

# Using the Buzzer Function in the HT47R20A-1

D/N : HA0034E

## Introduction

The HT47R20A-1 MCU provides two buzzer output pins on PA0 and PA1. These are pin-shared dual function pins whose buzzer function pin names are BZ and  $\overline{BZ}$ . The buzzer enable/disable function and frequency is setup via configuration options.

After the buzzer function has been selected, if the MCU program instructions are used to set the outputs PA0 and PA1 to a "0" level, the buzzer outputs will be enabled and the selected frequency will appear on both pins. If program instructions set PA0 and PA1 to a "1" level, both of the buzzer outputs will be disabled. If PA0="0" and PA1="1" the sound output will only appear on BZ, the  $\overline{BZ}$  output will be disabled. The following table shows this operation:

PA1	PA0	Function Description
0 (CLR PA.1)	0 (CLR PA.0)	PA0=BZ, PA1= $\overline{BZ}$
1 (SET PA.1)	0 (CLR PA.0)	PA0= BZ, PA1=0
X	1 (SET PA.0)	PA0=0, PA1=0

Buzzer Output Frequency Table:

Buzzer Frequency	Clock Source		
	12kHz (WDTCLK)	32.768kHz (RTC)	System Frequency/4
Clock Source/2 <sup>2</sup>	3000.0000 Hz	8192 Hz	30000.000 Hz
Clock Source/2 <sup>3</sup>	1500.0000 Hz	4096 Hz	15000.000 Hz
Clock Source/2 <sup>4</sup>	750.0000 Hz	2048 Hz	7500.000 Hz
Clock Source/2 <sup>5</sup>	375.0000 Hz	1024 Hz	3750.000 Hz
Clock Source/2 <sup>6</sup>	187.5000 Hz	512 Hz	1875.000 Hz
Clock Source/2 <sup>7</sup>	93.7500 Hz	256 Hz	937.500 Hz
Clock Source/2 <sup>8</sup>	46.8750 Hz	128 Hz	468.750 Hz
Clock Source/2 <sup>9</sup>	23.4375 Hz	64 Hz	234.375 Hz

Note: The system clock frequency is 480kHz.

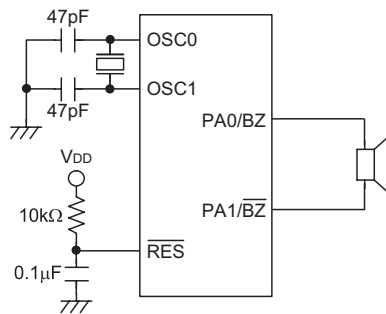
For the HT47C20L the clock source can only be 32.768kHz.

For the HT47R20A-1 the clock source can be either 12kHz, T1 or 32.768kHz.

## Using the Buzzer Output

- **Hardware**

Connect a buzzer to the pins PA.0 and PA.1 as shown in the drawing:



- **Configuration Options**

Enable the Buzzer Output: Setup the PA0/1 pins to have BZ/ $\overline{\text{BZ}}$  output

Buzzer Output Frequency: The BZ frequency can be setup according to the user requirements from  $\text{clock source}/2^2 \sim \text{clock source}/2^9$

- **Software**

The following program shows a buzzer operation example:

- This program first uses both the BZ and  $\overline{\text{BZ}}$  outputs for increased volume.
- The program then closes the  $\overline{\text{BZ}}$  output and only uses the BZ output, giving an obvious reduction in volume.
- Finally both the BZ and  $\overline{\text{BZ}}$  outputs are closed giving no sound output.

- **Program**

```
include ht47r20a-1.inc
data .section 'data'
count1 db ?
count2 db ?
code .section at 0 'code'
    org 00h
    jmp start
;-----
    org 20h
start:
    clr intc0
    clr intc1
loop:
    clr pa.1           ; PA1=BZ
    clr pa.0           ; PA0=BZ
    call delay         ; Delay_
    set pa.1           ; CloseBZ, PA1=0, PA0=BZ
```

```
    call delay          ;Delay
    set  pa.0          ;CloseBZ, PA1=0, PA0=0
    call delay
    jmp  loop
;-----
delay proc              ;Delay program
    mov  a,0a0h
    mov  count1,a
    mov  count2,a
d:  sdz  count1
    jmp  d
    sdz  count2
    jmp  d
    ret
delay endp
```