

Start using μ C/ Probe

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(IFCN PMM SMD AP SH APC POWER)

2016-4-27



安装 μ C/ Probe

 Micrium-Probe-TargetCode

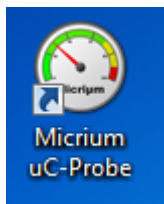
 Micrium-uC-Probe-Setup-Release-4.0.16.6_INFINEON

 Release_Update.

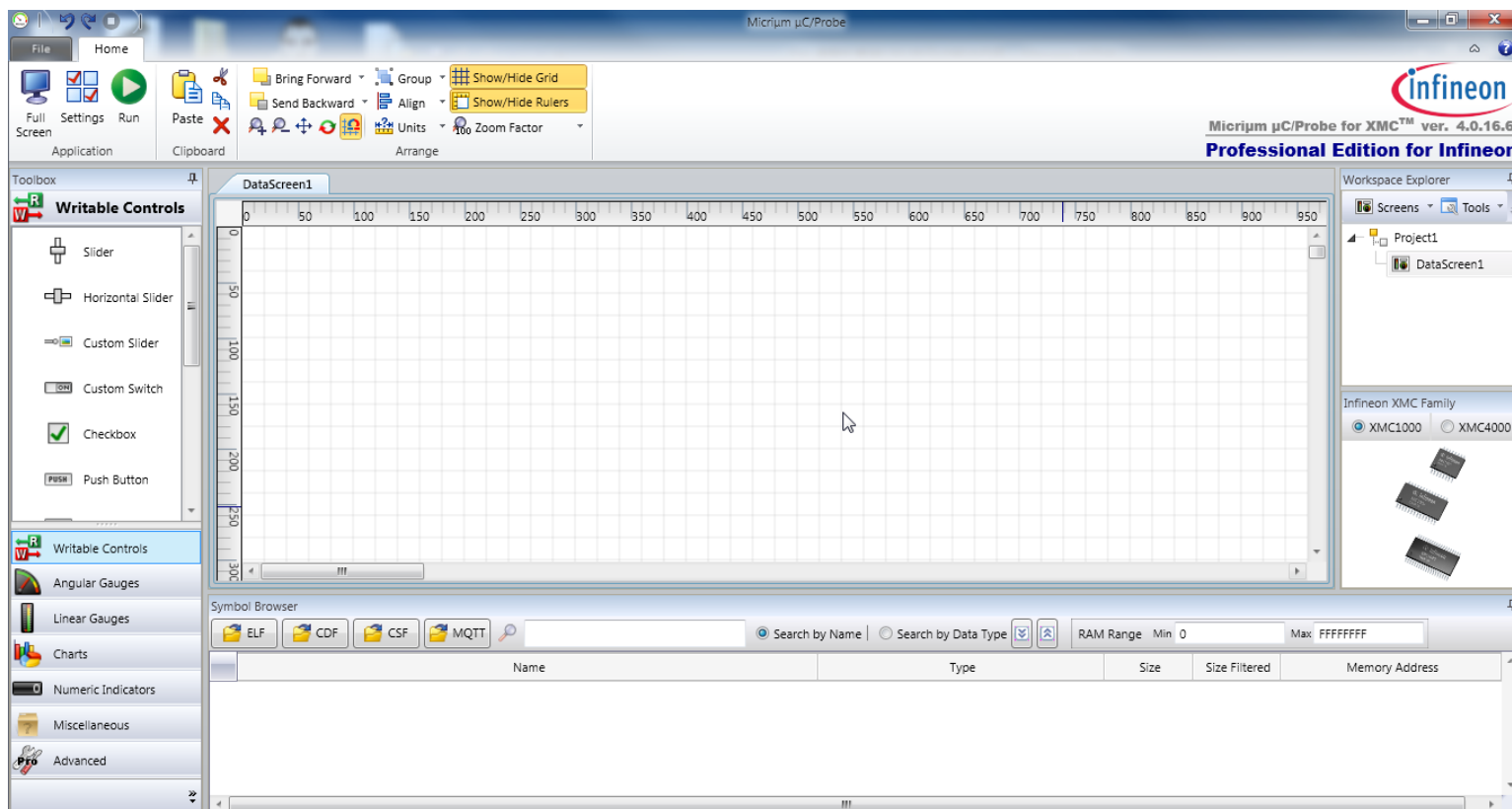
 xmc4700_relaxkit_waveform_generator

- › 执行安装程序，按提示完成
- › 压缩包TargetCode是虚拟示波器使用的C文件，后面详述
- › 后一个压缩包XMC4700kit的样例

进入uC_Probe

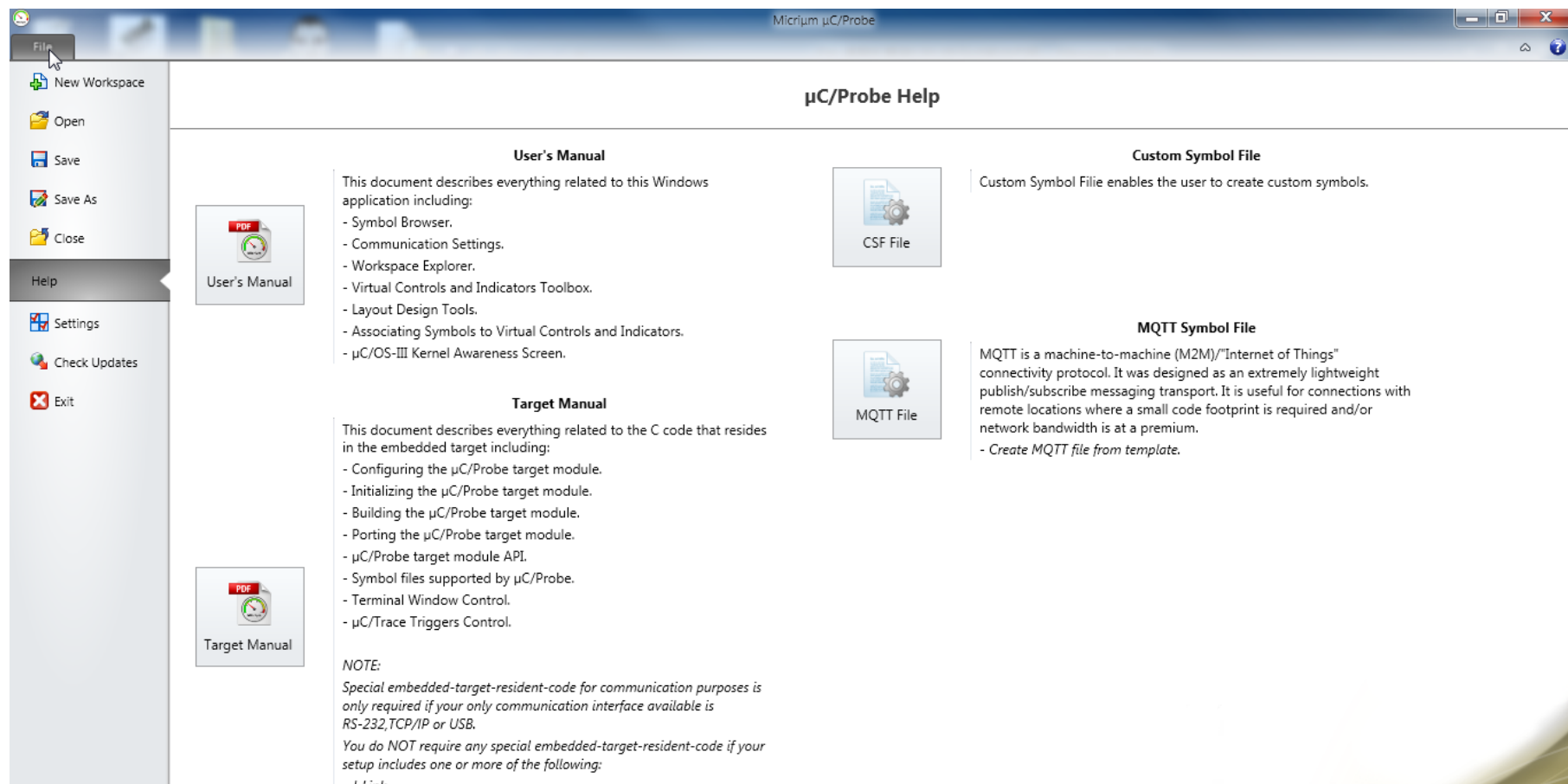


› 点击桌面图标执行uC_Probe



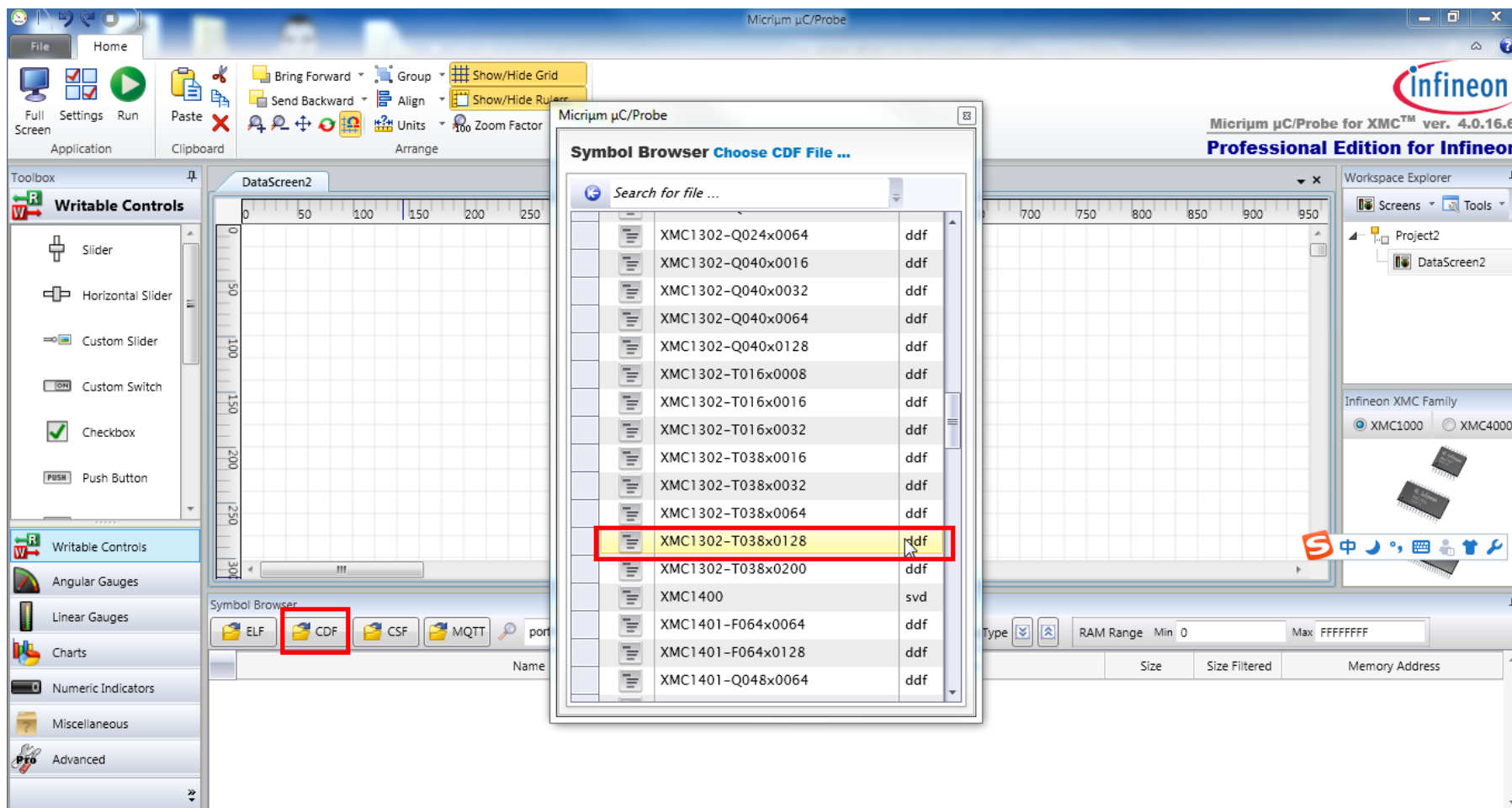
参考文件

- 鼠标点击左上角'File'，可以看到两个pdf手册描述细节，再点一下File返回



载入芯片文件

› 点击CDF，在列表里选择对应MCU型号



以KEIL例程为例

- › 生成一个KEIL的XMC1300的Blinky工程，做测试用途



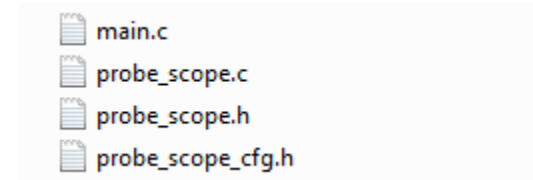
- › 解压缩安装文件里附带的Micrium-Probe-TargetCode.Zip,找到下面路径

- Micrium-Probe-TargetCode\Micrium\Software\uC-Probe\Target\Scope

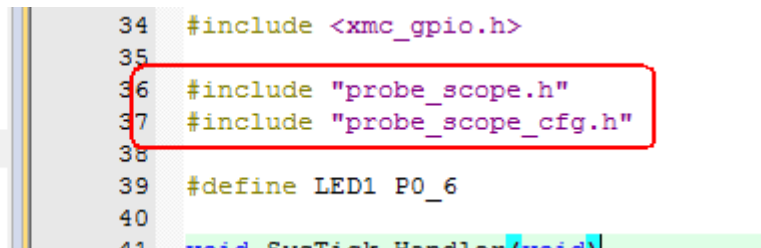
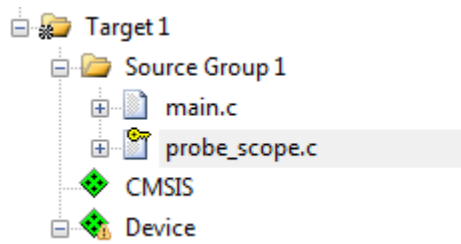
- › Copy scope下三个文件到测试工程目录，添加C文件到 Keil workspace

- › 打开option, 添加路径

- .\



- › Include两个头文件



配置cfg文件

- › 打开cfg头文件，配置示波器通道，根据自己芯片的内存大小选择通道数和采样数，这里把默认的8通道改成2通道。

```

probe_scope_cfg.h | main.c* | WDT.c | WDT.h | XMC1300.h | startup_XMC1300.s | probe_scope.c | GPIO.h
8  *
9  * File   : PROBE_SCOPE_CFG.H
10 * By    : JJL
11 * Version : V1.00.00
12 *****
13 */
14
15
16 /*
17 *****
18 *
19 *                               CONFIGURATION
20 *
21 *****
22 #define PROBE_SCOPE_MAX_CH          2    /* The maximum number of channels: [1,8].
23 #define PROBE_SCOPE_MAX_SAMPLES    1000 /* The maximum number of samples per channel.
24 #define PROBE_SCOPE_16_BIT_EN      1    /* The maximum size of each sample is 16-bits: [0,1].
25 #define PROBE_SCOPE_32_BIT_EN      1    /* The maximum size of each sample is 32-bits: [0,1].
26 #define PROBE_SCOPE_SAMPLING_CLK_HZ_DFLT 1000 /* Default freq (Hz) to configure the timer at init.
27 #define PROBE_SCOPE_IPL            13
28

```

程序内容

- › A. 在Main.c里面调用初始化函数ProbeScope_Init(10000).这里的形参10000代表下面的采样程序每0.1mS（10000HZ）就会去采样需要观察的变量。
- › B. 修改SysTick_Config()参数，每0.1ms产生一次System Tick的中断
- › C. 在System Tick中断服务函数中添加ProbeScope_Sampling()函数
- › D. 变量Count和Count1用来测试

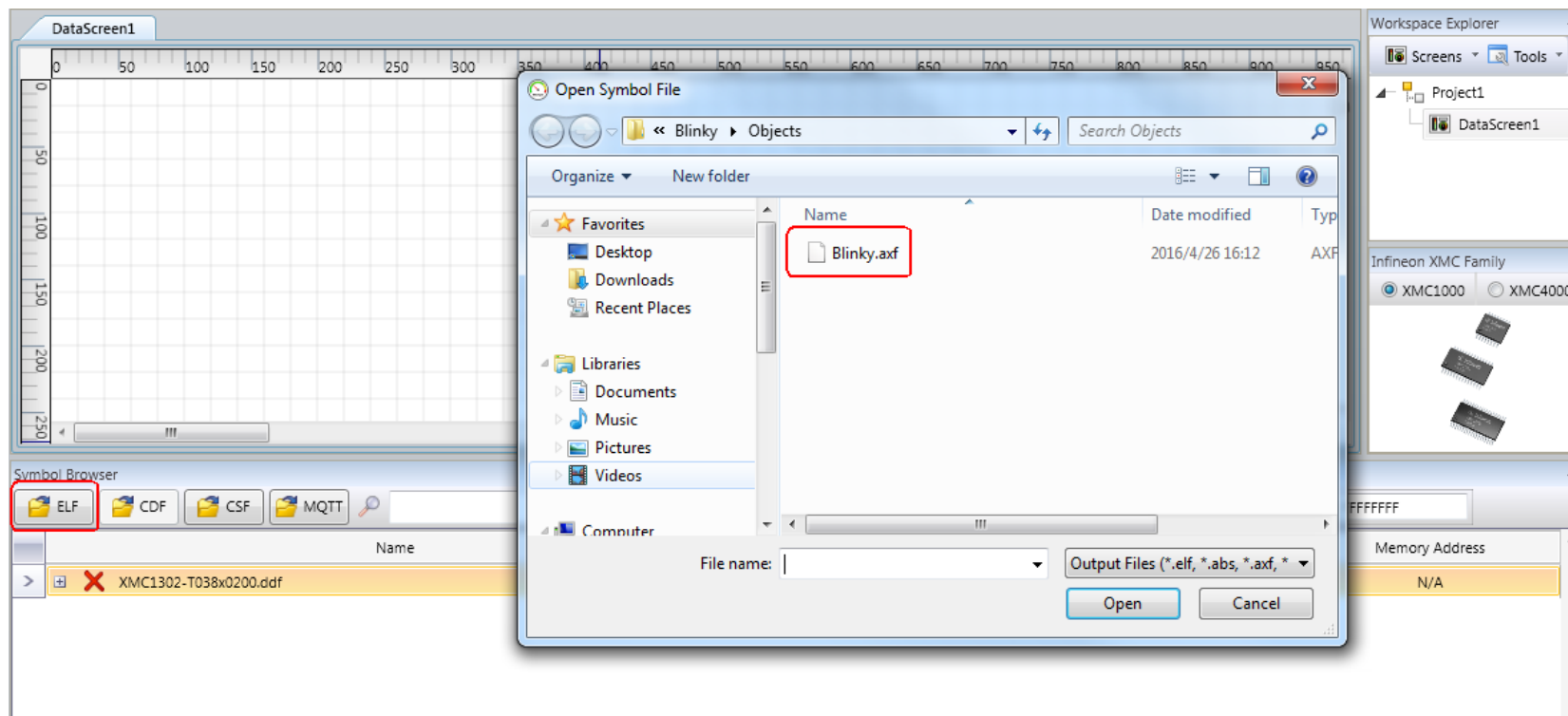
```

39  #define LED1 P0_6
40
41  uint16_t Count = 0, Count1 = 0; D
42
43  void SysTick_Handler(void)
44  {
45      Count++;
46      Count1 += 2; D
47      XMC_GPIO_ToggleOutput(LED1);
48      ProbeScope_Sampling(); C
49  }
50
51
52  int main(void)
53  {
54      ProbeScope_Init(10000); A
55
56      XMC_GPIO_SetMode(LED1, XMC_GPIO_MODE_OUTPUT_PUSH_PULL);
57
58      /* System timer configuration */
59      SysTick_Config(SystemCoreClock/10000); B
60
61      while(1)
62      {
63          /* Infinite loop */
64      }
65  }
66

```


载入对应的编译器仿真文件

- 编译完成后，download到XMC1300BOOTKIT，切换回uC_Probe
- keil用户选择axf文件打开（DAVE用户选择elf，其他找对应的文件后缀）



Symbol Browser窗口

- › 在Symbol Browser窗口可以看到相应的变量和外设
- › 查找窗口输入名字可以快速找到寻找的内容
- › 圆圈处可以关闭和展开分支

Symbol Browser

ELF CDF CSF MQTT

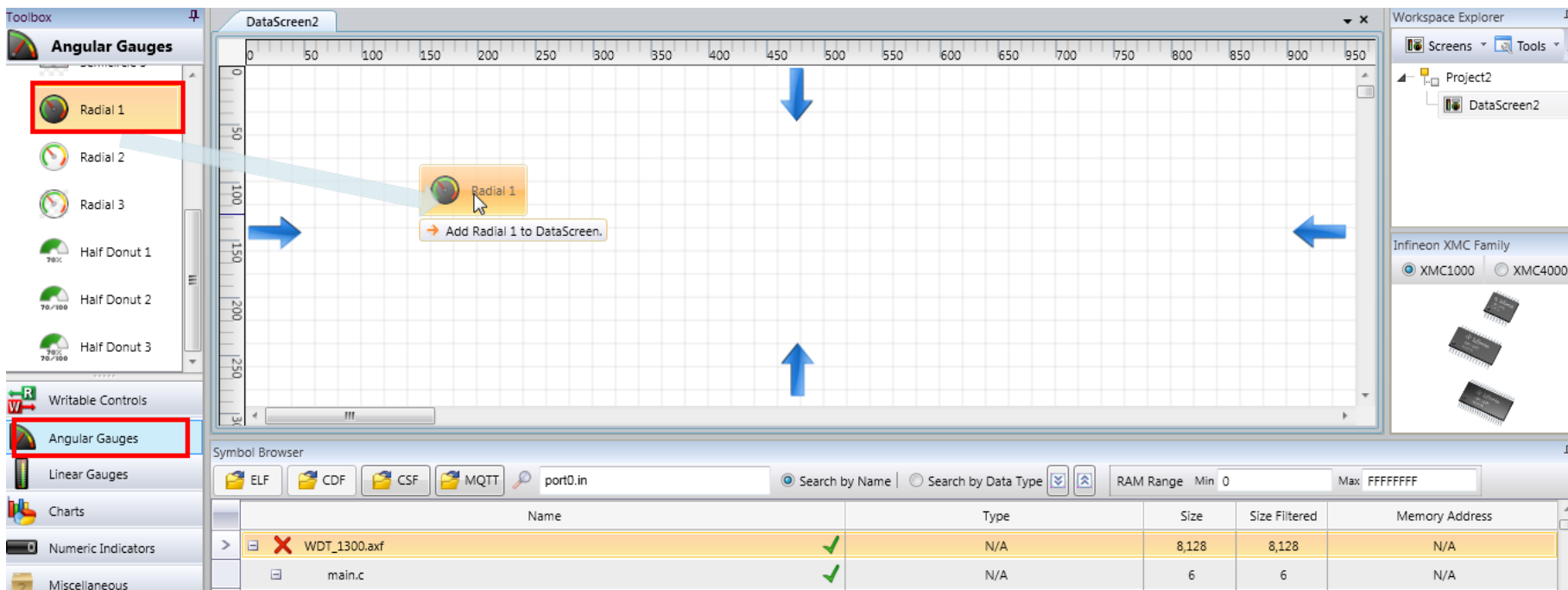
port0.in Search by Name Search by Data Type

RAM Range Min 0 Max FFFFFFFF

Name	Type	Size	Size Filtered	Memory Address
WDT_1300.axf	N/A	8,128	8,128	N/A
main.c	N/A	6	6	N/A
Count	short	2	2	0x20000182
Count1	short	2	2	0x20000184
RESET_BY_WDT	short	2	2	0x20000180
probe_scope.c	N/A	8,118	8,118	N/A
system_XMC1300.c	N/A	4	4	N/A
XMC1302-T038x0032.ddf	N/A	196	196	N/A
BCCU0	Peripheral	4	4	0x50030000
BCCU0_CHO	Peripheral	4	4	0x5003003c

1 增加一个仪表显示

- › 选择Angular Gauges，选择一个仪表，拖到datascreen里面



关联变量和仪表

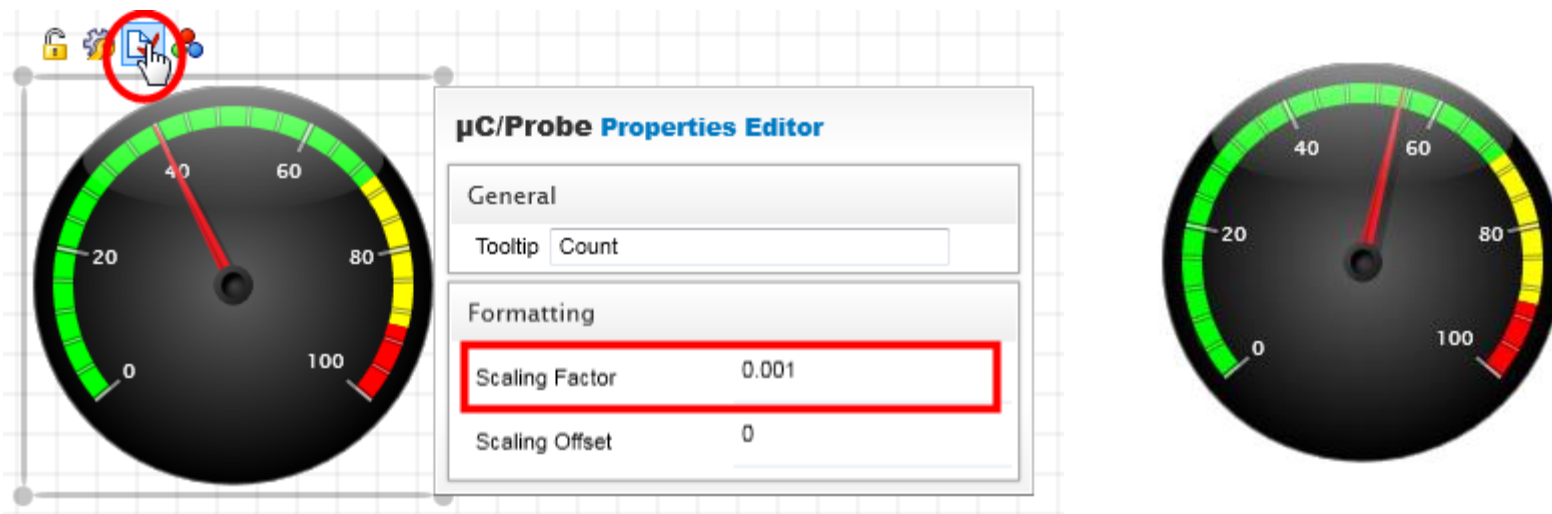
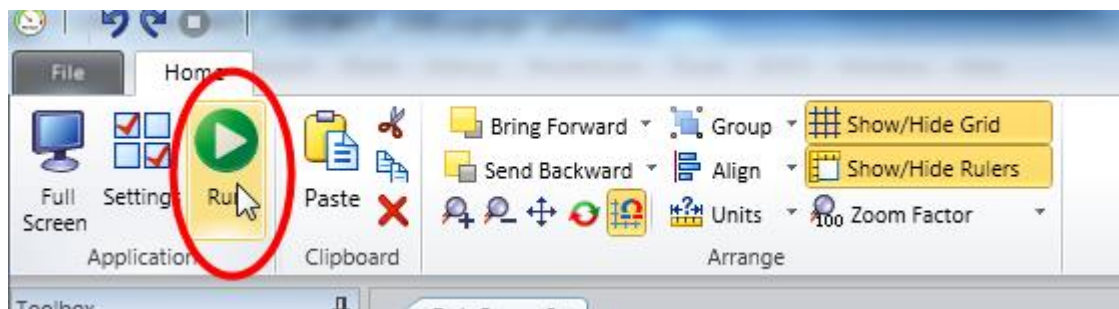
- › 在变量里选择一个拖入仪表界面

The screenshot shows a software development environment. At the top, a window titled "DataScreen1" contains a grid with a horizontal axis from 0 to 900 and a vertical axis from 150 to 400. A circular gauge widget is placed on the grid, with a needle pointing to approximately 10. The gauge has a scale from 0 to 100, with color-coded segments: green (0-40), yellow (40-80), and red (80-100). Below the DataScreen1 is a "Symbol Browser" window. It has a search bar and options for "Search by Name" (selected) and "Search by Data Type". A table lists variables with columns for Name, Type, Size, and Size Filtered. A red arrow points from the "Count" variable in the table to the gauge.

Name	Type	Size	Size Filtered
✖ Blinky.axf	N/A	8,126	8,126
main.c	N/A	4	4
> Count	unsigned short	2	2
Count1	unsigned short	2	2
⊕ probe_scope.c	N/A	8,118	8,118
⊕ system_XMC1300.c	N/A	4	4
✖ XMC1300_T028x0200.d4f	N/A	106	106

设定显示比例

- › 确认Bootkit里面程序已经运行
- › 由于count设为uint16_t,从0-65535循环,因此把比例Scaling Factor设为0.001,这样指针转到65到66之间就回到0
- › 设定完成后,点击Run,可以看到指针动态从0到65移动



2 增加一个数字表显示

- › 选择Numeric Indicators,鼠标拖一个数字表到DataScreen

Name	Type	Size	Size Filtered	Memory Address
WDT_1300.axf	N/A	8,128	8,128	N/A
main.c	N/A	6	6	N/A
Count	unsigned short	2	2	0x20000182
Count1	unsigned short	2	2	0x20000184
RESET_BY_WDT	short	2	2	0x20000180

关联变量到数字表

- › 拖变量Count1 到数字表

The screenshot shows the DataScreen2 interface with a gauge and a digital display. A tooltip for the variable 'Count1' is shown, indicating its type and memory address. A blue arrow points from the 'Count1' entry in the Symbol Browser table to the digital display.

Name	Type	Size	Size Filtered
WDT_1300.axf	N/A	8,128	8,128
main.c	N/A	6	6
Count	unsigned short	2	2
Count1	unsigned short	2	2
RESET_BY_WDT	short	2	2

显示结果

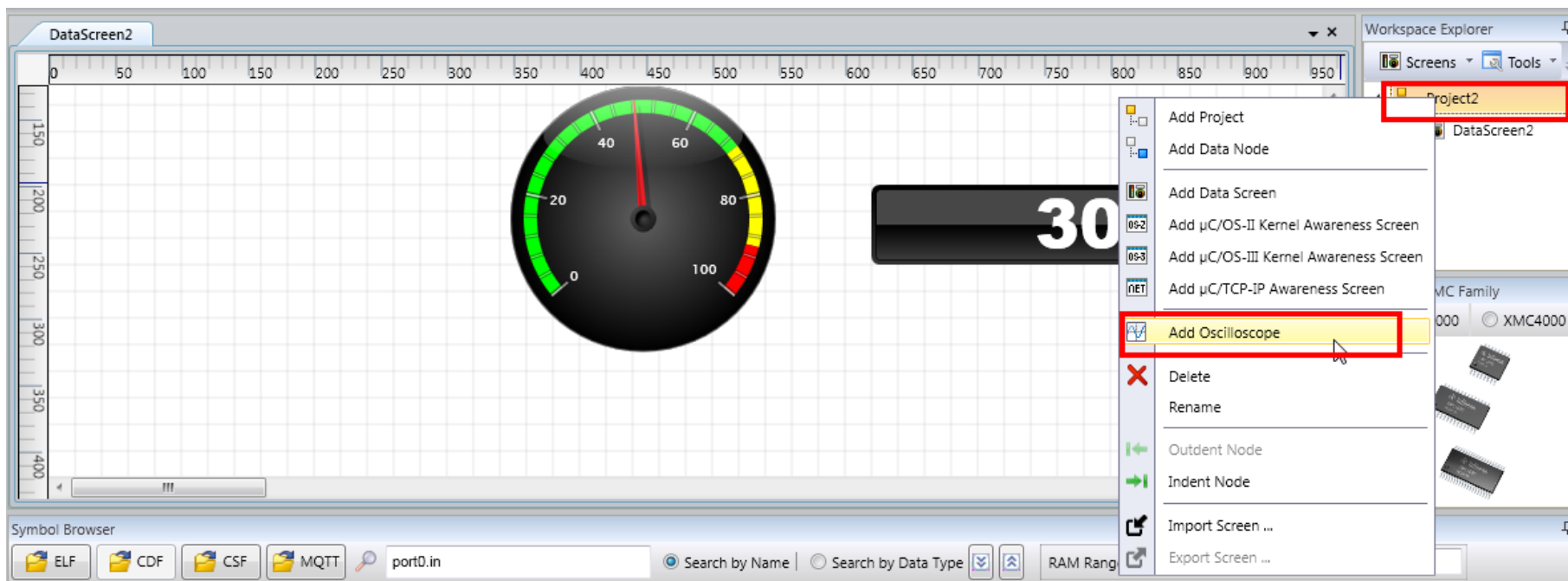
- › 点击Run后，可以看到变量Count1显示到数字表，不断变化



20980

3 增加示波器功能

› 右键点击project, 选择Add Oscilloscope



3-1 把变量添加到示波器

- 用鼠标把变量count, count1分别拖到Scope Setting

The screenshot shows the software interface for configuring an oscilloscope. The main window is titled 'Oscilloscope' and 'DataScreen2'. Below the waveform display is the 'Scope Settings' table. A tooltip is visible over the 'Symbol' column of the table, showing details for the variable 'Count'.

Ch	Ch En	Symbol	Label	Type	Max / Min	Trig Level	Trig Sel	Bit En	Bit #	Gain	Offset	Status
1	<input type="checkbox"/>	NONE			0	0	<input checked="" type="radio"/>	<input type="checkbox"/>	0	1.0000	0.0000	<input type="radio"/> Triggered
2	<input type="checkbox"/>	NONE			0	0	<input type="radio"/>	<input type="checkbox"/>	0	1.0000	0.0000	<input type="radio"/> Stop
3	<input type="checkbox"/>				0	0	<input type="radio"/>	<input type="checkbox"/>	0	1.0000	0.0000	<input checked="" type="radio"/> Continuous
4	<input type="checkbox"/>				0	0	<input type="radio"/>	<input type="checkbox"/>	0	1.0000	0.0000	<input type="radio"/> Single Trig

The tooltip for 'Count' shows:

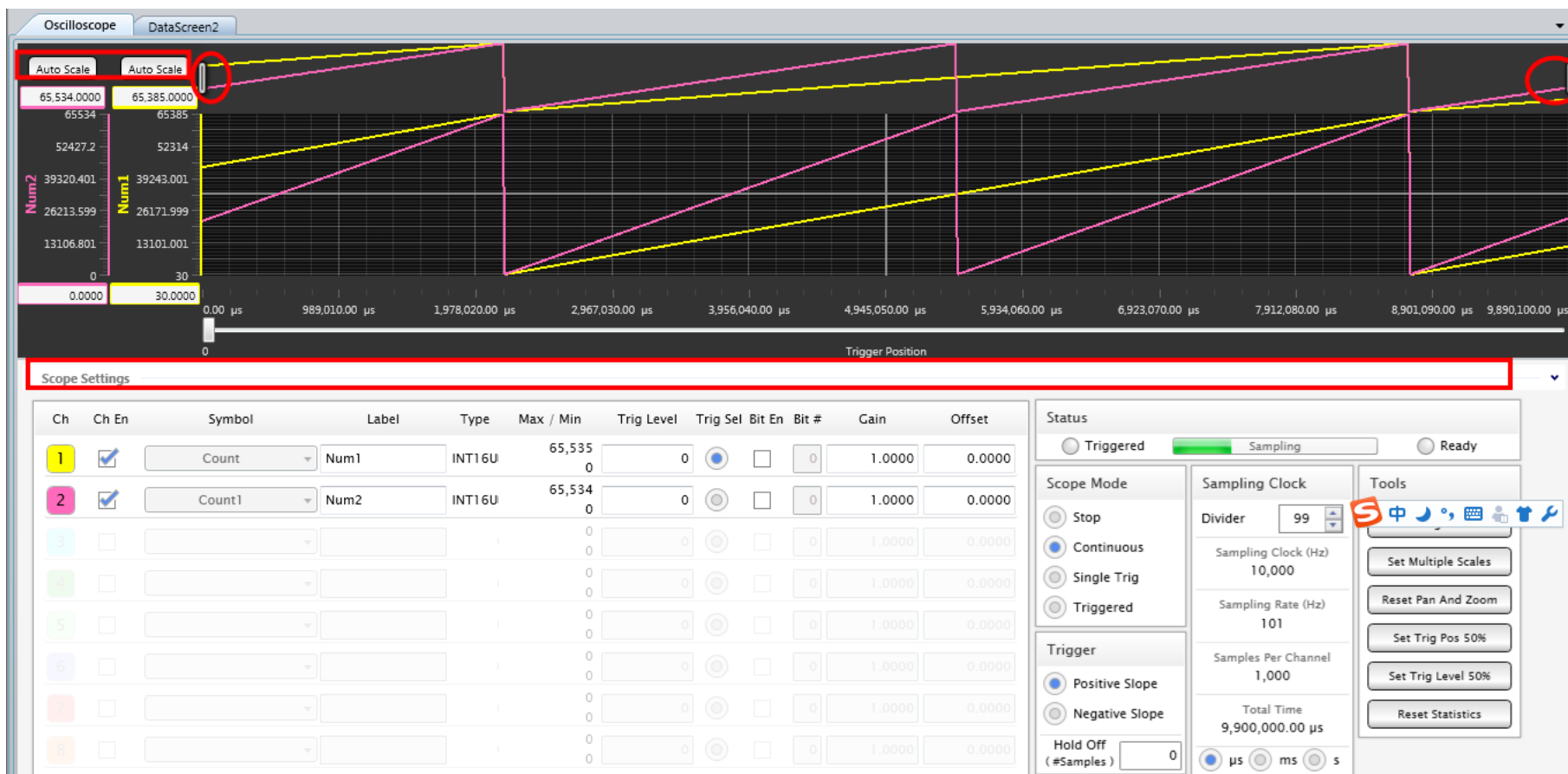
- Symbol : Count
- Type : unsigned short
- Memory Address : 0x20000182
- Size : 2

The Symbol Browser at the bottom shows a list of variables:

Name	Type	Size	Size Filtered	Memory Address
WDT_1300.axf	N/A	8,128	8,128	N/A
main.c	N/A	6	6	N/A
Count	unsigned short	2	2	0x20000182
Count1	unsigned short	2	2	0x20000184
RESET_BY_WDT	short	2	2	0x20000180
probe_scope	N/A	8,118	8,118	N/A

幅度和时间轴调节

- › 点击Auto_Scale把幅度调整到合适范围
- › 时间轴在Sampling Clock divide调整
- › 触发和停止等见操作界面，和正常示波器类似
- › 双击scope Setting可以放大示波器到全屏
- › 拖拽上方圆圈处可以进行局部放大



3-2 观察寄存器

- › 拖拽寄存器PORT0.IN到示波器设置

The screenshot displays the Infineon XMC IDE interface. The top window is the Oscilloscope, showing the Scope Settings table. The bottom window is the Symbol Browser, showing the search results for 'port0.in'.

Ch	Ch En	Symbol	Label	Type	Max / Min	Trig Level	Trig Sel	Bit En	Bit #	Gain	Offset	Status
1	<input checked="" type="checkbox"/>	Count	Num1	INT16U	65,535 0	0	<input checked="" type="radio"/>	<input type="checkbox"/>	0	1.0000	0.0000	Triggered
2	<input checked="" type="checkbox"/>	Count1	Num2	INT16U	65,534 0	0	<input type="radio"/>	<input type="checkbox"/>	0	1.0000	0.0000	Stop
3	<input type="checkbox"/>				0	0	<input type="radio"/>	<input type="checkbox"/>	0	1.0000	0.0000	Continuous
4	<input type="checkbox"/>				0	0	<input type="radio"/>	<input type="checkbox"/>	0	1.0000	0.0000	Single Trig
5	<input type="checkbox"/>				0	0	<input type="radio"/>	<input type="checkbox"/>	0	1.0000	0.0000	Triggered
6	<input type="checkbox"/>				0	0	<input type="radio"/>	<input type="checkbox"/>	0	1.0000	0.0000	Trigger

Name	Type	Size	Size Filtered	Memory Address
XMC1302-T038x0032.ddf	N/A	196	196	N/A
PORT0	Peripheral	4	4	0x40040000
IN	Register	4	4	0x40040024
P0	Bit Field [0:0]	4	4	0x40040024

选择通道2观测P0.6

> 下拉菜单选择PORT0.IN

Ch	Ch En	Symbol	Label	Type	Max / Min	Trig Level	Trig Sel	Bit En	Bit #	Gain	Offset
1	<input checked="" type="checkbox"/>	Count	Num1	INT16U	65,535 0	0	<input checked="" type="radio"/>	<input type="checkbox"/>	0	1.0000	0.0000
2	<input checked="" type="checkbox"/>	Count1	Num2	INT16U	65,534 0	0	<input checked="" type="radio"/>	<input type="checkbox"/>	0	1.0000	0.0000
3	<input type="checkbox"/>	NONE			0	0	<input checked="" type="radio"/>	<input type="checkbox"/>	0	1.0000	0.0000
4	<input type="checkbox"/>	Count			0	0	<input checked="" type="radio"/>	<input type="checkbox"/>	0	1.0000	0.0000
5	<input type="checkbox"/>	Count1			0	0	<input checked="" type="radio"/>	<input type="checkbox"/>	0	1.0000	0.0000
6	<input type="checkbox"/>				0	0	<input checked="" type="radio"/>	<input type="checkbox"/>	0	1.0000	0.0000

> 选择Bit, 第6位

Ch	Ch En	Symbol	Label	Type	Max / Min	Trig Level	Trig Sel	Bit En	Bit #	Gain	Offset
1	<input checked="" type="checkbox"/>	Count		INT16U	65,529 0	0	<input checked="" type="radio"/>	<input type="checkbox"/>	0	1.0000	0.0000
2	<input checked="" type="checkbox"/>	PORT0.IN		INT32S	1 0	0	<input checked="" type="radio"/>	<input checked="" type="checkbox"/>	6	1.0000	0.0000

第6位

输出结果

```

void SysTick_Handler(void)
{
    Count++;
    Count1 += 2;
    if((Count == 0) || (Count == 32767))
    {
        XMC_GPIO_ToggleOutput(LED1);
    }
    ProbeScope_Sampling();
}

```

Scope Settings

Ch	Ch En	Symbol	Label
1	<input checked="" type="checkbox"/>	Count	Num1
2	<input checked="" type="checkbox"/>	PORT0.IN	Num2



文件资源

› 安装程序包

Micrium-Probe-TargetCode	2016/4/5 22:00	WinZip File	439 KB		示波器辅助功能代码
Micrium-uC-Probe-Setup-Release-4.0.16.6_INFINEON	2016/4/10 18:39	Application	105,793 KB		安装程序
Release_Update.	2016/2/22 6:43	Text Document	3 KB		
xmc4700_relaxkit_waveform_generator	2016/4/5 22:00	WinZip File	4,479 KB		例程

› 示波器辅助功能代码位置

The image shows two screenshots of a WinZip file explorer window. The left screenshot displays the directory tree for '[Micrium-Probe-TargetCode.zip]'. The path is: Micrium > Software > uC-Probe > Target > Scope (highlighted in red) > cfg. The right screenshot shows the contents of the 'cfg' folder, with the file 'probe_scope_cfg.h' highlighted in black.



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