Procedure Title:	Science Exposure EPIC M1 Image
Last Date Modified:	28/05/98 14:34:55
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Purpose of Procedure:

This procedure defines and executes a suite of five exposures using Image type windows covering the Instrument Field of View (92%). The same filter wheel position is used for all five exposures.

The procedure sets up for each of the five exposures, predefined windows. The first exposure covers the central area of the FOV, while the susequent four exposures cover the outer FOV. Each exposure has two Image type windows defined, a small central window present in all five exposures and a second larger window which appears in a different position for each exposure to cover the FOV.

The Large Science windows used for the FOV coverage are fixed in detector co-ordinates and are independent from the XMM pointing direction, while the small central science window is aligned with the pointing direction of the prime instrument.

For this procedure the selected Prime Instrument is EPIC MOS 1.

Initial State: OM ON in SCIENCE

Final State: OM ON in IDLE

NOTE: To account for boresight offset, the RA and DEC of the Prime instrument must be entered at Proposal entry level as the Science Window Centre for Science Window 2 in each exposure.

Step	Time	Activity/Remarks	Command	TM Verification
1		ED- SETUP FILTER WHEEL		
1 .1	00:01:00	Set Filter Wheel Number. Filter Wheel to be set as selected in Proposal	**HS6001** **H7604** SET FW NUMBER	
1 .2	00:00:10	Move Filter Wheel to desired position. Await Filter Wheel move Event Report. (TBC) Packet ID	**HS6001** **H5600** MOVE FW	H2300= H5265=
1 .3	00:02:00	Wait for Filter Wheel to Move. Inform DPU which Filter is in use. (TBC if this should be sent?)	**HS6001** **H7241** LOAD FILT CONF	
2		ED- SETUP CHOOSE GUIDE STARS		
2 .1	00:00:00	Set Acquisition Mode to Low Resolution Full Frame snapshot lasting one frame. This sets up the MIC for full coverage in low resolution.	**HS1110** **H7130** LOAD ACQ MODE H0110=LO RES FULL	H5215=LO RES FULL

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Step	Time	Activity/Remarks	Command	TM Verification
2 .2	00:00:02	Load Window parameters to set up Full Frame. 4 windows defined in CCD centroided pixels (2048 by 2048) to cover the complete detector.	**HS1110** **H7110** LOAD WINDOW TAB H0010=ENABLED H0040=4 H0050=0 H0051=0 H0052=1023 H0053=1023 H0054=0 H0055=1024 H0056=1023 H0057=1024 H0058=1024 H0059=0 H0060=1024 H0061=1023 H0062=1024 H0063=1024 H0064=1024 H0065=1024	
2 .3	00:00:02	Start Load Window Task. Wait for Report that Window Table has been loaded. Packet 92100	**HS1110** **H5110** LOAD WINDOW TAB	H7000=WIN TAB LOAD
2 .4	00:00:02	Prepare DPU for acquiring low resolution data. Sets the DPU to acquire detector data in 1k*1k format (detector binned by 2)	**HS1110** **H7249** INIT EXPOSURE	
3		ED - SETUP EXPOSURE 1		
3 .1	00:00:02	Set the DPU Frame Time. Need to define the number of DPU cycles where 1 DPU cylce = 0.001 seconds. - This should be set as a defualt for the Acquire Field ED. (TC parameter NOT defined in DATABASE)	**HS1120** **H7236** SET FRAME TIME	
3 .2	00:00:10	Set Exposure Time Exposure Time in Number of Frames (TC PARAs missing from Database)	**HS1120** **H7237** SET EXPOSE TIME	
3 .3	00:00:02	Exposure ID as provided by SGS.	**HS1120** **H7238** SET EXPOSURE ID	

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Step	Time	Activity/Remarks	Command	TM Verification
3 .4	00:00:02	Load Science Windows using predefined window sizes. Window 1 - Window 2 - (TC parameters NOT defined in DATABASE)	**HS1201** **H7243** LOAD SCI WINDOW	
3 .5	00:01:00	Load Memory Windows using predefined window sizes. Window 1 - Window 2 - (TC parameters NOT defined in DATABASE)	**HS1301** **H7242** LOAD MEM WINDOW	
4		ED - EXECUTE CHOOSE GUIDE STARS		
4 .1	00:00:00	Start Detector Integration	**HS1130** **H5130** START DET INT	
4 .2	00:00:02	Choose Guide Star Task, defines all windows in DPU and asociated detector windows are allocated.	**HS1130** **H7251** CHOOSE GUIDE STA	
4 .3	00:00:30	Confirm the End of Choose Guide Star event has been received. Packet 92212.	**HS1130**	
4 .4	00:00:05	Stop DPU Integration after x (TBD) minutes.	**HS1130** **H6130** STOP DET INT	
4 .5	00:00:40	Confirm Deduced Guide Star window details sent to ground in packet DP_WDW. Packet 97401	**HS1130**	
5		ED - ACC AND TRACK		
5 .1	00:00:00	Set Acquisition Mode to High Resolution Window for execution of Science Exposure.	**HS1140** **H7130** LOAD ACQ MODE H0110=HI RES WIN	H5215=HI RES WIN
5 .2	00:00:02	Start Task Load DPU Deduced Window Table Confirm loading of window table. Packet TBD?	**HS1140** **H5120** LOAD DPU WIN TAB	

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Step	Time	Activity/Remarks	Command	TM Verification
5 .3	00:00:30	Start Detector Integration Confrim receipt of event packet 92204.	HS1140 H5130 START DET INT	
5 .4	00:00:02	Enable accumulation of Science Exposure with Drift correction enabled.	HS1140 H7252 TRACK GUIDESTARS	
6		ED-END EXPOSURE		
6 .1	T+ Exp dur.	End of Exposure Alert should be received based on the number of Frames as set in SETUP EXPOSURE ED. Packet 92205 At End of exposure as defined by Exposure duration in seconds execute the Stop Detector Integration.	HS1150 H6130 STOP DET INT	
7		EXPOSURE 2 ED - SETUP CHOOSE GUIDE STARS		
7 .1	00:00:00	Execute the Setup of Choose Guide Star ED which covers setup of a Low Res full frame window and preparing DPU to accept low res data.	HS1110	
8		ED - SETUP EXPOSURE 2		
8 .1	00:00:00	Execute the Setup Exposure TC Sequence. This defines the DPU Frame time and exposure time. TC Parameter values will be provided through PHS based on Exposure duration selected. NOTE each exposure (1 to 5) has same duration.	HS1120	
8 .2	00:00:02	Load Science Windows using predefined window sizes. Window 1 - Window 2 - (TC parameters NOT defined in DATABASE)	HS1202 H7243 LOAD SCI WINDOW	
8 .3	00:01:00	Load Memory Windows using predefined window sizes. Window 1 - Window 2 - (TC parameters NOT defined in DATABASE)	HS1302 H7242 LOAD MEM WINDOW	

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Step	Time	Activity/Remarks	Command	TM Verification
9		ED - EXECUTE CHOOSE GUIDE STARS		
9 .1	00:00:00	Execute Choose Guide Stars as defined in TC Sequence HS 1130	**HS1130**	
10		ED - ACC AND TRACK		
10 .1	00:00:00	Execute the Accumulate and Track TC Sequence. This sequence Set Acq mode to High Res, loads DPU deduced windows, starts the detector integration and enables accumulation of Science Exposure with Drift correction enabled.	**HS1140**	
11		ED-END EXPOSURE		
11 .1	+ Exp Dur	End of exposure alert should be received based on the number of frames set in the SETUP Exposure ED. At end of exposure as defined by input exposure duration (in seconds) Stop Detector Integration.	**HS1150**	
12		EXPOSURE 3 ED - SETUP CHOOSE GUIDE STARS		
12 .1	00:00:00	Execute the Setup of Choose Guide Star ED which covers setup of a Low Res full frame window and preparing DPU to accept low res data.	**HS1110**	
13		ED - SETUP EXPOSURE 3		
13 .1	00:00:00	Execute the Setup Exposure TC Sequence. This defines the DPU Frame time and exposure time. TC Parameter values will be provided through PHS based on Exposure duration selected. NOTE each exposure (1 to 5) has same duration.	**HS1120**	

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Step	Time	Activity/Remarks	Command	TM Verification
13 .2	00:00:02	Load Science Windows using predefined window sizes. Window 1 - Window 2 - (TC parameters NOT defined in DATABASE)	**HS1203** **H7243** LOAD SCI WINDOW	
13 .3	00:01:00	Load Memory Windows using predefined window sizes. Window 1 - Window 2 - (TC parameters NOT defined in DATABASE)	**HS1303** **H7242** LOAD MEM WINDOW	
14		ED - EXECUTE CHOOSE GUIDE STARS		
14 .1	00:00:00	Execute Choose Guide Stars as defined in TC Sequence HS 1130	**HS1130**	
15		ED - ACC AND TRACK		
15 .1	00:00:00	Execute the Accumulate and Track TC Sequence. This sequence Set Acq mode to High Res, loads DPU deduced windows, starts the detector integration and enables accumulation of Science Exposure with Drift correction enabled.	**HS1140**	
16		ED-END EXPOSURE		
16 .1	+ Exp Dur	End of exposure alert should be received based on the number of frames set in the SETUP Exposure ED. At end of exposure as defined by input exposure duration (in seconds) Stop Detector Integration.	**HS1150**	
17		EXPOSURE 4 ED - SETUP CHOOSE GUIDE STARS		
17 .1	00:00:00	Execute the Setup of Choose Guide Star ED which covers setup of a Low Res full frame window and preparing DPU to accept low res data.	**HS1110**	

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Step	Time	Activity/Remarks	Command	TM Verification
18		ED - SETUP EXPOSURE 4		
18 .1	00:00:00	Execute the Setup Exposure TC Sequence. This defines the DPU Frame time and exposure time. TC Parameter values will be provided through PHS based on Exposure duration selected. NOTE each exposure (1 to 5) has same duration.	**HS1120**	
18 .2	00:00:02	Load Science Windows using predefined window sizes. Window 1 - Window 2 - (TC parameters NOT defined in DATABASE)	**HS1204** **H7243** LOAD SCI WINDOW	
18 .3	00:01:00	Load Memory Windows using predefined window sizes. Window 1 - Window 2 - (TC parameters NOT defined in DATABASE)	**HS1304** **H7242** LOAD MEM WINDOW	
19		ED - EXECUTE CHOOSE GUIDE STARS		
19 .1	00:00:00	Execute Choose Guide Stars as defined in TC Sequence HS 1130	**HS1130**	
20		ED - ACC AND TRACK		
20 .1	00:00:00	Execute the Accumulate and Track TC Sequence. This sequence Set Acq mode to High Res, loads DPU deduced windows, starts the detector integration and enables accumulation of Science Exposure with Drift correction enabled.	**HS1140**	
21		ED-END EXPOSURE		
21 .1	+ Exp Dur	End of exposure alert should be receivedbased on the number of frames set in the SETUP Exposure ED. At end of exposure as defined by input exposure duration (in seconds) Stop Detector Integration.	**HS1150**	

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Step	Time	Activity/Remarks	Command	TM Verification
22		EXPOSURE 5 ED - SETUP CHOOSE GUIDE STARS		
22 .1	00:00:00	Execute the Setup of Choose Guide Star ED which covers setup of a Low Res full frame window and preparing DPU to accept low res data.	**HS1110**	
23		ED - SETUP EXPOSURE 5		
23 .1	00:00:00	Execute the Setup Exposure TC Sequence. This defines the DPU Frame time and exposure time. TC Parameter values will be provided through PHS based on Exposure duration selected. NOTE each exposure (1 to 5) has same duration.	**HS1120**	
23 .2	00:00:02	Load Science Windows using predefined window sizes. Window 1 - Window 2 - (TC parameters NOT defined in DATABASE)	**HS1205** **H7243** LOAD SCI WINDOW	
23 .3	00:01:00	Load Memory Windows using predefined window sizes. Window 1 - Window 2 - (TC parameters NOT defined in DATABASE)	**HS1305** **H7242** LOAD MEM WINDOW	
24		ED - EXECUTE CHOOSE GUIDE STARS		
24 .1	00:00:00	Execute Choose Guide Stars as defined in TC Sequence HS 1130	**HS1130**	
25		ED - ACC AND TRACK		
25 .1	00:00:00	Execute the Accumulate and Track TC Sequence. This sequence Set Acq mode to High Res, loads DPU deduced windows, starts the detector integration and enables accumulation of Science Exposure with Drift correction enabled.	**HS1140**	

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Issue   : 0

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Step	Time	Activity/Remarks	Command	TM Verification
26		ED-END EXPOSURE		
26 .1	+ Exp Dur	End of exposure alert should be receivedbased on the number of frames set in the SETUP Exposure ED. At end of exposure as defined by input exposure duration (in seconds) Stop Detector Integration.	**HS1150**	
27		ED- GO TO IDLE		
27 .1	00:00:00	Set Filter Wheel Number. Filter Wheel to be set to Blocked - Filter number 0, Filter position 1200. (Filter Wheel parameter not in Database!)	**HS6000** **H7604** SET FW NUMBER	
27 .2	00:00:02	Move Filter Wheel to Blocked. Await Filter Wheel move Event Report. (TBC) Packet ID	**HS6000** **H5600** MOVE FW	H2300= Blocked H5265=1200
27 .3	00:02:00	Wait for Filter Wheel to Move. Inform DPU which Filter is in use. (TBC if this should be sent?)	**HS6000** **H7241** LOAD FILT CONF	
27 .4	00:00:02	Go to IDLE Mode (TBC TM confirmation of OM Mode status)	**HS1020** **H9002** GOTO IDLE	H5405=Operating Mode H5450=DPUOS
28		END OF PROCEDURE		