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Arduino, Zigbee and Embedded Development

A helpful blog designed to get beginners up and running with Arduino, Zigbee and general embedded development.

Sunday, 27 November 2011

Sleeping Arduino - Part 5 Wake Up Via The Watchdog Timer

Overview
Welcome to the fifth and final part of the "Sleeping Arduino" series, where we will cover how to wake the Arduino from sleep mode using the Watchdog Timer (WDT). When waking your Arduino from sleep, you could use one of the standard internal timers of an Arduino as I have detailed in Part 4, but if you are looking for the maximum sleep time and/or minimum sleep power consumption, you have the use the WDT;

As I have mentioned in this table, the WDT can give us a sleep time of 8 seconds, whereas the 'longest' 8/18bit timer will only give us a sleep time of ~4 seconds.

Watchdog Timer (WDT)
The Watchdog Timer on the Arduino's microprocessor only has one source to drive it: it's own separate internal 128kHz oscillator (as opposed to the 8/16bit internal timers, which can use either the 16Mhz system clock or an external clock). It is this separate oscillator that enables the WDT to function in the lowest power mode: SLEEP_MODE_PWR_DOWN (see here for more detailed info on the Arduino's power modes).

The WDT also has a prescaler, which is used to configure the timeout period. It supports timeout periods from 16ms to 8 seconds:

Table 10-2.　Watchdog Timer Prescale Select

WDP3	WDP2	WDP1	WDP0	Number of WDT Oscillator Cycles	Typical Time-out at $V_{CC} = 5.0V$
0	0	0	0	2K (2048) cycles	16 ms
0	0	0	1	4K (4096) cycles	32 ms
0	0	1	0	8K (8192) cycles	64 ms
0	0	1	1	16K (16384) cycles	0.125 s
0	1	0	0	32K (32768) cycles	0.25 s
0	1	0	1	64K (65536) cycles	0.5 s
0	1	1	0	128K (131072) cycles	1.0 s
0	1	1	1	256K (262144) cycles	2.0 s
1	0	0	0	512K (524288) cycles	4.0 s
1	0	0	1	1024K (1048576) cycles	8.0 s
1	0	1	0	Reserved	
1	0	1	1		
1	1	0	0		
1	1	0	1		
1	1	1	0		
1	1	1	1		

Also it has three modes of operation:

1. Interrupt - The WDT_vect interrupt sub-routing will be called when the WDT times out. Can be used to wake the micro from sleep modes, including the lowest power sleep mode (SLEEP_MODE_PWR_DOWN), where other timers are not available.
2. System Reset - A watchdog time-out reset will occur, i.e. the micro-controller will be restarted. For use in handling code lockups.
3. Interrupt and System Reset - First the WDT_vect interrupt sub-routing will be called, when completed a watchdog time-out reset will occur.

About Me

Donal Morrissey

Senior embedded software engineer and team leader with experience in the telecommunications and automotive industries. Android application developer during my spare time. This includes the continued development of 'My Migraine Log', which is an application for tracking a user's migraine attack history. And a similar app called 'My Headache Log'. Both are currently on sale on the Android market. Specialties o Embedded software development o Android application development o SCRUM o Real-Time Operating Systems o Linux software development (embedded & desktop) o Microchip PIC16/PIC24 firmware development o Bootloaders, including fault tolerant remote update of application software o Embedded RF system software o Automotive embedded software o CAN Gateways & networks o Hardware interfacing (I2C, SPI, CAN, Etc) o Zigbee o C, C++, JAVA, Perl, Python o QT o Team Leadership o Recruitment

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Table 10-1.		Watchdog Timer Configuration			
WDTON[1]	WDE	WDIE	Mode	Action on Time-out	
1	0	0	Stopped	None	
1	0	1	Interrupt Mode	Interrupt	
1	1	0	System Reset Mode	Reset	
1	1	1	Interrupt and System Reset Mode	Interrupt, then go to System Reset Mode	
0	x	x	System Reset Mode	Reset	

Please refer to my post here for the other operation modes of the WDT. The post is for the Atmega1281, but the functionality is pretty much the same.

Code

So, we will be using interrupt mode in our code to wake the Arduino from sleep every 8 seconds to toggle the state of the LED:

```
/*
 * Sketch for testing sleep mode with wake up on WDT.
 * Donal Morrissey - 2011.
 *
 */
#include <avr/sleep.h>
#include <avr/power.h>
#include <avr/wdt.h>

#define LED_PIN (13)

volatile int f_wdt=1;


/***************************************************
 *  Name:        ISR(WDT_vect)
 *
 *  Returns:     Nothing.
 *
 *  Parameters:  None.
 *
 *  Description: Watchdog Interrupt Service. This
 *               is executed when watchdog timed out.
 *
 ***************************************************/
ISR(WDT_vect)
{
  if(f_wdt == 0)
  {
    f_wdt=1;
  }
  else
  {
    Serial.println("WDT Overrun!!!");
  }
}


/***************************************************
 *  Name:        enterSleep
 *
 *  Returns:     Nothing.
 *
 *  Parameters:  None.
 *
 *  Description: Enters the arduino into sleep mode.
 *
 ***************************************************/
void enterSleep(void)
{
  set_sleep_mode(SLEEP_MODE_PWR_SAVE);   /* EDIT: could also use SLEEP_MODE_PWR_DOWN fo|
  sleep_enable();

  /* Now enter sleep mode. */
  sleep_mode();

  /* The program will continue from here after the WDT timeout*/
```

```
  sleep_disable(); /* First thing to do is disable sleep. */

  /* Re-enable the peripherals. */
  power_all_enable();
}


/**************************************************
 *  Name:         setup
 *
 *  Returns:      Nothing.
 *
 *  Parameters:  None.
 *
 *  Description: Setup for the serial comms and the
 *               Watch dog timeout.
 *
 **************************************************/
void setup()
{
  Serial.begin(9600);
  Serial.println("Initialising...");
  delay(100); //Allow for serial print to complete.

  pinMode(LED_PIN,OUTPUT);

  /*** Setup the WDT ***/

  /* Clear the reset flag. */
  MCUSR &= ~(1<<WDRF);

  /* In order to change WDE or the prescaler, we need to
   * set WDCE (This will allow updates for 4 clock cycles).
   */
  WDTCSR |= (1<<WDCE) | (1<<WDE);

  /* set new watchdog timeout prescaler value */
  WDTCSR = 1<<WDP0 | 1<<WDP3; /* 8.0 seconds */

  /* Enable the WD interrupt (note no reset). */
  WDTCSR |= _BV(WDIE);

  Serial.println("Initialisation complete.");
  delay(100); //Allow for serial print to complete.
}


/**************************************************
 *  Name:         enterSleep
 *
 *  Returns:      Nothing.
 *
 *  Parameters:  None.
 *
 *  Description: Main application loop.
 *
 **************************************************/
void loop()
{
  if(f_wdt == 1)
  {
    /* Toggle the LED */
    digitalWrite(LED_PIN, !digitalRead(LED_PIN));

    /* Don't forget to clear the flag. */
    f_wdt = 0;

    /* Re-enter sleep mode. */
    enterSleep();
  }
  else
  {
    /* Do nothing. */
  }
}
```

All parts of this series:

- Part 5 Wake Up Via The Watchdog Timer

References

- Martin's excellent tutorial here.
- Darius's excellent blog here.

Posted by Donal Morrissey at 05:18

65 comments:

Philihp Busby 21 December 2011 at 07:53

thanks for this

Reply

NicolaG 3 January 2012 at 05:14

Hi, thanks for your articles first.
Does it work only for Arduino Diecimila?
I'm trying to run it on my Arduino UNO but the sketch returns me some strange characters
C¡ªËë šÙ•□±¥½…<0> instead of a simple test print i wrote.

```
void loop()
{
if(f_wdt == 1)
{
/* Toggle the LED */
Serial.println("Hello!");
/* Don't forget to clear the flag. */
f_wdt = 0;

/* Re-enter sleep mode. */
enterSleep();
}
else
{
/* Do nothing. */
}
}
```

Thanks

Reply

Donal Morrissey   7 January 2012 at 04:53

Hi NicolaG,
Yes, the code should work on your UNO. The strange characters could be because of your serial port settings aren't correct.
Check the baud rade that you have set in the Arduino pc software and check the value you have set in code using the Serial.begin(...) function.
Donal

Reply

Denis Joshua 28 February 2012 at 21:33

First of all thanks a lot for the article, I'm newbe but i understand a lot of thinks... i think :-)
I just want to ask ... is possible to put the arduino in sleep mode and also use an interrupt pulse counter ?
But what i need is a timer that tell me how much time
is between pulses...
Thanks a lot again
Denis

Reply

Donal Morrissey   1 March 2012 at 00:32

Hi Denis,
You probably will be able to do this a sleep mode, but not the lowest power sleep mode (power-down).
If you have a look at the excerpt from the datasheet here:
http://2.bp.blogspot.com/_9WOJMofzxU0/S9PyagiuISI/AAAAAAAAHY8/tGlOUPRmano/s400/Picture+1.png

You can see the different sleep modes and what hardware modules are supported within it.
I think you will need to wake the board from sleep using the external interrupt(count the pulses)
You could then use one of the timers to check the time between interrupt pulses.
Hope this helps.
Donal

Reply

Denis Joshua 14 March 2012 at 03:13

Thanks a lot Donal,
great think all this timers on the tabel.

I think i'll try using an external crystal (32MHz)

This weekend i'll play :-)

Thanks again
Denis

Reply

Joao Silva 8 May 2012 at 07:18

Thanks for this, very good.
How about if I just want to wake the arduino every hour?
How can I set that?

Thanks, great article!
Joao, Portugal

Reply

Donal Morrissey   9 May 2012 at 05:49

Hi Joao,
Thank you for the feedback. If you want a very long sleep time: several minutes or hours, I'd
suggest using an external real-time clock, such as:
http://proto-pic.co.uk/deadon-rtc-ds3234-breakout/
Something like this could generate an external interrupt to wakeup the Arduino.

Best Regards,
Donal

Reply

Eric VDB 5 July 2012 at 02:13

Hey, great tutorials, keep up the neat work.

Do you know if it is possible to combine the wake from interrupt and the watchdog ? I'm asking
because I would like to build a low power board that transmits temp data every 5 minutes, but
should also wake up on a PIR interrupt.

Thanks in advance,
Eric

Reply

Tom Rodgers 7 August 2012 at 08:37

This is really great, thanks! I wasn't able to get anywhere with the use of sleep modes by following
the threads on the Arduino forums, but you've made it much more clear. I'm going to be using
these concepts in the code for a project I'm writing up for MAKE magazine.

Can you tell me, is there a way to put an Arduino to seep so that it won't wake up until the power
is cycled (or it is reset)?

I have a gizmo that counts down for several minutes (or even hours) before it performs a single
action, and then it doesn't do anything else until it is restarted. I would like it to essentially shut
itself off after it performs the action, but the issue is complicated because I am using the watch
dog timer with an 8s delay to preserve power during the initial count-down phase.

Of course, after the action is complete, I can just make it go right back to sleep every time it wakes
up, but I'm looking for a more elegant solution. Is there a way to switch from an 8s watch dog to
_no_ watch dog once the code is already looping?

Thanks again for this great site, and for any other suggestions you may be able to give me.

Reply

Donal Morrissey   7 August 2012 at 09:12

Hi Tom,
Thank you for the feedback, always good to hear that people are finding the site helpful.

I think it would be as straight forward as disabling the watchdog interrupt before entering the SLEEP_MODE_PWR_DOWN sleep mode.

I don't have access to my Arduino at the moment to test this, so if you get to test this before I do, please let me know if it works :-)

Cheers,
Donal

Reply

Jerry 14 August 2012 at 11:50

Thanks for work on Power Save, this has saved me many hours.

How do I change the test PIN from 13 to 4 ?
Just changing #define LED_PIN (13) to (4) doesn't do the trick?

I have a WiFiRedback and am trying very hard to teach it and me how to make it sleep since battery operation is essential.

Any chance you have info on how to make the WiFi part (MRF24WBOMA) sleep using DTIM beacon, then though SPI from the Arduino (Nano) wake up the WiFi? I'm completly stumped.
thanks,

Reply

Donal Morrissey   14 August 2012 at 13:13

Hi Jerry,
I've plenty of experience with XBee modules, but unfortunately I have no experience with the MRF24WBOMA radio module or the WiFiRedback.
Sorry I can't be of more help.
Cheers,
Donal

Reply

Replies

Jerry 14 August 2012 at 13:46

How about how to change froom PIN 13 to PIN 4 ?
Thanks, your work here is very helpful.

Donal Morrissey   15 August 2012 at 13:24

Hi Jerry,
If you want to control an LED from PIN 4, you will need to configure the mode of the pin to be an output. You will need to do this in your setup() function.

pinMode(LED_PIN, OUTPUT);

Hope that helps,
Cheers,
Donal

Jerry 15 August 2012 at 15:11

Again, thanks! That did the trick. Hum didn't understand where PIN 13 was made an OUTPUT. Must have been in one of the headers.

Reply

Andy 24 September 2012 at 04:54

Thanks for the article.
When running the code it appears to put the arduino into a lower power mode for execution - ie the LED is only dimly lit. How would I modify the code so that the board runs at full power when not in sleep? I'm using an Uno (AtMega 328P), don't know if that may be causing problems?

Reply

johnbard 21 February 2013 at 03:27

What is the current consumption under SLEEP_MODE_PWR_DOWN mode for wdt enabled? and wdt disabled?

Reply

Unknown 26 March 2013 at 21:42

Hi I'm trying to use this code in my arduino uno, but it doesn't works, the serial show a different character "III" the baud rate is correct, the led doesn't change the state. Maybe you can help me. Thanks for now
luis

Reply

emos 3 April 2013 at 08:51

Hi I have a similar problem that luis with arduino uno, it doesn't write anything in the serial monitor at (9600 bauds)and the led is always "on". Any suggestion?

Reply

Donal Morrissey   3 April 2013 at 08:53

Hi Guys,
I will get my hands on an Arduino Uno and test the software.
Donal

Reply

emos 4 April 2013 at 06:26

This comment has been removed by the author.

Reply

emos 4 April 2013 at 06:27

I solved the problem with arduino UNO: pinMode(LED_PIN, OUTPUT); into SETUP LOOP solves the led problem.
the problem of communication is due to the microcontroller has a small delay in initialization, and it goes to sleep too faster before to finish the transmission (or something like that), a delay(50); solves this problem.

Regards

Reply

> Replies
>
> **Donal Morrissey**   4 April 2013 at 06:32
>
> Excellent Emos,
> I'm due to receive my UNO tomorrow, I will update the source code during the weekend.
> Best Regards,
> Donal

Reply

woodmate 14 April 2013 at 02:51

Donal,

could you explain how to use a RTC to sleep the arduino and wake it up? Thanks

Reply

> Replies
>
> **woodmate** 20 April 2013 at 04:30
>
> Does anyone use the watchdog timer on the Geogram One to extend the battery life?
>
> http://dsscircuits.com/geogram-one.html

> **Donal Morrissey**   23 April 2013 at 05:59
>
> Hi Woodmate,
> I have one of these Arduino data logging shields http://learn.adafruit.com/adafruit-data-logger-shield - which has a real time clock. Only problem is I can't find the shield! I'll search again and if I find it write a post on using it to wake the Arduino.
> Best Regards,
> Donal

woodmate 24 April 2013 at 22:29

That'd be great Donal

Reply

yuliaRetno 25 May 2013 at 11:13

I have tried code,sleeping-arduino-part-3-wake-up-via uart and this is works ! mm but If I want to awake arduino with serial data which I choose (ex: just send character "A" and then arduino wake up) /not receiving any serial data ? I really2 confuse,, I start depressed because that, can you help me ?? plis T___T

Reply

Replies

Donal Morrissey   27 May 2013 at 02:45

Hi yuliaRetno,
I don't think it is possible to wake up via a particular character. As far as I know, the wake up is triggered on either a logical 1 or 0 on one of the serial uart lines.
Cheers,
Donal

Reply

yuliaRetno 28 May 2013 at 04:33

hmm, ok sir, can you help me sir ?mm,I find a difficulty from my final project, particularly with wake up sleep arduino with tag rfid (mifare) ,my tag rfid communication with SPI,So I decided wake up with serial uart,
Actually, it can wake up, but I want to wake up with particularly tag (not all of tag)I confuse in what way I must try to wake up ?
Can I wake up with internal timer or watchdog ?

void sleepNow(){

uint32_t idc ;

idc = nfc.readPassiveTargetID(PN532_MIFARE_ISO14443A);// triger

from tag rfid ,,is like serial.available()

set_sleep_mode(SLEEP_MODE_PWR_DOWN);

sleep_enable();

sleep_mode();

sleep_disable();}

Reply

Replies

Donal Morrissey   2 June 2013 at 05:00

Hi Yulia,
I don't think you will be able to wake up via serial uart on a particular tag. What you could do is wake up the microcontroller on all tags, but check the tag immediately and if the tag in not the particular one you want, put the microcontroller back to sleep.
Hope that helps,
Donal

Reply

saperlot 5 June 2013 at 13:38

hi, this code seems not to work if i just look on the indicators (Serial and LED toggle).
Put a delay of 100ms after each serial print and initialize the LED_PIn as output in the setup.
Then its showing what it should (on arduino UNO).
I was searching for a bug in the WDT and Sleep setup for hours.... until i found this simple bug of just initializing the pin.. ;-(..

Reply

Replies

Donal Morrissey   8 June 2013 at 07:46

Hi saperlot,
Cheers for finding that, I have updated the code.
Donal

Reply

Anto 26 June 2013 at 01:22

Hi in my case I'm not able to see the message "WDT Overrun!".
I've also added the delay(100) after the Serial.println.
In addition I've moved the MCU on a breadboard but the LED is always on (pin 13 arduino -> pin 19 atmega328p).

Reply

Replies

Donal Morrissey　　　30 June 2013 at 04:53

Hi Anto,
The "WDT Overrun!" is an error message that you will see if your application doesn't clear the f_wdt correctly.
Was the LED flashing correctly if you run the code with your MCU on your Arduino board? If so, then perhaps it is an issue with your circuit on the breadboard? Have you checked you are wiring the LED correctly?
Cheers,
Donal

Reply

Anto 28 June 2013 at 07:04

I've integrated this code with a ZigBee transmission and it doesn't work. The ZigBee transmission works without the watchdog timer and it requires some delay time (5 secs) to work properly. Is the program restarted from the last row executed before the WatchDog interrupt ?

Reply

Donal Morrissey　　　30 June 2013 at 04:44

Hi Anto,
The code is designed to be a basic example that can be extended by the reader if necessary, not a piece of code that will work with all scenarios, so I'm not surprised that you are having issues.

The first line of C code executed when the micro wakes from sleep is 'sleep_disable();' in the'void enterSleep(void)' function.

Can you please post your code so I can have a better idea of what you are trying to do?

Cheers,
Donal

Reply

Anto 1 July 2013 at 01:31

You're right. Thanks in advance for your help.
This is the sketch: http://pastebin.com/Zn2htthL
I've disabled the power saving options to be sure the problem wasn't there.

Reply

Anto 3 July 2013 at 03:06

The transmission is now working. This is the sketch: pastebin.com/tFt2vJRm It's using some power saving options, the power hibernation of the xBee pin and the power_done mode. The problem is that I need to wait for a really long time (about 10 seconds) before I can send a packet. Where am i wrong?

Reply

Replies

Donal Morrissey　　　3 July 2013 at 03:38

Hi Anto,
Will have a look this evening when I get home from work.
Donal

Donal Morrissey   5 July 2013 at 08:35

Hi Ando,
I suspect it is taking 10 seconds for your xBee module to connect to the network once it has exited sleep.

First of all disable the watchdog sleep stuff and test enabling & disabling the xbee sleep.

Also, keep an eye on the Association LED connected to your xbee module. Does it take several seconds to illuminate after the xbee has been taken out of sleep?

Donal

Reply

cec 12 July 2013 at 01:46

Hello,
First, I'm sorry about my english, I'm french!
I'm trying to do a datalogger with low power to economise the battery. You say before that if we want 15 minutes of sleeping, we have to use the RTC ds3234. I want to know if it's possible to do it with the DS1307 that I have yet or if I have to buy this one particular? And if it's possible do you some tutorial to do it?
Thanks

Cécile

Reply

Replies

Donal Morrissey   12 July 2013 at 05:16

Hi Cecile,
I don't think you can use the DS1307 to wake your microcontroller as it doesn't have an alarm feature, whereas the DS3224 does:
DS3224 Features:
...
* Two Time-of-Day Alarms
...
"The clock provides two programmable time-of-day alarms and a programmable square-wave output. The INT/SQW pin either generates an interrupt due to alarm condition or outputs a square-wave signal and the selection is controlled by the bit INTCN."

I recently got a DS3234 and will try to complete the tutorial for using it this weekend.

Hope that helps!
Donal

cec 12 July 2013 at 05:52

Thank you very much for the information!
So I will follow with interest your next article!
The informations you give on your diferents posts were very helpful to put my arduino in sleep mode! Now I have to try to reduce more the consumption with a RBBB instead of my arduino!
thanks a lot!

Cécile

nb 17 July 2013 at 23:44

Hi Cécile,

You can find here Feature Comparison of the DS323x Real-Time Clocks.

cec 22 August 2013 at 01:28

Hi donal!
do you know when you will publish your article about DS3234? I'm very interested on it! I'm trying to program it and I have some dificulties! I hope you can help me!
thanks
Cécile

Reply

Igor Ramos 3 September 2013 at 22:16

Hi Donal,

Thanks for the code that you provided. Very useful!
I created a blog posing using your code, where I measure the current of an Arduino Uno R3 board. It's nice to see how current draw & power consumption changes as you put the microcontroller to sleep. Check out my post: http://www.dossant.com/projects/arduino-low-power/

Thanks,
Igor

Reply

Travis Paul 2 February 2014 at 11:32

Using the code from above, my arduino diecimila only seems to sleep for about 4 seconds, any idea why this might be?

Reply

Lance Arn 27 April 2014 at 20:56

Hi,
I have discovered a possible major problem with - Part 5 Wake Up Via The Watchdog Timer.
I used this code as a test on the Leonardo R3 and now cannot access the board.
I had no problems installing the code to my board, but now whenever I connect the board to the PC the Port tab in Device manager disappears after the first 8 second sleep cycle and does not re-apear.
I have no access to any port information in either the PC or Arduino 1.5.2 Sketchbook.
I have tested my other Arduino boards and they work perfectly.
My Leonardo usually access Ports 11 to 14, but all I have available with the Leonardo now is Ports 3 to 5 (which are already in use)

Do you have any ideas why the sleep cycle cuts off communication to the PC ports (I am assuming it cuts USB communication)?

Do you have any ideas on how I might be able to re-gain access to my Leonardo???

Any help will be appreciated.
Lance.

Reply

   Replies

   Donal Morrissey   28 April 2014 at 07:12

   Hi Lance,
   Can you hold down the reset button until the 'uploading sketch' message appears in the IDE then release it? Please let me know if you can program it that way.
   BR,
   Donal

   Lance Arn 28 April 2014 at 07:50

   Many thanks for that Donal.

   It took a couple of attempts, but it eventually allowed the IDE to sync with the correct Port and let me upload the blink sketch and has given me full control of the board again (I shall remember this trick for future similar lock ups).

   I like the Wakeup with Watchdog Timer, so it would be good to figure out why it severed USB control and find a code fix for this (plus maybe add a loop counter or interrupt to end the Timer).

   Thanks again for your great tutorial on Sleep and Wakeups, these have been very educational and useful. I will certainly be using these in my future projects to reduce power usage.

   I am soon to start using some ATtiny85 chips in my small projects. Do you foresee any conflicts with this code? (I have not used AT85 chips before. I have the Digispark Tiny 1.04 IDE).

   Lance.

   Donal Morrissey   28 April 2014 at 07:54

   Hi Lance,
   Glad you got your board back up and running again! I must get my hands on a Leonardo to see why is it causing a lock-up!
   Hmm, I've no experience with the ATtiny85 chips, please share if the code works.

Cheers,
Donal

Reply

Folkert van Heusden 16 May 2014 at 11:58

Hi Donal,

Thanks for the excellent article.
I have a suggestion for an enhancement.
Instead of delay(100) to wait for the serial transport to finish, you can also use:
Serial.flush();
Older arduino versions would clear the transmit buffers, but > 1.0 will really wait for the transmit to finish.

Reply

Olivier GASTÉ 10 December 2014 at 01:30

hi sir
thank's for this great article !
I tried your sleep wakeup by wdg timer and it works great . now I try to add my own stuff to this and I get surprise
I just begin a SOftwareSerial with a GPS in the setup part I sent few config string to GPS and for now I do nothing in loop part
the result is that it sleep for few ms and stay awake for almost 8sec I dont understand I mad the test several time and if I do not initiate my SoftSerial it works as soon as I do the begin function it fails
do you have any idea ??
thank's for your help

Reply

Replies

Donal Morrissey　　　　10 December 2014 at 01:38

Hi Olivier,
What Arduino are you using? What is the interface with your GPS module?
Can you share your startup code?
Cheers,
Donal

Reply

Olivier GASTÉ 10 December 2014 at 03:21

This comment has been removed by the author.

Reply

Olivier GASTÉ 10 December 2014 at 03:27

This comment has been removed by the author.

Reply

Olivier GASTÉ 10 December 2014 at 03:34

Hi donal
thank's for your fast answer
I'm using an arduino NANO 328
I've connected GPS serial on pin 7 and 6 (https://www.adafruit.com/products/746)
I' ve also a gsm module connected but I dont care for now
I just copy my source code below
thank's for your kind help

#include
#include
#include
#include
//#include
//#include
//#include

#define GPS_TX_PIN 7
#define GPS_RX_PIN 6
#define GPS_EN_PIN 5

```
#define GSM_TX_PIN 3
#define GSM_RX_PIN 2
#define GSM_KEY_PIN 8
#define GSM_PS_PIN 9
#define GSM_RST_PIN 4

#define LED_PIN 13

SoftwareSerial myGPSSerial(GPS_TX_PIN, GPS_RX_PIN);
//SoftwareSerial myGSMSerial(GSM_TX_PIN, GSM_RX_PIN);
//Adafruit_GPS GPS(&myGPSSerial);
//Adafruit_FONA FONA(&myGSMSerial,GSM_RST_PIN);

volatile int f_wdt=1; // sleep status ( must always be 0 on wakeup


ISR(WDT_vect) // watch dog interrupt executed just before wakeup
{
if(f_wdt == 0)
{
f_wdt=1;
}
else
{
Serial.println("WDT Overrun!!!");
}
}

void enterSleep(void)
{
Serial.print("SLEEP ... ");delay(100);digitalWrite(LED_PIN,LOW);
set_sleep_mode(SLEEP_MODE_PWR_DOWN);        /*      EDIT:      could      also      use
SLEEP_MODE_PWR_DOWN for lowest power consumption. */
sleep_enable();

/* Now enter sleep mode. */
sleep_mode();

/* The program will continue from here after the WDT timeout*/
sleep_disable(); /* First thing to do is disable sleep. */

/* Re-enable the peripherals. */
power_all_enable();
Serial.println("WAKEUP");delay(100);digitalWrite(LED_PIN,HIGH);
}


void setup()
{
Serial.begin(115200);
pinMode(LED_PIN,OUTPUT);

Serial.print("Init GPS ...");
delay(100); //Allow for serial print to complete.
myGPSSerial.begin(9600);

Serial.print("Init Watchdog ... ");
delay(100); //Allow for serial print to complete.
MCUSR &= ~(1<<WDRF); // Clear the reset flag.
WDTCSR |= (1<<WDCE) | (1<<WDE); // In order to change WDE or the prescaler, we need to set
WDCE (This will allow updates for 4 clock cycles).
WDTCSR = 1<<WDP0 | 1<<WDP3; // set new watchdog timeout prescaler value 8.0 seconds
WDTCSR |= _BV(WDIE); // Enable the WD interrupt (note no reset).
Serial.println("OK");
delay(100);

}


void loop()
{
if(f_wdt == 1)
{
f_wdt = 0;
enterSleep();
}
}
```

Reply

Olivier GASTÉ 10 December 2014 at 10:06

I start to figure out what happends
I got the feeling that somthing in soft serial keeps me awake while not resetting the flag (but what
? only WDG INT0 or INT1 can wakeup from deep powerdown mode)
it keeps me awake until wdg interrupt falls reseting flag and allowing loop to go sleeping witch
wakes up immediatly again ...
i read softserial lib and see that it register one if of PCINT0 to PCINT3 ididnt understand wicth one
but in my case it looks to be PCINT2 that falls and keep me awake
I tried to call softserial.end() that mask RX it :

void SoftwareSerial::end()
{
if (digitalPinToPCMSK(_receivePin))
*digitalPinToPCMSK(_receivePin) &= ~_BV(digitalPinToPCMSKbit(_receivePin));
}

and it works
all what i have to do is to call begin() after wakeup and end() just before
thank's

Reply

> Replies
>
> **Donal Morrissey**   14 December 2014 at 02:19
>
> Hi Olivier,
> Sorry for the delay in getting back to you.
> Glad to hear you got it sorted! Looking at the official documentation here:
> http://www.arduino.cc/en/Reference/SoftwareSerial it doesn't mention the end()
> function, but looking at the github repo, I can see it is there.
> Thanks for sharing!
> BR,
> Donal
>
> **Olivier GASTÉ** 18 December 2014 at 05:34
>
> hi donal !
> (sorry for my late answer too I get stuck on other things)
> I have a last question about Watchdog
> if I well understand it decrease a counter and send the it whenn reaching 0 and reload
> the counter for next countdown
> I configured it to get approx 8sec as you explain in your article but how can I reset the
> counter ?? I whant to do it right before entering in sleep to be sure to have 8 sec of
> sleep not regarding on time I spend in wake up phase
> (sory if my english is not understandable if you dont see what I mean let me know)

Reply

lucky2004 6 April 2015 at 01:17

hello, and congrat for the great article.Also , i want to use an arduino mini pro and a gsm module.I
want to sleep , ad once per day , wake up and verify an analog imput(baterry).Can i do this using
WTD?(lucky2004alex@yahoo.com)THX

Reply

Don 16 April 2016 at 06:50

Thanks for the informative article.

I have an Arduino application where I want to run at low power, wake up ca. every eight hours to
make a brief reading, then return to the low power mode. Also, I do not want to use interrupts, if
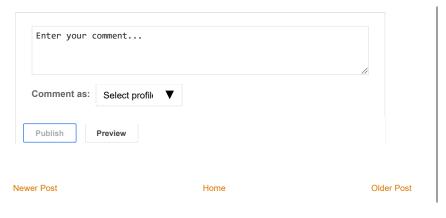possible.

Any suggestions?

Reply

Anmol Kohli 21 April 2017 at 00:52

hi, can you please help i want to put arduino to sleep for like 20mins. how can i increase it time .
which sleep mode should i use.

any help would be appreciated.

Reply

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