XMM Optical Monitor

MULLARD SPACE SCIENCE LABORATORY
UNIVERSITY COLLEGE LONDON

Author: Philip J. Smith (with contributions from Tim Sasseen and Cheng Ho)

Detailed Test Plan Document
Software release 9b

DOCUMENT: XMM-OM/MSSL/SP/0230.01 September 8, 1999

CHANGE RECORD

Issue	**Date**	**Changes**
1	08-Sep-99	First version

Contents

1 Introduction **1**

2 Reference Documents **1**

3 Overview **1**

4 Abbreviations **2**

5 Typographical and Other Conventions Used in this Document **2**

5.1 Typographical . . . 2

6 Equipment **3**

7 Synchronize software **3**

8 Operations Procedures **3**

8.1 Initial Switch On . . . 3

8.2 Commissioning . . . 3

8.3 Science Exposure . . . 4

8.4 End of Science Data . . . 4

8.5 Engineering modes . . . 4

8.6 Pre-perigee . . . 4

8.7 Post-perigee . . . 4

8.8 Pre-eclipse . . . 4

8.9 Post-eclipse . . . 4

8.10 Power-off . . . 4

9 NCR 180 test **5**

10 Close NCR 180 **5**

11 Fast mode tests **5**

12 NCR 171 test **6**

13 Close NCR 171 **6**

14 Engineering modes **6**

14.1 Engineering mode 0 6

14.2 Engineering mode 1 6

14.3 Engineering mode 2 6

14.4 Engineering mode 5 7

15 Fast fast mode tests **7**

16 Fast mode tests with optics **7**

17 Close NCR 159 **7**

18 USA tests **7**

18.1 NCR 180 test 8

18.2 NCR 171 test 8

18.3 Fast mode test 8

18.4 Fast fast mode test 8

18.5 Fast mode test 8

18.6 Fast fast mode test 8

18.7 NCR 171 test 8

19 Further tests **8**

20 Appendix A: VxWorks Scripts **9**

20.1 acquire 9

20.2 cgs . . . 11

20.3 exp . . . 13

20.4 eng3 . . . 14

20.5 eng4 . . . 16

20.6 eng5 . . . 18

20.7 eng6 . . . 20

20.8 flatfield . . . 22

20.9 tc_clean_slate . . . 25

20.10 dpu_post_mortem . . . 27

20.11 load_icu . . . 29

20.12 load_dpu . . . 30

20.13 load_table_24 . . . 31

20.14 load_table_25 . . . 32

20.15 load_table_28 . . . 33

20.16 load_table_29 . . . 34

20.17 hvonr . . . 35

20.18 hvoff . . . 36

20.19 flush . . . 37

20.20 reset . . . 38

1 Introduction

This is the Detailed Test Plan Document for release 9b of the ^{XMM}OM software. It describes the tests performed to check the functionality of the on-board software and the remaining tests to check the fixes for NCR and ECR software changes.

2 Reference Documents

- **XMM-OM/MSSL/ML/0006** ^{XMM}OM VxWorks Command Summary (FM Model) (http://xmmom.mssl.ucl.ac.uk/docs/xmm-om/mssl/ml/0006/)
- **XMM-OM/MSSL/ML/0009** ^{XMM}OM User Manual (FM) - Part 2: Experiment Operations Procedures http://xmmom.mssl.ucl.ac.uk/docs/xmm-om/mssl/ml/0009/ops.ps.gz
- **XMM-OM/MSSL/SP/0207** OM FM Software Testing at MSSL (http://xmmom.mssl.ucl.ac.uk/docs/xmm-om/mssl/sp/0207/icu_fm_testing.ps.gz)
- **XMM-OM/UCSB/TR/0002** DPU Flight Software Test Report (http://xmmom.mssl.ucl.ac.uk/docs/ucsb/UCSB_TR_0002.ps.gz)
- **OM-MSSL-NCR 159** ^{XMM}OM NCR 159
- **OM-MSSL-NCR 180** ^{XMM}OM NCR 180
- **OM-MSSL-NCR 171** ^{XMM}OM NCR 171

3 Overview

This document describes the software testing done to check the ^{XMM}OM flight code and to check the NCR and ECR fixes.

The general testing philosophy and test equipment is described in the "OM FM Software Testing at MSSL" document XMM-OM/MSSL/SP/0207 (http://xmmom.mssl.ucl.ac.uk/docs/xmm-om/mssl/sp/0207/).

Because of the statistical nature of possible timing problems in real-time, it is not enough to run a particular exposure. To have good confidence that such exposures would run for a whole orbit, they must be tested for a total time which is considerably longer than one orbit.

The tests will take approximately 2 weeks to complete.

4 Abbreviations

CPU	Central Processor Unit
CVS	Concurrent Version System
DEM	Digital Electronics Module (consists of the DPU and the ICU)
DPU	Digital Processing Unit (supplied by the USA team)
ECR	Engineering Change Request
EOB	Electro-Optical Breadboard
ESA	European Space Agency
FAQ	Field Acquisition
GS	guide star(s)
HK	Housekeeping
HV	High Voltage
ICU	Instrument Control Unit (supplied by MSSL)
IFT	Integrated Functional Test
KAL	Keep Alive
LANL	Los Alamos National Laboratory
LUT	Lookup Table
MCP	Microchannel Plate(s)
MSSL	Mullard Space Science Lab (University College London)
NCR	Non-Conformance Report
OM	Optical Monitor
RBI	Remote Bus Interface
SNLA	Sandia National Laboratory
SOC	Science Operations Centre
TMPSU	Telescope module power supply unit
UCSB	University of California at Santa Barbara
XMM	X-ray Multi Mirror Mission
s/c	spacecraft
tc	Telecommand
tm	Telemetry

5 Typographical and Other Conventions Used in this Document

5.1 Typographical

- Running text appears in this normal Roman font.
- *Italic font* will indicate something (*e.g.*, a parameter) that should not be taken literally.
- A `"typewriter" font` will be used to indicate Unix/VxWorks commands.

6 Equipment

All tests at MSSL will be performed on the Flight Spare DEM. All tests at SNLA will be performed on EOB2.

The MSSL configuration for the tests is the Electronic Ground Support Equipment (EGSE) connected to the flight spare DEM hardware system. The hardware configuration includes a Sun networked via ethernet to a dedicated Force VME processor card running VxWorks housed in a VME bus card cage. Also in this card cage are cards to simulate the spacecraft. The flight spare DEM is thought to behave almost identically to the flight units.

The SNLA configuration is similar but has EOB2 instead of the flight spare DEM. EOB2 has different timing characteristics to the flight units.

The input data is produced either by a QM detector or a fast PC OM1-simulator.

7 Synchronize software

Version control is maintained using the CVS software.

MSSL will update SNLA/LANL with the latest MSSL CVS modules of (the egse) "scripts", the "egse" (code) & ICU uploadable flight "oper" code. UCSB/SNLA/LANL will update MSSL with the latest UCSB CVS modules of the DPU uploadable flight code "white", "blue", "red", "include", "dpu/util".

8 Operations Procedures

The following procedures documented in XMM-OM/MSSL/ML/0009 will be performed using the Flight Spare DEM and the QM OM1 (see document XMM-OM/MSSL/SP/0207). These will take 1 day to test.

8.1 Initial Switch On

Check that the procedure for the initial switch-on of OM is correct.

8.2 Commissioning

Check the new commissioning procedure.

8.3 Science Exposure

Perform a sample science exposure including "Acquisition", "Choose Guide Stars", "Accumulate and track". These are tested in depth many times in the exposure tests that follow.

8.4 End of Science Data

Check the flushing of exposures.

8.5 Engineering modes

These are covered by later tests.

8.6 Pre-perigee

Check the new pre-perigee procedure which assumes the DEM is left powered on.

8.7 Post-perigee

Check the new pre-perigee procedure which assumes the DEM has been left powered on.

8.8 Pre-eclipse

Check the new pre-eclipse procedure which powers down OM for eclipse.

8.9 Post-eclipse

Check the new pre-eclipse procedure which powers up OM after eclipse relying on KAL.

8.10 Power-off

Turn off.

9 NCR 180 test

NCR 180 is already tested on EOB2 by LANL/SNLA but it requires testing on the Flight Spare at MSSL. This will take 3 hours.

Do long-term testing of NCR 180. Dump RAM/ROM and let LANL check the results.

10 Close NCR 180

This NCR can then be closed.

11 Fast mode tests

The ICU and DPU code will be tested using the fast PC OM1 simulator to provide data for the Flight Spare DEM. 5 realistic starfields will be used and each filter. These tests will take 5 days with each Rudi-window taking 1 day.

- Rudi-1 window science exposure with 2 fast-mode windows on a variable source.
- Repeat for each filter (except blocked).
- Rudi-2 window science exposure with 2 fast-mode windows on a variable source.
- Repeat for each filter (except blocked).
- Rudi-3 window science exposure with 2 fast-mode windows on a variable source.
- Repeat for each filter (except blocked).
- Rudi-4 window science exposure with 2 fast-mode windows on a variable source.
- Repeat for each filter (except blocked).
- Rudi-5 window science exposure with 2 fast-mode windows on a variable source.
- Repeat for each filter (except blocked).

Repeat the above sequence for each starfield (starfield-1, starfield-2, starfield-3, starfield-4, starfield-5).

12 NCR 171 test

NCR 171 is already tested and the modifications have worked so far but thorough testing is required with "difficult" to process input data.

Do long-term testing of NCR 171 for 100 hr. Run engineering mode 4 with 3 starfields: starfield-1, starfield-2, starfield-3. These will test a blank image, a bright image (at the brightness limit of the OM detector), an image with a huge pixel-to-pixel variation of up to a factor of 1000 (to test compression) and a normal star image.

13 Close NCR 171

This NCR can then be closed.

14 Engineering modes

The engineering modes that are not tested in the Post Perigee Procedure will be tested. These tests will take a total of 5 hours.

14.1 Engineering mode 0

Use the fast real-time PC simulator (see document XMM-OM/MSSL/SP/0207) to produce realtime data for the engineering mode. An archive of the output data and the data is unpacked, displayed and analyzed. Events from both DSPs are dumped.

14.2 Engineering mode 1

Use the fast real-time PC simulator (see document XMM-OM/MSSL/SP/0207) to produce realtime data for the engineering mode. An archive of the output data and the data is unpacked, displayed and analyzed. Events from the first DSP are dumped.

14.3 Engineering mode 2

Use the fast real-time PC simulator (see document XMM-OM/MSSL/SP/0207) to produce realtime data for the engineering mode. An archive of the output data and the data is unpacked, displayed and analyzed. Events from the second DSP are dumped.

14.4 Engineering mode 5

A 4 ks centroiding confirmation exposure is performed.

15 Fast fast mode tests

These tests are performed using the special "Fast Fast" software on the fast PC simulator. This software is not as good a simulation of the OM1 as the normal fast PC simulator but gives a higher data rate (see document XMM-OM/MSSL/SP/0207).

- Small window test for 50 hr.
- Large window test for 50 hr.

16 Fast mode tests with optics

Each of the following tests will be performed on the Flight Spare DEM and QM OM1 for 50 hr.

- Rudi-1 window science exposure with 2 fast-mode windows.
- Repeat for each filter (except blocked).
- Rudi-2 window science exposure with 2 fast-mode windows.
- Repeat for each filter (except blocked).
- Rudi-3 window science exposure with 2 fast-mode windows.
- Repeat for each filter (except blocked).
- Rudi-4 window science exposure with 2 fast-mode windows.
- Repeat for each filter (except blocked).
- Rudi-5 window science exposure with 2 fast-mode windows.
- Repeat for each filter (except blocked).

17 Close NCR 159

18 USA tests

In parallel, the USA team will perform the following tests on EOB2.

18.1 NCR 180 test

As above.

18.2 NCR 171 test

As above.

18.3 Fast mode test

As above.

18.4 Fast fast mode test

As above.

18.5 Fast mode test

As above.

18.6 Fast fast mode test

As above.

18.7 NCR 171 test

As above.

19 Further tests

After delivery, further tests will be performed: “fast”, “fast fast” and “eng4” will each be tested for a few more orbits.

20 Appendix A: VxWorks Scripts

Here are the VxWorks scripts used for software testing in the UK and USA. Frequently used procedures have scripts. Other procedures are followed from ML/0009.

20.1 acquire

```
#############################################################################
#
# RCS $Id: acquire,v 1.5 1999/03/21 17:37:26 pjs1 Exp $
# RCS $Log: acquire,v $
# RCS Revision 1.5  1999/03/21 17:37:26  pjs1
# RCS Don't set exp_no and don't copy ref_stars.cfg file.
# RCS
# RCS Revision 1.4  1999/03/18 20:46:28  pjs1
# RCS Set threshold to 15.  Increased end delay.
# RCS
# RCS Revision 1.3  1999/03/15 15:26:41  pjs1
# RCS Decreased Jon delay (for simulator use only).
# RCS
# RCS Revision 1.2  1999/03/04 04:44:03  pjs1
# RCS Added load_tables.
# RCS
# RCS Revision 1.1  1999/03/04 02:28:45  pjs1
# RCS The scripts after the Feb 1999 USA integration.
# RCS
#
#############################################################################


#################################################################
#
#   Set up some numbers first
#
#################################################################

date
frame_time = 15
bpe_bin = 0
filter = 1
#exp_no = 0xd40001
#copy "/home/xmmom/sim_data/ref_stars.cfg","ref_stars.cfg"

############################################
```

```

tc_det_acq_mode 0

# load det acq 0 configuration
< load_table_24
# Jon delay
taskDelay(10*60)

tc_fw_filter 1
tc_fw_move
taskDelay(20*60)

tc_set_bpe bpe_bin
tc_set_exp_no exp_no

tc_det_enbl_frame_tag 1
tc_det_event_threshold 15

# load reference stars
< load_table_25

# ref frame exp
tc_set_frame_time frame_time*1024

tc_send_command IC_INIT_EXP
taskDelay(3*60)

# change to science mode
#tc_mode 3
# start the detector integration
tc_det_start_int

tc_send_command IC_ACQUIRE_FLD
taskDelay(frame_time*60)
tc_det_stop_int
# should check this
taskDelay(60*60)
```

20.2 cgs

```
################################################################################
#
# RCS $Id: cgs,v 1.4 1999/04/13 16:21:16 pjs1 Exp $
# RCS $Log: cgs,v $
# RCS Revision 1.4  1999/04/13 16:21:16  pjs1
# RCS Removed Jon delay.
# RCS
# RCS Revision 1.3  1999/03/18 20:46:50  pjs1
# RCS Added enable frame tags and threshold.
# RCS
# RCS Revision 1.2  1999/03/04 04:44:03  pjs1
# RCS Added load_tables.
# RCS
# RCS Revision 1.1  1999/03/04 02:28:46  pjs1
# RCS The scripts after the Feb 1999 USA integration.
# RCS
#
################################################################################

date
tc_fw_filter filter
tc_fw_move
taskDelay(20*60)
tc_det_acq_mode 0

# load acq 0 mode
< load_table_24
# Jon delay
taskDelay(20*60)

tc_set_exp_no exp_no
tc_send_command IC_INIT_EXP
taskDelay(3*60)

tc_det_enbl_frame_tag 1
tc_det_event_threshold 15

############
tc_set_frame_time frame_time*1024
# tc_prog_mem_wind "mmw.cfg"
< load_table_28
# tc_prog_sci_wind "scw.cfg"
< load_table_29
```

```
tc_set_exposure_time exposure_time
tc_set_bpe bpe_bin
tc_det_start_int
tc_send_command IC_CHOOSE_GS
taskDelay((frame_time+40+40)*60)
tc_det_stop_int
# Jon delay
#taskDelay(60*60)
```

20.3 exp

```
############################################################################
#
# RCS $Id: exp,v 1.3 1999/04/13 16:21:31 pjs1 Exp $
# RCS $Log: exp,v $
# RCS Revision 1.3  1999/04/13 16:21:31  pjs1
# RCS Added tracking on.
# RCS
# RCS Revision 1.2  1999/03/18 20:47:05  pjs1
# RCS Changed threshold.
# RCS
# RCS Revision 1.1  1999/03/04 02:28:47  pjs1
# RCS The scripts after the Feb 1999 USA integration.
# RCS
#
############################################################################

date
tc_det_acq_mode 2
tc_set_bpe bpe_bin
#
# Put BPE into the right mode, really shouldn't be here
#
tc_det_enbl_frame_tag 1
tc_det_event_threshold 15
#
tc_det_start_int
# taskDelay 2*60
tc_send_command IC_TRACK_GS
taskDelay((frame_time*(exposure_time+1)+10)*60)
tc_set_trk 1

```

20.4 eng3

```
##############################################################################
#
# RCS $Id: eng3,v 1.8 1999/04/13 16:14:52 pjs1 Exp $
# RCS $Log: eng3,v $
# RCS Revision 1.8  1999/04/13 16:14:52  pjs1
# RCS Changed detector windows.
# RCS
# RCS Revision 1.7  1999/03/21 17:38:48  pjs1
# RCS Changed archive name.  Changed exposure id.  Changed window size.  Added missing delay at end.
# RCS
# RCS Revision 1.6  1999/03/20 20:39:55  pjs1
# RCS Added open packet_archive. Moved LEDs. Changed exposure id.  Removed enable_verbose. Changed threshold.  Added a Dave.
# RCS
# RCS Revision 1.5  1999/03/17 21:19:54  pjs1
# RCS Added date, increased frame_time, added leds, added blocked, turned off frame
# RCS tags, increased delay, added Dave.
# RCS
# RCS Revision 1.4  1999/03/16 19:45:24  pjs1
# RCS Changed exposure ID, window coords, delays.
# RCS
# RCS Revision 1.3  1999/03/16 08:43:29  pjs1
# RCS Changed exposure id, acquisition mode, delay.
# RCS
# RCS Revision 1.2  1999/03/15 15:25:42  pjs1
# RCS Increased delay at end.
# RCS
# RCS Revision 1.1  1999/03/15 15:24:53  pjs1
# RCS New engineering mode scripts.
# RCS
#
##############################################################################
date
open_packet_archive("/data/xmmom/archive/d40003")
frame_time=300
tc_mode 4

tc_init_dpu
taskDelay(60*25)
# expect Dave from the Grave

tc_fw_filter 0
tc_fw_move
taskDelay(20*60)
```

```
tc_det_flood_led_current 4
tc_set_frame_time frame_time*1024
tc_set_exp_no 0xd40003
tc_send_command IC_INIT_EXP
# tm_wait_for_alert DA_EOT_INIT_EXP
taskDelay(3*60)

det_reset_wind
# full size
#det_wind 64, 15, 256, 256
#inner part
det_wind 64+32, 15+32, 256-64, 256-64
tc_det_load_windows 1
taskDelay(60*60)

#turn on eng7 if necessary - probably not for post perigee procedure
#tc_enbl_verbose 4,1
tc_det_enbl_frame_tag 0
tc_det_event_threshold 15

tc_det_acq_mode 4

# start sending events from mic
tc_det_start_int

tc_enbl_eng 1, 3

# wait for DA_ENDOF_EXP DA_COMPLETE_EXP all data
taskDelay(frame_time*60)
# the following delay is for 4,1
#taskDelay(500*60)
taskDelay(380*60)

close_packet_archive
tc_det_flood_led_current 0

tc_mode 2
```

20.5 eng4

```
################################################################################
#
# RCS $Id: eng4,v 1.7 1999/07/08 10:54:46 pjs1 Exp $
# RCS $Log: eng4,v $
# RCS Revision 1.7  1999/07/08 10:54:46  pjs1
# RCS Changed delay.
# RCS
# RCS Revision 1.6  1999/03/21 17:39:12  pjs1
# RCS Changed archive name and exposure id.
# RCS
# RCS Revision 1.5  1999/03/20 20:43:47  pjs1
# RCS Changed frame_time. Added open_packet_archive. Added Dave.
# RCS
# RCS Revision 1.4  1999/03/17 21:20:45  pjs1
# RCS Added date, fixed delay, turned off frame tags.
# RCS
# RCS Revision 1.3  1999/03/16 19:50:37  pjs1
# RCS Changed threshold.
# RCS
# RCS Revision 1.2  1999/03/16 08:43:48  pjs1
# RCS Added mode change to idle.
# RCS
# RCS Revision 1.1  1999/03/15 16:47:26  pjs1
# RCS Engineering mode 4.
# RCS
#
################################################################################
date
open_packet_archive("/data/xmmom/archive/d40004")
frame_time=300
tc_mode 4

tc_init_dpu
taskDelay(60*25)
# expect Dave from the Grave

tc_set_frame_time frame_time*1024
tc_set_exp_no 0xd40004
tc_send_command IC_INIT_EXP
# tm_wait_for_alert DA_EOT_INIT_EXP
taskDelay(3*60)

det_reset_wind
```

```
det_wind 64, 15, 256, 256
tc_det_load_windows 1
taskDelay(60*60)

# Jon delay
taskDelay(20*60)

tc_det_enbl_frame_tag 0
tc_det_event_threshold 15
tc_det_acq_mode 3

# start sending events from mic
tc_det_start_int

tc_enbl_eng 1, 4

# wait for DA_ENDOF_EXP
taskDelay(frame_time*60)
#tm_wait_for_alert DA_COMPLETE_EXP
taskDelay(4800*60)
taskDelay(4800*60)
taskDelay(4800*60)
taskDelay(1000*60)

tc_mode 2
close_packet_archive
```

20.6 eng5

```
################################################################################
#
# RCS $Id: eng5,v 1.6 1999/04/13 16:14:05 pjs1 Exp $
# RCS $Log: eng5,v $
# RCS Revision 1.6  1999/04/13 16:14:05  pjs1
# RCS Changed delays and exposure time.
# RCS
# RCS Revision 1.5  1999/03/21 17:39:31  pjs1
# RCS Changed archive name and exposure id.
# RCS
# RCS Revision 1.4  1999/03/20 20:44:52  pjs1
# RCS Lengthened frame_time. Added open_packet_archive. Moved LEDs. Changed threshold. Added Dave.
# RCS
# RCS Revision 1.3  1999/03/17 21:21:59  pjs1
# RCS Added date, increased frame_time, added blocked, disabled tags, added LEDs, added Dave.
# RCS
# RCS Revision 1.2  1999/03/16 19:45:24  pjs1
# RCS Changed exposure ID, window coords, delays.
# RCS
# RCS Revision 1.1  1999/03/15 15:24:53  pjs1
# RCS New engineering mode scripts.
# RCS
#
################################################################################
date
open_packet_archive("/data/xmmom/archive/d40005")
# was 600
frame_time=4000
tc_mode 4

tc_init_dpu
taskDelay(60*25)
# expect Dave from the Grave

tc_fw_filter 0
tc_fw_move
taskDelay(20*60)
tc_det_flood_led_current 4
tc_set_frame_time frame_time*1024
tc_set_exp_no 0xd40005
tc_send_command IC_INIT_EXP
# tm_wait_for_alert DA_EOT_INIT_EXP
taskDelay(3*60)
```

```

det_reset_wind
det_wind 64, 15, 256, 256
tc_det_load_windows 1
taskDelay(60*60)

tc_det_enbl_frame_tag 0
tc_det_event_threshold 15
tc_det_acq_mode 3

# start sending events from mic
tc_det_start_int

tc_enbl_eng 1, 5

# wait for DA_ENDOF_EXP
taskDelay(frame_time*60)
taskDelay(130*60)
#tm_wait_for_alert DA_COMPLETE_EXP
taskDelay(20*60)
# wait for data
taskDelay(20*60)

close_packet_archive

tc_det_flood_led_current 0

tc_mode 2
```

20.7 eng6

```
################################################################################
#
# RCS $Id: eng6,v 1.6 1999/04/13 16:15:44 pjs1 Exp $
# RCS $Log: eng6,v $
# RCS Revision 1.6  1999/04/13 16:15:44  pjs1
# RCS Changed delay.
# RCS
# RCS Revision 1.5  1999/03/21 17:39:31  pjs1
# RCS Changed archive name and exposure id.
# RCS
# RCS Revision 1.4  1999/03/20 20:46:11  pjs1
# RCS Added open_packet_archive. Added Dave.
# RCS
# RCS Revision 1.3  1999/03/17 21:22:34  pjs1
# RCS Added date, added blocked, added LEDs, disabled frame tags, added Dave.
# RCS
# RCS Revision 1.2  1999/03/16 19:45:25  pjs1
# RCS Changed exposure ID, window coords, delays.
# RCS
# RCS Revision 1.1  1999/03/15 15:24:54  pjs1
# RCS New engineering mode scripts.
# RCS
#
################################################################################
date
open_packet_archive("/data/xmmom/archive/d40006")
frame_time=20
tc_mode 4

tc_init_dpu
taskDelay(60*25)
# expect Dave from the Grave

tc_fw_filter 0
tc_fw_move
taskDelay(20*60)
tc_det_flood_led_current 4

tc_set_frame_time frame_time*1024
tc_set_exp_no 0xd40006
tc_send_command IC_INIT_EXP
# tm_wait_for_alert DA_EOT_INIT_EXP
taskDelay(3*60)
```

```

det_reset_wind
det_wind 64, 15, 256, 256
tc_det_load_windows 1
taskDelay(60*60)

tc_det_enbl_frame_tag 0
tc_det_event_threshold 12
tc_det_acq_mode 6

# start sending events from mic
tc_det_start_int

tc_enbl_eng 1, 6

# wait (exposure time) for DA_ENDOF_EXP
taskDelay(frame_time*60)
#tm_wait_for_alert DA_COMPLETE_EXP
taskDelay(20*60)
# wait for end of data
taskDelay(20*60)

close_packet_archive

tc_det_flood_led_current 0

tc_mode 2
```

20.8 flatfield

```
##############################################################################
#
# RCS $Id: flatfield,v 1.4 1999/07/08 10:55:21 pjs1 Exp $
# RCS $Log: flatfield,v $
# RCS Revision 1.4  1999/07/08 10:55:21  pjs1
# RCS Added move filter wheel to blocked.
# RCS
# RCS Revision 1.3  1999/03/20 20:57:38  pjs1
# RCS Added open_packet_archive. Changed exposure IDs. Altered LED. Put all exposures back in.
# RCS
# RCS Revision 1.2  1999/03/17 21:27:30  pjs1
# RCS Added date.
# RCS
# RCS Revision 1.1  1999/03/04 02:28:59  pjs1
# RCS The scripts after the Feb 1999 USA integration.
# RCS
#
##############################################################################

date
open_packet_archive("/data/xmmom/archive/d40018")
#####################
# Common parameters for all 4 FF
#
frame_time = 25
exposure_time = 20
bpe_bin = 1
track = 0
filter = 0
led = 4
copy "/home/xmmom/sim_data/e40018/mmw.cfg","mmw.cfg"
#####################
tc_fw_filter 0
tc_fw_move
taskDelay(20*60)
tc_set_trk track
tc_set_bpe bpe_bin
tc_mode 2
tc_mode 4
tc_det_flood_led_current led
tc_mode 2
tc_mode 3
######################
```

```
# Specific parameters for FF
#
exp_no = 0xd40008
copy "/home/xmmom/sim_data/e40018/scw.cfg","scw.cfg"
######################
# could be <cgs_wo_fw_move to save some time
#
<cgs
<exp
######################
# Specific parameters for FF
exp_no = 0xd40009
copy "/home/xmmom/sim_data/e40019/scw.cfg","scw.cfg"
######################
# could be <cgs_wo_fw_move to save some time
#
<cgs
<exp
######################
# Specific parameters for FF
exp_no = 0xd4000a
copy "/home/xmmom/sim_data/e4001a/scw.cfg","scw.cfg"
######################
# could be <cgs_wo_fw_move to save some time
#
<cgs
<exp
######################
# Specific parameters for FF
exp_no = 0xd4000b
copy "/home/xmmom/sim_data/e4001b/scw.cfg","scw.cfg"
######################
# could be <cgs_wo_fw_move to save some time
#
<cgs
<exp
######################
tc_set_trk 1
tc_set_bpe 0
tc_mode 2
tc_mode 4
tc_det_flood_led_current 0
tc_mode 2
tc_mode 3

#########################################################################
```

```
###########################################################################
# vvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvv
# remember to flush and close_packet_archive ##############################
# ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
###########################################################################
###########################################################################
```

20.9 tc_clean_slate

```
##############################################################################
#
# RCS $Id: tc_clean_slate,v 1.2 1999/03/17 21:13:23 pjs1 Exp $
# RCS $Log: tc_clean_slate,v $
# RCS Revision 1.2  1999/03/17 21:13:23  pjs1
# RCS Added date and removed debug patch.
# RCS
# RCS Revision 1.1  1999/03/04 02:29:02  pjs1
# RCS The scripts after the Feb 1999 USA integration.
# RCS
#
##############################################################################

date
#
#  Reset the ICU to the operational mode
#

rate 8

open_packet_archive "/data/xmmom/archive/d80ini"

set_dump_tm 0

#####################################################
#
# This script brings up the DPU in a clean slate
#
#####################################################

# clear all GSE semaphores

tm_clear_sem

#
#  First reset the DPU
#
tc_reset_dsp 0
taskDelay (60*12)

#
# Next reload the DPUOS
#
```

```
tc_load_dpuos
taskDelay (60*10)

# Turn on all color processors
tc_enbl_dsp red,1
taskDelay (60*10)

tc_enbl_dsp blue1,1
taskDelay (60*10)

tc_enbl_dsp blue2,1
taskDelay (60*10)

# Select blue2 as the klingon
tc_sel_klingon 1

# synchronize the clock bewteen ICU and DPU
tc_synch_clk_auto

#wait for it to happen
taskDelay(60*2)

##################################################################
#
# Initialize DPU
#
##################################################################
tc_init_dpu
taskDelay(60*25)
# expect Dave from the Grave

# DA_TRK enabled by code - not selectable
#tc_report_tracking 1
# DP_TRH enabled already
#tc_enbl_verbose 0,1
# turn on DD_REF verbosity
tc_enbl_verbose 3,1

# remove this later. special patch to debug Linux/Sim
#tc_load_local_ram 0x5c60,0x30

close_packet_archive
```

20.10 dpu_post_mortem

```
##############################################################################
#
# RCS $Id: dpu_post_mortem,v 1.4 1999/03/20 20:15:55 pjs1 Exp $
# RCS $Log: dpu_post_mortem,v $
# RCS Revision 1.4  1999/03/20 20:15:55  pjs1
# RCS Removed unnecessary close_packet_archive.
# RCS
# RCS Revision 1.3  1999/03/17 21:27:20  pjs1
# RCS Added date.
# RCS
# RCS Revision 1.2  1999/03/04 05:24:04  pjs1
# RCS Added taskDelay after reset.
# RCS
# RCS Revision 1.1  1999/03/04 02:28:47  pjs1
# RCS The scripts after the Feb 1999 USA integration.
# RCS
#
##############################################################################
#
#
date

open_packet_archive "/data/xmmom/archive/dpupmm"

speed = 3

tc_reset_dsp
taskDelay(10*60)
#### SU
base = 0xE00000
length = 0xB000
tc_dump_prog_ram base, length
#### Blue
base = 0xE30000
length = 0x1000
tc_dump_prog_ram base, length
#### Red
base = 0xE50000
length = 0x3400
tc_dump_prog_ram base, length
#### White DPUOS
base = 0xE70000
length = 0x3400
```

```
tc_dump_prog_ram base, length
#### LUT
base = 0xE7FF00
length =  0x0100
tc_dump_prog_ram base, length
#### PROC
tc_dump_ram 0x0000, 0x8000
###
taskDelay(60*180*speed)
close_packet_archive
```

20.11 load_icu

```
##############################################################################
#
# RCS $Id: load_icu,v 1.2 1999/07/08 10:56:36 pjs1 Exp $
# RCS $Log: load_icu,v $
# RCS Revision 1.2  1999/07/08 10:56:36  pjs1
# RCS Commented out set_dump_tc and set_dump_tm.
# RCS
# RCS Revision 1.1  1999/03/04 02:29:00  pjs1
# RCS The scripts after the Feb 1999 USA integration.
# RCS
#
##############################################################################
rate 100
set_dump_tc 0
set_dump_tm 0
packet_load < /home/pjs1/icu/fm/oper/icu.hex
#set_dump_tc 1
#set_dump_tm 1
rate 8
```

20.12 load_dpu

```
############################################################################
#
# RCS $Id: load_dpu,v 1.3 1999/07/08 10:57:03 pjs1 Exp $
# RCS $Log: load_dpu,v $
# RCS Revision 1.3  1999/07/08 10:57:03  pjs1
# RCS Commented out set_dump_tc and set_dump_tm.
# RCS
# RCS Revision 1.2  1999/03/20 20:58:12  pjs1
# RCS Removed unnecessary delay. Removed set_dump_tm.
# RCS
# RCS Revision 1.1  1999/03/04 02:28:59  pjs1
# RCS The scripts after the Feb 1999 USA integration.
# RCS
#
############################################################################
rate 100
set_dump_tc 0
set_dump_tm 0
tc_reset_dsp
taskDelay(60*10)
tc_packet_load 0 < /home/xmmom/dpu/development/eeprom/p0.cmd.0
tc_packet_load 5 < /home/xmmom/dpu/development/eeprom/p5.cmd.0
tc_packet_load 7 < /home/xmmom/dpu/development/eeprom/p7.cmd.0
tc_packet_load 3 < /home/xmmom/dpu/development/eeprom/blue_p3.cmd.0
#set_dump_tc 0
#set_dump_tm 0
#taskDelay(60*12)
tc_load_dpuos
taskDelay(60*6)
rate 8
```

20.13 load_table_24

```
#############################################################################
#
# RCS $Id: load_table_24,v 1.1 1999/03/04 04:44:04 pjs1 Exp $
# RCS $Log: load_table_24,v $
# RCS Revision 1.1  1999/03/04 04:44:04  pjs1
# RCS Added load_tables.
# RCS
#
#############################################################################
det_reset_wind
det_wind 64,15,128,128
det_wind 64,143,128,128
det_wind 192,15,128,128
det_wind 192,143,128,128
tc_det_load_windows 4
taskDelay(30*60)
```

20.14 load_table_25

```
###############################################################################
#
# RCS $Id: load_table_25,v 1.1 1999/03/04 04:44:04 pjs1 Exp $
# RCS $Log: load_table_25,v $
# RCS Revision 1.1  1999/03/04 04:44:04  pjs1
# RCS Added load_tables.
# RCS
#
###############################################################################
tc_prog_ref_stars "ref_stars.cfg"
```

20.15 load_table_28

```
##############################################################################
#
# RCS $Id: load_table_25,v 1.1 1999/03/04 04:44:04 pjs1 Exp $
# RCS $Log: load_table_25,v $
# RCS Revision 1.1  1999/03/04 04:44:04  pjs1
# RCS Added load_tables.
# RCS
#
##############################################################################
tc_prog_ref_stars "ref_stars.cfg"
```

20.16 load_table_29

```
##############################################################################
#
# RCS $Id: load_table_29,v 1.1 1999/03/04 04:44:05 pjs1 Exp $
# RCS $Log: load_table_29,v $
# RCS Revision 1.1  1999/03/04 04:44:05  pjs1
# RCS Added load_tables.
# RCS
#
##############################################################################
tc_prog_sci_wind "scw.cfg"
```

20.17 hvonr

```
################################################################################
#
# RCS $Id: hvonr,v 1.2 1999/03/21 17:40:02 pjs1 Exp $
# RCS $Log: hvonr,v $
# RCS Revision 1.2  1999/03/21 17:40:02  pjs1
# RCS Removed cathode to 2 V ramp.
# RCS
# RCS Revision 1.1  1999/03/17 21:08:17  pjs1
# RCS HV procedures.
# RCS
#
################################################################################

date
tc_det_load_hv_ramp_params 3,100,25,0
tc_det_start_hv_ramp
taskDelay(10 * 60)

tc_det_load_hv_ramp_params 3,1500,25,0
tc_det_start_hv_ramp
taskDelay(90 * 60)

tc_det_load_hv_ramp_params 2,500,25,0
tc_det_start_hv_ramp
taskDelay(40 * 60)

# don't need
#tc_det_load_hv_ramp_params 1,2,25,0
#tc_det_start_hv_ramp
#taskDelay(8 * 60)

tc_det_load_hv_ramp_params 1,390,25,0
tc_det_start_hv_ramp
taskDelay(30 * 60)

tc_det_load_hv_ramp_params 2,550,25,0
tc_det_start_hv_ramp
taskDelay(10 * 60)

tc_det_load_hv_ramp_params 3,1850,25,0
tc_det_start_hv_ramp
taskDelay(30 * 60)
```

20.18 hvoff

```
############################################################################
#
# RCS $Id: hvoff,v 1.1 1999/03/17 21:08:16 pjs1 Exp $
# RCS $Log: hvoff,v $
# RCS Revision 1.1  1999/03/17 21:08:16  pjs1
# RCS HV procedures.
# RCS
#
############################################################################

date
tc_det_load_hv_ramp_params 1,0,25,0
tc_det_start_hv_ramp
taskDelay(30*60)

tc_det_load_hv_ramp_params 2,0,25,0
tc_det_start_hv_ramp
taskDelay(40*60)

tc_det_load_hv_ramp_params 3,0,25,0
tc_det_start_hv_ramp
taskDelay(100*60)
```

20.19 flush

```
##############################################################################
#
# RCS $Id: flush,v 1.2 1999/03/10 22:13:19 mcrw Exp $
# RCS $Log: flush,v $
# RCS Revision 1.2  1999/03/10 22:13:19  mcrw
# RCS Added date.
# RCS
# RCS Revision 1.1  1999/03/04 02:28:59  pjs1
# RCS The scripts after the Feb 1999 USA integration.
# RCS
#
##############################################################################
date
tc_send_command IC_FLUSH_CMPRS
```

20.20 reset

```
###############################################################################
#
# RCS $Id: reset,v 1.2 1999/03/17 21:27:31 pjs1 Exp $
# RCS $Log: reset,v $
# RCS Revision 1.2  1999/03/17 21:27:31  pjs1
# RCS Added date.
# RCS
# RCS Revision 1.1  1999/03/04 02:29:02  pjs1
# RCS The scripts after the Feb 1999 USA integration.
# RCS
#
###############################################################################
date
reset
packet_msg 0
taskDelay(20*60)
packet_msg 1
```