**Module Design Document**

**For**

**Os**

**1/6/16**

**Prepared For:**

**Software Engineering**

**Nexteer Automotive,**

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# Introduction

## Purpose

This design document will capture the design of the Nexteer Os Error Handling (NxtrOsErrHndlg) functionality. This is the only portion of this component that is designed by Nexteer rather than a 3rd party.

## Scope

The following definitions are used throughout this document:

* **Shall**: indicates a mandatory requirement without exception in compliance.
* **Should**: indicates a mandatory requirement; exceptions allowed only with documented justification.
* **May**: indicates an optional action.

# High-Level Description

The Nexteer designed portions of the Os component consist of the Os error processing. This Nexteer specific design was embedded within the Os component itself since this functionality is specifically tied to the errors and names that this particular Os supports. This error handling is expected to be called by the Os protection and error callout functions in any given project. It interfaces with the Exception Handler that is created to react to the different categories of Os errors.

# Design details of software module

*<The Data Flow Diagrams should be created in the absence of this representation with the FDD.>*

## Graphical representation of NxtrOsErrHndlg (Expected External Intefaces)



## Data Flow Diagram

### Component level DFD

### Function level DFD

# Constant Data Dictionary

## Program (fixed) Constants

### Embedded Constants

#### Local Constants

|  |  |  |  |
| --- | --- | --- | --- |
| Constant Name | Resolution | Units | Value |
| None |  |  |  |

# Software Component Implementation

## Sub-Module Functions

## Init:

*None*

## Per:

*None*

## Server Runables

## NxtrOsErrHndlg

## Design Rationale

*This runnable will parse through the different Os errors that can be detected and interface into the Exception Handler component for handling of the different categories of errors. This runnable is expected to be called by both the Os ErrorHook and the Os ProtectionHook as it handles all categories of Os errors.*

## Processing

*switch (OSErrorGetosCANError())*

*case osdErrUEUnhandledException:*

*case osdErrUEUnhandledCoreException:*

*case osdErrUEUnhandledDirectBranch:*

*/\* Unhandled Exceptions \*/*

*ProcUkwnExcpnErr(OSErrorGetosCANError())*

*break*

*case osdErrEXMemoryViolation:*

*/\* MPU Violations \*/*

*ProcMpuExcpnErr(OSErrorGetosCANError());*

*break*

*case osdErrEXPrivilegedInstruction:*

*/\* Privileged Instruction Exceptions \*/*

*ProcPrvlgdInstrExcpnErr(OSErrorGetosCANError());*

*break*

*case osdErrATWrongTaskPrio:*

*case osdErrTTNotActivated:*

*case osdErrTTNoImmediateTaskSwitch:*

*case osdErrTTWrongActiveTaskID:*

*case osdErrHTNotActivated:*

*case osdErrHTNoImmediateTaskSwitch:*

*case osdErrHTWrongActiveTaskID:*

*case osdErrSHScheduleNotAllowed:*

*case osdErrSHWrongActiveTaskID:*

*case osdErrGSOddInvocation:*

*case osdErrGIOddInvocation:*

*case osdErrMTMissingTerminateTask:*

*case osdErrEAIntAPIWrongSequence:*

*case osdErrDAIntAPIDisabled:*

*case osdErrSDWrongCounter:*

*case osdErrREWrongCounter:*

*case osdErrSGWrongCounter:*

*case osdErrRGWrongCounter:*

*case osdErrGRPriorityOccupied:*

*case osdErrGRNoAccessRights:*

*case osdErrGRWrongTaskID:*

*case osdErrRRCeilingPriorityNotSet:*

*case osdErrRRWrongTask:*

*case osdErrRRNoReadyTaskFound:*

*case osdErrRRWrongTaskID:*

*case osdErrRRWrongHighRdyPrio:*

*case osdErrSEWrongTaskPrio:*

*case osdErrGEOddInvocation:*

*case osdErrCAAlarmInternal:*

*case osdErrWAWrongIDonHeap:*

*case osdErrWAHeapOverflow:*

*case osdErrWAUnknownAction:*

*case osdErrWAWrongCounterID:*

*case osdErrSOStackOverflow:*

*case osdErrSUWrongTaskID:*

*case osdErrCLWrongLibrary:*

*case osdErrEHInterruptsEnabled:*

*case osdErrSTMemoryError:*

*case osdErrSTNoImmediateTaskSwitch:*

*case osdErrSTWrongAppMode:*

*case osdErrSTConfigCRCError:*

*case osdErrSTConfigMagicNrError:*

*case osdErrSTInvalidMajorVersion:*

*case osdErrSTInvalidMinorVersion:*

*case osdErrSTInvalidSTCfg:*

*case osdErrQIWrongTaskPrio:*

*case osdErrQRInterruptsEnabled:*

*case osdErrQRWrongTaskID:*

*case osdErrQRWrongTaskPrio:*

*case osdErrQRWrongHighRdyPrio:*

*case osdErrQSInterruptsEnabled:*

*case osdErrQSNoReadyTaskFound:*

*case osdErrQSWrongPriority:*

*case osdErrQOWrongTaskID:*

*case osdErrSPUnknownCase:*

*case osdErrSGOddInvocation:*

*case osdErrWSUnknownAction:*

*case osdErrWSUnknownReaction:*

*case osdErrWSWrongID:*

*case osdErrGCOddInvocation:*

*case osdErrBMResAlreadyMeasured:*

*case osdErrBMInvalidProcessInStart:*

*case osdErrBMInvalidProcessInStop:*

*case osdErrBMInvalidResource:*

*case osdErrETNoCurrentProcess:*

*case osdErrASOddInvocation:*

*case osdErrTAInvalidTaskState:*

*case osdErrRSWrongTaskPrio:*

*case osdErrPAInvalidAreaIndex:*

*case osdErrPANoAccessRight:*

*case osdErrPAInvalidAddress:*

*case osdErrYOSystemStackOverflow:*

*case osdErrYOTaskStackOverflow:*

*case osdErrYOISRStackOverflow:*

*case osdErrSCWrongSysCallParameter:*

*case osdErrDPStartValidContext:*

*case osdErrDPResumeInvalidContext:*

*case osdErrDPInvalidTaskIndex:*

*case osdErrDPInvalidApplicationID:*

*case osdErrSUInvalidTaskIndex:*

*case osdErrSUInvalidIsrIndex:*

*case osdErrSUInvalidIsrPrioLevel:*

*case osdErrCIInvalidIsrIndex:*

*case osdErrCIInvalidIsrPrioLevel:*

*case osdErrCIInvalidApplicationID:*

*case osdErrCIMissingIntRequest:*

*case osdErrCIInterruptIsMasked:*

*case osdErrCIWrongIntPriority:*

*case osdErrPIGetIMRInvalidIndex:*

*case osdErrPISetIMRInvalidIndex:*

*case osdErrPIClearIMRInvalidIndex:*

*case osdErrPIWriteIMR8InvalidAddr:*

*case osdErrPIWriteIMR16InvalidAddr:*

*case osdErrPIWriteIMR32InvalidAddr:*

*case osdErrPISetICRMaskInvalidAddr:*

*case osdErrPIClearICRMaskInvalidAddr:*

*case osdErrPISetICRReqInvalidAddr:*

*case osdErrPIClearICRReqInvalidAddr:*

*case osdErrPIWriteICR8InvalidAddr:*

*case osdErrPIWriteICR16InvalidAddr:*

*case osdErrPIWriteICRxLoInvalidIndex:*

*case osdErrPIWriteICRxHiInvalidIndex:*

*case osdErrPIWriteICRx16InvalidIndex:*

*case osdErrCRInvalidSettingOSTM:*

*case osdErrCRInvalidSettingMPU:*

*/\* Fatal OS fault for assertion / syscheck errors - set data for reset cause \*/*

*ProcPrmntOsErr(OSErrorGetosCANError())*

*break*

*default:*

*/\* Assumed to be a non-fatal OSEK fault - Set data for periodic sweep up \*/*

*ProcNonCritOsErr(OSErrorGetosCANError())*

*break*

## Interrupt Functions

*None*

## Module Internal (Local) Functions

## Local Function #1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** |  | Type | Min | Max |
| **Arguments Passed** |  |  |  |  |
|  |  |  |  |  |
| **Return Value** |  |  |  |  |

## Design Rationale

## Processing

## GLOBAL Function/Macro Definitions

## GLOBAL Function #1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** |  | Type | Min | Max |
| **Arguments Passed** |  |  |  |  |
|  |  |  |  |  |
| **Return Value** |  |  |  |  |

## Design Rationale

## Processing

# Known Limitations with Design

<Any known limitations with the design shall be documented clearly in this section.>

# UNIT TEST CONSIDERATION

Abbreviations and Acronyms

| **Abbreviation or Acronym** | **Description** |
| --- | --- |
|  |  |
|  |  |

Glossary

**Note**: Terms and definitions from the source “Nexteer Automotive” take precedence over all other definitions of the same term. Terms and definitions from the source “Nexteer Automotive” are formulated from multiple sources, including the following:

* ISO 9000
* ISO/IEC 12207
* ISO/IEC 15504
* Automotive SPICE® Process Reference Model (PRM)
* Automotive SPICE® Process Assessment Model (PAM)
* ISO/IEC 15288
* ISO 26262
* IEEE Standards
* SWEBOK
* PMBOK
* Existing Nexteer Automotive documentation

| **Term** | **Definition** | **Source** |
| --- | --- | --- |
| MDD | Module Design Document |  |
| DFD | Data Flow Diagram |  |

References

| **Ref. #** | **Title** | **Version** |
| --- | --- | --- |
| 1 | AUTOSAR Specification of Memory Mapping (Link:[AUTOSAR\_SWS\_MemoryMapping.pdf](http://www.autosar.org/download/R4.0/AUTOSAR_SWS_MemoryMapping.pdf)) | v1.3.0 R4.0 Rev 2 |
| 2 | MDD Guideline | EA4 01.00.00 |
| 3 | [Software Naming Conventions.doc](http://misagweb01.nexteer.com/eRoomReq/Files/erooms8/NextGeneration/0_fc55f/Software%20Naming%20Conventions%2003x(In%20Work).doc) | 1.0 |
| 4 | [Software Design and Coding Standards.doc](http://eroom1.nexteer.com/eRoomReq/Files/erooms8/NextGeneration/0_1a67a9/Software%20Design%20and%20Coding%20Standards.doc) | 2.0 |