XMM Optical Monitor

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Description of Changes to DPU Software June-August 2000 (Release 11)

DOCUMENT: XMM-OM/UCSB/TC/0052 Version 1.0 19-August-00

Contents

This document describes the changes made for thenrelease "11", released to ESA August 2000. It summarizes the changes and fixes reported in the ECR's and NCR's below. The description of the revision versions indicates changes since the last delivery of May 2000. For previous changes to the DPU flight software, see documents XMMOM/UCSB/TC/0041, 0042, 0043, 0045 (available from UCSB web site.) Test reports specific to the changes described in this document are found in XMMOM/UCSB/RP/0006. For a description of ICU flight software and other testing performed at MSSL please see document XMMOM/MSSL/SP/0232.

List of NCRs/ECRS Described in this Document

NCR/ECR	Description	Status this Release
NCR 171	Output Eng 4 image in 1 part, not 16 segments	closed
NCR 202	DPU software alerts from CGS	closed
NCR 203	FAQ failure: DPU assumes incorrect word ordering of input reference stars	closed
NCR 205	DPU software alerts from CGS	closed
NCR 208	FAQ failure: Toggling of the fast mode data buffer pointer	closed
NCR 209	Tracking offsets remembered by Red DSP	closed
ECR 90	Add alerts at the beginning and end of engineering exposures	closed
ECR 91	Full field low res imaging mode	closed

1 NCR 171 - FAQ failure: DPU assumes incorrect word ordering of input reference stars

Explanation:

NCR 171 originally called for the ENG4 downlink to be changed from 16 chunks to 1 chunk, in order to comply with the capabilites of the ground software. We are now reversing this decision and moving to 16 chunk ENG4 mode.

Affected codes:

- include/white_control.h

```
include/white_control.h
----------------------------
revision 1.17
date: 2000/08/07 20:52:05;  author: jak;  state: Exp;  lines: +2 -2
JAK20000807: Changed ENG4_OUTPUT to 0, enabling the ENG4 16 chunk mode.
```

2 NCR 202 - Missing alerts during clean slate.

Explanation:

A change made to the DPU code in Release 10 (detailed in NCR 194) allowed the DPU alerts to be "shut up" to stop problems seen with loss of filter wheel position, due to many alerts being transmitted on the SSI during filter movement. However as a side effect of this the DPUOS_READY ("Jim") alert was no longer seen as the variable controlling whether the alert is generated set to zero until after the INITIALIZE swap unit is run. The initialisation of this variable was moved to occur before this in the run sequence so the alert can be generated.

Affected codes:
- white/src/cc/cwhite.c
- white/src/cc/su_initialize.c

```
white/src/cc/cwhite.c
----------------------------
revision 1.49
date: 2000/05/22 08:41:26;  author: ho;  state: Exp;  lines: +2 -1
CH20000522: NCR 194a, Post release 10. Put the correct initialization
of inhibit_ssi into cwhite.c such that Jim can be transmitted
correctly. Remove inhibit_ssi initialization from su_initialize.c
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white/src/cc/su_initialize.c
----------------------------
revision 1.42
date: 2000/05/22 08:41:28;  author: ho;  state: Exp;  lines: +2 -2
CH20000522: NCR 194a, Post release 10. Put the correct initialization
of inhibit_ssi into cwhite.c such that Jim can be transmitted
correctly. Remove inhibit_ssi initialization from su_initialize.c
----------------------------
```

3 NCR 203 - FAQ failure: DPU assumes incorrect word ordering of input reference stars

Explanation:

When loading reference stars for field acquistion, the DPU code assumes that the word ordering of the coordinates in the IC_LOAD_REF_STARS (A428) command as least significant word first. The DPU-ICU Protocol Definitions document (XMM-OM/MSSL/ML/0011.4) states that "In all cases, the most significant bit is transmitted first." This error causes the input reference star positions to be corrupted and therefore field acquisition fails.

Affected codes:
- white/src/cc/cwhite.c

```
----------------------------
revision 1.48.2.1
date: 2000/06/13 11:58:29;  author: jak;  state: Exp;  lines: +3 -3
JK2000-06-13: NCR203. Change word ordering in IC_LOAD_REF_STARS to conform
to what is being commanded (and in ICU-DPU protocol document).
```

4 NCR 205 - Alerts during magnifier CGS

Explanation:

During the choose guide star algorithm, illegal memory access alerts were being seen for the case when the magnifer was being used. This was due to the NOMINAL_X_DIM and NOMINAL_Y_DIM being set to "26" for the magnifier, which is larger than the tracking guide star window. The problem was fixed by setting NOMINAL_X_DIM and NOMINAL_Y_DIM to 24 for magnifier tracking.

Affected codes:
- white/src/cc/su_scangs.c
- include/white_default.h

```
white/src/cc/su_scangs.c
----------------------------
revision 1.29
date: 2000/08/07 19:10:47;  author: jak;  state: Exp;  lines: +1 -5
JAK20000807: NCR 205: Changed magnifier nominal_x_dim and nominal_y_dim to
24 from 26 as this seemed to be causing the alerts during CGS.
----------------------------

include/white_default.h
----------------------------
revision 1.25
date: 2000/08/07 19:48:57;  author: jak;  state: Exp;  lines: +4 -6
JAK2000807: NCR 184: Modified CGS parameters to include lower limit of 50
counts for a good guide star. NCR 205: Removed MAG_NOMINAL_X_DIM and
MAG_NOMINAL_Y_DIM as we no longer use them.
----------------------------
```

5 NCR 208 - Fast mode buffer pointer toggling

Explanation:

The fast mode accumulation buffer pointer was not being correctly initialised, leading to a possible corruption of fast mode data.

Affected codes:

- white/src/cc/whitedsp.c

```
white/src/cc/whitedsp.c
----------------------------
revision 1.73
date: 2000/08/11 13:57:25;  author: ho;  state: Exp;  lines: +13 -13
CH20000811: ECR91 - Correctly implement resetting the accum pointers.
----------------------------
revision 1.72
date: 2000/08/09 04:02:59;  author: ho;  state: Exp;  lines: +108 -60
CH20000808: NCR208/ECR91 (TBC)
NCR208: fix the fast mode buffer pointer toggling to be indepndent from accum
ECR91: Implement support for full field half resolution mode.
----------------------------
```

6 NCR 209 - Tracking offsets remembered by Red DSP

Explanation:

If tracking failed due to CGS not finding any good guide stars, the calculated shift and add offsets (usually from the previous exposure) are not reset and the Red DSP applies these shifts to all frames for the observation. Occasionally when tracking fails badly these offsets can be large and cause data loss.

Affected codes:
- white/src/cc/whitedsp.c

```
white/src/cc/whitedsp.c
----------------------------
revision 1.71
date: 2000/08/07 19:43:37;  author: jak;  state: Exp;  lines: +10 -8
JAK20000807 ECR90: Removed DA_ENDOF_EXP in engineering_task() and moved it
into the engineering swap unit. NCR 209: If CGS fails to find any guide
stars (A5D7) set the offsets to zero so that the Red DSP doesn't apply
shift and add offsets from a previous exposure.
----------------------------
```

7 ECR 90 - Add alerts at the beginning and end of engineering exposures

Explanation:

ECR90 requires the addition of DA_BEGOF_EXP and DA_ENDOF_EXP alerts at the beginning and end of engineering mode exposures.

Affected codes:
- white/src/cc/whitedsp.c
- white/src/cc/su_engineering.c

```
white/src/cc/whitedsp.c
----------------------------
revision 1.71
date: 2000/08/07 19:43:37;  author: jak;  state: Exp;  lines: +10 -8
JAK20000807 ECR90: Removed DA_ENDOF_EXP in engineering_task() and moved it
into the engineering swap unit. NCR 209: If CGS fails to find any guide
stars (A5D7) set the offsets to zero so that the Red DSP doesn't apply
shift and add offsets from a previous exposure.
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white/src/cc/su_engineering.c
----------------------------
revision 1.12
date: 2000/08/07 19:26:42;  author: jak;  state: Exp;  lines: +37 -2
JAK20000807 ECR90: Added DA_BEGOF_EXP and DA_ENDOF_EXP into Engineering
modes.
----------------------------
```

8 ECR 91 - Full field low res imaging mode

Explanation:

Rudi-5 imaging is not efficient at observing due to only the central hi-res window being observed in all 5 exposures. This results in the rest of the FOV only being observed for 20% of the time. Therefore new mode of observation was programmed, where the entire field of view is imaged with BPE binning on to obtain a resultant 1024x1024 image with 1" pixels (binned 2x2).

Affected codes:
- white/src/cc/whitedsp.c
- white/src/cc/cwhite.c

```
white/src/cc/whitedsp.c
----------------------------
revision 1.72
date: 2000/08/09 04:02:59;  author: ho;  state: Exp;  lines: +108 -60
CH20000808: NCR208/ECR91 (TBC)
NCR208: fix the fast mode buffer pointer toggling to be indepndent from accum
ECR91: Implement support for full field half resolution mode.
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white/src/cc/cwhite.c
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revision 1.51
date: 2000/08/09 04:04:13;  author: ho;  state: Exp;  lines: +13 -1
CH20000808: ECR91 - Implement support for full field half res imaging.
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```