Integration Manual –Cd\_uDiag

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# Dependencies

NOTE – the TMS570\_uDiag component includes both uDiag and FlsTst functionality. For complete integration information on the TMS570\_uDiag component, also see the FlsTst integration manual (in the TMS570\_uDiag\doc folder).

## SWCs

|  |  |
| --- | --- |
| Module | Required Feature |
| TMS570\_Startup | \_coreGetFPSCR\_()  \_coreGetSecondaryAuxiliaryControlRegister\_()  \_coreSetSecondaryAuxiliaryControlRegister\_()  Reset Causes  \_fiqhandler\*\* |
| Basic System Services | EnableVFPInterrupt()\*  EnableESMLInterrupt()\*\*\* |
| Dma | Dma\_DmaRstFail\_Cnt\_G\_lgc\*\*\*\* |
| Nhet | Nhet\_Htu1RstFail\_Cnt\_G\_lgc\*\*\*\*  Nhet\_Htu2RstFail\_Cnt\_G\_lgc\*\*\*\* |

NOTES:

\*When uDiagEnableFPUDiag is set to STD\_OFF, the floating point exception diagnostic is disabled and EnableVFPInterrupt() is optional.

\*\*\_fiqhandler needed only if configuring Mcu\_FpuIrq as an interrupt (see section 2.2.2).

\*\*\* EnableESMLInterrupt() is now called from a function in the TMS570\_uDiag component, as of component version FDD32B\_TMS570\_uDiag\_000.23. When using component version FDD32B\_TMS570\_uDiag\_000.23 or later, any other call(s) to the EnableESMLInterrupt() function, e.g. in EcuStartup, must be removed. This fixes anomaly 6133.

\*\*\*\* DmaRstFail needed only when DMA\_MPU\_ENABLE is set to STD\_ON; Htu1RstFail needed only when N2HET1TU\_MPU\_ENABLE is set to STD\_ON; Htu2RstFail needed only when N2HET2TU\_MPU\_ENABLE is set to STD\_ON. See section 2.2.3.

## Functions to be provided to Integration Project

< Global function (except the ones that are defined in RTE modules) that is defined in this component but used by other function>

FUNC(void, CD\_UDIAG\_APPL\_CODE) uDiagFPU\_Init1(void);

FUNC(void, CD\_UDIAG\_APPL\_CODE) uDiagFPU\_Init2(void);

UDIAG\_COMPILER\_ISR void Mcu\_FpuIrq(void);

FUNC(void, CD\_UDIAG\_APPL\_CODE) uDiagCCRM\_Init(void);

FUNC(void, CD\_UDIAG\_APPL\_CODE) uDiagClockMonitor\_Init(void);

FUNC(void, CD\_UDIAG\_APPL\_CODE) uDiagECC\_Init(void);

FUNC(void, CD\_UDIAG\_APPL\_CODE) uDiagESM\_Init(void);

FUNC(void, CD\_UDIAG\_APPL\_CODE) uDiagIOMM\_Init(void);

FUNC(void, CD\_UDIAG\_APPL\_CODE) uDiagParity\_Init(void);

FUNC(void, CD\_UDIAG\_APPL\_CODE) uDiagPeriphMPU\_Init(void);

FUNC(void, CD\_UDIAG\_APPL\_CODE) uDiagStaticRegs\_Init(void);

FUNC(void, CD\_UDIAG\_APPL\_CODE) uDiagVIM\_Init(void);

# Configuration

## Build Time Config

|  |  |  |
| --- | --- | --- |
| Modules | Notes |  |
| None |  |  |

## Configuration Files to be provided by Integration Project

uDiag\_Cfg.c generated from uDiag\_Cfg.c.tt

uDiag\_Cfg.h generated from uDiag\_Cfg.h.tt

### Da Vinci Parameter Configuration Changes

|  |  |  |
| --- | --- | --- |
| Parameter | Notes | SWC |
| uDiagGeneral\uDiagEnableFPUDiag | When set to STD\_ON,the floating point exception diagnostic is enabled. When set to STD\_OFF, the diagnostic is disabled, the EnableVFPInterrupt() function (see section 1.1) is optional, interrupt configuration of Mcu\_FpuIrq (see section 2.2.2) is optional, and the calls to uDiagFPU\_Init1() and uDiagFPU\_Init2() (see section 4) are optional. | TMS570\_uDiag |
| OsOSFIQHandler\NONO\_AUTO\OsOSFIQHandler | Must be set to “\_fiqhandler” when Mcu\_FpuIrq is configured as an interrupt. (See section 2.2.2). | Os |
| uDiagGeneral\uDiagGladiatorCompatible | Must be set to STD\_ON for programs where code compatibility is required between Gladiator and Champion parts.\* Set to STD\_OFF for programs where only Champion parts are used. | TMS570\_uDiag |
| uDiagGeneral\uDiagVIMPerTrusted | Set to STD\_ON when uDiagVIM\_Per() is called from a trusted task. Set to STD\_OFF when uDiagVIM\_Per() is called from a non-trusted task. NOTE that when this parameter is set to STD\_OFF, the void function TWrapS\_uDiagVIM\_RednRpdShtdn(void) must be added as a trusted function. | TMS570\_uDiag |
| uDiagGeneral\uDiagECCPerTrusted | Set to STD\_ON when uDiagECC\_Per() is called from a trusted task. Set to STD\_OFF when uDiagECC\_Per() is called from a non-trusted task. NOTE that when this parameter is set to STD\_OFF, the void function TWrapS\_uDiagECC\_RednRpdShtdn(void) must be added as a trusted function. | TMS570\_uDiag |

\*The uDiagGladiatorCompatible parameter selects ESM Group 1 Channel 7 (as used on Gladiator) vs Group 1 Channel 34 (as used on Champion) for NHET2 Parity Error. On programs where code compatibility is required, the Gladiator ESM configuration must be used, because the Champion configuration enables an interrupt that is Reserved for Gladiator. NOTE that on Champion parts running code configured as Gladiator-compatible, an NHET2 RAM Parity Error will trigger only a Critical Registers Verification Fault , with no NHET2 RAM Fault diagnostic.

### DaVinci Interrupt Configuration Changes

|  |  |  |  |
| --- | --- | --- | --- |
| ISR Name | VIM # | Priority Dependency | Notes |
| Mcu\_FpuIrq | 47 | higher priority than any other FIQ that uses floating point | Must be an FIQ and Category 1 when configured, and if FIRQPR0 is included in the runtime register check, its value needs to be changed in the RuntimeRegCheck configuration. When uDiagEnableFPUDiag is set to STD\_OFF, the floating point exception diagnostic is disabled and the interrupt configuration of Mcu\_FpuIrq is optional. |
| Isr\_ESMH | 0 | Highest priority FIQ | Must be FIQ and Category 1 |
| Isr\_ESML | 20 |  | Must be IRQ and Category 2 |
|  |  |  |  |

### Manual Configuration Changes

|  |  |  |
| --- | --- | --- |
| Constant | Notes | SWC |
| N2HET1\_PARITY\_ENABLE | \*See note | Appinit\_cfg.h |
| N2HET2\_PARITY\_ENABLE | \*See note | Appinit\_cfg.h |
| N2HET1TU\_PARITY\_ENABLE | \*See note | Appinit\_cfg.h |
| N2HET2TU\_PARITY\_ENABLE | \*See note | Appinit\_cfg.h |
| MIBADC1\_PARITY\_ENABLE | \*See note | Appinit\_cfg.h |
| MIBADC2\_PARITY\_ENABLE | \*See note | Appinit\_cfg.h |
| DCAN1\_PARITY\_ENABLE | \*See note | Appinit\_cfg.h |
| DCAN2\_PARITY\_ENABLE | \*See note | Appinit\_cfg.h |
| VIM\_PARITY\_ENABLE | \*See note | Appinit\_cfg.h |
| DMA\_PARITY\_ENABLE | \*See note | Appinit\_cfg.h |
| DMA\_MPU\_ENABLE | \*See note | Appinit\_cfg.h |
| N2HET1TU\_MPU\_ENABLE | \*See note | Appinit\_cfg.h |
| N2HET2TU\_MPU\_ENABLE | \*See note | Appinit\_cfg.h |

\*Note – these enable parameters must be defined for the TMS570\_uDiag component. They should be #defined to either STD\_ON or STD\_OFF as directed for the specific application/integration project; in general they will be on when the corresponding peripheral is used and off when it is not used, but there are application-specific exceptions. Some of the enable parameters are also used by other components. In addition, there may be other similar enable parameters used by other components which are not currently used in the uDiag component.

The combination of which enable parameters are enabled, will determine the critical register values for ESMIESR1 and the peripheral control registers for the respective peripherals; when changing these enables it will be necessary to also change the corresponding critical register checks in the uDiag configuration. When integrating TMS570\_uDiag version 000.28 or later into a program that previously had version 000.27 or earlier, it will also be necessary to change the value for ESMIESR1 if DCAN2\_PARITY\_ENABLE is enabled, because version 000.28 corrected the ESM setting when CAN2 parity is enabled.

# Integration

## Required Global Data Inputs

<Mention any global variable that this component requires from other components>

ResetCause\_Cnt\_Enum

Dma\_DmaRstFail\_Cnt\_G\_lgc (when DMA\_MPU\_ENABLE is set to STD\_ON)

Nhet\_Htu1RstFail\_Cnt\_G\_lgc (when N2HET1TU\_MPU\_ENABLE is set to STD\_ON)

Nhet\_Htu2RstFail\_Cnt\_G\_lgc (when N2HET2TU\_MPU\_ENABLE is set to STD\_ON)

## Optional Global Data Inputs

<Mention any global variable that this component requires for other components>

## Specific Include Path present

<Yes>

# Runnable Scheduling

This section specifies the required runnable scheduling.

|  |  |  |
| --- | --- | --- |
| Init | Scheduling Requirements | Trigger |
| uDiagCCRM\_Init | Before the OS is started | ECU Startup |
| uDiagClockMonitor\_Init | Before the OS is started | ECU Startup |
| uDiagECC\_Init | Before the OS is started | ECU Startup |
| uDiagESM\_Init | Before the OS is started | ECU Startup |
| uDiagIOMM\_Init | Before the OS is started | ECU Startup |
| uDiagParity\_Init | Before the OS is started | ECU Startup |
| uDiagPeriphMPU\_Init | Before the OS is started | ECU Startup |
| uDiagStaticRegs\_Init | Before the OS is started | ECU Startup |
| uDiagVIM\_Init | Before the OS is started | ECU Startup |
| uDiagFPU\_Init1\* | Before the OS is started | ECU Startup |
| uDiagFPU\_Init2\* | After the OS is started, before any code that uses floating point | ECU Startup |
| uDiagPeriphStartup\_Init | After DiagMgr initialization | RTE (Init) |
| uDiagResetHandler\_Init | After DiagMgr initialization | RTE (Init) |

\*NOTE: When uDiagEnableFPUDiag is set to STD\_OFF, the floating point exception diagnostic is disabled and the calls to uDiagFPU\_Init1() and uDiagFPU\_Init2() are optional.

|  |  |  |
| --- | --- | --- |
| Runnable | Scheduling Requirements | Trigger |
| <Runnable name> | None | RTE/ISR(<time>ms) |

# Memory Mapping

## Mapping

|  |  |  |
| --- | --- | --- |
| Memory Section | Contents | Notes |
| UDIAG\_START\_SEC\_VAR\_SAVED\_UNSPECIFIED | FPUExceptionAddr\_Cnt\_D\_u32 | do not clear on reset |
| UDIAG\_START\_SEC\_VAR\_CLEARED\_UNSPECIFIED |  |  |
| UDIAG\_START\_SEC\_VAR\_CLEARED\_BOOLEAN |  |  |
| UDIAG\_START\_SEC\_VAR\_CLEARED\_16 |  |  |
| UDIAG\_START\_SEC\_VAR\_CLEARED\_32 |  |  |
| WDGRESETHANDLER\_START\_SEC\_VAR\_POWER\_ON\_CLEARED\_8 |  |  |

\* Each …START\_SEC… constant is terminated by a …STOP\_SEC… constant as specified in the AUTOSAR Memory Mapping requirements.

## Usage

|  |  |  |
| --- | --- | --- |
| Feature | RAM | ROM |
| <Memmap usuage info> |  |  |

Table 1: ARM Cortex R4 Memory Usage

## NvM Blocks

|  |
| --- |
| Block Name |
| <NvM Block Info> |

Note : Size of the NVM block if configured in developer

# Compiler Settings

## Preprocessor MACRO

<Define all the preprocessor Macros needed and conditions when needed>.

## Optimization Settings

# Revision Control Log

|  |  |  |  |
| --- | --- | --- | --- |
| **Rev #** | **Change Description** | **Date** | **Author** |
| 1 | Initial version – includes information for Cd\_uDiagFPU and Cd\_uDiagUtility only | 6-Jun-2013 | Kathleen Creager |
| 2 | Added uDiagGeneral\uDiagEnableFPUDiag to configuration parameters, and related notes, for enabling/disabling floating point exception diagnostic. Added “Category 1” and mention of Runtime Register Check to notes on configuring Mcu\_FpuIrq. Added OsOSFIQHandler configuration parameter. Clarified scheduling requirements on uDiagFPU\_Init2(). | 26-Jun-13 | KMC |
| 3 | Added information on parameters uDiagGladiatorCompatible and uDiagVIMPerTrusted,FlsTstBlockSize, interrupt routines, and optimization settings as needed for changes made to fix anomalies 5403, 5801, 5491, 5809, and 5810. NOTE that this integration manual is not complete; it includes only information related to changes made to the component beginning in June 2013.. | 16-Oct-13 | KMC |
| 4 | Updated for change to call init functions from EcuStartup instead of as RTE init functions, and removed unneeded instructions about inlining compiler directive, both changes per CR11158. Added dependency and note regarding EnableESMLInterrupt() per CR 11157. Other misc cleanup. | 06-Jan-14 | KMC |
| 5 | Added uDiagPeriphMPU\_Init runnable, added PARITY\_ENABLE and MPU\_ENABLE configuration parameters | 09-Apr-14 | KMC |
| 6 | Added uDiagPeriphStartup\_Init runnable and related dependencies and global variables | 31-Jan-15 | KMC |
| 7 | Added note for modifying the critical register after correcting the coded for enabling the DCAN2 Parity interrupt | 20-Apr-16 | AJM |