Routines directly measure microcontroller-bus clock

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The Freescale HC08 and newer HCS08 microcontroller families have versatile peripheral modules. Their clock generators are no exceptions. They range from the internal clock, which frees I/O pins, to external crystals or oscillators. Once you select the timing source, you have many options for controlling the final bus frequency. For instancè, connecting a 32,768-Hz crystal to an MC9S08GB microcontroller allows you to use the FLL (frequency-locked loop) to generate many bus frequencies as high as 18.874 MHz.

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Selecting the source, the divisors, and the FLL settings allows versatility but also can get complicated.

Once you write the bus-clock-initialization routine, you may want to verify that the bus is running at the speed you intend before moving on to the rest of the project. This Design Idea presents routines that output a square wave at exactly one-tenth the bus speed on any I/O port (listings 1 and 2). Just connect a frequency counter to this pin, and it will display your bus frequency. All you have to do is move the decimal point one place to the right. Once you verify the bus speed, you can confidently write the timer, serial-I/O, and other clock-dependent routines.

You need to write code only to first disable interrupts and disable the COP (common on-chip processor). In your bus-clock-initialization routine, be sure to initialize the I/O port you want to use as an output. Then, just jump to the toggle clock, which outputs the bus frequency divided by 10 until power-down. This Design Idea uses PB0 in the HC08 version and PD0 in the HCS08 version. You can use any available I/O port by altering the first line to identify the port and the second line to choose a bit. Also, this Design Idea names ports with the older notation PB, instead of today's more fashionable PTB.**EDN**

LISTING 1. CODE FOR HC08

```
;TOGCLK - toggle PB0 at 1/10th the bus clock freq. (square wave)
;(NEVER ENDS)

TOGCLK   LDHX #PB          ;put 16-bit address of PB in H:X
         LDA #S01          ;make whatever bits in PB that will toggle=1
TOG01    CLR ,X            ;2
         NOP               ;1
         NOP               ;1
         NOP               ;1
         STA ,X            ;2
         BRA TOG01         ;3
```

LISTING 2 CODE FOR HCS08

```
;TOGCLK - toggle PD0 at 1/10th the bus clock freq. (square wave)
;(NEVER ENDS)

TOGCLK   LDHX #PD          ;put 16-bit address of port PD in H:X
         LDA #S01          ;make whatever bits in PD that will toggle=1
TOG01    STA ,X            ;2
         NOP               ;1
         CLR ,X            ;4
         BRA TOG01         ;3
```