

Differential Code Review of the OSIRIS on-board Soft- ware

Revision: 1.1
IIT-OSI-OCL-0003
2009-09-04

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1 Scope

1.1 Change record

Issue	Date	Change Ref. / Reason (AI, RID, e-mail etc.)	Status N New D Deleted M Modified	Change	Description of Change
0.1	2009-02-13		N	all	Initial version
0.2	2009-08-11		N	4	High-level software check started (up to 4.16)
1.0	2009-08-19	2 nd Delta Review of LL-Software	M	2, 3	Version numbers of files visited in 2 nd Delta Review added
			N	2.1.1, 2.1.5.1, 3.1, 3.2, 3.5.1, 3.5.2, 3.28.1	Modifications added
		Preliminary Delta Review of High-Level Software	M	4.3.1, 4.5.1,	Bugfixes documented
			M	2.1, 2.1.4, 3.5.2, 3.23.2, 3.26.2, 4.7.2	Possible influences on timing or concurrent access highlighted
1.1	2009-09-04	3 rd Delta Review of mid-ware	M	2, 2.1	Third check mentioned and version numbers added.
			N	2.1.1.2, 2.1.4.1	Results of the third delta review added
		3 rd Delta Review of low level software	M	3	Third check mentioned and version numbers added.
			N	3.5.2.1, 3.20.2.1, 3.22.1.1, 3.24.2.1, 3.25.2.1, 3.30.2.1, 3.31.2.1	Results of the third delta review added
2 nd Delta Review of high-level Software	N	4.1.1, 4.2.1, 4.3.3, 4.4.3, 4.5.3, 4.7.3, 4.8.2, 4.9.3, 4.10.3, 4.13.3, 4.15.3, 4.17.3, 4.18.3, 4.19.2, 4.20.2, 4.22.2, 4.23.2, 4.25.2, 4.26.1, 4.27.1, 4.28.3, 4.29.3, 4.30.3, 4.31.3, 4.32.3	Results of the second delta review added		

1.2 Purpose of this document

This document reflects the results of the differential code review of the OSIRIS on-board software. For the low-level

part this contains all changes between version 8.10 BETA 2 (LL 1.14, OCL 4.x) and 8.10 BETA 9 have been checked; due to the different versions used for the initial high level review, the differential review uses different version deltas. The base code review is documented in [AD3] and [AD4].

1.3 Applicable Documents

- [AD1] OSIRIS OCL Fault Tree Analysis, Institut für Datentechnik und Kommunikationsnetze, IDA-OCL-x00x
- [AD2] RTL code review, IDA 2008, presented in OSIRIS S/W Review Meeting at IDA (RO-RIS-MPAE-MN-114), 2009-01-23
- [AD3] Results of Code Review and Fault-Tree Analysis of OSIRIS low-level on-board Software, indi-IT GmbH, IIT-OSI-OCL-0001
- [AD4] Results of Code Review of OSIRIS high-level on-board Software (OSIRIS Library), indi-IT GmbH, IIT-OSI-OCL-0002

1.4 Marking Conventions

This document reflects the delta code review of the on-board software for Rosetta/OSIRIS. Found issues of the previous review which are still present in the current software are highlighted as described in the following table:

Fixed / checked / uncritical	Bugs which have been fixed, or issues which have been considered uncritical after re-checking.
Minor critical unfixed issues	Issues which are not yet fixed but seem to be minor critical
Medium critical unfixed issues	Issues which are not yet fixed but seem to be of medium criticality
Unfixed critical bug	Probably critical bugs which have not been fixed yet
Potential side effects	Changed timing, global variables etc.

2 Middleware (OCL)

File	Checked Version	Delta-Check	2 nd Delta-Check	3 rd Delta-Check
OclCom.h	1.2	1.2	1.3	1.4
OclDef.h	1.3	1.4	1.4	1.4
OclInc.c	1.2	1.2	1.2	1.2
OclInc.h	1.2	1.3	1.3	1.3
OclInt.c	1.5	1.14	1.14	1.18
OclInt.h	1.3	1.3	1.3	1.3
OclMan.c	1.4	1.12	1.14	1.14
OclMan.h	1.3	1.6	1.6	1.6

2.1 OCL System Source Files

Some bugs in the OSIRIS/OCL software have been found and corrected. These were not detected during the review before. Furthermore a couple of features have been added or changed according to the customer's wishes.

Currently there are no known bugs left in the OCL software, but the changed priority handling of some basic RTL calls might cause unexpected changes in timing. Especially the now persistent priority settings might lead to permanent blocking of other UDPs, if a fully busy UDP is prioritized. Other side effects are possible due to the deactivation of the automatic priority-boosting of certain RTL functions. The effects of these changes are not reviewed here and require careful tests of the high-level software.

2.1.1 OclCom.h

2.1.1.1 2nd Delta Check

- chg: brackets in define of TOSYSADDR and TOLONGADDR added (cosmetic)

2.1.1.2 3rd Delta Check

- new: comment for RTL priority boosting flag added (cosmetic)

2.1.2 OclDef.h

- New: The command MGR_MASTEREXEC for privileged UDP execution has been added to the enumeration type MGR_ACTIONS. This was intended by the wishlist for new features.

2.1.3 OclInc.h

- Fix: using new runtime information item 'ulActualStackSize' to check the remaining stack size (previous versions used the current global setting which caused trouble if the size setting changed after VM start). The value has been added to the data structure strRunInfo, which is used by token interpreter tasks to store their local data. This bug has been found during testing of new features (new RTL functions to modify OCL settings).

2.1.4 OclInt.c

- fix: in some abort-cases (in the START and ALLOC token) the cleanup-routine left out the next token, which resulted in 'not implemented' errors and possibly memory leaks. This bug has been found during testing the new messaging.
- fix: using new runtime information item 'ulActualStackSize' to check the remaining stack size (previous versions used the current global setting which caused trouble if the size setting changed after VM start)
- chg: privileged start command for UDPs (top 2 bits used for discrimination). This change was done to add a

new feature from the wishlist.

- **chg: priority boost for RTL functions deactivated (by #ifdef). The priority boost is suspected to cause some strange timing problems.**
 - **chg: priority reset to pre-RTL-call level after return from RTL (was reset after 20*5 ms before). This change has been deactivated with the priority boost itself.**
- changes in status messaging:
 - chg: initialization order changed in function 'run' to avoid unpaired "running" and "finished" messages
 - chg: 'running' message generation moved - no more aborting possible before entering the execution loop (that keeps 'running' and 'finished' messages symmetrical)
 - chg: generating OCL_ABORT mailbox event whenever a UDP finishes with errors (not only if UDP is aborted).
 - chg: OCL_ABORT message contains now IsCritical and !bExecute flags to evaluate importance of error (IsCritical is set if the finished UDP is critical, is !bExecute is set, the UDP was aborted)
 - new: function HandleUDPExecutionError for handling abort-messaging.
 - new: call to HandleUDPExecutionError if UDP start fails
- chg: using "SuspendUDP" instead of "SuspendUDPInternal" in function "Run" to avoid compiler warning
- new: three new VMs: TaskRun8 up to ...10. These have been added according to the wishlist
 - chg: machine 0 reserved for privileged UDPs, now synchronized to MAIL_MUDP. This was one point of the wishlist.
 - chg: define VIRT_MACHS used instead of constant 8. This change was made for code maintenance improvements.

2.1.4.1 3rd Delta Check

- new: cleaning up all OCL resources at the beginning of the main interpreter loop, just before starting to wait for execution event
- chg: automatic priority boosting for RTL calls deactivated
- chg: automatic priority boosting decay deactivated
- fix: priority restoring mechanism for auto-boost in RTL calls corrected. Priority changing only on flag = 1, deactivating boost period on flag = 2, restarting boost period on flag = 3. This does not matter for this version, since boosting has been deactivated, but if it is re-activated, the bug is fixed already.
- chg: explicit priority boosting deactivated during super-boost
- chg: using UDP_STD_PRIO instead of immediate constants 60, 59 and 58
- chg: boosting RTL functions only if current priority is >59 in _CALL handling. Does not matter now, because boosting is deactivated anyway.

2.1.5 OCLMan.c

- fix: removing generated UDP for start-by-name if all interpreters are busy (previously the memory slot was not freed, which might render the start-by-name useless in worst case). Bug has been found during testing of new feature (MASTEREXEC).
- fix: workaround for gnu-compiler optimizer (correction of limit for messages per second is now executed only if the limit is changed). This bug has been found during compilation for OSIRIS hardware. Microsoft visual C compiler did not show any problems with the source code. It does not really fix the bug.
- Internal fixes of new features in beta versions:
 - fix: avoiding warning about assignment of int to pointer
 - fix: WriteSettings does return error code
 - fix: address base corrected for PC based use in call to WriteSettings (this affected the PC version only)

- chg: removing UDP loaded during autostart procedure, if it is not auto-startable. This has been changed to avoid possible confusion when the autostart-UDP ID has changed
- new: functions "ReadSettings" and "WriteSettings" for RTL access to OCL settings. This was on the wishlist
 - chg: WriteSettings used as subfunction for settings via TC
 - chg: default number of errors until abort changed to 1. This was on the wishlist.
- new: support added for new command MGR_MASTEREXEC in TaskUDPManager
 - new: support for privileged UDP execution in ExecParamUDP (call by name), privileged access is used on TimeStamp == 0
- new: emergency exit added to LoadPOPInternal, used when end of NVRAM is reached to avoid endless loop in case of inconsistent NVRAM contents
- new support for semaphores in UDPs:
 - new: signalling all UDP signals and semaphores to allow abort of waiting UDPs in ResetUDPManagerInternal
- new: initialization of new semaphore SEMA_UDP in InitUDPManager
- chg: UDP address replaced by UDP ID in UDP_LOADED message for temp UDPs in ExecParamUDP to improve visibility in messages to ground.
- chg: UDP_LOADED and UDP_DELETED messages suppressed for automatically temp-UDPs (call by name) up to verbosity level 'normal'. This was on the wishlist.
 - new: 'UDP loaded' message is generated when a start-by-name temporary UDP has been successfully added to the symbol table (keeps the pairing of 'loaded' and 'deleted' messages consistent. This is only visible if verbosity is higher than 'normal'.
- chg: size of "EXECPOOL" set to 11 (to allow all existing machines to be used via start-by-name TC 'ExecParamUDP'). This change was made according to the wishlist.
- chg: timeline activation/deactivation via preprocessor symbol. This was done to gain some free memory (OCL internal timeline was unused).

2.1.5.1 2nd Delta review changes

- chg: CheckSum using UNS32 pm* as first parameter instead of long pm*
- chg: LoadUDPInternal uses UNS32 sync mark
- chg: PrepareLoadInternal gets UNS32 input
- chg: ExecParamUDP receives UNS32 buffer for parameters
- chg: TaskUDPManager uses UNS32 buffer for header information and magic number
- chg: adapted to changed interface of FromNVRAMP and ToNVRAMP
- fix: MGR_SETTINGS uses DM buffer. Previously PM pointer was misused in call to WriteSettings
- fix: UDP_LOADED message in call with parameters provided PM pointer to message generator, which expects DM. This caused strange messages on startup of UDPs with parameters. Now using DM buffer for data transmission.

2.1.6 OCLMan.h

- chg: timeline activation/deactivation via preprocessor symbol
- new: functions "ReadSettings" and "WriteSettings" for RTL access to OCL settings

2.2 OCL System Ground Segment (Compiler)

In addition to the changes in the on-board segment, the OCL compiler has been updated from v4.1 to v4.19 with the following changes:

- fix: resulting type of "a += b" (and other assignment operators) was unknown and caused following operations on this expression to fail (assignment failed without notification)
- fix: handling of time buffer corrected from 32 to 64 bit size to prevent overwriting e.g. the UDP manager command
- fix: old GSEOS handling of primary_expressions in postfix_expression for supporting prev.blocks removed, because it caused wrong code if the last expression before the postfix_expression was the last parameter of the function (position -1)
- fix: using memcpy instead of copying dVal part of symbol's union "Entry" in assignment operator
 - chg: using memset for clean initialisation of symbol's value union "Entry"
- fix: handling of built-in boolean datatypes (some operations rejected valid use of 'bool' types)
- fix: direct array operations (+ = etc.) failed
- new: "-masterrun" to generate privileged UDP run command
- new: "startXP" command to initiate execution of UDPs on the reserved token interpreter task.

3 Low-Level Software

The first checked software version is 8.10 beta 9. The second check used release version 8.11, the third 8.15.

File	Checked Version	Delta-Check	2 nd Delta-Check	3 rd Delta-Check
OsiAsm.asm	1.2	1.2	1.3	1.3
OsiAsm.h	1.1	1.1	1.2	1.2
OsiDecod.asm	1.1	1.4	1.5	1.5
OsiDib.h	1.1	1.1	1.1	1.1
OsiDrv.c	1.1.2.1	1.2	1.4	1.5
OsiDrv.h	1.1	1.2	1.4	1.4
OsiEncod.asm	1.1	1.5	1.6	1.6
OsiEncod.h	1.1	1.1	1.1	1.1
OsiEnd.asm	1.1	1.1	1.1	1.1
OsilDa.h	1.1	1.1	1.1	1.1
OsilLib.c	1.1.2.1	1.2	1.2	1.2
OsilLib.h	1.2	1.2	1.2	1.2
OsilImage.c	1.1.2.1	1.2	1.2	1.2
OsilImage.h	1.1	1.2	1.2	1.2
OsilO.h	1.1	1.1	1.2	1.2
OsiLib.asm	1.1.2.1	1.4	1.5	1.5
OsiLib.h	1.1	1.2	1.2	1.2
OsiMmb.c	1.1.2.1	1.2	1.2	1.2
OsiMmb.h	1.1.2.1	1.2	1.2	1.2
OsiNode.c	1.1.2.1	1.2	1.3	1.6
OsiNode.h	1.1.2.1	1.2	1.2	1.3
Osiris.ach	1.1	1.1	1.2	1.3
Osiris.c	1.1.2.1	1.2	1.4	1.4
Osiris.h	1.1.2.1	1.5	1.7	1.12
OsiTable.h	1.1.2.1	1.3	1.5	1.7
OsiTest.c	1.1.2.1	1.2	1.2	1.2
OsiTest.h	1.1	1.2	1.2	1.2
OsiUnit.c	1.2	1.2	1.3	1.3
OsiUnit.h	1.1	1.2	1.2	1.2
OsiVirt.c	1.1.2.1	1.2	1.3	1.5
OsiVirt.h	1.1.2.1	1.2	1.2	1.3
OsiWave.h	1.1	1.1	1.1	1.1

3.1 OsiAsm.asm

No significant annotations were made for this file. According to this, no changes were made for the first delta review. The second delta review showed one change.

3.1.1 Other changes

The rounding settings in Proclnit are now set to TRUNC | RND32

3.2 OsiAsm.h

No significant annotations were made for this file. According to this, no changes were made up to the first delta review. The second delta review shows some changes.

3.2.1 Other changes

C_RET_I3 and C_RET_I11 are using m6 instead of immediate 1 now.

3.3 OsiDecod.asm

3.3.1 Annotations in [AD3]

- Decode:
 - Waits for event 6 (that is SEMA_OCL0, but it should be SEMA_ENCODE), Signals event 6 (that is SEMA_OCL0, but it should be SEMA_ENCODE): Fixed, uses symbol _semaEncode now.
- SquareRoot
 - Signals event 6 (that is SEMA_OCL0, but it should be SEMA_ENCODE): Fixed, uses symbol _semaEncode now.

3.3.2 Other changes

- Decode, SquareRoot:
 - improved return mechanism for error codes (values < 0)
- InitLisp (2nd delta review):
 - Improved initialization and error detection

3.4 OsiDib.h

No annotations were made for this file. According to this fact, the file remained unchanged.

3.5 OsiDrv.c

3.5.1 Annotations in [AD3]

No modifications according to the annotations were made.

- LinkStart3:
 - **Ignores return code of LinkStart (which is some kind of "timeout")**
- TaskInit:
 - **Ignores return code of LinkStart**
- TaskSend1355:
 - **100 ms for E_TX3, result ignored**
- SendDIB:

- **Ignoring timeout notification**
- DIBConfig:
 - **No input checking, illegal eFun or eSS might cause possibly illegal bit pattern in command (critical?)**
- ToNVRAM
 - NVRAM address (offset) is not checked, wrap-around could access any DM memory. Fixed.
 - **No input checking, only the sleep in NVPage is suppressed, if illegal input is detected, it is not signaled to calling function.**
- ToNVRAMP
 - NVRAM address (offset) is not checked, wrap-around could access any DM memory. Fixed
 - **No input checking, only the sleep in NVPage is suppressed, if illegal input is detected, it is not signaled to calling function.**
 - **No action/return value if eNV is invalid (no default branch in switch)**
- FromNVRAM
 - **No input checking. No action/return value if eNV is invalid (no default branch in switch)**
 - **No notification about illegal NVRAM position**
- FromNVRAMP
 - **No input checking. No action/return value if eNV is invalid (no default branch in switch)**

3.5.2 Other changes

- Comments have been updated
- TaskMemTest has been integrated into TaskInit for more efficient use of on-board resources
 - Some lines have been moved inside the file
 - **TaskInit's priority is set to lower priority when initialization is done.**
- LinkStop, LinkStatusAll, DIBReset : New functions in v8.11
- LinkReset3: Calling LinkStop in v8.11
- DIBClock v8.11
 - using LinkStop instead of direct access to GetSMCS->puSMCS[SMCS_CH_DSM_CMDR]
 - calling LinkStart before DIBInit
 - **some waiting around the function calls added**

3.5.2.1 3rd Delta Review

- TaskInit: Scheduler configured to use timeslicing for all priorities ≥ 58 (instead of 59 before). This was made to support the super-boosting of UDPs in critical sections.

3.6 OsiDrv.h

3.6.1 Annotations in [AD3]

No annotations for this file.

3.6.2 Other changes

- Prototypes of tasks TestMemory, TaskInit, TaskMemTest, TaskSend1355, TaskSendDIBA and TaskSendDIBB have been removed.

3.7 OsiEncod.asm

3.7.1 Annotations in [AD3]

- Encode
 - Waits for event 6 (that is SEMA_OCL0, but it should be SEMA_ENCODE), signals event 6 (that is SEMA_OCL0, but it should be SEMA_ENCODE). Fixed.
- SquareRoot
 - Signals event 6 (that is SEMA_OCL0, but it should be SEMA_ENCODE). Fixed.

3.7.2 Other changes

- Encode and SquareRoot
 - Improved error return codes (negative values indicate different error cases)

3.8 OsiEncod.h

No annotations, no changes.

3.9 OsiEnd.asm

No annotations, no changes.

3.10 Osilda.h

No annotations, no changes.

3.11 Osilib.c

3.11.1 Annotations in [AD3]

- FFTCooleyTukey:
 - memcpy might fail on size 1. Now changed to use of "memmove".
- RtlBoxcarFilter
 - memcpy might fail on size 1. Now changed to use of "memmove".

3.12 Osilib.h

No annotations, no changes.

3.13 Osilimage.c

3.13.1 Annotations in [AD3]

- GetShutter
 - Illegal read access might occur if image buffer is smaller than shutter buffer and no end-marker is found in image buffer. This issue has been considered to be irrelevant.
- SendPicture
 - **No message about alloc failures.**
 - **Ignoring return codes of Reorder and ImgRemoveBad**

3.13.2 Other changes

- Some re-formatting has been done
- Function "SendPicture" has been removed from this file to OsiTest.c
 - some deactivated code of raw image handling has been removed permanently.

3.14 Osimage.h

3.14.1 Annotations in [AD3]

No annotations.

3.14.2 Other changes

- Prototypes of functions TaskCRBDual and SendPicture have been removed (but definition of function body is still present in Osimage.c)

3.15 Osilo.h

Neither annotations nor changes.

3.16 OsiLib.asm

3.16.1 Annotations in [AD3]

- Swap16
 - Buffer sizes are not checked, uses only destination buffer size for loop. Might exceed source buffer. Check has been rewritten (**fixed? Does the new version cope with zero-sized buffers?**)
 - **Has no return code**
- Swap32
 - Buffer sizes are not checked, uses only destination buffer size for loop. Might exceed source buffer. Check has been rewritten (**fixed? Does the new version cope with zero-sized buffers?**)
 - **Has no return code**
- Split16
 - **No return code**
- Join16
 - **No return code**
- Join16S
 - Does not check for fitting sizes (**fixed? Does the new version cope with zero-sized buffers?**)
 - **No notification about non-corresponding buffer sizes**
- Not32
 - Does not check for fitting sizes (**fixed? Does the new version cope with zero-sized buffers?**)
 - **No notification about non-corresponding buffer sizes**
- Join16S
 - Does not check for fitting sizes (**fixed? Does the new version cope with zero-sized buffers?**)
 - **No notification about non-corresponding buffer sizes**
- Join16S
 - Does not check for fitting sizes (**fixed? Does the new version cope with zero-sized buffers?**)

- **No notification about non-corresponding buffer sizes**

- ImgAdd, ImgSub, ImgMin, ImgMax, ImgMult, ImgSqrt, ImgMean, ImgMean32

- **No return value**

3.16.2 Other changes

- New functions Split9, Join9

- **do they cope with zero-sized buffers?**

- SumArray32, SumArray16, SumArray8

- algorithms optimized

- New function _Split8, _Join8

- **do they cope with zero-sized buffers?**

- Split16, Join16

- Some reformatting (comments, label names)

- using r12 instead of r8

- ToPM, FromPM

- Commenting changed

- Labels renamed

- New function Crc32

- New functions _ImgTable, ImgLookup

- ImgAdd, ImgSub, ImgMin, ImgMax, ImgMult, ImgSqrt

- algorithms optimized

- ImgMean, ImgMean32, ImgStdDev, ImgHist

- **not checking for zero size any more.**

3.17 OsiLib.h

3.17.1 Annotations in [AD3]

No annotations.

3.17.2 Other changes

- Prototypes of Split8, Split9, Join8, Join9, Crc32, ImgTable, ImgLookup added
- SumArray8, SumArray16, SumArray32 now use const pointer to data instead of var pointer.

3.18 OsiMmb.c

3.18.1 Annotations in [AD3]

- MMBRead

- **500 ms timeout in M_STAT: result ignored**

- **Ignoring timeout result for M_READ**
- MMBSwitch
 - **No input checking**
- MMBConf
 - **No input checking**
 - **No return code**
- MMBStatus
 - **No input checking**
- ToMMB
 - **No return code**
- FromMMB
 - **No return code**
- FileToMMB
 - **illegal size or offset are not detected**

3.18.2 Other changes

- **Statistics based on global variables uPut, uGet, uFill now, not reset in each repetition of TaskMMBPower any more**
- MMBGet and MMBPut removed

3.19 OsiMmb.h

3.19.1 Annotations in [AD3]

No annotations.

3.19.2 Other changes

- Prototypes of functions TaskMMBPower, TaskMMBRead0, TaskMMBRead1, TaskMMBWrite0, TaskMMBWrite1, MMBGet and MMBPut removed

3.20 OsiNode.c

3.20.1 Annotations in [AD3]

No annotations.

3.20.2 Other changes

- TaskMemTest, TaskTimeLine, TaskTestA and TaskTestB deactivated
 - table K_TaskList cleaned up (without gaps in Task-IDs to avoid scheduler bug detected in beta versions up to 8.10 beta 8)
- Now using calculated sizes for arrays, absolute constants eliminated in array size definitions
- Call to InitRes added to init_node

3.20.2.1 3rd Delta Review

- Virtuoso resource support activated. 32 resources are now reserved for UDP use.
 - K_ResList instantiated to array of 32 elements
 - K_ResCount set to 32

- Pointers to functions K_lockreq, K_lockrpl, K_unlock set in array of kernel functions
- Priority of TaskCRBDual increased by 1 from 58 (which is now used for super-boosting UDPs in critical section handling) to 57 (which was unused before)

3.21 OsiNode.h

3.21.1 Annotations in [AD3]

No annotations.

3.21.2 Other changes

- Enumeration type eTASK cleaned up
 - TIMELINE, TESTA, TESTB are now deactivated by #ifdef and put to the end of the list
 - MEMTEST has been removed
- prototype of TaskMemTest has been removed
- type eEVENT and global extern variables K_max_eventnr and EVENTS[] have been removed

3.22 Osiris.ach

3.22.1 Other changes

3.22.1.1 3rd Delta review

- Size of seg_dmda increased by 0x100, because low level software size increased due to include of virtuoso resource functionality

3.23 Osiris.c

3.23.1 Annotations in [AD3]

- SendData
 - **uSize is not checked against uLength**
- GetNextSeqCounter
 - **No, relies on OCL enumeration check**

3.23.2 Other changes

- Global vars auNACShutter[256], auWACShutter[256] are now external.
- TaskTcParse
 - **Variable auShInd[2] was local, is now global extern.**
 - **A couple of variables are now static**
 - DPU Service subtype 9 deactivated if _USE_LLTEST_ not defined
- SendData
 - return codes improved
- TaskTmNAC, TaskTmWAC, TaskTmPCM, TaskTmMCB
- TaskBlink
 - now uses static variable to store previous state

3.24 Osiris.h

3.24.1 Annotations in [AD3]

No annotations.

3.24.2 Other changes

- Version number set to 0x0c (0x8b In 2nd Delta Review)
- Prototypes of TaskTime, TaskTimeNAC, TaskTimeWAC, TaskTcGet, TaskTcParse, TaskTmPut, TaskTmGet, TaskTmDPU, TaskTmNAC, TaskTmWAC, TaskTmMCB, TaskTmPCM, TaskIdle, TaskLED and TaskBlink removed
- Prototype of TmUnit changed (two parameters added)
- **new function prototype fLED (no definition in Osiris.c!)**

3.24.2.1 3rd Delta review

- Version number set to 0x8f
- default priority for UDP threads now using symbol "#define UDP_STD_Prio 60"
- definition of enumeration type eEvents moved here.

3.25 OsiTable.h

3.25.1 Annotations in [AD3]

No annotations.

3.25.2 Other changes

- Some functions re-ordered
- New RTL functions ReadSettings and WriteSettings to access OCL settings with UDPs
- New RTL functions Split8, Split9, Join8, Join9, Crc32, ImgTable, ImgLookup

3.25.2.1 3rd Delta review

- RTL functions CritSecBegin and CritSecEnd now using new priority-boosting flag values 2 and 3
- New RTL functions for resource locking added (ResLock, ResLockW, ResLockWT, ResUnlock, ResAvail, ResOwned)

3.26 OsiTest.c

3.26.1 Annotations in [AD3]

- CheckSum
 - OsiTest declares just the header, there is no code and the function is never called. Maybe this declaration should be removed. - Has been removed.
- TaskTestA
 - **Ignoring return code of SendData, CRBToRAM and CRBDual**

3.26.2 Other changes

- SendPicture moved from OsiImage.c to this file. See annotations to that function there.
- **New global variables uPut, uGet, uFill, auNACShutter[256], auWACShutter[256], auShInd[2]**

- New functions MMBPut and MMBGet

3.27 OsiTest.h

3.27.1 Annotations in [AD3]

No annotations.

3.27.2 Other changes

- New function prototypes added: MMBPut and MMBGet
- Function prototypes removed: TaskTestA and TaskTestB

3.28 OsiUnit.c

3.28.1 Annotations in [AD3]

- SendXAC
 - **Timeout of wait for E_OKN, E_OKW, E_OKP or E_OKM ignored**
- CRBSend
 - Trusts in enumeration types for UDP interface. - No change, but uncritical since value is limited to 0 or 1.
 - **uBytes should be checked against uSize.**
- CRBSync
 - Parameter eDib is used as array index and should be limited. Fixed in v8.11.
 - **ignoring return code of CRBSend**
- CRBImage
 - Parameter eDib is used as array index and should be limited. Fixed in v8.11.
 - **ignoring return code of CRBSend**
- CRBExec
 - Parameter eDib is used as array index and should be limited. Fixed in v8.11.
 - **ignoring return code of CRBSend and GetDuration**
- CRBReadHK
 - Parameter eDib is used as array index and should be limited. Fixed in v8.11.
 - **ignoring return code of CRBSend**
- CRBHKSize
 - Parameter eDib is used as array index and should be limited. No use of eDib found in v8.11.
- CRBReadHk
 - Parameter eDib is used as array index and should be limited. Fixed in v8.11.
- CRBShutter
 - Parameter eDib is used as array index and should be limited. Fixed in v8.11.
- MCBSend
 - **No Parameter checking, uSize should checked against uBytes (OCL generated size specifier uSize is not used at all)**
- MCBGetRegister
 - **uReg is cut to 3 bits without warning**

- MCBSetRegister
 - **uReg and uValue are cut (possible bit loss) without warning**
- MCBMove
 - **Several parameters are cut (possibly bit loss) without warning**
- MCBPhase
 - **Several parameters are cut (possibly bit loss) without warning**
- MCBZeroStepMode
 - **Several parameters are cut (possibly bit loss) without warning**
- HKStatus
 - **input parameter is used as index and has to be limited (enumeration can be ignored by UDPs)**
- HKControl
 - **input parameter is used as index and has to be limited (enumeration can be ignored by UDPs)**
- IFControl
 - **invalid parameters are not indicated to calling functions**

3.28.2 Other changes

No changes at all.

3.29 OsiUnit.h

3.29.1 Annotations in [AD3]

No annotations.

3.29.2 Other changes

- Prototypes of functions TaskReceiveNAC, TaskReceiveWAC, TaskReceivePCM, TaskReceiveMCB, TaskSendNAC, TaskSendWAC, TaskSendPCM and TaskSendMCB removed.

3.30 OsiVirt.c

3.30.1 Annotations in [AD3]

- xalloc
 - **Not checking for failing malloc (calling memset in any case) - low criticality, because used only at system startup**
- FreeP
 - **no incrementation of error counter if timeout occurs**
- MsgPutW, MsgPutWT (for MsgPut the annotation is irrelevant, because it is not called by RTL)
 - **RTL input should be limited to mailboxes reserved for UDPs. - still relies fully on the enumeration type checking of OCL which can be ignored easily by the UDP programmer.**
- MsgGetW
 - **RTL input should be limited to mailboxes reserved for UDPs. - still relies fully on the enumeration type checking of OCL which can be ignored easily by the UDP programmer.**
- MsgGetWT

- RTL input should be limited to mailboxes reserved for UDPs. - still relies fully on the enumeration type checking of OCL which can be ignored easily by the UDP programmer.

- CritSecBegin

- RTL input should be limited to semaphores reserved for UDPs. - still relies fully on the enumeration type checking of OCL which can be ignored easily by the UDP programmer.

- CritSecEnd

- RTL input should be limited to semaphores reserved for UDPs. - still relies fully on the enumeration type checking of OCL which can be ignored easily by the UDP programmer.

3.30.2 Other changes

- New global variable semaEncode

3.30.2.1 3rd Delta review

- New global 2-element array to store enter-priorities for critical sections
- CritSecBegin and CritSecEnd now super-boosting and restoring previous priority
- new RTL functions implemented for access to resources of Virtuoso (directly forwarding to OS-functions or reading OS internal variables).

3.31 OsiVirt.h

3.31.1 Annotations in [AD3]

No annotations.

3.31.2 Other changes

- Prototypes of functions TaskEventTime, TaskAntiBlock, KS_EventSignal, KS_EventTest, KS_EventTestW, KS_SemaTestWT, KS_SemaTestW, KS_SemaSignal, KS_SemaReset, KS_TaskSleep, KS_TaskSetPrio and KS_CriticalSection removed

3.31.2.1 3rd Delta review

- New RTL function headers added

3.32 OsiWave.h

Neither annotations nor changes were made regarding to this file.

4 High-Level Software

The changes between the software checked in [AD4] and the snapshot of the development branch of 2009-07-10 as well as the release version 2009-08-26 (if there were further changes) are reviewed in this chapter.

4.1 Osilnit.ocl

Interfaces of new RTL functions added.

4.1.1 2nd Delta Review

- Interfaces of LinkStatusAll, DIBReset, ResLock, ResLockW, ResLockWT, ResUnlock, ResAvail and eBool ResOwned added

4.2 OsirisInit.ocl

4.2.1 2nd Delta Review

- OsirisLibInit: marking pre-allocated system blocks in IM with flag BLOCK_PERMANENT.

4.3 CRBHandler.ocl (20090515)

4.3.1 Annotations in [AD4]

- CRBSetAcquireMode: Does not unlock resource on illegal shutter mode. **Fixed in V2.2 RC2 (20090812).**
- CRBSetAmplifier: return value ignored by callers. Fixed, return type is now void. Furthermore, this function has been deactivated (commented out) completely.
- CRBAcquireFinalize:
 - **returns always TRUE**
 - **ignores return codes of AcquireHKSnapsho, ShutterConfigSHE and ShutterPeformHomepush**
 - **unchecked parameter "camera" is used as array index**
- **CRBSetCCDHeaterPower and**
- CRBSetWindow: returns TRUE even if one or more coordinate limits are violated. Fixed, return type is now void.
- **CRBAcquireImageToIM, CRBAcquireImageToMMB: first use of parameter "camera" as array index is before the check**
- **CRBBuildCommand: Frame transfer mode support needs to be updated, if required.**
- **CRBSetCCDHeaterPower, CRBCheckAcquirePreCon: unchecked parameter "camera" is used as array index**

4.3.2 Other Changes

- CRBSetGain, CRBSetADC, CRBSetBinningMode, CRBSetFullframe: return type now void, completely deactivated by commenting.
- **CRBSetWindow: No messages any more. Tries to correct coordinates if out of range, but fails on large exceedings.**
- CRBSetAcquireMode:
 - TableCheck removed.
 - **Parameter camera is not checked but used as array index. Illegal value might lead to range exceeding.**
- CRBSetUp:
 - Return type is now void. No messages any more.
 - **Not checking for negative parameter values (enum type is not unsigned!)**
- CRBRequestExtra:

- TableCheck removed
- **parameter "camera" is not checked but used as array index - may lead to range exceeding.**
- **No value (or random value) is returned, but return type is still BOOL.**
- CRBSetShutterConfig
 - Return type is now void
 - **value of parameter camera is not limited any more and can cause array exceeding errors.**
- CRBInitiateShutter: Table check simplified, message generation cleaned up
- CRBPackConfig:
 - **parameter "camera" is not checked but used as array index - may lead to range exceeding.**
- CRBBuildCommand:
 - Not setting parameters to 0 explicitly, whole structure is initialized with 0 before.
- CRBSetCCDHeaterPower: adapted to new interface of CRBBuildCommand
- CRBEnsureCRBCOMMOK: new.
 - **parameter "camera" is not checked but used as array index - may lead to range exceeding.**
- CRBCheckAcquirePreCon
 - new detection of unit / power on
- CRBAcquirePrepare:
 - new parameter "crb_config" in interface
 - simplified table check
 - ih.control.sw_rect is now filled with information from new input parameter, not from ParameterTable any more.
 - homepush_count is limited to 10
 - abortion of ShutterPeformHomepush-loop if homepush fails
- CRBAcquireFinalize
 - homepush_count is limited to 10
 - abortion of ShutterPeformHomepush-loop if homepush fails
- CRBAcquireImageToIM, CRBAcquireImageToMMB
 - new parameter "crb_config" in interface
 - adapted to new interface of CRBAcquirePrepare
 - less messages
- CRBAcquireDualImage
 - Adapted to new interface of CRBAcquirePrepare
 - no success message any more.

4.3.3 2nd Delta review

- CRBSetUp: Always setting window-coordinates, setting frame_mode to FRAME_FULL or FRAME_SUBFRAME according to input parameter.
- CRBBuildCommand: Checking some additional error cases (crbx.uOverLine == TRUE && crbx.uOverLine == TRUE && crbx.uEnBin == TRUE would crash the system).
- CRBCheckAcquirePreCon: Exposure time limit decreased by 1 to stay in 24 bits.
- CRBAcquirePrepare: setting window coordinates according to input parameter, independent of ParameterTable's settings

4.4 IMManager.ocl

4.4.1 Annotations in [AD4]

- IMReleaseHandlesOwnedByVM: Return value is missing. Fixed by interface-change to void return type.

4.4.2 Other Changes

- im_InsertBeforeMemList does not return constant BOOL value any more (but it is still stated in comment).

- IMAlloc:
 - Adapted to changed interface of im_InsertBeforeMemList
 - RuntimeTable.max_used_im_memory is updated (set to maximum)
- IMShrink: commented out

4.4.3 2nd Delta review

- IMReleaseHandlesOwnedByVM: now checking for more flags before releasing a handle to prevent releasing un-allocated or permanent blocks.

4.5 MCBHandler.ocl (20090515)

4.5.1 Annotations in [AD4]

- MCBMoveFilterWheelLow: 'return FALSE' is missing for filterwheel #2 unknown-position-branch. **Fixed in V2.2 RC2 (20090812).**
- **MCBHardwareDirection: Error code is identical to valid return values**

4.5.2 Other Changes

- CheckFWMTemperature, CheckFDMTemperature: Checking for result of MCBReadHK and returning FALSE on error.
- MCBGetController: less messages
- MCBPerformZeroStep
 - no messages any more
 - **always returning TRUE**
- MCBMoveMechanism: no status message any more
- MCBInitFilterWheel:
 - simplified TableCheck
 - no message about wrong phase any more
- MCBMoveFilterWheelLow: no message if entering already active save mode any more.
- MCBMoveFilterWheel:
 - Simplified TableCheck
 - Checking motor power

4.5.3 2nd Delta review

- CheckFWMTemperature: now returning immediately with TRUE, if ParameterTable flag indicates FW is in range. OK, if HKMonitorDemon is running in reasonable intervals.
- MCBGetController, MCBReleaseController: Not checking for free MCB resource (primary or secondary motor controller) any more, taking always RES_MCB.
- MCBMoveMechanismDual: using only one resource for MCB instead of handling and locking two separate resources. Always waiting for successful acquisition of resource, not returning if not fully available any more.
- MCBInitFilterWheel: invalidating ParameterTable flag for FW in range. OK.
- MCBMoveFilterWheel:
 - checking temperature after resource acquisition (which is released on temperature error). OK.
 - Saving a HK snapshot of the MCB
 - Verbosity of successful FW move decreased.

4.6 mem_util.ocl (20090515)

4.6.1 Annotations in [AD4]

- IMBlockToMMB: not checking return code of MMBLock. Fixed.
- **MMBBlockToIM: IM is not locked against concurrent execution.**

4.6.2 Other Changes

- MMBBlockToIM, IMBlockToMMB: less messages (no success message anymore)

4.7 MMBManager.ocl

4.7.1 Annotations in [AD4]

- mmb_ReadMemManagerQuiet does not handle FAT2 copy correctly in error case "FAT1 invalid". Fixed by resetting the ok-flag.
- MMBInitHandleMemory: does not unlock MMB if IMAlloc fails. Fixed.
- MMBLock: returning 0 (FALSE) if MMB Manager is not OK (0xFFFFFFFF (NULL) would be correct). Fixed.
- SelectMMB is not implemented. Fixed by complete removal of the function.
- **mmb_WriteFAT: no notification on abort if MMB is switched off.**
- MMBSetFlag: "flag" is still not checked (valid bits seem to be 0x0fff0000 only). But all calls use valid constants.
- MMBOptimizeMemBlockLocation: Block is lost if IMBlockToMMB fails. This behavior is okay in this error case, since loss of information cannot be avoided in this case.

4.7.2 Other Changes

- mmb_IsManagerOK has been commented out
- mmb_ReadMemManagerQuiet expects verbosity level parameter as enumeration type instead of UNS32 now.
- mmb_InsertBeforeMemList does not return constant BOOL any more.
- MMBManagerReset: Setting RuntimeTable.mmb_is_initiated has moved to the end of the function.
- StartMMB:
 - now checking first for MMB already switched on and initiated.
 - Using simpler TableCheck
 - **Sleeping around initialization.**
 - Now changing the scrubbing cycle only on success (was only on failure before)
- MMBDefragment: unused iteration counter removed.
- MMBAlloc:
 - checking RuntimeTable.mmb_is_initiated instead of mmb_IsManagerOK() at the beginning
 - updating RuntimeTable.max_used_mmb_memory to the current maximum
 - updated to changed interface of mmb_InsertBeforeMemList
- MMBFree, MMBShrink, MMBSetQueue, MMBNamedFind, MMBGetHandleSize, MMBGetHandleName, MMBIsHandleValid, MMBStat, MMBLargestBlock, MMBLock, MMBUnlock: checking RuntimeTable.mmb_is_initiated instead of mmb_IsManagerOK() at the beginning
- MMBSplit: checking RuntimeTable.mmb_is_initiated instead of mmb_IsManagerOK(), checks combined to only one return branch
- MMBSetFlag: Initial checking optimized, AcquireResAccess(RES_MMB_MAN, RTM_INF) is called after all checks now.
- MMBIsFlagSet:
 - No message generation in error case any more
 - Not checking for un-allocated block any more.
- MMBSetHandleName, MMBRangeCheck: commented out.

4.7.3 2nd Delta review

- MMB_MAX_BLOCK_COUNT and MMB_MANAGER_SIZE: values slightly decreased.

4.8 TMHandler.ocl (20090515)

4.8.1 Annotations in [AD4]

- MMBMemoryDump: Uses undefined value of "res" for resource acquisition, which is not released. Fixed.
- **GetHKPacketData: return value is always the required size ("min_size"), even if buffer is not filled.**
- **SendArrayViaIF: RTU blocks might be lost without notification if RequestRTUTransfer fails.**
- PackImageHeader: Contains a known bug which is kept for the moment for compatibility reasons (see comments inside the function). The offset of the last element is 1 long too low.

4.8.2 2nd Delta Review

- SendUDPHKPacket:
 - now using RTL function for CRC calculation
 - using AIF_RTU for debug information instead of AIF_SCIENCE

4.9 ImageLib.ocl

4.9.1 Annotations in [AD4]

- AcquireHKSnapshot, GetImageControlHeaderFromIM, GetImageControlHeaderFromMMB, GetImageHeaderFromMMB, SetImageControlHeaderToMMB, SetImageHeaderToMMB: return value is ignored by some callers. Since this is a problem of the callers, see there.

4.9.2 Other Changes

- CRBReorderImage: No message generation on successful reordering any more.

4.9.3 2nd Delta review

- AcquireHKSnapshot: now acquiring data from saved snapshot, if possible

4.10 ParameterTable.ocl

4.10.1 Annotations in [AD4]

- **TableExit: return value is always TRUE (if at least the table check was successful), even if saving failed (but at least TM error message is generated)**
- TableGetHWSpecifiHeader, TableReadLifetimeHeader, TableWriteLifetimeHeader: return value ignored by callers. This is a problem of the callers, see there.

4.10.2 Other changes

- WriteToNVRAM: Messages for single NVRAM segments commented out (summary message is still present)
- TableResetSegment:
 - Adaptation to changes in parameter table definition (no magic values any more, some renamed elements)
 - Several parameters changed
- TableReset:
 - ParameterTable.udp_vm_config.auc is restored from Settings
- TableCheck, TableCheckQuiet:
 - completely deactivated (and would not check magic numbers any more)

- TableResetRuntimeParams
 - transferring mechanism safemode parameters to the runtime state
- TableInit
 - configuring the UDP Manager
- TableExit
 - Table-check simplified
 - Transferring some information from the runtime table to the parameter table before saving
- TableSendSegment, SendLifetimeCounters
 - first parameter's type is now eTMVerbosity to check valid value range.
- SendParameterTable has been deactivated

4.10.3 2nd Delta review

- TableResetSegment:
 - in TM section some values of ParameterTable.tm.hk_period have changed.
 - In limit table defaults section the flag ParameterTable.hk.enable_service19_actions is set to TRUE instead of FALSE

4.11 ShutteErrorHandling.ocl (20090224)

4.11.1 Annotations in [AD4]

- **ShutterErrorRecovery: RuntimeTable.she_error_history is not modified for error type D.**
- ShutterFunctionalLimitCheck: Does not enter safemode if uMinExpTimeForMotionOpt < LONG_EXP_TIME_FOR_OPT, no notification about this. Seems to be intentional and correct.

4.11.2 Other Changes

- ShutterErrorRecovery: Table check simplified.

4.12 ShutterCalibrate.ocl (20090515)

4.12.1 Annotations in [AD4]

- **CalibrateShutter: Ignores return values of SendDemonRequest, CRBSetup, CRBSetLampState, ShutterConfigSHE, TCAcquireImage, CRBInitiateShutter, ShutterTuneMotion, ShutterTuneTravel, ShutterTuneImpact, ShutterTuneImpactVelOff, ShutterTuneFiltering, ShutterOptimizeMaster and RealizeShutterProfile.**

4.12.2 Other Changes

- CalibrateShutter: eOptimizeFilter and eMeasureAB deactivated

4.13 ShutterHandler.ocl (20090224)

4.13.1 Annotations in [AD4]

- CheckShutterTemperature,: ignore some return values. Fixed.
- **ShutterAcquireTestImage, ShutterBuildUnlockProfile, ShutterHomepushNAC, ShutterHomepush-WAC: ignore some return values.**
- **ShutterAcquireTestImage: no TM if NAC/WAC is not switched on, but other errors are signaled via TM.**
- **ShutterBuildUnlockProfile: Ignoring result of RealizeAccelerationProfile**
- ShutterCalcRefProfileTiming: If bp.fDecelPowerCorrFactor is negative, it is set to 1 without further messaging. This is intentional

- **ShutterDelayForCharge: Not sleeping at all if sleep_time is >= 13000, but no message about it**
- **ShutterHomepushNAC, ShutterHomepushWAC: Ignores the return value of ShutterPeformHomepush.**
- ShutterPeformHomepush: return value ignored by callers. See there.

4.13.2 Other Changes

- ShutterAcquireTestImage: Interface expanded to receive TestExposureType.
- ShutterEnableNACBrake: Adapted to new interface of CRBBuildCommand
- ShutterConfigSHE: new sanity check on the integrity of the power profile
- ShutterOpen, ShutterClose, ShutterForceClosed: Call adapted to changed interface of ShutterAcquireTestImage
- ShutterDelayForCharge: No messages any more.
- BuildShutterPowerProfile:
 - using array operation for power profile calculation
 - improved value limitation
- CalculateShutterStatFromMotion
 - improved maximum calculation
- CalculateShutterMotionStat: Message verbosity specified by symbol instead of immediate constant
- ShutterBuildHomepushProfile:
 - Saving the profile
 - Checking for necessary build
 - no return value any more
- ShutterPeformHomepush
 - Call adapted to changed interface of ShutterAcquireTestImage
 - **Not checking for successful ShutterAcquireTestImage any more**
- ShutterTestFunctionality
 - **If ShutterForceClosed was successful, ShutterPeformHomepush is called multiple times, regardless of it's return value**
 - Call adapted to changed interface of ShutterAcquireTestImage

4.13.3 2nd Delta Review

- CheckShutterTemperature: now returning immediately with TRUE, if ParameterTable flag indicates SHM is in range. OK, if HKMonitorDemon is running in reasonable intervals.
- ShutterPeformHomepush: not entering shutter safemode any more (see mantis issue 229)

4.14 ShutterOptimize.ocl (20090515)

4.14.1 Annotations in [AD4]

- ShutterTuneAB: Returns TRUE on illegal workspace and does not send an error message. Fixed by complete deactivation of this function.
- **ShutterSearchFunctionalInterval: Endless "while"-loops if "sp.fMinStep" is 0 (input parameter sp.fMinStep is not checked).**

4.14.2 Other Changes

- ShutterTuneFiltering: completely deactivated

4.15 StreamedImageProcessing.ocl

4.15.1 Annotations in [AD4]

- **CloseProcessingWorkspace, CloseStreamWriter, StreamImageTo, StreamIImageTo: ignore some**

return values

- InitSegmentHeader, StreamImageTo, WriteToStream: result is ignored by callers. See there.
- **StreamHandleSegment: No notification about failing InitSegmentHeader, ignores return value of WriteToStream and ImgBright**
- **StreamMImageTo: PackImageHeader's parameter "ih" contains unchecked "comp_type" and "comp_value"**

4.15.2 Other Changes

- WriteToStream uses symbol instead of immediate constant for SendMessageArg verbosity specification
- RunStreamProcessor:
 - LUT Sqrt compression added
 - Pack9Bit compression added
 - No message any more when encoding starts, encoder activity flag around encoding set to TRUE
- StreamProcessSection
 - Check whether the segment can be processed in one block or if the section has to be segmented corrected.
- StreamImageTo
 - Verbosity of message changed to VERB_NORMAL_HIGH

4.15.3 2nd Delta Review

- StreamFilterBadPixels: lowering priority during execution of ImgRemoveBad. Restoring priority afterwards. OK.
- RunStreamProcessor: lowering priority during execution of certain functions (see below). Restoring priority afterwards. OK.
 - ImgConv, ImgTable, ImgLookup, ImgSqrt, ImgBin, Join9
 - Split16 and Encode
- RunStreamProcessor: indicating EX_LOSSLESS_ENCODE if encoder used less destination buffer space than provided.
- StreamProcessSection: lowering priority during execution of ImgCrop. Restoring priority afterwards. OK.
- StreamHandleSegment: lowering priority during execution of ImgBright. Restoring priority afterwards. OK.

4.16 SwitchMCBOn.ocl (20090515)**4.16.1 Annotations in [AD4]**

- **SwitchMCBOn: Does not check for successful start**

4.17 TC.ocl (20090515)**4.17.1 Annotations in [AD4]**

- TCInitPlainfileRead:
 - **result of MMBLock is not checked for failure code. Return value of MMBFree is not checked - freeing might fail if concurrent plainfile access is active.**
 - **not protected against concurrent execution**
- TCPlainfileRecovery:
 - **Return value of MMBLock is not checked**
 - **Size of handle might change between call to MMBGetHandleSize and MMBLock on concurrent access.**

- TCMonitorInput, TCMonitorObservation: marked "to do". Still marked, but have been reworked heavily.

4.17.2 Other Changes

- TCNACOn, TCWACOn: Protected against misuse in safe mode or active service 19 protection
- TCACquireImage:
 - Protected against misuse in safe mode or active service 19 protection
 - Adapted to new interface of PutExposureToQueue
 - Calling AcquireImageRouted instead of AcquireImageStored (function has been renamed)
- TCACquireDualImage: Adapted to new interface of CRBBuildCommand
- TCShutterConfig renamed to TCShutterConfigTM
- TCHandleSafemode: new function

4.17.3 2nd Delta Review

- TCHandleSafemode:
 - "SendOCLEvent(OCLCMD_REQUEST_SAFEMODE);" added for eGlobalSafemode
 - "EnterShutterSafemode" added for NAC- and WAC-shutter
 - TCNACOff/TCWACOff added for NAC/WAC

4.18 UserLib.ocl (20090515)

4.18.1 Annotations in [AD4]

- **DeletelImagesFromQueue, MovelImagesToQueue: return missing, random boolean value is returned**

4.18.2 Other Changes

- AutoExpose:
 - Improved check of processing flags
 - Improved subframe activation
 - Exposure time loop is now aborted on shutter error.
- AcquireImageLowPower:
 - Additional parameter tsCRBConfig
 - adapted to changed interface of CRBAcquireImageToIM
- AcquireImageStored renamed to AcquireImageRouted
 - interface enhanced by new parameter tsCRBConfig
 - adapted to new interface of AcquireImageLowPower, CRBAcquireImageToIM and CRBAcquireImageToMMB
- AcquireDark, AcquireBias, AcquireImage: adapted to new interface of AcquireImageRouted

4.18.3 2nd Delta Review

- AcquireImageLowPower: power-off reordered, now powering shutter off before CRB is powered down.

4.19 HKCheck.ocl (20090515)

4.19.1 Other changes

- HKGenericLimitAction:
 - Handles LA_UNIT_SAFEMODE
 - LA_POWER_DOWN_OSIRIS uses "SendOCLEvent(OCLCMD_REQUEST_SAFEMODE)" instead of calling RequestOsirisShutdown
 - **LA_OSIRIS_SAFEMODE is nearly identical to LA_POWER_DOWN_OSIRIS, but sets ParameterT-able.hk.osiris_in_safemode, too. Re-Ordering might shorten the code.**
- HKCheckForRequiredAction: no messages any more.
- HKLimitCheckUnit
 - not requiring resource-access any more
 - trying 5 times to grab a HK block

4.19.2 2nd Delta review

- HKLimitCheckUnit: in MCB, NAC and WAC HK check filter-wheel range checking added

4.20 HKHandler.ocl (20090515)

4.20.1 Other Changes

- HKGetSensor
 - not requiring resource-access any more
 - trying 5 times to grab a HK block

4.20.2 2nd Delta review

- SafeCRBReadHK: Acquiring and releasing Resource around CRBReadHK. OK.
- SafeMCBReadHK: Acquiring and releasing Resource around MCBReadHK. OK.

4.21 Obsolete.ocl (20090515)

All functions have been deactivated.

4.22 PCMHandler.ocl

4.22.1 Other Changes

- IsSwitchOn uses symbols instead of immediate constant values
- SelectPCM, PCMOn, PCMOff, PowerMCBOn, SelectHeaters, PowerHeaters: TableCheck simplified
- **PowerMCBMotorsOn, PowerMCBMotorsRedOn: Aborting if protection active. Return value is missing in this case!**
- PowerCRBOn: adapted to changed CRBBuildCommand interface
- CRBSetLampState: storing current time in toRuntimeTable.callamp_on_time[] when switching the lamp
- RequestOsirisShutdown removed.

4.22.2 2nd Delta review

- **IsUnitOn: not checking for available resource RES_MCB and not synchronizing to update communication flags in DPU HK any more. Is this intended or just done for testing (lines are just commented out)?**
- PowerMCBOn: Now calling MCBReadHK while waiting for the MCB to come up.

4.23 ProcessHandler.ocl (20090224)

4.23.1 Other Changes

- ProcessHandlerInit: Magic numbers removed from ControlArray.
- QueryResAccess: "if" now using comparison.
- AcquireResAccess: Does not use ControlArray.res_acquire_flag any more
- SendOCLEvent: now of category safe
- MarkDemonAlive: No messages any more.

4.23.2 2nd Delta review

- ProcessHandlerInit: initializing a (no more needed) resource flag "vm_waiting".
- IsResourceOwnedByUDP, QueryResAccess, AcquireResAccess, ReleaseResAccess: now using RTL function instead of high-level implementation (but still updating flags for HK). Use of semaphores is now obsolete.

4.24 SwitchPCMOn.ocl (20090515)

4.24.1 Other Changes

- SwitchPCMOn: now checking the global safemode flag.

4.25 Demons.ocl

4.25.1 Other Changes

- New include of AcquireDemon.ocl
- New function DemonStart. Function starts different demons, according to provided parameter.

4.25.2 2nd Delta review

No changes.

4.26 AnnealControl.ocl

All functions have been commented out.

4.26.1 2nd Delta review

No changes.

4.27 AcquireDemon.ocl

New file.

- AcquireQueueHandler: OK
- NACAcquireQueueDemon: OK
- WACAcquireQueueDemon: OK.

4.27.1 2nd Delta review

- Priority change has been added, surrounding the call to "AcquireImageRouted". Priority is increased before and reset afterwards, so only the image acquisition is running with high priority. OK.

4.28 DownlinkManager.ocl

4.28.1 Annotations in [AD4]

- **DLHandleThumbnails: no message on illegal input handle or MMBGetQueue failing (which is extremely improbable)**
- **DLProcessQueue: ignores some return values**

4.28.2 Other Changes

- DLSafeMMBFree decrements RuntimeTable.images_queued (if > 0)
- DLFindImageToHandle decrements RuntimeTable.queue_count[queue] if valid image handle is found
- DLProcessQueue:
 - re-incrementing RuntimeTable.queue_count[queue] on illegal handles.
- Verbosity slightly increased for some messages

4.28.3 2nd Delta review

- Priority is lowered during the search for handle in DLFindImageToHandle and reset to normal when the search is finished. OK.
- Priority is lowered in DLProcessQueue during the execution of MMBBlockToIM and reset to normal afterwards. OK.

4.29 HKMonitor.ocl (20090515)

4.29.1 Annotations in [AD4]

- Service19Monitor: On initial violation count exceeding only WAC filter wheel is moved – is this correct? Fixed by heavily reworked code.

4.29.2 Other Changes

- DIBMonitor, PCMSwitchMonitor: new functions
- HKLimitCheck: No message any more
- HKMonitorDemon:
 - simplified TableCheck
 - keep alive check on the running demons now replaced by call to DIBMonitor

4.29.3 2nd Delta review

- **Service19Monitor does not “ensure that we have new data from the SREM interface before doing any checking” any more (lines commented out). Is this really intended or was it just made for testing?**
- In HKMonitorDemon the priority is lowered while executing IsMMBConsistent and reset afterwards. OK.

4.30 OCLEvent.ocl (20090515)

4.30.1 Annotations in [AD4]

- HandleSpuriousPCMEvent: ePSEActionIgnore is not handled correctly (“do nothing”) in switch - reaches default branch which sends REQUEST_LCL_OFF_EVENT. **Fixed in V2.2 RC2 (20090812).**
- OCLEventDemon:
 - Return value of “start(“OsirisToSafeMode”);” is not checked. Successful restart should be checked somehow (might fail e.g. due to low memory or all token interpreters busy). Fixed by waiting with timeout and special handling in HandleUDPMgrAbort
 - MsgGetW might block UDP manager reset. Return value of “start(“OsirisToSafeMode”);” is not checked. Fixed with other changes.
- HandleUDPMgrAbort: Attention: Format of UDP abort message is under change!
 - Defines in OsiTypesMPAe.h should be adapted accordingly:
 - #define UDPMGR_ABORT_UDPID_MASK 0x00FFF000. **Adapted in V2.2 RC2 (20090812).**
 - #define UDPMGR_ABORT_EARLY_MASK 0x01000000
 - #define UDPMGR_ABORT_CATEGORY_MASK 0x02000000

4.30.2 Other Changes

- HandleService19: new function
- HandleUDPMgrAbort now returning BOOL value.
- OCLEventDemon
 - new: handling of OCLCMD_REQUEST_SAFEMODE by starting “OsirisToSafeMode”
 - Service 19 handling separated

4.30.3 2nd Delta review

- HandleUDPMgrAbort unlocks resources of a terminated UDP in a loop until all locks are unlocked. This is okay, but not necessary, because the token interpreter itself frees all resources owned by itself when it re-enters “waiting for execution-command”-state.

4.31 SHMOptimize.ocl

4.31.1 Annotations in [AD4]

- **ProcessSHMOpt: ignores return value of ShutterConfigSHE (from CRBShutter)**
- **SHMOptimizeDemon: no default branch handling illegal demon requests**

4.31.2 Other Changes

- ProcessSHMOpt:
- SHMOptimizeDemon: Table check does not check for size any more.

4.31.3 2nd Delta review

- IterateTVRandomWalk improved for travel or velocity optimization.

4.32 ThermalControl.ocl (20090515)

4.32.1 Annotations in [AD4]

- **PowerHeatersT: Return value of PCMHeaters is ignored.**

4.32.2 Other changes

- PowerHeatersT, ThermalControlDemon: Simplified TableCheck

4.32.3 2nd Delta review

No changes.

5 Summary

A couple of bugs have been found and corrected during the reviewing progress. Only a few potential dangerous functions are still left in the RTL software (see 3.28.1 and 3.30.1), but these are not critical in combination with the current high-level software, because all of these potential bugs are related to missing checks of enumeration input parameters at runtime. These would at least cause warning messages during compilation of the UDP sources (when the according warning message is activated). The current high-level software does not cause such a warning, nevertheless, these weaknesses have to be taken into account for future versions of the high-level software.

Compared to the low-level software version 8.10 BETA 2 (LL 1.14, OCL 4.x) and high-level software version 2.1 Patch-level 2 Release 1, the current version (low-level version 8.15, high level version 2.2) is a significant step forward to a very stable and reliable system.