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What is the difference between 'Trace Enable' and 'TraceOn/TraceOff'?

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In short: TraceEnable defines what trace data is generated, while TraceON/TraceOFF controls when the generation of trace data starts and stops.

If you only need a quick answer, you can stop reading here. But if you want a more detailed explanation, let's dive deeper.

Understanding Trace Filtering

In many cases, generating trace data for the entire program and data flow is unnecessary. Instead, you may want to focus on specific instructions, data accesses, or a short program section. This is where trace filters—TraceEnable, TraceON, and TraceOFF—come into play. These filters configure the available comparators in the core trace logic so that trace data is only generated for the events of interest. The number of filters you can use and the level of detail in the trace data depend on the number of comparators and the trace protocol used.

How TraceEnable Works

Examples:

Generates trace data when a write access to the variable 'flags[3]' occurs:

Var.Break.Set flags[3] /Write /TraceEnable

Generates trace data when the 'sieve ' function is entered:

Break.Set sieve /Program /TraceEnable

When displaying trace data, TRACE32 always uses the TRACE ENABLE keyword when the specified event occurred:

```
B::Trace.List
  Setup...
                  # Config...
                                      Goto... Find...

    Chart

                                                                                          ■ Profile
                                                                                                           MIPS
                                                                                                                             ♦ More
                                                                                                                                              X Less
record run address cycle data symbol
+0000058097 D:08002A0C wr-long 00000068 ...v7r_le\Global\_
+0000058099 D:08002A10 wr-long 08002A50 ...v7r_le\Global\_
                                                                                                                                                                  i.back
824.435us
                                                                                                                                   _bss_end+0x110
                                                                                                                                                                    <0.005us
                                                                                                                                   _bss_end+0x114
 +0000058110
                                         R:08001B48 ptrace
                                                                                                                                                                      0.500us
                                                                                                ..eve_ram_arm_v7r_le\sieve\sieve
                               #define SIZE 18
char flags[SIZE+1];
                                static int sieve(void)
                                                                                                               /* sieve of erathostenes */
                737
                                         {r4-r6,r11}
D:08002A04 wr-long 08002508 .._v7r_le\Global\_bss_end+0x108
D:08002A08 wr-long 00000000 .._v7r_le\Global\_bss_end+0x100
D:08002A0C wr-long 00000068 .._v7r_le\Global\_bss_end+0x110
D:08002A10 wr-long 08002A50 .._v7r_le\Global\_bss_end+0x114
                                push
+0000058111
+0000058122
+0000058123
+0000058125
                                                                                                                                                                    <0.005us
                                                                                                                                                                      1.000us
                                                                                                                                                                    <0.005us
                                TRACE ENABLE
  +0000058137
                                         R:08001B48 ptrace
                               #define SIZE 18
char flags[SIZE+1];
                                static int sieve(void)
                                                                                                               /* sieve of erathostenes */
                737
                                         {r4-r6,r11}
D:08002A04 wr-long 08002508 .._v7r_le\Global\__bss_end+0x108
D:08002A08 wr-long 00000000 .._v7r_le\Global\__bss_end+0x10c
D:08002A0C wr-long 00000068 .._v7r_le\Global\__bss_end+0x110
D:08002A10 wr-long 08002A50 .._v7r_le\Global\__bss_end+0x114
                                push
 +0000058138
                                                                                                                                                                    <0.005us
0.500us
<0.005us
+0000058158
+0000058150
  0000058152
                                                                                                                                                                    <0.005us
```

How TraceON and TraceOFF Work

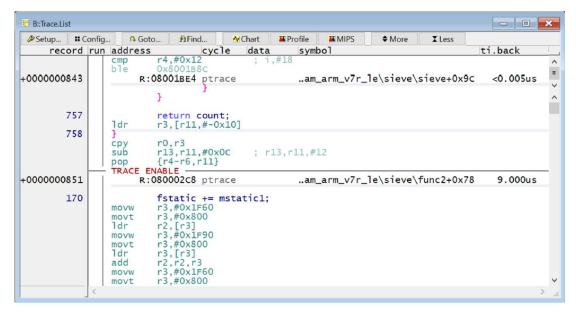
The command Break.Set <start_event> /TraceON configures the comparators to start generating trace data when <start_event> occurs. Similarly, the command Break.Set <stop_event> /TraceOFF stops trace data generation when <stop_event> occurs.

Example:

Start generating trace data when line 16 of the 'func2' function is executed and stop generating it when the 'sieve' function exits:

```
Break.Set func2\16 /Program /TraceON
Break.Set sYmbol.EXIT(sieve) /Program /TraceOFF
```

The TRACE ENABLE keyword marks where trace data generation stopped before restarting:



Note

If TraceON <start_event> occurs after TraceOFF <stop_event> has taken effect, the generation of trace data is restarted.

Controlling What Type of Trace Data is Generated

Now that we've discussed when tracing starts and stops, let's look at what kind of trace data is generated. For most core architectures, the default trace generates program flow trace data. However, additional details (e.g., data accesses) can be explicitly enabled. For the Cortex-R5 for example, in addition to program flow, you can also generate trace data for write accesses.

ETM.DataTrace Write
Break.Set func2\16 /Program /TraceON
Break.Set sYmbol.EXIT(sieve) /Program /TraceOFF

Combining TraceEnable with TraceON/TraceOFF

Finally, let's look at a case where TraceEnable is combined with TraceON and TraceOFF—again for the Cortex-R5.

ETM.DataTracePrestore ON
Break.Set func2\16 /Program /TraceON
Break.Set sYmbol.EXIT(sieve) /Program /TraceOFF
Var.Break.Set flags /Write /TraceEnable

This configuration ensures that trace data for write accesses (i.e., what) to the variable 'flags' is generated, but only between the program points (i.e., when) at line 16 of 'func2' and the exit of 'sieve'.