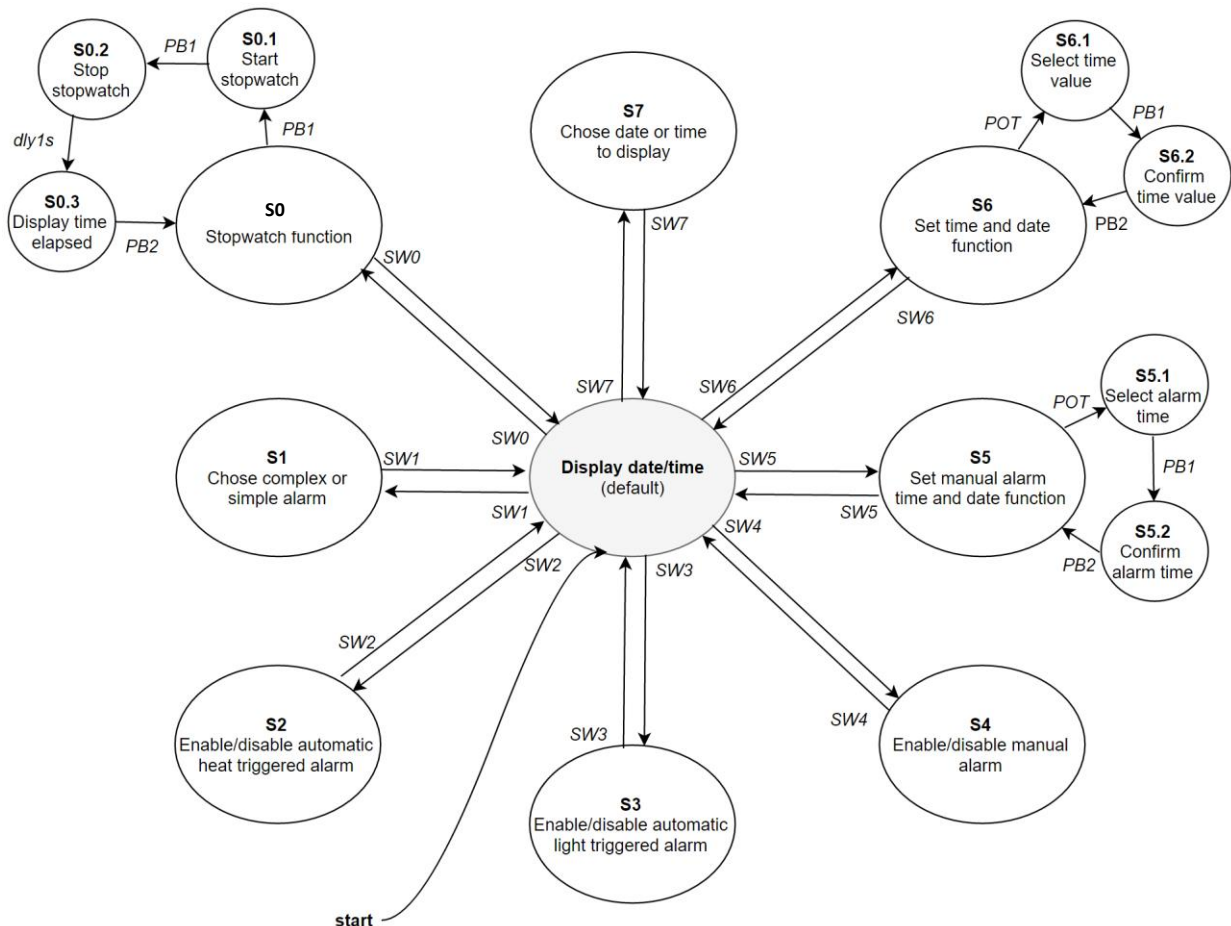
- All functionalities are enabled, in any combination, through the intuitive user friendly operation of the switch bank. This allows for a simple, nearly manual free, operation of the clock, custom fit to the user.
- The first function (SW7) is the default state of the clock that will always be displayed unless another functionality is desired and chosen from the other switches. It flicks through either the date (year, month & day) or the time (hour, minute & second). Each unit is displayed for two seconds before moving onto the next unit. The current unit is indicated by an LED that moves down the LED bank as the clocks runs through the units of the time or the date.
- The set time function (SW6) allows the user to set the date and time of the clock to the current time. This is done in the most intuitive way possible by turning the potentiometer knob and hitting PB1 to confirm and PB2 to return to main menu. Leap years are implemented and a full calendar is programmed into the clock so users won't have to worry about resetting it either.
- Similarly, a single manual non-repeating alarm can be implemented in the set manual alarm function (SW5) with the exact same combination of potentiometer knob and push buttons.
- This alarm can be saved for future use and enabled only when desired via the use of the manual alarm toggle option (SW4). This option allows the user to decide if they want a manual alarm or one of the other types of automated alarms.
- The first type of automated alarm is the light triggered alarm (SW3). Life is not all about work and on weekends the user may like to synchronise his natural bodily circadian rhythm to the rise of the sun. Simply enable the light triggered alarm functionality and wake up in tune with nature.

- The second type of automated alarm is the temperature triggered alarm (SW2). We all suffer from occasionally waking up a bit too early and having to face the biting cold of the house while walking to the shower, as the central heating is not yet turned on. This functionality enables the user to be awoken when the house is warm and ready for a smooth and stress-free walk to the shower or kitchen.
- The type of alarm can also be modified (SW1) from a simple, but effective, single tone ear-ache for the deep sleepers to a more complex, jovial and relaxing jam from The Boo Radleys - Wake Up Boo!
- Finally, the alarm-clock is capable of a basic stopwatch function (SW0) without losing track of current time using push button 1 to start/stop and push button 2 to return as before. You never know when you will set a new record for fastest time in the shower...

*Top Tip: Try combining light, temperature and complex alarms for the smoothest transition from Morpheus's arms to real life, every time.*

## II) State machine model

The state machine model of the clock is shown below:



From the above state machine diagram, it is clearly shown that nearly all functions are accessed by the flick of a single switch except for the more complex states (S0, S5, S6). However, even these states use the same combination of POT, PB1 and PB2 to navigate around the system. POT is used to set numerical values, PB1 is used to confirm, PB2 is used to return. PB1 is the equivalent of a right pointing continue button while PB2 is the equivalent of a left pointing return button.