**Static Analysis**

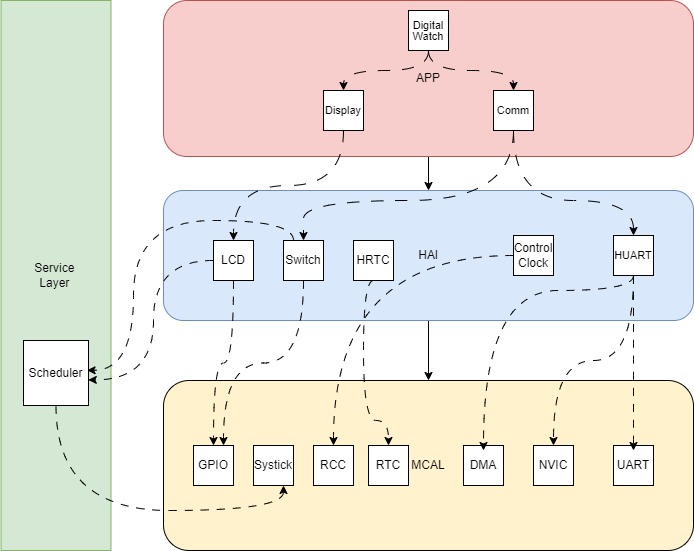
1. **System Overview**

**A Stopwatch / Watch application with the ability to be controlled**

**A diagram of a software

Description automatically generatedby 2 microcontrollers each Microcontroller has each switches and LCD**

1. **Layered Architecture**



1. **Hardware System Components**
   1. **2 Microcontroller STM32f401CC**
   2. **2 LCD 2x16**
   3. **6 Switches**
2. **API’s For Each Module**

|  |  |
| --- | --- |
| **RCC** | **RCC\_Enable\_AHB1\_Peripheral(uint32\_t Copy\_AHB2PeripheralName);** |
| **RCC\_Enable\_AHB2\_Peripheral(uint32\_t Copy\_AHB2PeripheralName)** |
| **RCC\_Enable\_APB1\_Peripheral(uint32\_t Copy\_AHB2PeripheralName)** |
| **RCC\_Enable\_APB2\_Peripheral(uint32\_t Copy\_AHB2PeripheralName)** |
| **SYSTICK** | **STK\_Start(void);** |
| **STK\_SetConfig(uint32\_t Copy\_Mode);** |
| **STK\_SetTimeMs(uint32\_t Copy\_TimeMs);** |
| **STK\_SetCallBack(STK\_CBF\_t Copy\_CallBack);** |
| **GPIO** | **GPIO\_InitPin (GPIO\_Config\_t \*Loc\_GPIOElement);** |
| **GPIO\_Set\_PinValue(void \*Port , uint32\_t Copy\_PinNum , uint32\_t Copy\_PinState );** |
| **GPIO\_Get\_GetPinValue(void \*Port , uint32\_t Copy\_PinNum, uint8\_t \* PinStatus) ;** |
| **GPIO\_Get\_GetPinValue(void \*Port , uint32\_t Copy\_PinNum, uint8\_t \* PinStatus) ;** |
| **NVIC** | **Enable\_NVIC\_IRQ(IRQn\_t IRQn);** |
| **Set\_Interrupt\_Priority(IRQn\_t IRQn, uint8\_t Copy\_PreemptGroup ,uint8\_t Copy\_SubpriorityGroup ,uint32\_t GroupPriority );** |
| **USART** | **USART\_Init(void);** |
| **USART\_Init(void);** |
| **USART\_GetByte(USART\_UserReq\_t\* Ptr\_UserReq);** |
| **USART\_TxBufferAsyncZeroCopy(USART\_UserReq\_t\* Ptr\_UserReq );** |
| **USART\_RxBufferAsyncZeroCopy(USART\_UserReq\_t\* Ptr\_UserReq );** |
| **SWITCH** | **HSwitch\_Init (void);** |
| **HSwitch\_Get\_Status(uint32\_t Copy\_HSwitchName , uint8\_t\* Ptr\_Status );** |
| **LCD** | **LCD\_Set\_CursorPosAsync(uint8\_t Copy\_LCDPosX , uint8\_t Copy\_LCDPosY );** |
| **LCD\_Get\_Status(uint8\_t\* Ptr\_LCDStatus);** |
| **LCD\_Clear\_ScreenAsync(void);** |
| **LCD\_Write\_StringAsync(const uint8\_t\* Ptr\_string, uint16\_t size);** |
| **LCD\_Write\_NUmberAsync(uint32\_t Copy\_Number);** |

1. **Messages**

|  |  |  |  |
| --- | --- | --- | --- |
| **MSG\_NAME** | **Increment /Reset** | **Mode** | **Edit/Start-Pause** |
| **MSG\_Value** | **0x10** | **0x20** | **0x30** |

1. **Switch Table**

|  |  |  |  |
| --- | --- | --- | --- |
| **MSG\_NAME** | **Increment /Reset** | **Mode** | **Edit/Start-Pause** |
| **MSG\_Value** | **0x10** | **0x20** | **0x30** |
| **Date & Time** | **None** | **Switch to Stopwatch** | **Edit Date and Time** |
| **Edit Date & Time** | **Increment Current Digit** | **Exit Edit and go to Show Date & Time** | **Move to next digit to edit it** |
| **Stopwatch** | **Reset Stopwatch** | **Switch to Date and Time** | **Start and pause Stopwatch** |
| **Pressing Mode with Edit/Start-Pause for 5 Sec will reset the whole system** | | | |