Basic IO Interfacing on Firebird-V

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Agenda for Discussion

1. Input-Output Ports in LPC2148
   - Overview of Ports
   - Acessing Ports
   - Example
2. Write Your First Embedded C Program
   - Buzzer Interfacing
   - Programming Tools
   - C-code

What are Ports?

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       Example: Switch, Sensors, etc...
    2. Output Device

       Example: Buzzer,LCD,Motors,LED, etc...

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   1. PORT 0- Out of 32 pins, 24th, 26th and 27th pins are not available and 31st pin can only be used as output pin.
   2. PORT 1- Out of 32 pins, 0 to 15 pins are not available.

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    1. PINSELx — x = 0,1 and 2
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    5. IOxCLR — x = 0 or 1

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3. PINSEL0 and PINSEL1 is used for PORT0
4. PINSEL2 is used for PORT1
5. Each pin can be used for atmost 4 functions so in PINSEL register 2 bits are provided for every single pin.

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1. PINSEL0 REGISTER

D31	D30	D29	D28	...	...	D3	D2	D1	D0
P0.15		P0.14		...	...	P0.1		P0.0	

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3. PINSEL2 REGISTER

D31	D30	D29	D28	...	...	D3	D2	D1	D0
P1.31		P1.30		...	...	P1.17		P1.16	

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D1 D0	Function
00	GPIO
01	UART0(TxD)
10	PWM1
11	Reserved

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D1 D0	Function
00	GPIO
01	UART0(TxD)
10	PWM1
11	Reserved

- To set all pins of PORT 0 as GPIO,
  PINSEL0= 0x00000000; To set P0.0 to P0.15 pins as GPIO
  PINSEL1= 0x00000000; To set P0.16 to P0.31 pins as GPIO

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```
PINSEL0=0x00000000;
PINSEL1=0x00000000;
IO0DIR=0xFFFF0000;
```

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   x=IO0PIN;
   then x=0xFFFF0000

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   IO0SET=0x00000001;

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   - Step 3: Put data on the Port 0

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     IO0SET=0x0000FFFF;
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Buzzer Interfacing in Firebird V

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1. Buzzer Connected to Port0 pin 25

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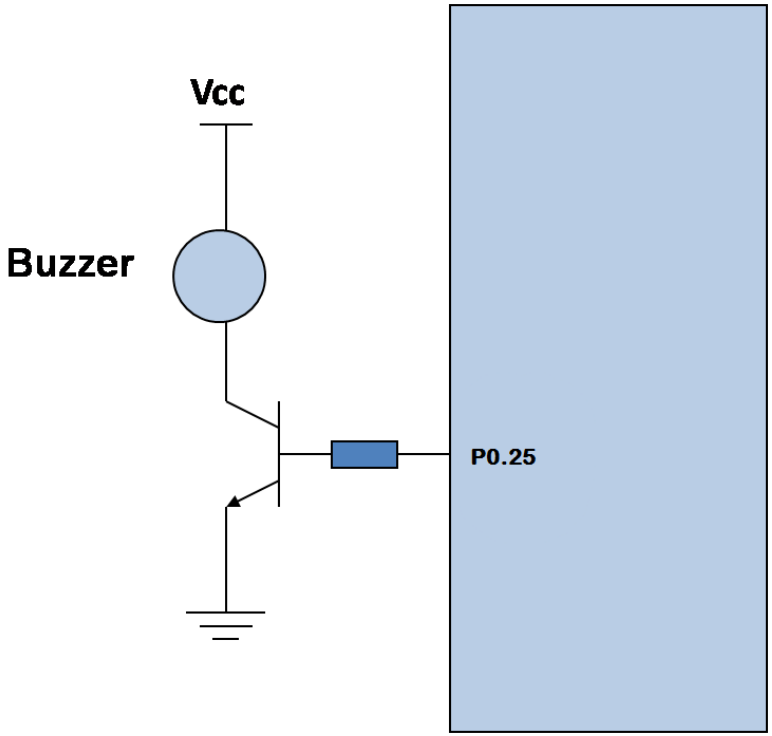

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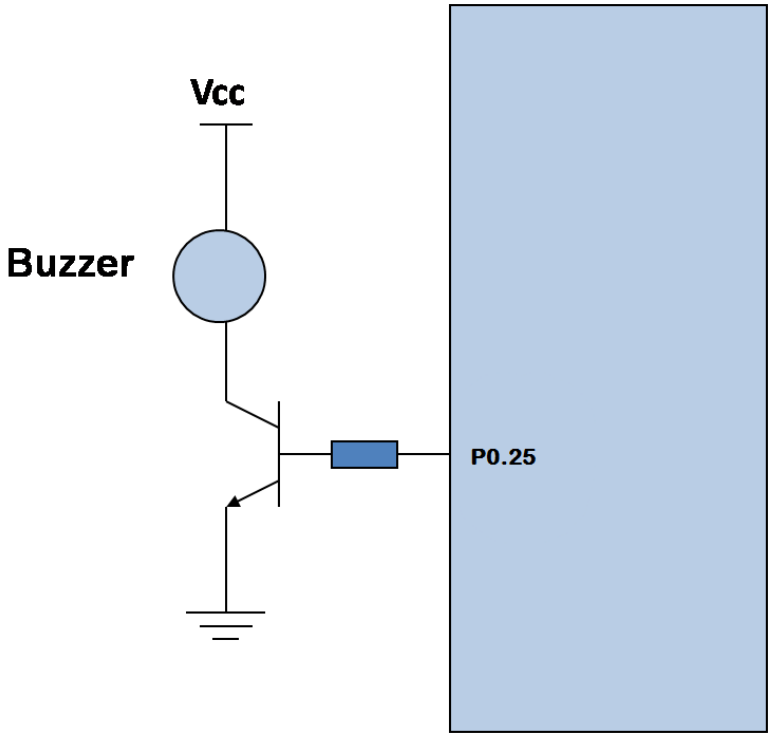

2. To Turn on buzzer:

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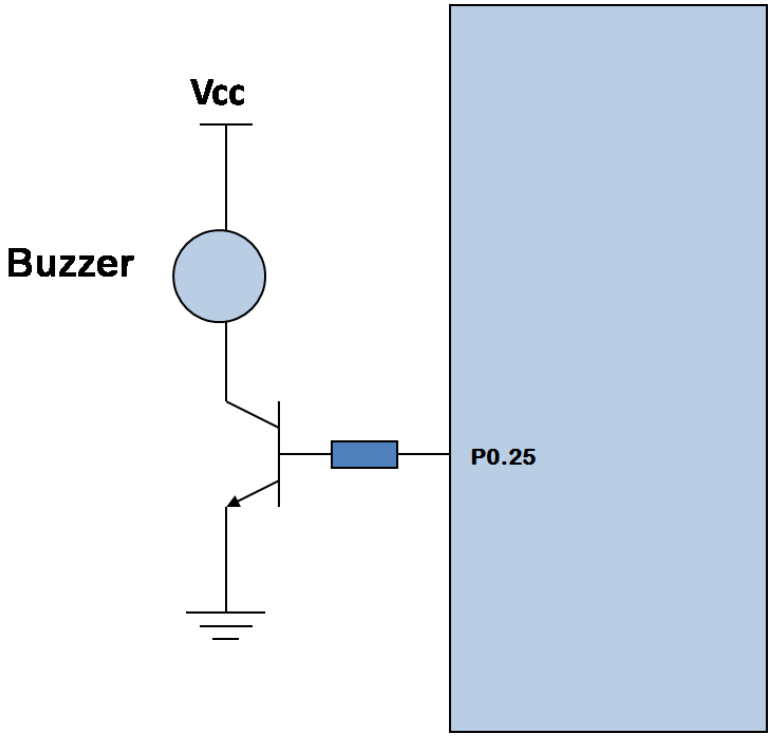

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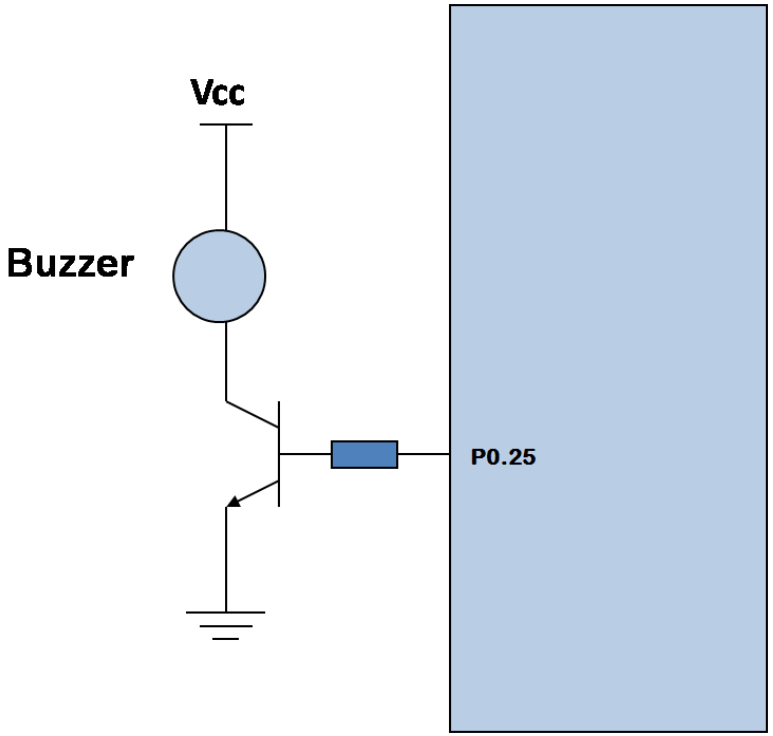

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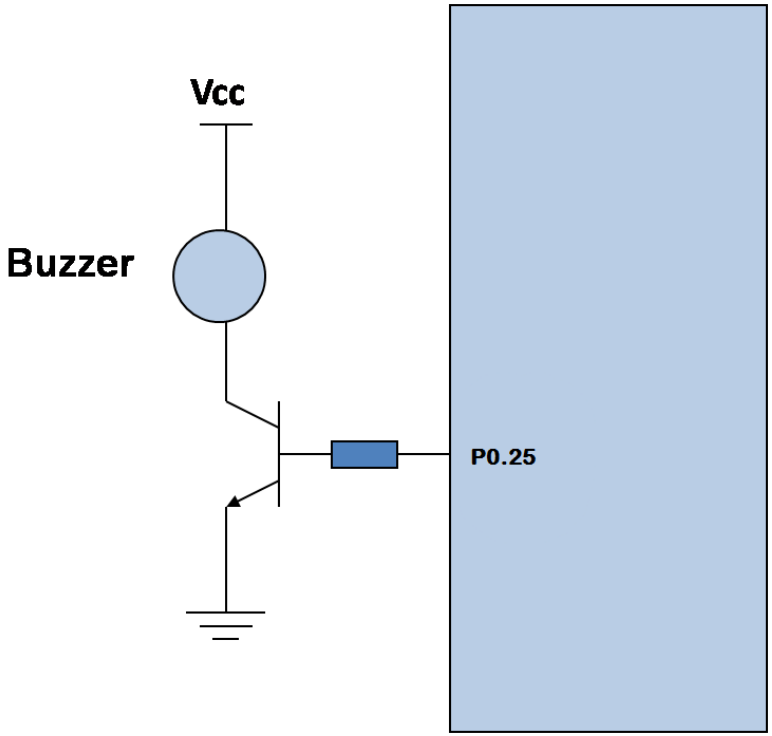

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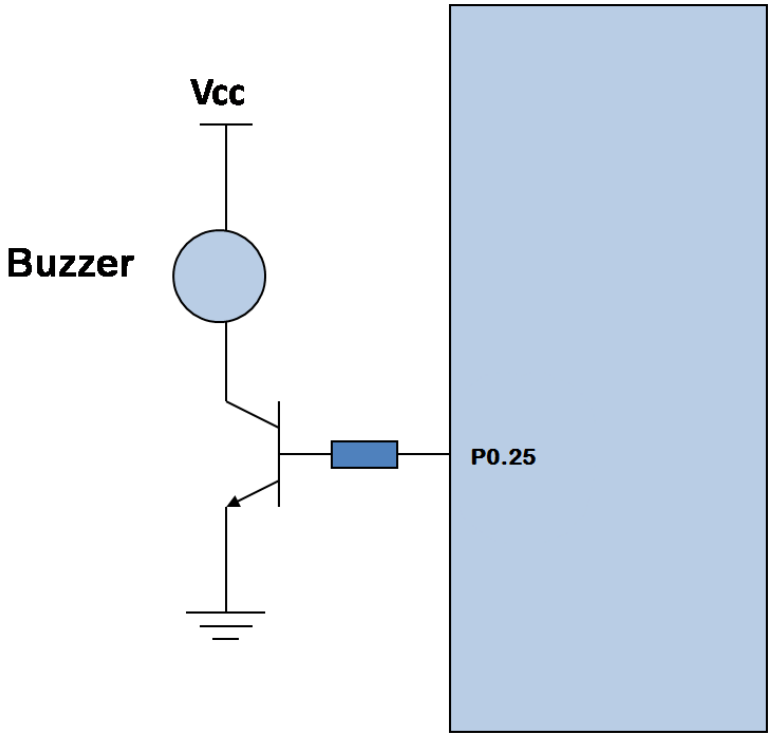

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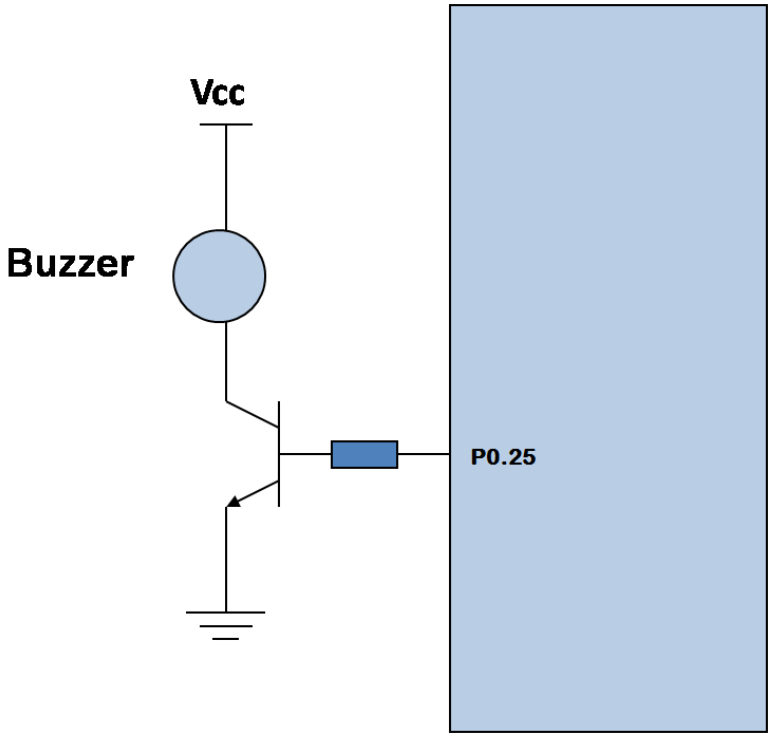

2. To Turn on buzzer: send logic HIGH on pin25 of Port0
3. To Turn off buzzer: send logic LOW on pin25 of Port0

Buzzer Program

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1. Set P0.25 as GPIO

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```
PINSEL1= 0x00000000;
```

Buzzer Program

1. Set P0.25 as GPIO

   PINSEL1= 0x00000000;

2. Configure PORT0.25 pin as output.

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   IO0DIR= 0x02000000;

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   IO0SET = 0x02000000;

4. To turn OFF the buzzer set P0.25 output low

   IO0CLR = 0x02000000;

ARM Programming Tools

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2. Hardware Required

   - hex file can be loaded into microcontroller using
     a. BootLoader
     b. ARM Programmers viz. FlashMagic, LPC2000 Flash Utility, winARM etc..

Syntax for C-Program

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#include

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```
#include <lpc214x.h>
```

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```

Pin Configuration

Syntax for C-Program

#include

```
#include <lpc214x.h>
```

Pin Configuration

```
void Init_buzzer_pin (void)
{
      PINSEL1 =
      IO0DIR =
      IO0CLR =   \\ Initially buzzer off
}
```

Syntax for C-Program

Syntax for C-Program

Main-Program

Syntax for C-Program

Main-Program

```
int main (void)
{
   Init_buzzer_pin ();
   while(1)
    {
      buzzer_on();
      delay_ms();
      buzzer_off();
      delay_ms();
    }
}
```

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Functions

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Functions

```
void buzzer_on (void)
{
     IO0SET = 0x02000000;
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    {
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      delay_ms();
      buzzer_off();
      delay_ms();
    }
}
```

Functions

```
void buzzer_on (void)
{
     IO0SET = 0x02000000;
}
```

```
void buzzer_off (void)
{
     IO0CLR = 0x02000000;
}
```

Thank You!

Post your queries on: http://qa.e-yantra.org/