INPUTS

1. HR button
2. RR button
3. Crying button
4. Reset button
5. Checked button
6. Adjust Temp button
7. Temp Value button
8. Status button

OUTPUTS

1. Red LED
2. Yellow LED
3. White LED
4. Blue LED
5. Green LED
6. Serial Monitor

Inputs and outputs are either HIGH or LOW
and represented by 1 bit.

Timer1

We want ISR to be called every 0.5s (2 Hz)

- To update the systemTimer, even when no button is pressed

Using a prescaler of 256: timer counts up to 62,500 before overflow
(16,000,000 cycles per second / 256 = 62,500 cycles per second)

timer1_compare_match = [16,000,000 Hz / (256 * 2 Hz)] - 1 = 31249

Having ISR fire every half counter limit -> 2 Hz

Preload Timer1 with timer1_compare_match after each overflow, so that overflow interrupt is caused every 31249 ticks.

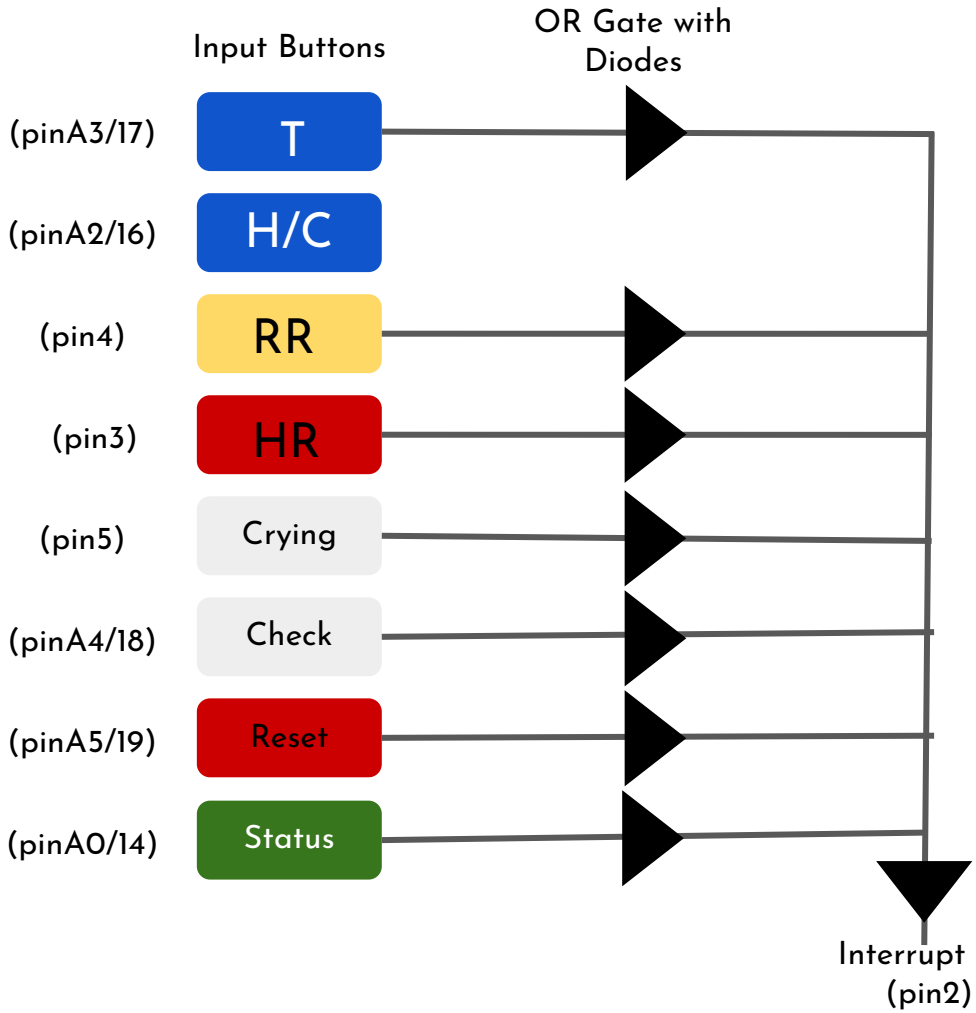
systemTimer

Incremented by 1 every 0.5s

Set to 0 on system start and incremented every timer interrupt call.

timer{?}

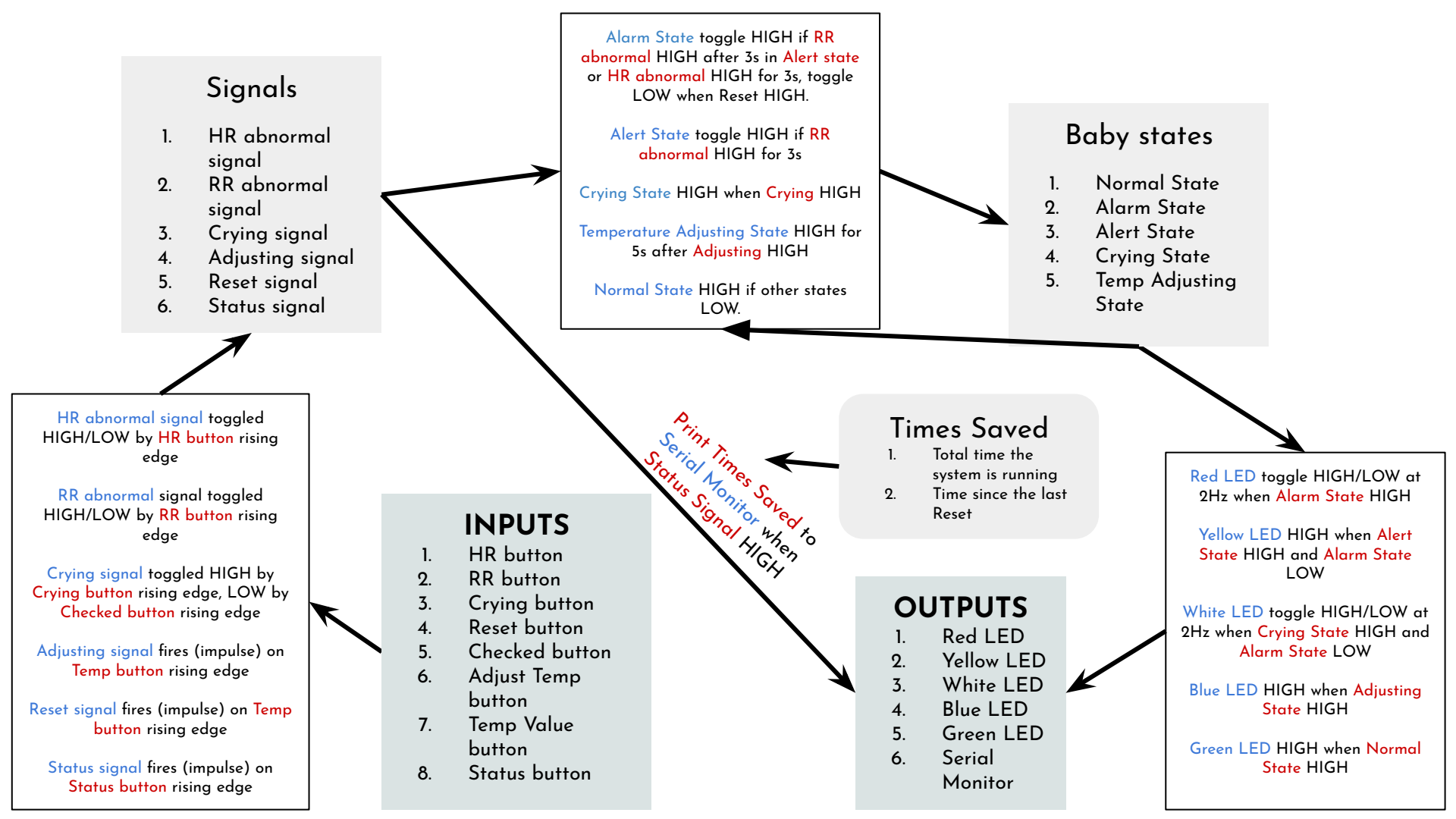
Timers are implemented by saving the value of systemTimer at start of timer, and then compared with the systemTimer at the endpoint to find the time since start.



When RISING,
enter hardwareISR()

hardwareISR() {
Determine which pin is HIGH with getPressedButton()

Set and reset flags and timers accordingly
}


Signals
1. HR abnormal signal
2. RR abnormal signal
3. Crying signal
4. Adjusting signal
5. Reset signal
6. Status signal
Alarm State toggle HIGH if RR abnormal HIGH after 3s in Alert state or HR abnormal HIGH for 3s, toggle LOW when Reset HIGH.
Alert State toggle HIGH if RR abnormal HIGH for 3s
Crying State HIGH when Crying HIGH
Temperature Adjusting State HIGH for 5s after Adjusting HIGH
Normal State HIGH if other states LOW.
Baby states
1. Normal State
2. Alarm State
3. Alert State
4. Crying State
5. Temp Adjusting State
HR abnormal signal toggled HIGH/LOW by HR button rising edge
RR abnormal signal toggled HIGH/LOW by RR button rising edge
Crying signal toggled HIGH by Crying button rising edge, LOW by Checked button rising edge
Adjusting signal fires (impulse) on Temp button rising edge
Reset signal fires (impulse) on Temp button rising edge
Status signal fires (impulse) on Status button rising edge
INPUTS
1. HR button
2. RR button
3. Crying button
4. Reset button
5. Checked button
6. Adjust Temp button
7. Temp Value button
8. Status button
Print Times Saved to Serial Monitor when Status Signal HIGH
Times Saved
1. Total time the system is running
2. Time since the last Reset
OUTPUTS
1. Red LED
2. Yellow LED
3. White LED
4. Blue LED
5. Green LED
6. Serial Monitor
Red LED toggle HIGH/LOW at 2Hz when Alarm State HIGH
Yellow LED HIGH when Alert State HIGH and Alarm State LOW
White LED toggle HIGH/LOW at 2Hz when Crying State HIGH and Alarm State LOW
Blue LED HIGH when Adjusting State HIGH
Green LED HIGH when Normal State HIGH