Intel® 6300ESB I/O Controller Watchdog Demo Application Specification

Ref. No. 0.2

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Introduction

As systems continually become more complex, the likelihood that a platform will suffer a hard hang, an operating system (OS) software lockup, or an application lockup is also becoming more likely. The Intel® 6300ESB I/O Controller Watchdog Timer (WDT) device can be used to either reboot or notify the OS that a lockup condition has occurred.

Scope

This specification describes the Intel® 6300ESB I/O Controller Watchdog Timer demo utility, "Wdtdemo.exe". This demo utility is a MFC-based dialog application used to control and monitor the WDT device on both the Microsoft* NT* and Microsoft* XP* platforms. The WDT demo utility is to be used only for demonstration of the WDT device functionality and **should not** be used as a customer solution.

The utility uses a dynamic link library to communicate with the kernel mode driver, which is responsible for handling the WDT device for the operating system. The WDT software stack is detailed below.

ESB Watchdog Timer Software Stack

```
┌─────────────────────────────────────┐
│ MFC UTILITY APPLICATION              │
│ Wdtdemo.exe                          │
│                                      │
└─────────────────────────────────────┘

┌─────────────────────────────────────┐
│ DYNAMIC LINK LIBRARY                 │
│ Iwdlib.dll                           │
│                                      │
└─────────────────────────────────────┘

┌─────────────────────────────────────┐
│ KERNEL MODE DRIVER                   │
│ wdtdrvr.sys                          │
│                                      │
└─────────────────────────────────────┘
```
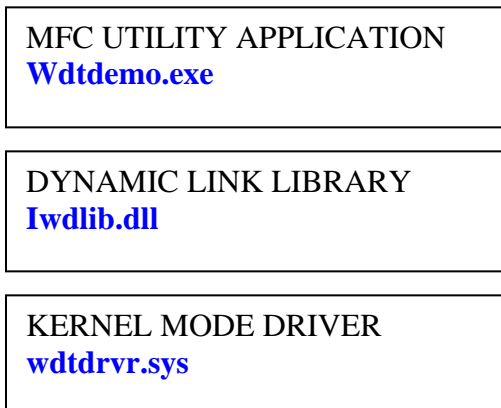
Supporting Documents

- *Intelwdtapi.doc*
- *Hance Rapids (Communications I/O Controller Hub 2) Component Specification, Volume 3* – Contact your Intel Representative to obtain.

Using the Demo Application
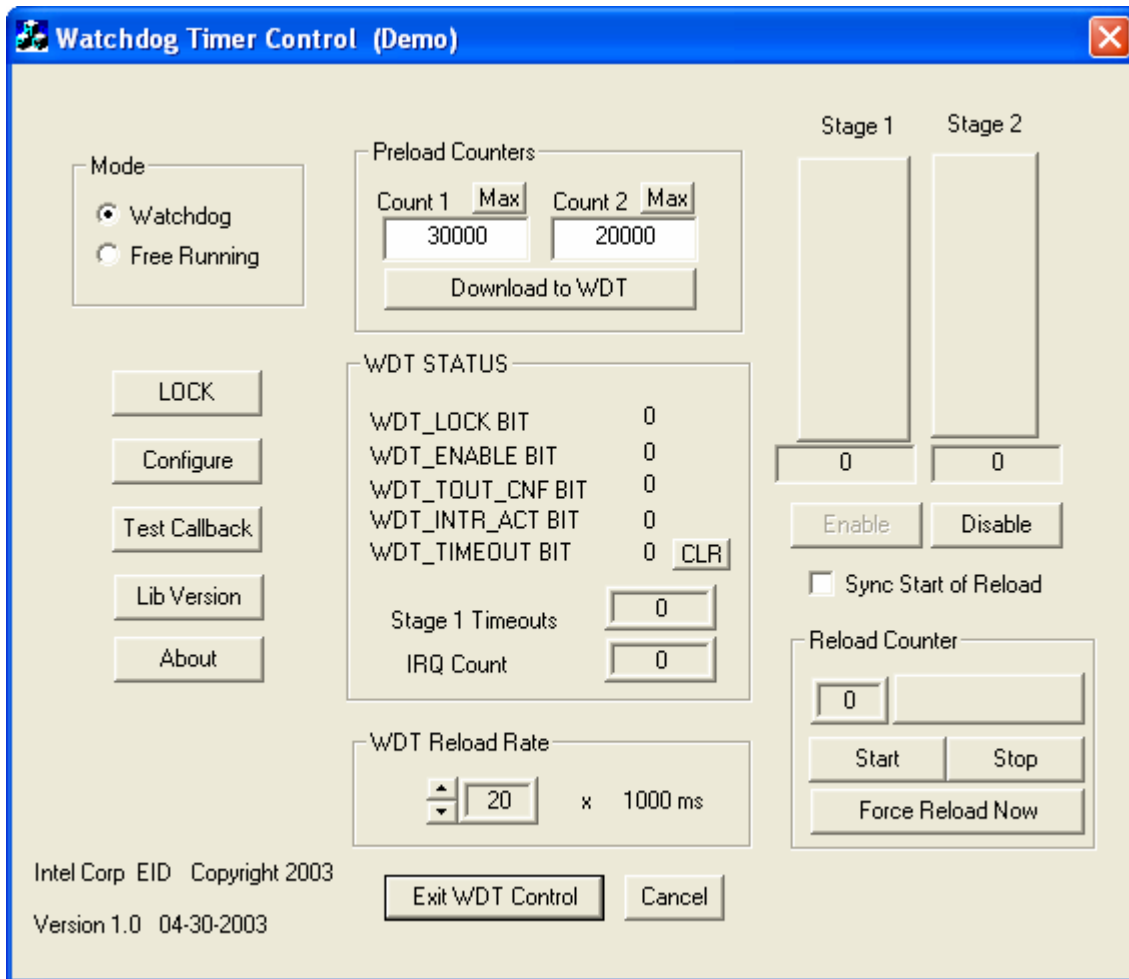
The WDT demo application has a number of buttons and text entry fields for configuring and controlling the WDT device. Each of the following items has a corresponding button or entry field on the application screen.

- Setting the Mode
- Locking the WDT device
- Configuring the WDT device
- Testing the user mode call function
- Getting the driver and dynamic link version number
- Downloading the Stage 1 and Stage 2 timeout values
- Setting the Max timeout values
- Setting the refresh rate
- Enabling or disabling the WDT device
- Starting and stopping the refresh of the WDT
- Synchronizing reload with starting the WDT

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Setting the Mode

The mode can be set to either Watchdog Mode or Free Running Mode using the radio select button at the upper left of the screen.
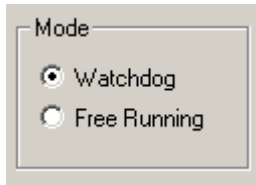
Locking the WDT device

The WDT can be locked by software. Clicking the LOCK button locks the WDT device. The application first warns you that the lock can only be cleared by resetting the system or power cycling the system. A locked WDT cannot be enabled or disabled.

Configuring the WDT device

Clicking the **Configure** button programs the following three configuration options: Output Enable, Set Presecalar and Interrupt Routing.
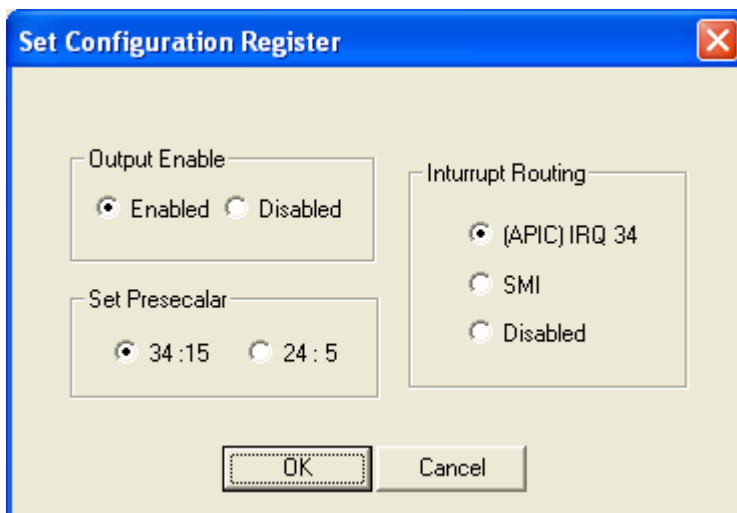
Output Enable
This allows you to enable or disable the toggling of the external output pin if the WDT timer times out.

Set Presecalar
This allows you to specify a Presecalar value for the 35-bit countdown counter. The
default value is 34:15 setting. See the ESB C-Spec Volume 3 for more details on how the
Presecalar works.

Interrupt Routing
Currently we only support using IRQ 34 to handle Stage 1 interrupts. There is no support
for using SMI to report timeout. You may select **Disabled** to prevent a Stage 1 interrupt
from being generated. The underlying WDT driver has an ISR that is called on every
occurrence of the PCI IRQ being generated. The ISR communicates with the WDT demo,
resulting in a CALLBACK routine being executed by the WDT demo. The demo
increments a counter to indicate an interrupt occurred. A customer application could use
this callback mechanism to stabilize the system before the Stage 2 timer counts to zero
and reboots the system.

## Testing the user mode call function

This button allows the user to verify that interrupt handler and callback mechanisms are
working correctly. Clicking the **Test Callback** button increments the Stage 1 interrupt.

Getting the driver and dynamic link version number

Clicking the **Lib Version** button opens a dialog box with the version number of the WDT
dynamic link library the demo is using and the version number of WDT device driver
installed on the system.

Downloading the Stage 1 and Stage 2 timeout values

The demo has two text boxes that let you specify Stage 1 and Stage 2 countdown values.
Click the **Download to WDT** button to copy the counts from the application to the WDT
device. The WDT device contains a single 35-bit down counter that decrements using a
20-bit Presecalar. See the ESB C-Spec Volume 3 for details on how the Presecalar works.
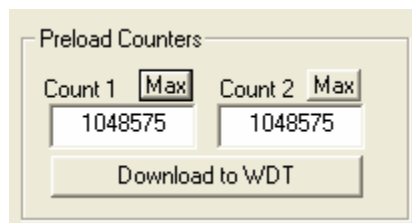
Setting the Max timeout values

Clicking the **Max** button sets the maximum allowed timeout value for either counter. The
Max buttons are located above the text box for each counter. See the image above. The
Max value that the either counter can hold is 1048575.

Setting the Refresh Rate

The refresh rate is set using the slider control located in the lower center of the screen. The rate can be adjusted from 0 to 100 seconds.
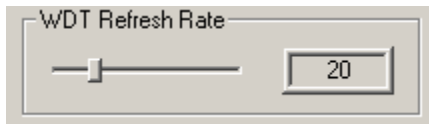
Starting and stopping the refresh of the WDT

Clicking the **Start** button refreshes the WDT. Clicking the **Stop** button stops the refresh of the WDT. You can force an immediate refresh of the WDT by clicking the **Force Refresh Now** button. To prevent Stage 1 or Stage 2 timeout, you *must* start refresh and have a refresh rate that ensures that the timer is refreshed before the first- or second-stage timeout.
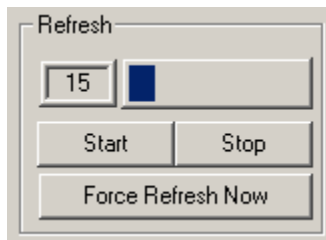
Enabling or disabling the WDT device

Clicking the **Enable** button starts the WDT counting down. Clicking the **Disable** button stops the WDT from counting down.
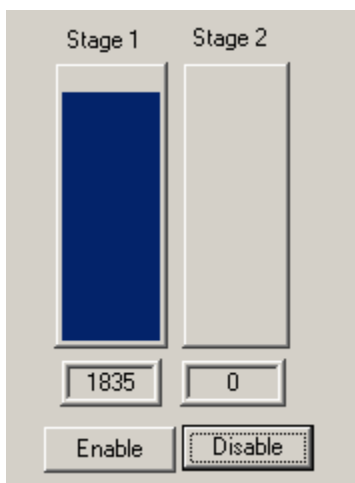
Synchronizing reload with start of the WDT

Select the **Sync Start of Reload** box to synchronize the start of the reload counter with the start of the WDT. This ensures that the demo application immediately starts counting down the reload counter when the **Enable** button is clicked. This is useful if you have chosen a very small WDT countdown value and want to ensure that the WDT counter gets reloaded in sufficient time to prevent a timeout from occurring. If this box is not checked, the user must manually start the reload counter.

☐ Sync Start of Reload