

Infineon Aurix Tc234L Motor Control Trouble-shooting

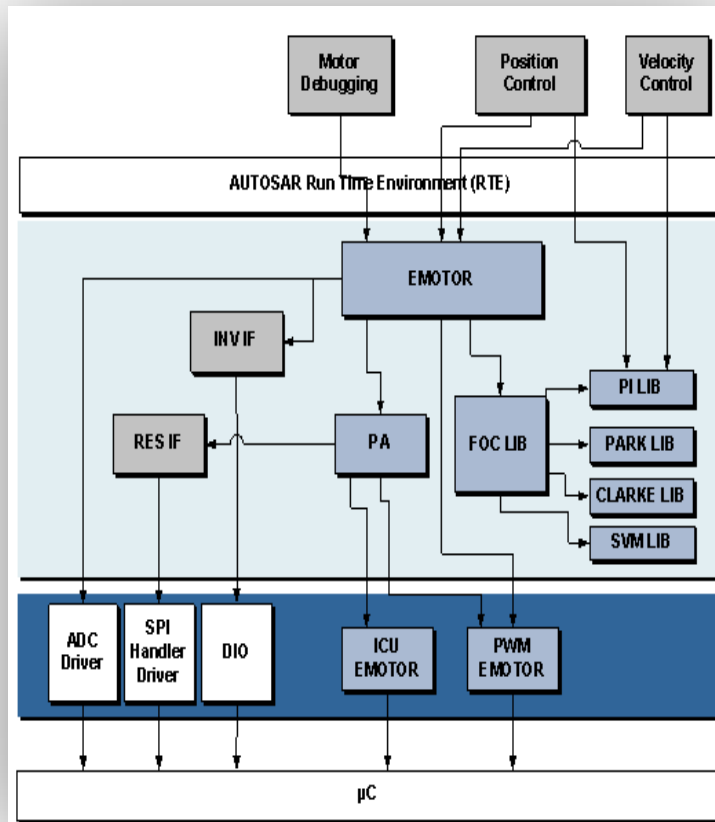
PMSM with FOC

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PMSM Motor Control Introduction

- ▶ multi-phase motors replace DC motor for Hydraulic pumps assisting steering system and transmission system
- ▶ The Generic Timer Module (GTM) module generate the PWM
 - the generation of PWMs to control a B6 bridge,
- ▶ the VADC measure the phase current
- ▶ DSADC or GPT12 determines the motor position
- ▶ The eMotor application kit uses the FOC algorithms

Motor Control Module



Var profile, Complex Breakpoint



OS Awareness, Task Analyzer



Frame work , Flow Check



Per Check , Realtime Access

Demo Show -- Flash

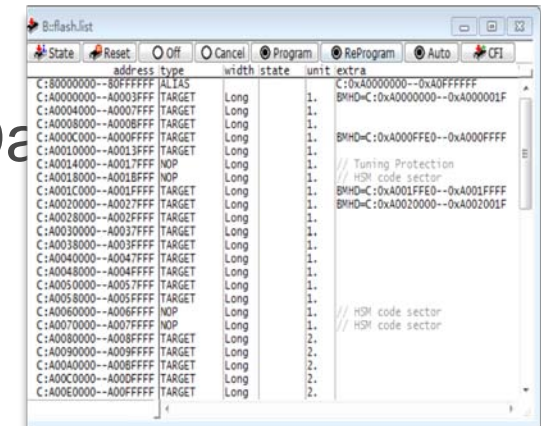
▶ Environment setup Issue

▶ Flash Issue

- ▶ Be careful when using command flash.erase
- ▶ Protected section (HSM UCB) program enable
- ▶ Don't into run mode after Flash algorithms loaded
- ▶ BMHD check after loaded
- ▶ ECC error indicated as "?????" in Data



Demo

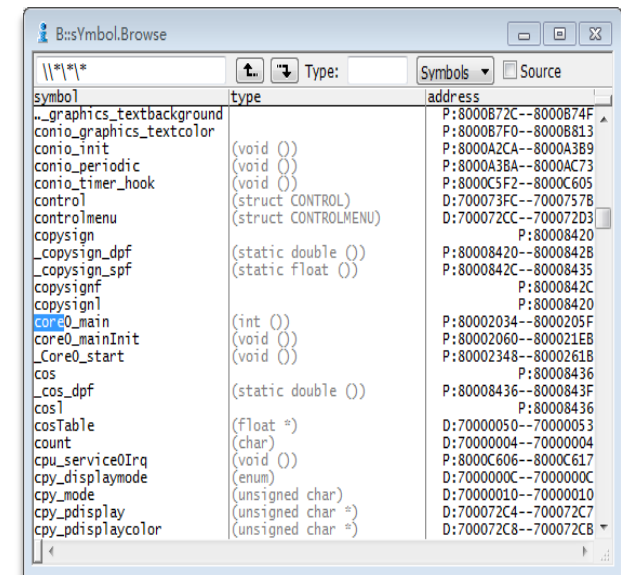


Demo Show -- sYmbol

- ▶ Environment setup Issue
- ▶ sYmbol Load Issue
 - ▶ SourcePath error
 - ▶ Data.load.elf * /nocode /singleline
 - ▶ Find code From *.C file



Demo

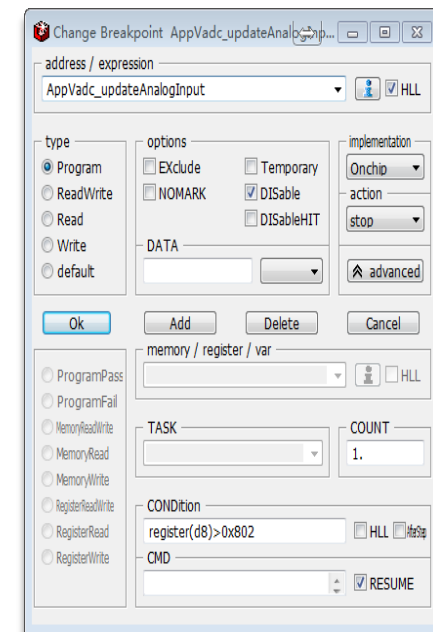


Demo Show -- Breakpoint

- ▶ Debug Issue
 - ▶ Breakpoint
 - ▶ Register breakpoint
 - ▶ Condition breakpoint
 - ▶ Bit breakpoint



Demo

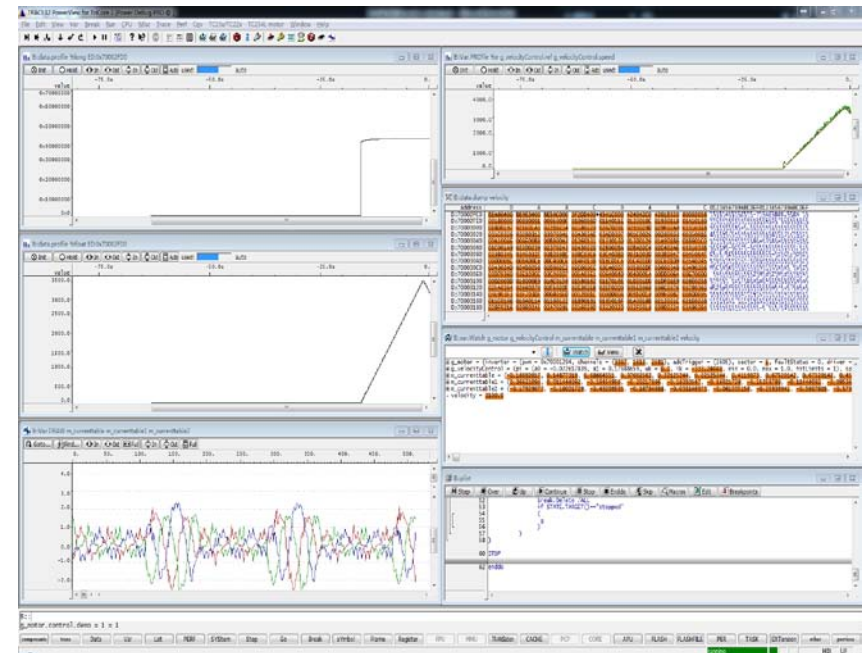


Demo Show – Graphic show

- ▶ **Debug Issue**
 - ▶ **Var Graphic**
 - ▶ Var.profile
 - ▶ Data.profile
 - ▶ Var.draw



Demo

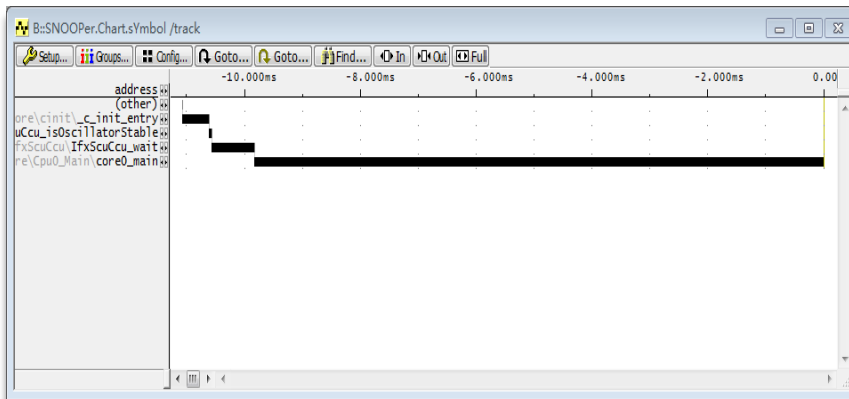


Demo Show – Program flow

- ▶ Debug (snooper)
- ▶ Program Flow check by sample PC
- ▶ Frame work to check the function nesting



Demo



```

B:frame.view /Caller /Locals
┌ Up ── Down ── Args ── Locals ── Caller Task:
-001 IfxVadc_getResult (inline)
-001 IfxVadc_Adc_getResult (inline)
-001 AppVadc_updateAnalogInput_DRC (
  @ input = 0x70004FCC
  . value = -0.076293945
  . rawValue = 2045
  @ tmpResult = (U = 2147491828, I = -2147475468, B = (RESULT = 8180, DRC = 0, CHNR = 0, EMUX = 0, CRS = 0, FCR = 0, VF = 1))
  {
    float32 value;
    uint32 rawValue;
    rawValue = IfxVadc_Adc_getResult(&input->input).B.RESULT->>2;
-002 vadc_conversionEndGroup0
    AppVadc_updateAnalogInput_DRC (&g_appVadc_kernel.channel[AppVadc_Ch_I_V]);
-003 vadcgroup0ISR()
  {
    vadc_conversionEndGroup0();
  }
  ── exception
-004 cpu_service0Irq()
  {
    __enable();
  }
  ── exception
-005 core0_main()
  . i = 3
  if (i == AppScheduler_Task_count)
  ── end of frame
  
```


Demo Show – BMC

- ▶ **Benchmark count**
- ▶ **Mark breakpoint set**
- ▶ **BMC (ATOB) calculate static runtime**



Demo

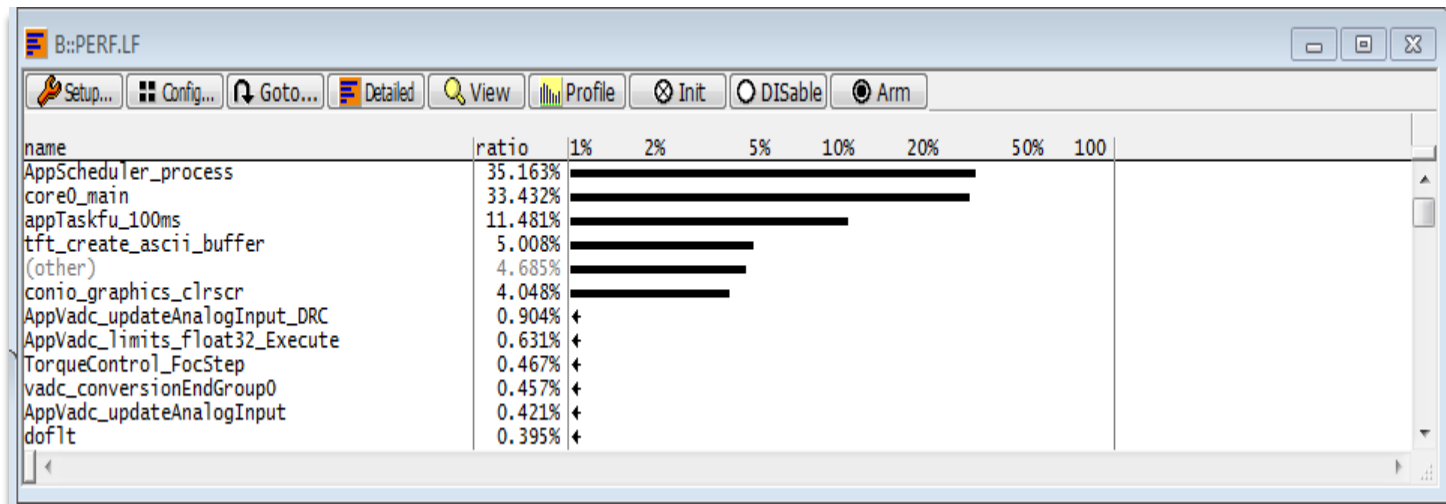
counter name	event	atob	size	value	ratio	ratio value	ov
—	CLOCKS				0		0.000us
—	ICNT	ON (instructions)	31BIT		0	OFF	
—	M1CNT	NONE (counter not used)	31BIT			OFF	
—	M2CNT	NONE (counter not used)	31BIT			OFF	
—	M3CNT	NONE (counter not used)	31BIT			OFF	

Demo Show – dynamic

- ▶ Perf mode select
- ▶ Check function workload
 - ▶ Snoop mode
 - ▶ StopAndGo



Demo



Demo Show – User Case

- ▶ **TFT Debug**
- ▶ **Screen update Issue**
- ▶ **Touch event Debug**



Demo

```

B:Var-Watch
--- Watch ---
@menulist = (
@color_display = 112, color_select = 12, xmin = 5, xmax = 0, y = 0, select = 0x8000C1FA, display = 0x80008E2C, input = 0x8000C10
@color_display = 112, color_select = 12, xmin = 0, xmax = 10, y = 2, select = 0x8000C210, display = 0x80008EFA, input = 0x8000C1
@color_display = 112, color_select = 12, xmin = 15, xmax = 20, y = 4, select = 0x80008F16, display = 0x80008F56, input = 0x8000C
@color_display = 112, color_select = 12, xmin = 0, xmax = 11, y = 4, select = 0x8000C514, display = 0x8000C086, input = 0x8000C1
@color_display = 112, color_select = 12, xmin = 15, xmax = 25, y = 4, select = 0x8000C358, display = 0x8000C00C, input = 0x8000C
@color_display = 112, color_select = 12, xmin = 30, xmax = 36, y = 4, select = 0x8000C186, display = 0x80008E44, input = 0x8000C
@color_display = 112, color_select = 12, xmin = 0, xmax = 8, y = 6, select = 0x8000C440, display = 0x8000C090, input = 0x8000C10
@color_display = 112, color_select = 12, xmin = 15, xmax = 23, y = 6, select = 0x8000C42C, display = 0x8000C064, input = 0x8000C
@color_display = 112, color_select = 12, xmin = 0, xmax = 15, y = 8, select = 0x8000C100, display = 0x80008F46, input = 0x8000C1
@color_display = 112, color_select = 12, xmin = 0, xmax = 10, y = 10, select = 0x8000C018, display = 0x8000C018, input = 0x8000C
@color_display = 112, color_select = 12, xmin = 12, xmax = 0, y = 12, select = 0x8000C138, display = 0x80008E58, input = 0x8000C
@color_display = 112, color_select = 12, xmin = 0, xmax = 16, y = 14, select = 0x8000C2C0, display = 0x80008F71, input = 0x8000C
@color_display = 112, color_select = 12, xmin = 22, xmax = 39, y = 14, select = 0x8000C394, display = 0x80008FCC, input = 0x8000
@color_display = 112, color_select = 12, xmin = 20, xmax = 17, y = 17, select = 0x8000C264, display = 0x80008F69, input = 0x8000
@color_display = 112, color_select = 12, xmin = 0, xmax = 17, y = 17, select = 0x8000C172, display = 0x80008E7E, input = 0x8000C
@color_display = 0, color_select = 0, xmin = 0, xmax = 0, y = 0, select = 0x0, display = 0x0, input = 0x0, text = (0, 0, 0, 0, 0
touch_event = (
+ time = 0,
+ dttime = 0,
+ x = 1035,
+ y = 549,
+ dx = 0,
+ dy = 75,
+ xdisp = 21,
+ ydisp = 15,
+ status = TOUCH_UP
touch_driver = (
+ time = 0,
+ prev_time = 0,
+ prev_time_down = 0,
+ bounce_limit = 0,
+ bounce_cnt = 0,
+ x = -1,
+ prev_x = 1,
+ prev_x_down = 1035,
+ y = -1,
+ prev_y = -1,
+ prev_y_down = 474,
+ cnt = 1,
+ xdisp = 21,
+ ydisp = 15,
+ xmin = 120.0,
+ xmax = 1850.0,
+ ymin = 1870.0,
+ ymax = 110.0,
+ status = TOUCH_UP,
+ prev_status = TOUCH_UP,
+ touchmode = 0)

```

```

B:Data.dump vaddress("controlmenu")/DIALOG/SpotLight
--- Find ---
ED:0x7000721
address 0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF
ED:700072C0 0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF
ED:70007300 0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF
ED:70007340 0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF
ED:70007380 0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF
ED:700073C0 0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF
ED:70007400 0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF
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ED:700074C0 0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF
ED:70007500 0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF
ED:70007540 0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF
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ED:70007E40 0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF
ED:70007E80 0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF
ED:70007EC0 0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF

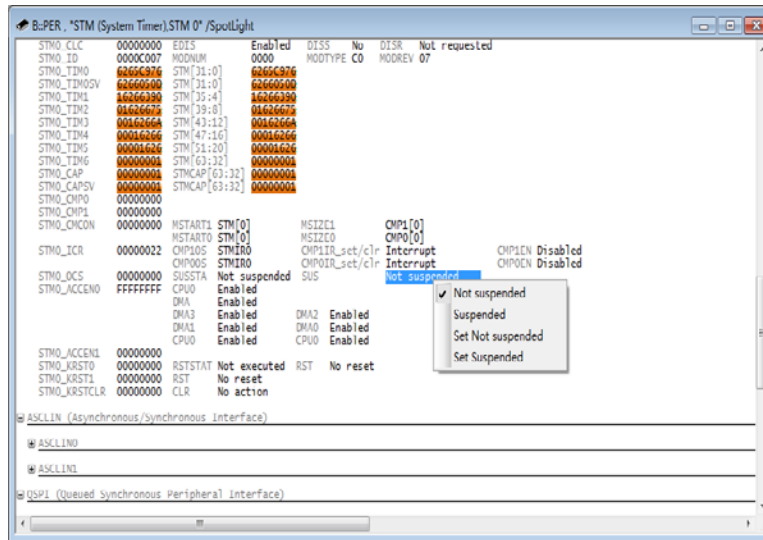
```

Demo Show – User Case

- ▶ **STM Debug mode**
- ▶ **STM suspend Issue**



Demo



THANK YOU!

QUESTIONS?

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