LPC1114 display driver

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Example:
LPC1114 driving a 4 digit LED display

LPC1114 display driver

The main function

1) Perform initial IO configuration
2) Increment a number (reset to 0 after 9999)
3) Call on DisplayNumber
4) Call on RefreshDisplay
5) Repeat 2-4

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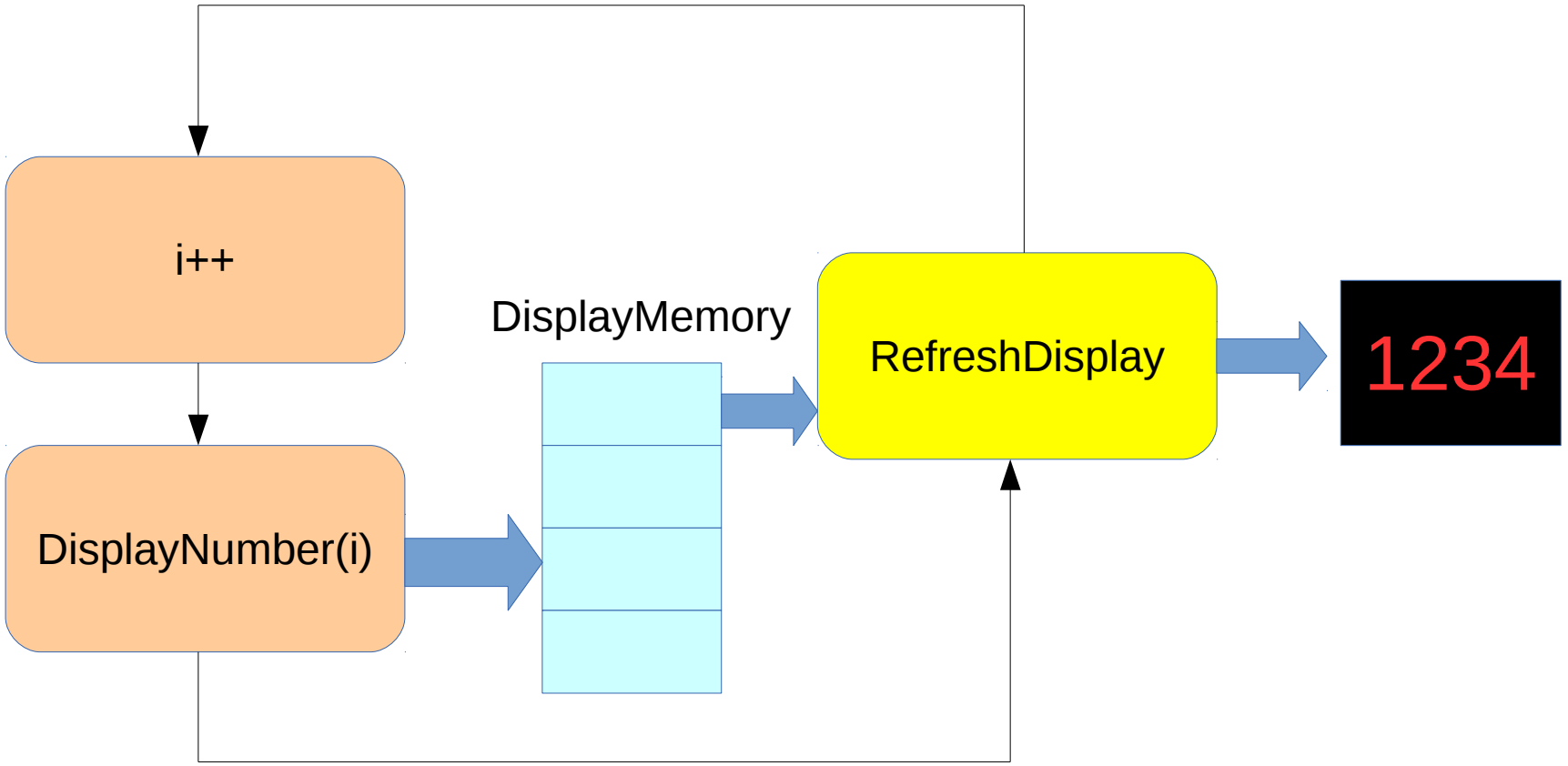
Main loop



LPC1114 display driver

```
int main()
{
   ConfigPins();
   int i=0;

   while(1)
   {
      DisplayNumber(i++);
      RefreshDisplay();
      if (i > 9999)
         i=0;
   }
}
```

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ConfigPins function

1) Enable IO configuration function
2) Enable GPIO ports
3) Set port bit function
4) Set port bit direction

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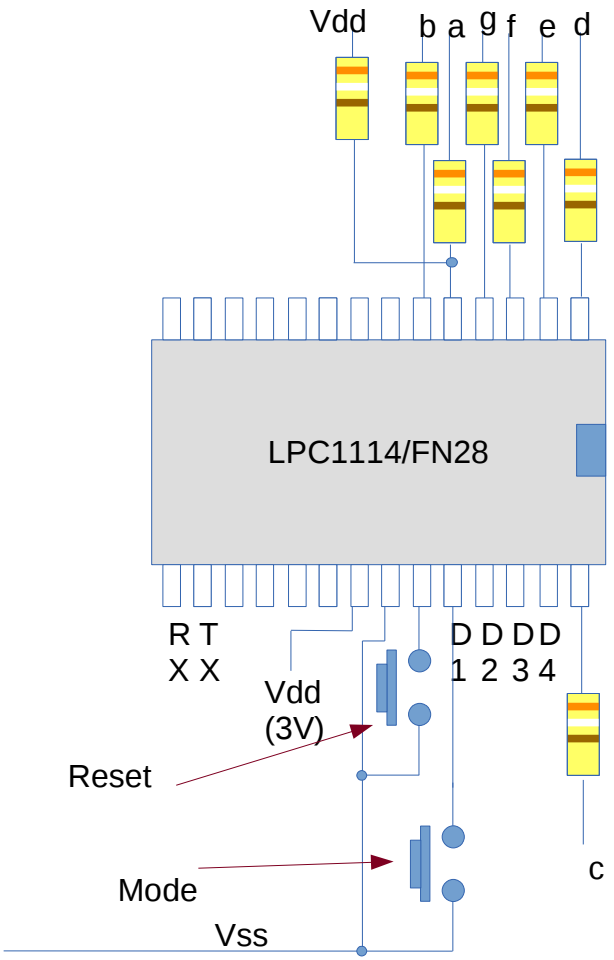
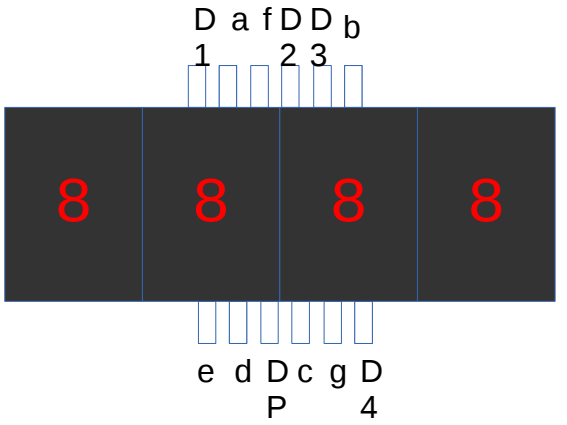
Wiring





LPC1114 display driver

```
// Association of bits to segments due to wiring
// Display is on Port 0
#define SEG_A BIT5
#define SEG_B BIT6
#define SEG_C BIT7
#define SEG_D BIT8
#define SEG_E BIT9
#define SEG_F BIT10
#define SEG_G BIT11
#define DIG_1 BIT1
#define DIG_2 BIT2
#define DIG_3 BIT3
#define DIG_4 BIT4
```

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```
const short digits[]=
{ \
 SEG_A | SEG_B | SEG_C | SEG_D | SEG_E | SEG_F         ,\
         SEG_B | SEG_C                                 ,\
 SEG_A | SEG_B |         SEG_D | SEG_E |         SEG_G,\
 SEG_A | SEG_B | SEG_C | SEG_D |                 SEG_G,\
         SEG_B | SEG_C |                 SEG_F | SEG_G,\
 SEG_A |         SEG_C | SEG_D |         SEG_F | SEG_G,\
 SEG_A |         SEG_C | SEG_D | SEG_E | SEG_F | SEG_G,\
 SEG_A | SEG_B | SEG_C                         ,\
 SEG_A | SEG_B | SEG_C | SEG_D | SEG_E | SEG_F | SEG_G,\
 SEG_A | SEG_B | SEG_C | SEG_D |         SEG_F | SEG_G \
 };
```

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```
void ConfigPins()
{
   SYSAHBCLKCTRL |= BIT6 + BIT16; // Turn on clock for
                                  // GPIO and IOCON
   // Make all of the segment and digit bits outputs
   GPIO0DIR = SEG_A | SEG_B | SEG_C | SEG_D | SEG_E \ |
      SEG_F | SEG_G | DIG_1 | DIG_2 | DIG_3 | DIG_4;
   // Turn off (make high) all display digits
   GPIO0DATA = DIG_1 | DIG_2 | DIG_3  | DIG_4;
   // Make Port 0 bit 5 behave as a generic
   // output port (open drain)
   IOCON_PIO0_5 |= BIT8;
   // Make Port 0 bit 10 behave as a generic I/O port
   IOCON_SWCLK_PIO0_10  = 1;
   // Make Port 0 bit 11 behave as a generic I/O port
   IOCON_R_PIO0_11  = 1;
}
```

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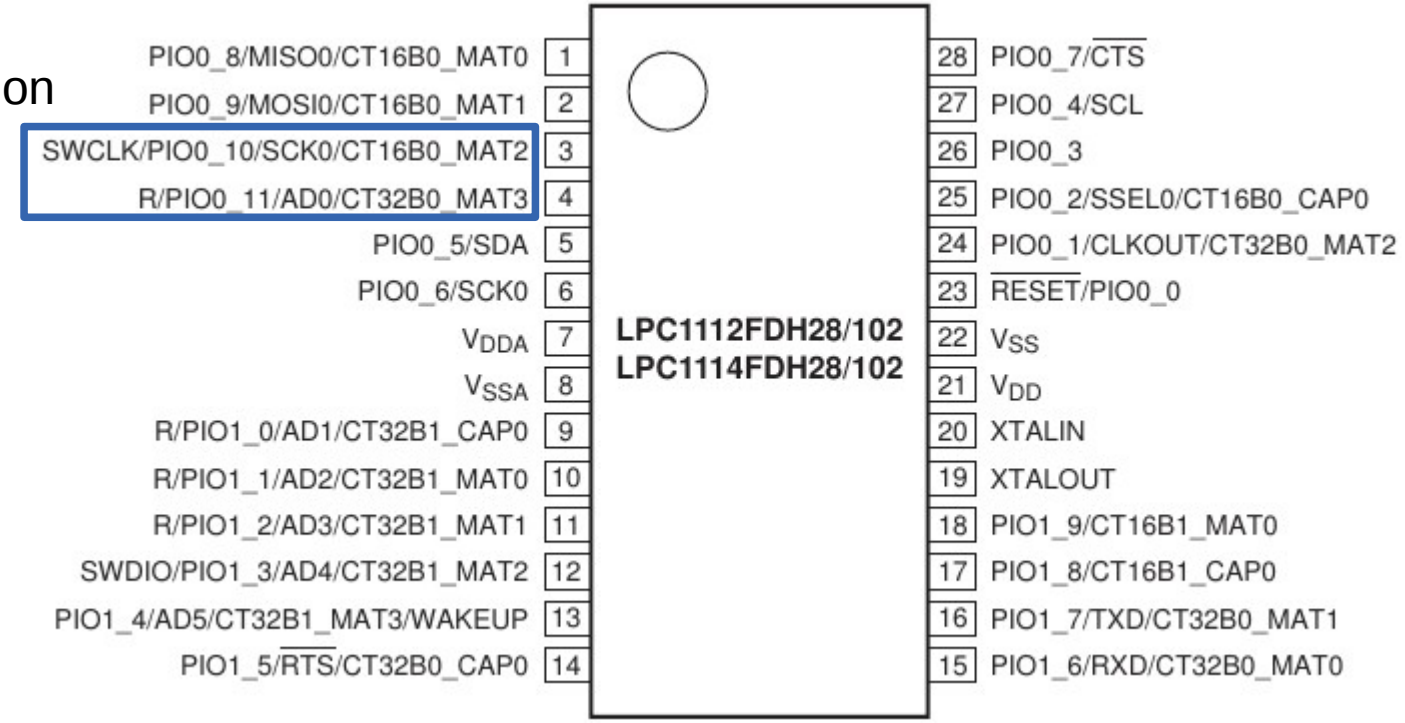
Default function
Not GPIO



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(Refer to tables: 69,82,85)

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```
void RefreshDisplay(void)
{
   // Turn on (make low) the desired
   // digit and blank all segments
   GPIO0DATA = DIG_1 | DIG_2 | DIG_3;
   // Set the relevant segment bits
   GPIO0DATA |= DisplayMemory[0];
   // Wait for display to light up
   delay(1000);

   // repeat for next digit
   GPIO0DATA = DIG_1 | DIG_2 | DIG_4;
   GPIO0DATA |= DisplayMemory[1];
   delay(1000);
```

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```
    // repeat for next digit
    GPIO0DATA = DIG_1 | DIG_3 | DIG_4;
    GPIO0DATA |= DisplayMemory[2];
    delay(1000);


    // repeat for next digit
    GPIO0DATA = DIG_2 | DIG_3 | DIG_4;
    GPIO0DATA |= DisplayMemory[3];
    delay(1000);
}
```

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```
void DisplayNumber(int Number)
{
   DisplayMemory[0]=digits[Number % 10];
   Number = Number / 10;
   DisplayMemory[1]=digits[Number % 10];
   Number = Number / 10;
   DisplayMemory[2]=digits[Number % 10];
   Number = Number / 10;
   DisplayMemory[3]=digits[Number % 10];
}
```

LPC1114 display driver

- Demonstration of display
- Vary timings
- Task: recode for display in Hex
  - New segment codes
  - Create DisplayHex (variation of Display Number)
  - Test