More than 3 attachInterrupts() don't seem to work #4468

Closed mars000 opened this issue on Mar 6, 2018 · 18 comments

mars000 commented on Mar 6, 2018

Please fill the info fields, it helps to get you faster support ;)

if you have a stack dump decode it:
https://github.com/esp8266/Arduino/blob/master/doc/Troubleshooting/stack_dump.rst

for better debug messages:
https://github.com/esp8266/Arduino/blob/master/doc/Troubleshooting/debugging.rst

---------------------------- Remove above -----------------------------

Basic Infos

Hardware

Hardware: wemos mini pro
Core Version: V2.4.0

Description

i have 4 x flow meters on D1, D5, D6, D7 respectively.
I found that when I do the ```attachInterrupt(sensorPin, pulseCounter, FALLING);`` function that the 3rd and 4th function bind in such a way that only 3 x flow meters interrupts are active.
Is there a limitation on number of interrupts that ESP8266 can handle ?

Settings in IDE

Module: ?Generic ESP8266 Module?
Flash Size: ?4MB/1MB?
CPU Frequency: ?80Mhz?
Flash Mode: ?qio?
Flash Frequency: ?40Mhz?
Upload Using: ?OTA / SERIAL?
Reset Method: ?ck / nodemcu?

Sketch

```
#define sensorPin_1 D1
#define sensorPin_2 D5
#define sensorPin_3 D6
#define sensorPin_4 D7

volatile byte pulseCount[4];

void setup() {

Serial.begin(115200);
```

```
   attachInterrupt(sensorPin_1, pulseCounter_1, FALLING);
    attachInterrupt(sensorPin_2, pulseCounter_2, FALLING);
    attachInterrupt(sensorPin_3, pulseCounter_3, FALLING);
    attachInterrupt(sensorPin_4, pulseCounter_4, FALLING);

}

//*************************************************************
//======== Interrupt Service Routine for Flow Meter ==========

void pulseCounter_1()
{
  // Increment the pulse counter
  pulseCount[0]++;
}

void pulseCounter_2()
{
  // Increment the pulse counter
  pulseCount[1]++;
}

void pulseCounter_3()
{
  // Increment the pulse counter
  pulseCount[2]++;
}

void pulseCounter_4()
{
  // Increment the pulse counter
  pulseCount[3]++;
}
void loop() {
 Serial.print ("Pulses are = ");
Serial.print (pulseCount[0]);
Serial.print (pulseCount[1]);
Serial.print (pulseCount[2]);
Serial.print (pulseCount[3]);
}
```

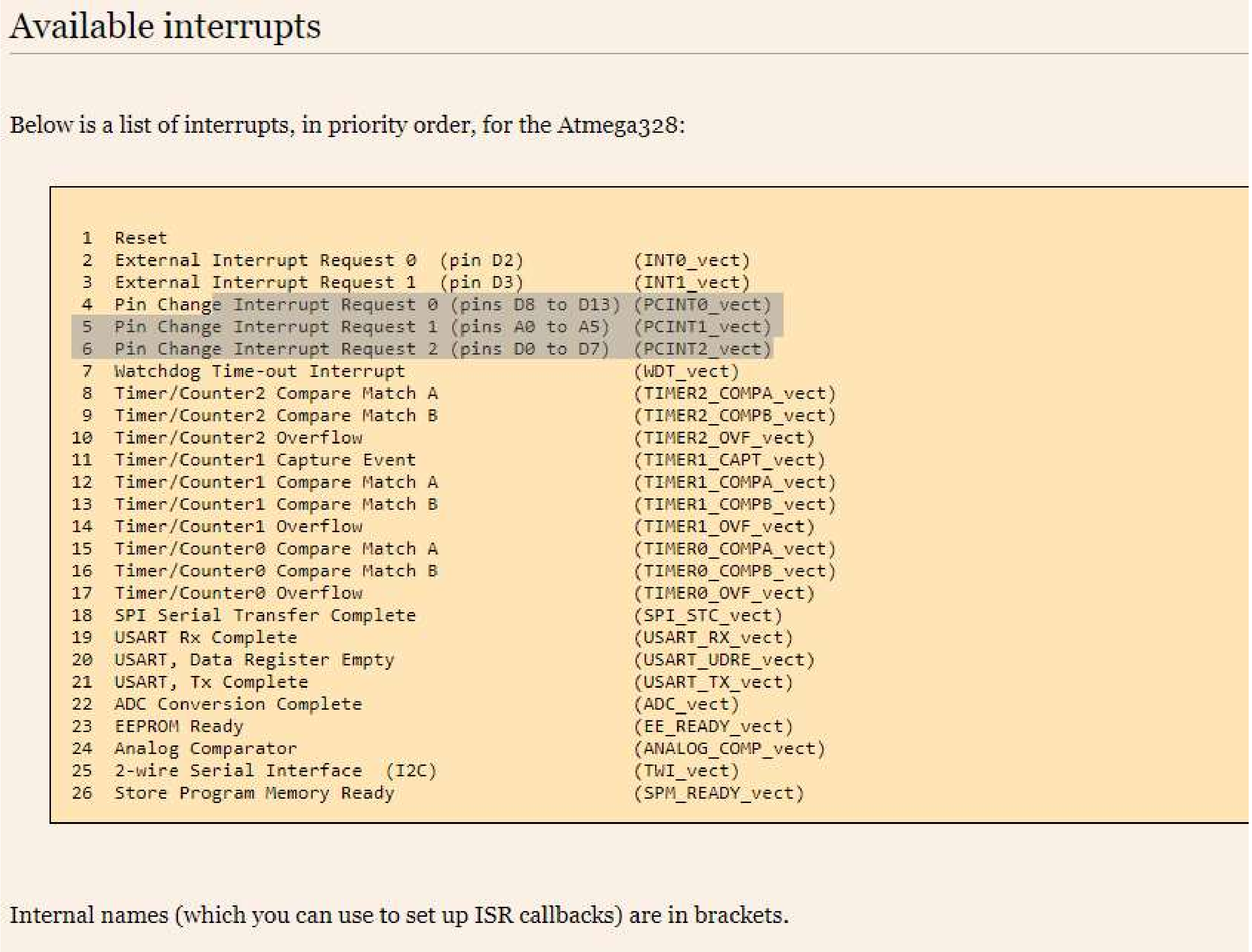
Debug Messages

```
messages here
```

mars000 commented on Mar 6, 2018

Author

Hi - I just read here http://gammon.com.au/interrupts that there seems to be a limit to 3 pin change interrupts ? does this limitation also apply to ESP8266 ?



Available interrupts

Below is a list of interrupts, in priority order, for the Atmega328:

```
 1  Reset
 2  External Interrupt Request 0  (pin D2)          (INT0_vect)
 3  External Interrupt Request 1  (pin D3)          (INT1_vect)
 4  Pin Change Interrupt Request 0 (pins D8 to D13) (PCINT0_vect)
 5  Pin Change Interrupt Request 1 (pins A0 to A5)  (PCINT1_vect)
 6  Pin Change Interrupt Request 2 (pins D0 to D7)  (PCINT2_vect)
 7  Watchdog Time-out Interrupt                     (WDT_vect)
 8  Timer/Counter2 Compare Match A                  (TIMER2_COMPA_vect)
 9  Timer/Counter2 Compare Match B                  (TIMER2_COMPB_vect)
10  Timer/Counter2 Overflow                         (TIMER2_OVF_vect)
11  Timer/Counter1 Capture Event                    (TIMER1_CAPT_vect)
12  Timer/Counter1 Compare Match A                  (TIMER1_COMPA_vect)
13  Timer/Counter1 Compare Match B                  (TIMER1_COMPB_vect)
14  Timer/Counter1 Overflow                         (TIMER1_OVF_vect)
15  Timer/Counter0 Compare Match A                  (TIMER0_COMPA_vect)
16  Timer/Counter0 Compare Match B                  (TIMER0_COMPB_vect)
17  Timer/Counter0 Overflow                         (TIMER0_OVF_vect)
18  SPI Serial Transfer Complete                    (SPI_STC_vect)
19  USART Rx Complete                               (USART_RX_vect)
20  USART, Data Register Empty                      (USART_UDRE_vect)
21  USART, Tx Complete                              (USART_TX_vect)
22  ADC Conversion Complete                         (ADC_vect)
23  EEPROM Ready                                    (EE_READY_vect)
24  Analog Comparator                               (ANALOG_COMP_vect)
25  2-wire Serial Interface  (I2C)                  (TWI_vect)
26  Store Program Memory Ready                      (SPM_READY_vect)
```

Internal names (which you can use to set up ISR callbacks) are in brackets.

mars000 commented on Mar 7, 2018 Author

@igrr - hi ivan
sorry for direct question but really need to solve issue I have with inability to have more than 3 gpio interrupts setup on Wemos mini pro. I use attachInterrupt function as per example above but what happens are interrupts for sensor_Pin3 and sensort_pin4 get combined. Is there a limit to number of pins that can assigned interrupts in one sketch ? (BTW: i also tried `attachInterrupt(digitalPinToInterrupt(sensorPin_3), pulseCounter_3, FALLING);`

MarkusAD commented on Mar 7, 2018

Your interrupt service routines need to be in ram, not flash. Make them all look like this...

void ICACHE_RAM_ATTR pulseCounter_1()
{
// Increment the pulse counter
pulseCount[0]++;
}

👍 2

mars000 commented on Mar 7, 2018 Author

hi - thanks for your suggestion. I implement changes but unfortunately not making any difference.
i.e. I seem to get same number for pulseCount[2] and pulseCount[3] , as if the interrupts are connected/entangledin some way. The only way to resolve is to keep it at max 3 interrupts.

MarkusAD commented on Mar 7, 2018 • edited

Works for me... where are your pinMode() statements in setup()? For each pin...

pinMode(sensorPin_1, INPUT_PULLUP);
attachInterrupt(digitalPinToInterrupt(sensorPin_1), pulseCounter_1, FALLING);

mars000 commented on Mar 7, 2018 Author

yes I have in setup before `attachInterrupt(xxxx)` the following:

```
    pinMode(sensorPin_1, INPUT_PULLUP);
    pinMode(sensorPin_2, INPUT_PULLUP);
    pinMode(sensorPin_3, INPUT_PULLUP);
    pinMode(sensorPin_4, INPUT_PULLUP);
```

BTW: is it important/critical to use `digitalPinToInterrupt` -- seems to make no difference when if I do or dont' use it.

Any chance you can share your code that validates it works. As noted for me it sometime combines Int3 and Int 4 and sometimes it doesn't.

MarkusAD commented on Mar 7, 2018 • edited

Same as your code, only other thing I changed was loop()...

```
void loop() {
  char buf[16];
  sprintf(buf, "%03d %03d %03d %03d",
  pulseCount[0], pulseCount[1], pulseCount[2], pulseCount[3]);
  Serial.println(buf);
  delay(1000);
}
```

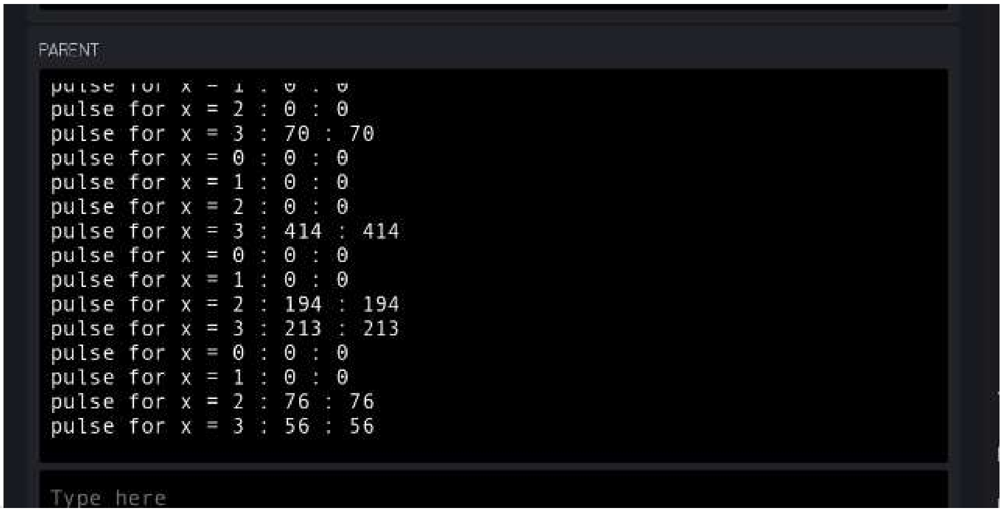
MarkusAD commented on Mar 7, 2018

edited: sorry for the typo, sprintf() vars should be 3 characters wide.

mars000 commented on Mar 7, 2018 Author

I see - but how are you generating the input i.e. you using 4 flow sensors in order to verify pulses ?

To provide more context see screenshot below. I count pulses received from x = 0 to 3 representing pulseCount[0] to [3]. You will notice when flowmeter[2] two is spinning and generating FALLING pulses it also shows pulses for flowmeter[3]; even though flowmeter[3] in this case was not spinning.



```
pulse for x = 1 : 0 : 0
pulse for x = 2 : 0 : 0
pulse for x = 3 : 70 : 70
pulse for x = 0 : 0 : 0
pulse for x = 1 : 0 : 0
pulse for x = 2 : 0 : 0
pulse for x = 3 : 414 : 414
pulse for x = 0 : 0 : 0
pulse for x = 1 : 0 : 0
pulse for x = 2 : 194 : 194
pulse for x = 3 : 213 : 213
pulse for x = 0 : 0 : 0
pulse for x = 1 : 0 : 0
pulse for x = 2 : 76 : 76
pulse for x = 3 : 56 : 56
```

MarkusAD commented on Mar 7, 2018

I was just testing each pin with a jumper to ground, but seems to work ok, they all respond individually.

MarkusAD commented on Mar 7, 2018

try using actual gpio pin numbers instead of the arduino digital pin aliases?
D1 = 5
D5 = 14
D6 = 12
D7 = 13

👍 1

pieman64 commented on Mar 7, 2018

@mars000 like @MarkyAD wrote I notice you state Generic ESP8266 so how would the D references work?

MarkusAD commented on Mar 7, 2018

thats probably it, I compiled for my actual board (lolin).

mars000 commented on Mar 7, 2018 Author

sorry I copied my code from another editor. I actually have the following in the code:
(btw: i did now change attachInterrupt with actual GPIO number. see below. However my test still show same intermittent issue. I'm beginning to wonder if its my wiring setup.
I have same +5V and GND going to each flow meter. And separately I have data pins coming back to respective GPIO pins on Wemos mini pro.
I do have this running over about 100M cat6 so maybe come long distance signally issues ?

```
// Pins mapping For Wemos Mini and D1 R2 to ARDUINO GPIO
#define D0 16   // NOTE: this GPIO16 does not support interrupts
#define D1 5    // NTE: avoid using GPIO6 to GPIO11 for Interrupts
#define D2 4
#define D3 0
#define D4 2
#define D5 14
```

```
#define D6 12
#define D7 13
#define D8 15
#define RX 3
#define TX 1

#define sensorPin_1 D1
#define sensorPin_2 D5
#define sensorPin_3 D6
#define sensorPin_4 D7

volatile byte pulseCount[4];

void setup() {

Serial.begin(115200);

pinMode(sensorPin_1, INPUT_PULLUP);
  pinMode(sensorPin_2, INPUT_PULLUP);
  pinMode(sensorPin_3, INPUT_PULLUP);
  pinMode(sensorPin_4, INPUT_PULLUP);

 attachInterrupt(digitalPinToInterrupt(5), pulseCounter_1, FALLING);
    attachInterrupt(digitalPinToInterrupt(14), pulseCounter_2, FALLING);
    attachInterrupt(digitalPinToInterrupt(12), pulseCounter_3, FALLING);
    attachInterrupt(digitalPinToInterrupt(13), pulseCounter_4, FALLING);

}

//************************************************************
//======== Interrupt Service Routine for Flow Meter ==========

void ICACHE_RAM_ATTR pulseCounter_1()
{
  // Increment the pulse counter
  pulseCount[0]++;
}

void void ICACHE_RAM_ATTR pulseCounter_2()
{
  // Increment the pulse counter
  pulseCount[1]++;
}

void void ICACHE_RAM_ATTR pulseCounter_3()
{
  // Increment the pulse counter
  pulseCount[2]++;
}

void void ICACHE_RAM_ATTR pulseCounter_4()
{
  // Increment the pulse counter
  pulseCount[3]++;
}
void loop() {
 Serial.print ("Pulses are = ");
Serial.print (pulseCount[0]);
Serial.print (pulseCount[1]);
Serial.print (pulseCount[2]);
Serial.print (pulseCount[3]);
}
```

👍 1

mars000 commented on Mar 7, 2018 Author

I wonder if it may have to do

mars000 closed this as completed on Mar 7, 2018

mars000 reopened this on Mar 7, 2018

mars000 commented on Mar 7, 2018 Author

i just tried it over a much shorter distance of cable i.e. 1 m vs 100m and seems to works better. I have a strong suspicion that over long cable distances there could be some sort of interference - I don't know why to be honest at this stage.

MarkusAD commented on Mar 7, 2018

Crazy stuff always happens with long cable runs, voltage sag and/or current starvation due to the resistance of the wire, noise getting on signal lines, crosstalk between individual lines, etc. If you've got extra wires in the bundle try using multiple wires in parallel for +V and ground or giving each sensor its own pair (stay with how the pairs are twisted in the bundle) for signal and ground.

Anyway the code does work and its not a core problem, suggest to close.

👍 1

mars000 commented on Mar 8, 2018 Author

thanks all for your assistance. I would conclude its a wiring issue and the interrupts work.

mars000 closed this as completed on Mar 8, 2018

Assignees

No one assigned

Labels

None yet

Projects

None yet

Milestone

No milestone

Development

No branches or pull requests

3 participants