

# Using the Time Base Function in the HT47R20A-1

D/N : HA0029E

## Introduction

The HT47 series MCU time base can provide a periodical time-out time signal to produce a regular internal interrupt. The time base clock source can be chosen by configuration options as either the WDT clock, RTC clock or system clock/4. The time-out can be chosen to have a range of clock source/ $2^{12}$  ~ clock source/ $2^{15}$ . When the time-base emits a time-out signal its corresponding flag, the TBF flag, will be set to "1". If its corresponding interrupt is enabled, a jump to its related vector at address 08H, will occur.

If the time base clock source is either the WDT clock or the RTC, it will continue counting even if the system is in the HALT mode. However, if the clock source is the system clock/4, the time base will stop counting when the system is in the HALT mode.

Time base overflow cycle table

Time Base Overflow Cycle	Clock Source		
	12kHz (WDTCLK)	32768Hz (RTC)	System Frequency/4
Clock source/ $2^{12}$	341.33 ms	125 ms	34.133 ms
Clock source/ $2^{13}$	682.66 ms	250 ms	68.266 ms
Clock source/ $2^{14}$	1365.33 ms	500 ms	136.533 ms
Clock source/ $2^{15}$	2730.66 ms	1000 ms	273.066 ms

Note: System clock is 480kHz

for the HT47R20A-1 a clock source of 12kHz, T1 or 32768Hz may be chosen.

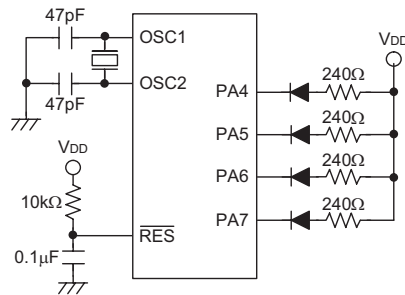
for the HT47C20L the clock source is 32768Hz

## Time Base Usage

The function of the time base is very similar to that of the Real Time Clock. The difference lies in the fact that the time-out cycle of the Real Time Clock is determined by software while the Time Base is determined by configuration options.

- Hardware:

PA4~PA7 connect individually to the LEDs as shown below :



- Configuration options:

Set the clock source as 32kHz(RTC)

Set the Time Base period as  $\text{clock source}/2^{15}$

- Software:

The following program shows how to use the Time Base. The time-out cycle of the Time Base, which is the number of interrupts that occur every second, is given by  $\text{clock source}/2^{15}$ . In this application, which forms a scanning LED display, the program uses the Time Base interrupt to control the length of time each LED is illuminated.

- Program list:

```
include ht47r20a-1.inc
data .section 'data'
count db ?

code .section at 0 'code'
org 00h
jmp start
org 04h
reti
org 08h
jmp tb_int ;time base interrupt routine
org 0ch
reti
```

```
        org    10h
        reti

;-----
start:
    mov    a,77h
    mov    count,a
    set    intc0.2        ;time base interrupt enabled
    set    intc0.0        ;global interrupt enabled
    jmp    $

;-----
tb_int:                ;time base interrupt service subroutine
    rl    count
    mov    a,count
    mov    pa,a
    reti
```