



RADIATION TEST REPORT

**Heavy Ions Testing of
UC1842J
Current mode PWM Controller
from Unitrode**

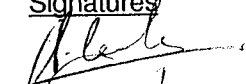
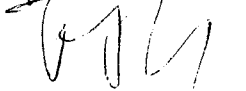
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This test report has been prepared by:

<u>Name</u>	<u>Function</u>	<u>Date</u>	<u>Signatures</u>
H Constans	Development Engineer	29/10/98	
FX Guerre	Study Manager	29/10/98	

ESTEC Technical Officer:

R. Harboe Sorensen



HEAVY IONS TEST REPORT

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I. INTRODUCTION

This report presents the results of a heavy ion Single Event Effects (SEEs) test program carried out for the XMM project on Unitrode UC1842 Current Mode PWM controller. Hirel devices were tested at the European Heavy Ion Irradiation Facility (HIF) at Cyclone, Université Catholique de Louvain, Belgium.

The main aims of these tests were to assess the UC1842 susceptibility to Single Event Upsets (SEUs) induced by heavy ions.

Tests were performed in such a way that the SEU cross sections can be plotted over a wide LET range in order to allow computation of the SEU rates in XMM orbit.

This work was performed for ESA/ESTEC under Purchase Order No 181635 dated 13/08/98.

II. APPLICABLE DOCUMENTS

The following documents are applicable:

- XMM SOW QCA/RHS-98XMM01.DOC July 98, Issue 0 (e-mail dated June 25, 98), Radiation SEE Testing of RH1078M, LM139, UC1842 and UC1707 for XMM.
- Proposal for SEE Testing of RH1078M, LM139, UC1842, UC1707 for XMM - Hirex Doc No HRX/98.3568 Issue 1, dated July 2, 1998 -

II.1 REFERENCE DOCUMENTS

- Unitrode, UC1842 data sheet.
- Single Event Effects Test method and Guidelines ESA/SCC basic specification No 25100
- The Heavy Ion Irradiation Facility at CYCLONE, UCL document, Centre de Recherches du Cyclotron (IEEE NSREC'96, Workshop Record, Indian Wells, California, 1996)

III. DEVICE INFORMATION

III.1 DEVICE DESCRIPTION

Current Mode PWM controller

III.2 PROCUREMENT OF TEST SAMPLES

5 hirel samples have been procured by ESA.

III.3 PREPARATION OF SAMPLES

3 devices with the following numbers #014, #015, #016 have been delidded by Hirex lab.

No sample has been mechanically damaged during this operation.

III.4 SAMPLES CHECK OUT

A functional test sequence has been performed on delidded samples to check that devices have not been degraded by the delidding operation.

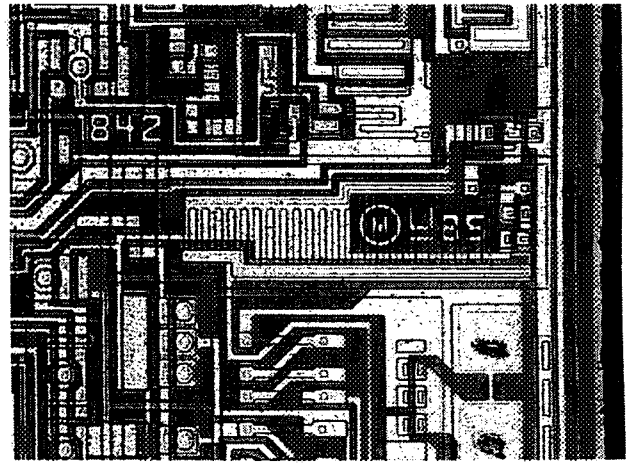
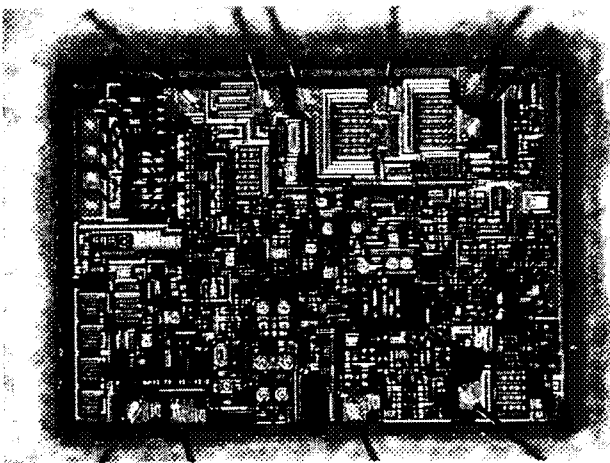
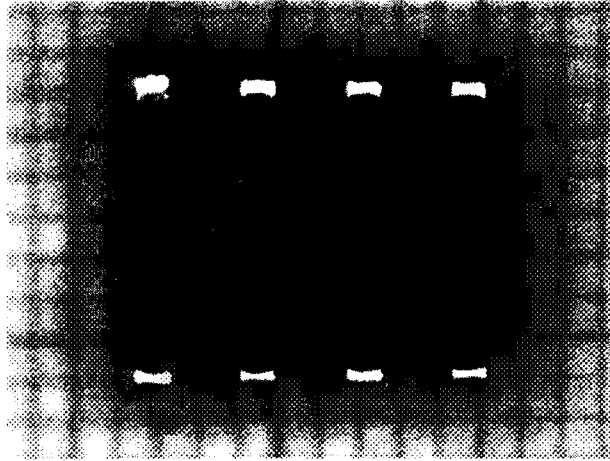
III.5 DEVICE DESCRIPTION

Description of the devices is as follows:

Part type :	UC1842
Manufacturer :	Unitrode
Package :	Cerdip DIL-8
Quality Level :	Hirel
Date Code :	9146
Serial Number :	#014, #015, #016, #018, #019
Die Technology :	Bipolar
Top Marking:	SIC01-00902B
Die Size :	2.4 mm x 1.75 mm approximately
Die Marking :	<u>U</u> 85 1842
Tested samples :	2 (#014, #015)

External and Internal Photos are shown in Figure III-1.

Figure III-1 - External and Internal Photos



IV. DEVICE TEST PATTERN DEFINITION

IV.1 PREPARATION OF TEST HARDWARE AND PROGRAM

Overall device emulation, SEU and Latch-up detection, data storage and processing were implemented using an in-house test hardware and an application specific test board.

The generic in-house test equipment is driven by a PC computer through a RS232 line. All power supplies and input signals are delivered and monitored by the in-house equipment which also stores in its memory the output data from the device throughout the specific test board.

The application specific test board allowed to interface the standard test hardware with the device under test, in order to correctly emulate the relevant part, to record all the different type of errors during the irradiation and to set output signal for processing and storage by the standard test equipment.

At the end of each test run, data are transferred to the PC computer through the RS232 link for storage on hard disk or floppies.

IV.2 GENERIC TEST SET-UP

The complete test equipment is constituted of:

- A PC computer (to configure and interface with the test system and store the data),
 - An electronic rack with the instrumentation functions provided by a set of electronic modules,
 - A mother board under vacuum which allows for the sequential test of up to 4 devices
 - A digital oscilloscope to store analog upset waveform
- Generic device test set-up is presented in Figure IV-1.

IV.2.1 Mother board description (ref. IL110)

The motherboard acts as a standard interface between each DUT test board and the control unit :

For each DUT board slot , the following signals can be considered:

- 8 inputs signals
 - 4 programmable power supplies
 - 4 programmable clocks
 - 8 output signals
 - 4 logic counting signals
 - 2 fast analog signals
 - 2 accurate analog signals
- Each device needs a dedicated plug-in test board compatible with IL110 mother board.
- IL110 board has been designed to comply with Louvain Test facilities .
- The number of slots is limited to four

Operation is multiplexed and only one slot is powered at one time.

Mother board synoptic is shown in Figure IV-2.

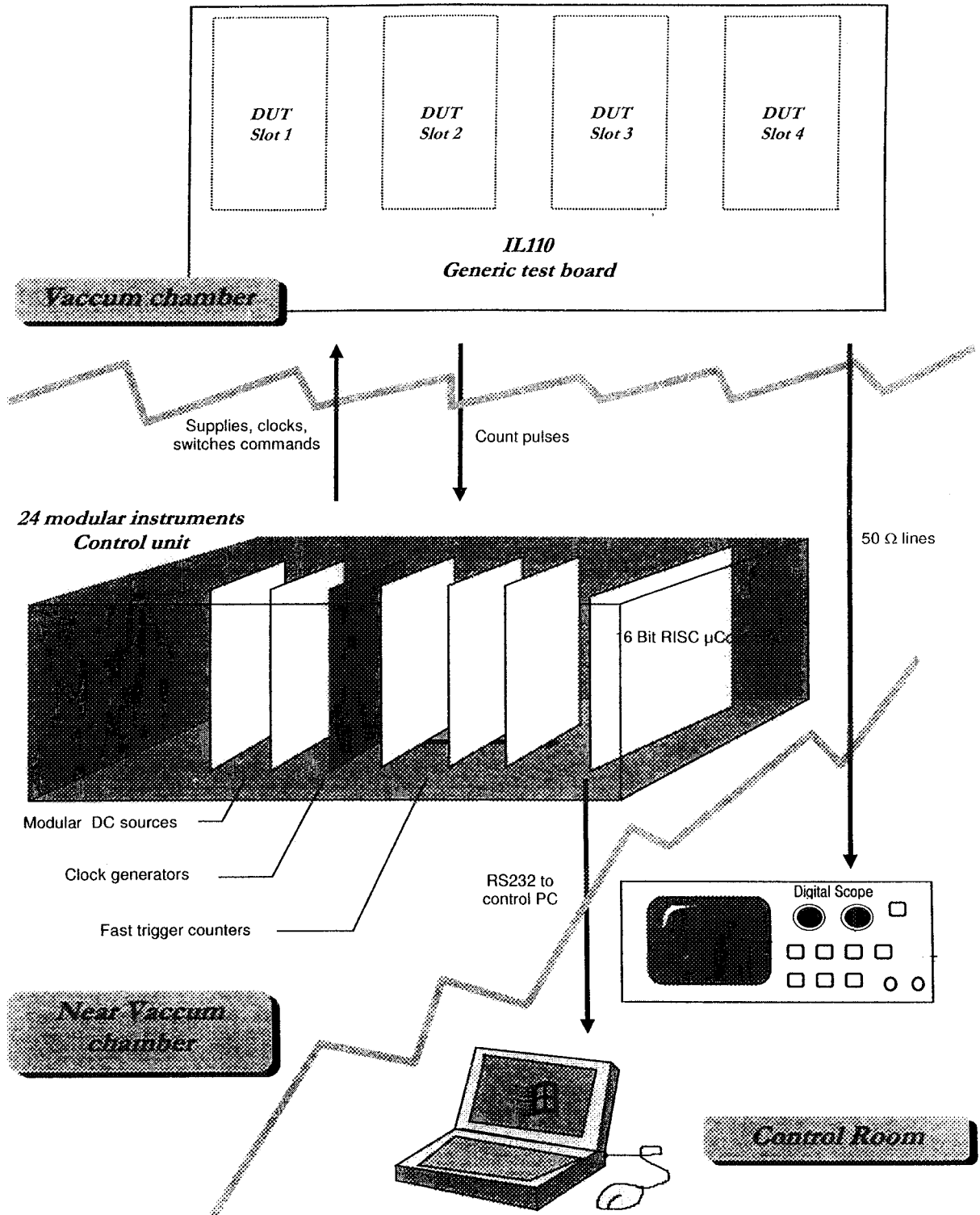


Figure IV-1 - Generic Device Test Set-up

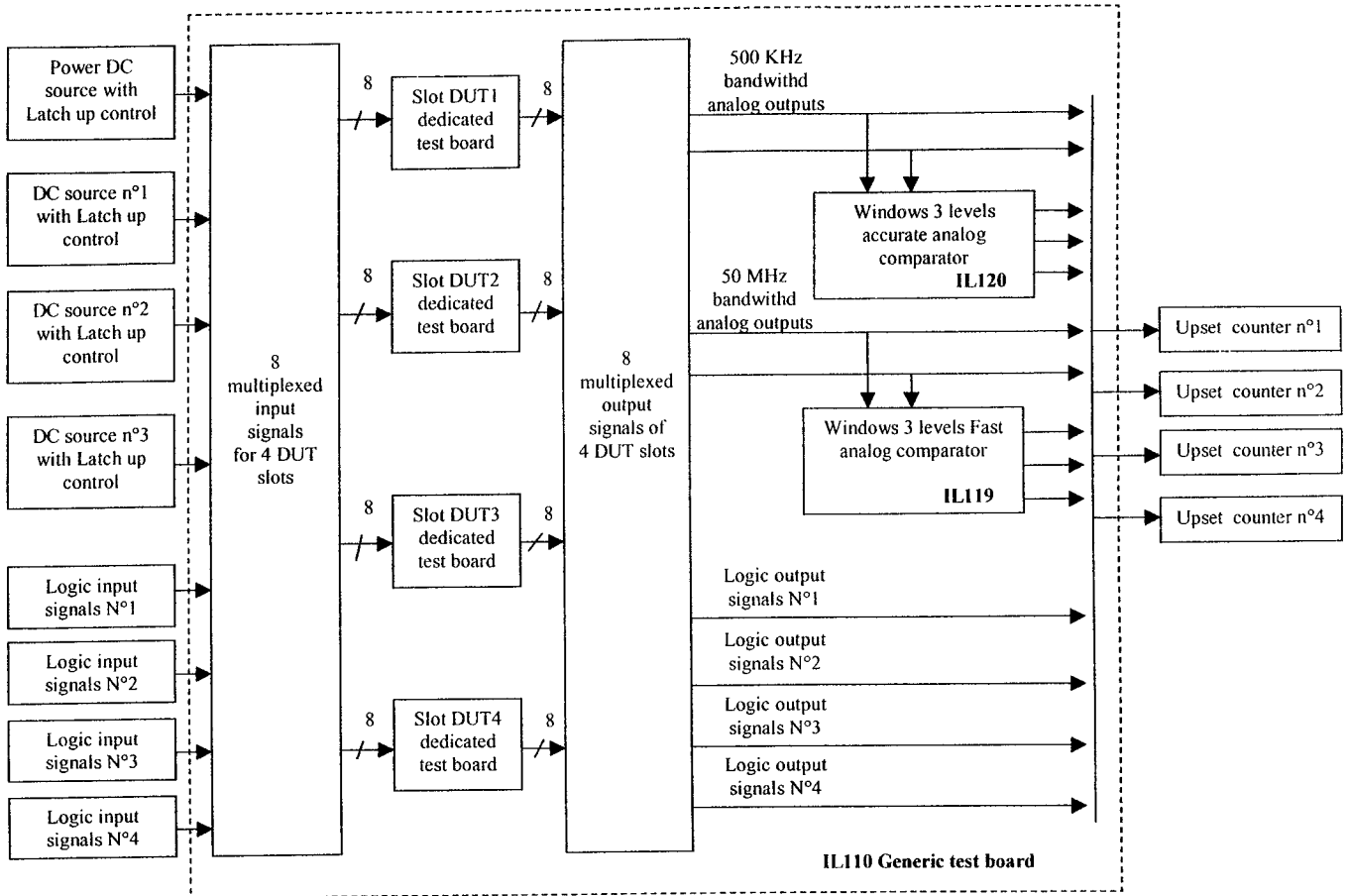


Figure IV-2 - Mother board synoptic

IV.2.2 DUT Test board description

The device under test is mounted on a specific board support which is plugged onto the motherboard.

Mechanical outlines : 141 mm x 50 mm, wrapping or printed circuit board with two 20 pins connectors.

According to test set up and device operating conditions, the test board can accept the mounting of :

- The DUT package with beam positioning constraints (unique for Louvain facilities)
- The golden chip
- The pattern generator
- any interface circuit such as buffer, latches ...
- a standalone micro controller if necessary...

Note : Beam focus diameter is limited to maximum 25 mm, to prevent the exposure of others devices which might be sensitive.

IV.3 TEST CONFIGURATION

This test does not refer to a specific application.

Test principle :

The test setup provides simulation of instantaneous pulse current control. Falling edge of the output signal is monitored as it allows for detecting any eventual period change and as it is the edge used in the duty cycle regulation. It is implemented via a PLL circuit with edge triggered phase comparator locked on the falling edge. PLL circuit used in test board provides a logic signal giving the absolute phase error (either in advance or delayed). This large signal is processed via a RC filter used to convert pulse width into transient amplitude. These transients are monitored by two counters with programmable thresholds. In this application, the thresholds have been defined in the following way (see here after table) :

- Large error which should correspond to period change error
- Small error which should correspond to regulation errors

Functional Check :

A 10µs @ 1Hz signal modifying current setting and allowing activation of counting function.

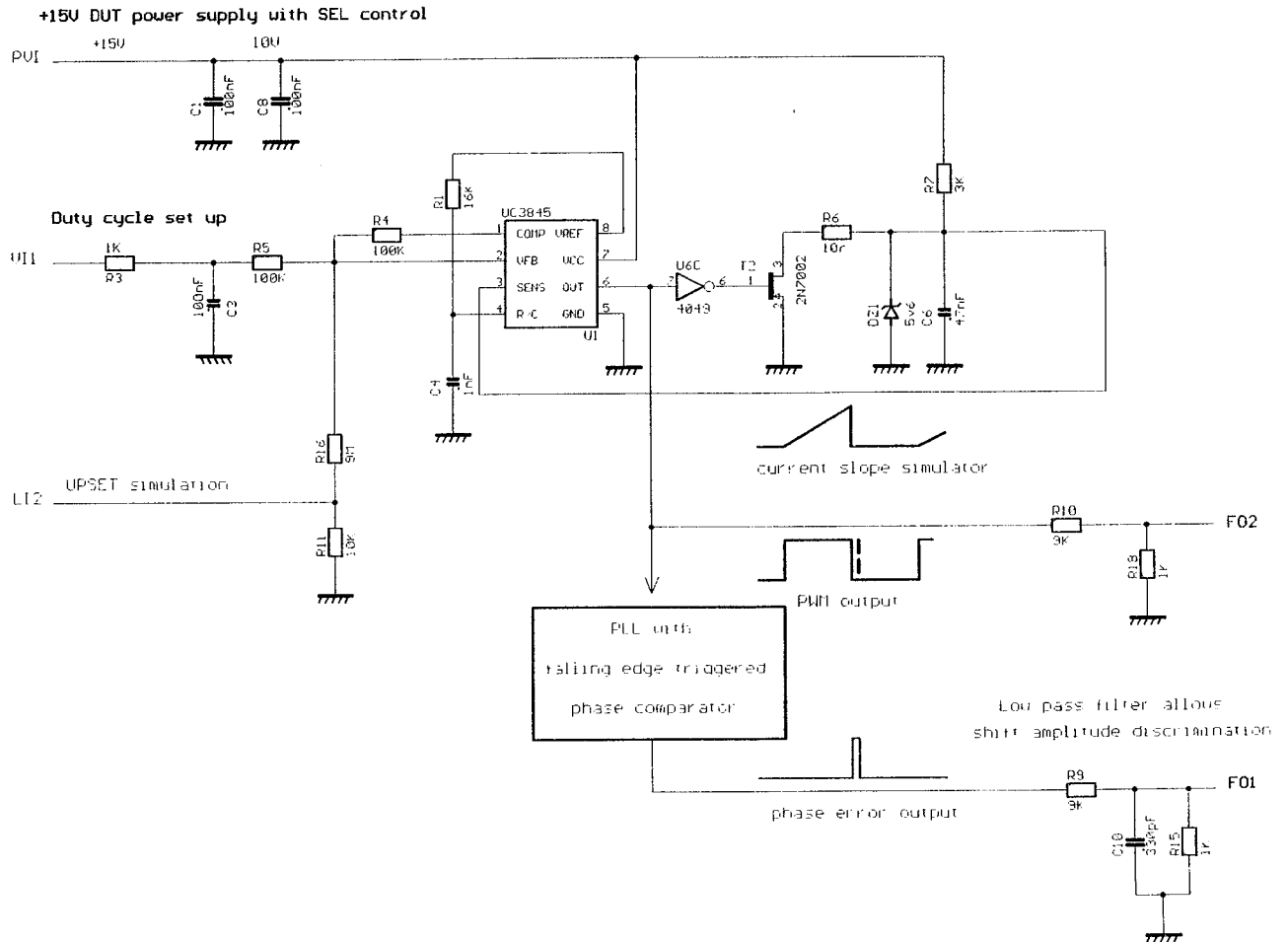
Test board		Signal definition	Signal state	Set up 1	
DC source	PVI	DUT supply	16.5V 24mA	50mA limit threshold	
DC source	VI1	Duty cycle set up		1.5V	
Scope chan 1	FO1	Phase comparator	0V to 16.5V	10V / Div	
Scope chan 2	FO2	PWM output	0V to 16.5V	10V / Div	
Counter 1	FO1	Small = phase shift		Trig @ 8V ↑	
Counter 2	FO1	Large = period mismatch		Trig @ 16V ↑	

Note : actual differential input level is calculated as follow: (+input) – (-input)

Table IV-1 – UC1842 Test Conditions

Figure IV-3 – UC1842 Test Synoptic

UC 1842 test set up



V. TEST FACILITIES

Test at the cyclotron accelerator was performed at Université de Louvain (UCL) in Louvain la neuve (Belgium) under HIREX Engineering responsibility.
2 delidded samples were irradiated.

V.1 BEAM SOURCE

In collaboration with the European Space Agency (ESA), the needed equipment for single events studies using heavy ions has been built and installed on the HIF beam line in the experimental hall of Louvain-la-Neuve cyclotron.
CYCLONE is a multi particle, variable energy, cyclotron capable of accelerating protons (up to 75 MeV), alpha particles and heavy ions. For the heavy ions, the covered energy range is between 0.6 MeV/AMU and 27.5 MeV/AMU. For these ions, the maximal energy can be determined by the formula :

$$110 Q^2/M$$

where Q is the ion charge state, and M is the mass in Atomic Mass Units.

The heavy ions are produced in a double stage Electron Cyclotron Resonance (ECR) source. Such a source allows to produce highly charged ions and ion "cocktails". These are composed of ions with the same or very close M/Q ratios. The cocktail ions are injected in the cyclotron, accelerated at the same time and extracted separately by a fine tuning of the magnetic field or a slight changing of the RF frequency. This method is very convenient for a quick change of ion (in a few minutes) which is equivalent to a LET variation.

V.2 BEAM SET-UP

V.2.1 Ion Beam Selection

The LET range was obtained by changing the ion species and incident energy and changing the angle of incidence between the beam and the chip.
For each run, information is provided on the beam characteristics in the detailed results tables provided in paragraph VI.

V.2.2 Flux Range

Particle flux could be varied from few hundred ions/cm²/sec up to a ten thousand ions/cm²/sec under normal operations (tilt 0°).

V.2.3 Particle Fluence Levels

Fluence level was comprised between 3 x10E5 and 1 x10E6 ions/cm²

V.2.4 Dosimetry

The current UCL Cyclotron dosimetry system and procedures were used.

V.2.5 Accumulated Total Dose

For each run, the equivalent dose figure received during the run and the computed cumulated dose received by the DUT sample, are provided in the detailed results tables of paragraph VI.

V.2.6 Test Temperature Range

All the tests performed were conducted at ambient temperature.

VI. RESULTS

Results are presented in Table VI-2.

Corresponding SEU error cross-sections per device versus LET, are plotted in Figure VI-1.

Lastly , some typical scope observations are presented in Figure VI-2, Figure VI-3, and Figure VI-4.

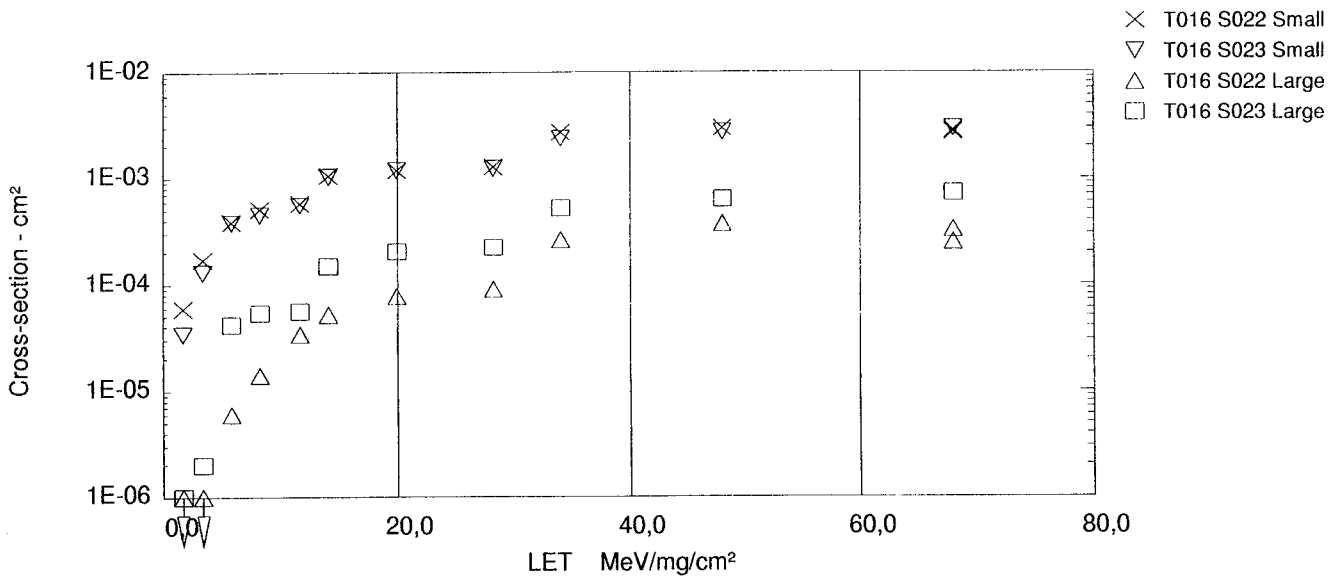


Figure VI-1 - UC1842, SEU error cross-section per device

Test	Sample	Error Type	Fluence p/cm ²	Energy Mev	LET Mev/mg/cm ²	Nb Errors	Sigma cm ²
T016	S022	Small	5,95 E+05	150	14,1	629	1,057 E-03
T016	S022	Small	1,00 E+06	150	19,9	1183	1,183 E-03
T016	S022	Small	1,00 E+06	150	28,2	1276	1,276 E-03
T016	S022	Small	5,00 E+05	78	11,7	290	5,800 E-04
T016	S022	Small	5,00 E+05	78	8,3	255	5,100 E-04
T016	S022	Small	5,00 E+05	78	5,9	194	3,880 E-04
T016	S022	Small	1,92 E+05	316	68,0	524	2,729 E-03
T016	S022	Small	3,00 E+05	316	68,0	847	2,823 E-03
T016	S022	Small	3,00 E+05	316	48,1	885	2,950 E-03
T016	S022	Small	3,00 E+05	316	34,0	813	2,710 E-03
T016	S022	Small	1,00 E+06	41	3,4	171	1,710 E-04
T016	S022	Small	1,00 E+06	41	1,7	59	5,900 E-05
T016	S023	Small	1,00 E+06	150	14,1	1038	1,038 E-03
T016	S023	Small	1,00 E+06	150	19,9	1194	1,194 E-03
T016	S023	Small	1,00 E+06	150	28,2	1240	1,240 E-03
T016	S023	Small	5,00 E+05	78	5,9	191	3,820 E-04
T016	S023	Small	5,00 E+05	78	8,3	228	4,560 E-04
T016	S023	Small	5,00 E+05	78	11,7	278	5,560 E-04
T016	S023	Small	3,00 E+05	316	34,0	714	2,380 E-03
T016	S023	Small	3,00 E+05	316	48,1	812	2,707 E-03
T016	S023	Small	3,00 E+05	316	68,0	880	2,933 E-03
T016	S023	Small	1,00 E+06	41	1,7	34	3,400 E-05
T016	S023	Small	1,00 E+06	41	3,4	130	1,300 E-04
T016	S022	Large	5,95 E+05	150	14,1	31	5,210 E-05
T016	S022	Large	1,00 E+06	150	19,9	78	7,800 E-05
T016	S022	Large	1,00 E+06	150	28,2	90	9,000 E-05
T016	S022	Large	5,00 E+05	78	11,7	17	3,400 E-05
T016	S022	Large	5,00 E+05	78	8,3	7	1,400 E-05
T016	S022	Large	5,00 E+05	78	5,9	3	6,000 E-06
T016	S022	Large	1,92 E+05	316	68,0	48	2,500 E-04
T016	S022	Large	3,00 E+05	316	68,0	98	3,267 E-04
T016	S022	Large	3,00 E+05	316	48,1	111	3,700 E-04
T016	S022	Large	3,00 E+05	316	34,0	78	2,600 E-04
T016	S022	Large	1,00 E+06	41	3,4	0	1,000 E-06 *
T016	S022	Large	1,00 E+06	41	1,7	0	1,000 E-06 *
T016	S023	Large	1,00 E+06	150	14,1	150	1,500 E-04
T016	S023	Large	1,00 E+06	150	19,9	206	2,060 E-04
T016	S023	Large	1,00 E+06	150	28,2	223	2,230 E-04
T016	S023	Large	5,00 E+05	78	5,9	21	4,200 E-05
T016	S023	Large	5,00 E+05	78	8,3	27	5,400 E-05
T016	S023	Large	5,00 E+05	78	11,7	28	5,600 E-05
T016	S023	Large	3,00 E+05	316	34,0	156	5,200 E-04
T016	S023	Large	3,00 E+05	316	48,1	189	6,300 E-04
T016	S023	Large	3,00 E+05	316	68,0	218	7,267 E-04
T016	S023	Large	1,00 E+06	41	1,7	0	1,000 E-06 *
T016	S023	Large	1,00 E+06	41	3,4	2	2,000 E-06

Table VI-1 - UC11842, SEU errors cross-section



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Table VI-2 – Test results on Unitrode UC1842

Run ID No	Test ID No	Sample ID No	Ion ID No	Date	Angle °	Eff. LET Mev/mg/cm ²	Run Time sec	Eff. Time sec	Flux P/cm ² /sec	TID per Sample Rads (Si)	Fluence P/cm ²	Eff. Fluence P/cm ²	Errors	
													Small.	Large
R00024	T016	S022	1004	24/09/98	0	14,1	75	-	6,69 E+03	1,13 E+02	5,02 E+05	-	1162	27
R00025	T016	S022	1004	24/09/98	0	14,1	1150	-	5,17 E+02	2,47 E+02	5,95 E+05	-	629	31
R00026	T016	S022	1004	24/09/98	45	19,94	211	-	4,74 E+03	5,67 E+02	1,00 E+06	-	1183	78
R00027	T016	S022	1004	24/09/98	60	28,2	282	-	3,55 E+03	1,02 E+03	1,00 E+06	-	1276	90
R00028	T016	S023	1004	24/09/98	0	14,1	149	-	6,71 E+03	2,26 E+02	1,00 E+06	-	1038	150
R00029	T016	S023	1004	24/09/98	45	19,94	249	-	4,02 E+03	5,45 E+02	1,00 E+06	-	1194	206
R00030	T016	S023	1004	24/09/98	60	28,2	399	-	2,51 E+03	9,96 E+02	1,00 E+06	-	1240	223
R00172	T016	S022	1005	26/09/98	0	5,85	76	-	6,58 E+03	1,06 E+03	5,00 E+05	-	72	0
R00173	T016	S022	1005	26/09/98	60	11,7	173	-	2,89 E+03	1,16 E+03	5,00 E+05	-	100	0
R00174	T016	S022	1005	26/09/98	60	11,7	148	-	3,38 E+03	1,25 E+03	5,00 E+05	-	334	64
R00175	T016	S022	1005	26/09/98	60	11,7	139	-	3,60 E+03	1,35 E+03	5,00 E+05	-	290	17
R00176	T016	S022	1005	26/09/98	45	8,27	101	-	4,95 E+03	1,41 E+03	5,00 E+05	-	255	7
R00177	T016	S022	1005	26/09/98	0	5,85	71	-	7,04 E+03	1,46 E+03	5,00 E+05	-	194	3
R00178	T016	S023	1005	26/09/98	0	5,85	73	-	6,85 E+03	1,04 E+03	5,00 E+05	-	191	21
R00179	T016	S023	1005	26/09/98	45	8,27	108	-	4,63 E+03	1,11 E+03	5,00 E+05	-	228	27
R00180	T016	S023	1005	26/09/98	60	11,7	155	-	3,23 E+03	1,20 E+03	5,00 E+05	-	278	28
R00221	T016	S022	1003	27/09/98	60	68	66	-	2,91 E+03	1,67 E+03	1,92 E+05	-	524	48
R00222	T016	S022	1003	27/09/98	60	68	98	-	3,06 E+03	1,99 E+03	3,00 E+05	-	847	98
R00223	T016	S022	1003	27/09/98	45	48,08	72	-	4,17 E+03	2,22 E+03	3,00 E+05	-	885	111
R00224	T016	S022	1003	27/09/98	0	34	53	-	5,66 E+03	2,39 E+03	3,00 E+05	-	813	78
R00225	T016	S023	1003	27/09/98	0	34	51	-	5,88 E+03	1,37 E+03	3,00 E+05	-	714	156
R00226	T016	S023	1003	27/09/98	45	48,08	64	-	4,69 E+03	1,60 E+03	3,00 E+05	-	812	189
R00227	T016	S023	1003	27/09/98	60	68	95	-	3,16 E+03	1,92 E+03	3,00 E+05	-	880	218
R00307	T016	S022	1007	27/09/98	60	3,4	132	-	7,58 E+03	2,44 E+03	1,00 E+06	-	171	0
R00308	T016	S022	1007	27/09/98	0	1,7	66	-	1,52 E+04	2,47 E+03	1,00 E+06	-	59	0
R00309	T016	S023	1007	27/09/98	0	1,7	65	-	1,54 E+04	1,95 E+03	1,00 E+06	-	34	0
R00310	T016	S023	1007	27/09/98	60	3,4	128	-	7,81 E+03	2,00 E+03	1,00 E+06	-	130	2

Ion ID	Specy	Energy MeV	LET Mev/mg/cm ²	Range μm
1004	40-Ar	150	14,1	42
1005	20-Ne	78	5,85	45
1003	84-Kr	316	34	43
1007	10-B	41	1,7	80

Sample ID	SN	Part Type	Date Code	Comments
S022	#014	UC1842	9146	Unitrode
S023	#015	UC1842	9146	Unitrode

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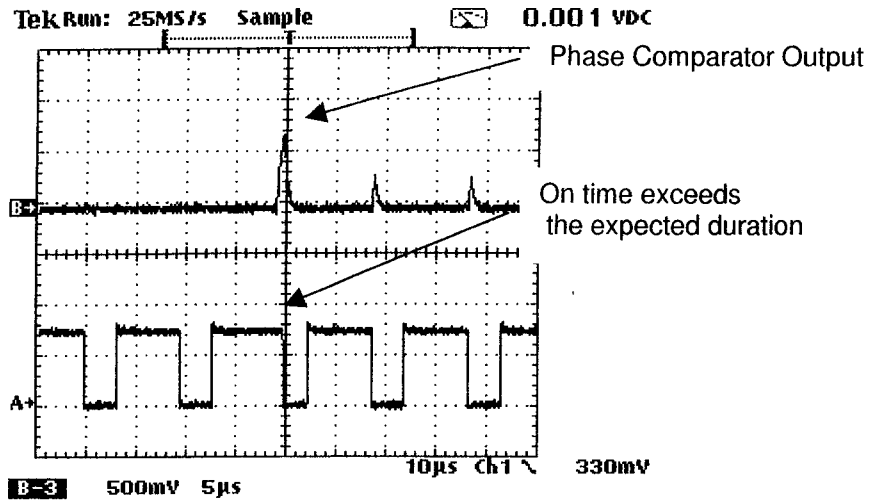


Figure VI-2 – UC1842 run24, picture #1

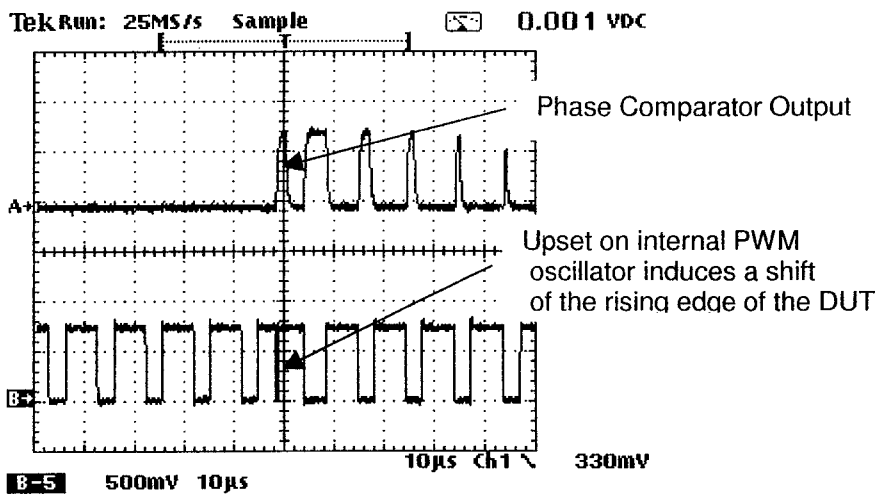


Figure VI-3 – UC1842, run24, picture #2

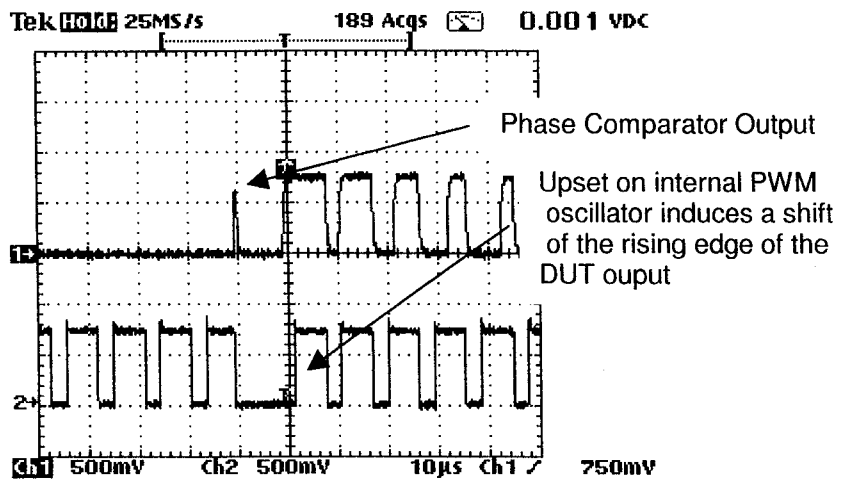


Figure VI-4 – UC1842, run180

VII. CONCLUSION

SEU test have been conducted on UC1842 Common Mode PWM Controllerr from Unitrode, using the heavy ions available at the University of Louvain facility.

SEU susceptibility was obtained through the error cross section versus LET.

With these results, upset predictions on XMM orbit, can be performed for each error type and the risk associated with the present Virgo design can be assessed.

Xmmrad2

MANPARTTYPE	PAD_NO	PLIN	TOTAL_DOSE	RAD TEST LEVEL @ FIRST PARAMAETRIC FAILURE	FAILED PARAMETER
AD574ATD	XM-PA-IGG-0030	150073	30kRAD(Si)	150KRADS	DLE
AD574AUD	XM-PA-IGG-0308	151756	30kRAD(Si)	150KRADS	DLE
AD585SQ	XM-PA-IGG-0071	150750	25kRAD(Si)	150KRADS	CMRR
AMP01A	XM-PA-IGG-0061	150689	20kRAD(Si)	20KRADS	VOS,IOS,
DAC-08A	XM-PA-IGG-0074	150760	30kRAD(Si)	40KRADS	IFSC,IFS,IREF,NL
OP07AJ T099	XM-PA-IGG-0038	150377	25kRAD(Si)	100KRADS	AVO @-10V
OP07AJ T099	XM-PA-IGG-0038	153554	25kRAD(Si)	100KRADS	AVO @-10V
OP16AJ T099	XM-PA-IGG-0058	150378	25kRAD(Si)	75KRADS	IIO
OP16AJ T099	XM-PA-IGG-0058	153961	25kRAD(Si)	75KRADS	IIO
OP27A	XM-PA-IGG-0039	150650	25kRAD(Si)	75KRADS	SR
OP37A	XM-PA-IGG-0040	150651	30kRAD(Si)	50KRADS	SR
OP42AJ	XM-PA-IGG-0099	150745	50kRAD(Si)	20KRADS	IBRES
OP43AJ	XM-PA-IGG-0348	152057	20KRAD(Si)	75KRADS	PSRR
SMP11AY	XM-PA-IGG-0868	150382	50kRAD(Si)	10KRADS;NCR XM-NC-IGG-0525 REFERS:USER ACCEPT	SR
3C91C	XM-PA-IGG-0005	150069	40kRAD(Si)	100KRADS:NO PARAMETRIC FAILURE	
BA CORE	XM-PA-IGG-0084	150340	45kRAD(Si)	50KRADS	TRRVAL1
GLUE LOGIC	XM-PA-IGG-0235	151042	45kRAD(Si)	50KRADS	IOZHO (LSEF) & (DMAT)
HM4-65687EBSB	XM-PA-IGG-0104	151044	35kRAD(Si)	25KRADS	ICCSB1
UBC	XM-PA-IGG-0085	150384	45kRAD(Si)	50KRADS	ICCSB,ICCP
MH67202FV-50	XM-PA-IGG-0057	150376	25kRAD(Si)	50KRADS	ILOH,ILOL,ICCPD
SMDP-67205EV-40SC	XM-PA-IGG-0488	150904	20KRAD(Si)	35KRADS	IDDPD
LM111 DIE	XM-PA-IGG-0702	150363	20kRAD(Si)	TO BE RVT BY IGG .WAITING LABEN RESPONSE	
OP224	XM-PA-IGG-0748	151253	100KRAD(Si)	SEE RD225 2PC WITH 0KRAD ICON FAILURE:USER ACCE	ICON
OP604	XM-PA-IGG-0749	151252	100KRAD(Si)	SEE RD225 2PC WITH 0KRAD ICON FAILURE:USER ACCE	ICON
2N4392	XM-PA-IGG-0458	150776	20KRAD(Si)	30KRADS:LOT REJECTED	IDSX
2N4392	XM-PA-IGG-0458	154239	20KRAD(Si)	30KRADS:LOT REJECTED	IDSX
2N2222A	XM-PA-IGG-0012	150571	60KRAD(Si)	100KRADS. NO PARAMETRIC FAILURE	
2N2222A DIE	XM-PA-IGG-0438	150582	60KRAD(Si)	100KRADS. NO PARAMETRIC FAILURE	
2N2905A	XM-PA-IGG-0357	150779	60KRAD(Si)	100KRADS .NO PARAMETRIC FAILURE	
2N3810	XM-PA-IGG-0018	150115	60kRAD(Si)	30KRADS:FAX XM-FX-IGG-6032	HFE1
2N5154	XM-PA-IGG-0358	150574	25KRAD(Si)	100KRADS .NO PARAMETRIC FAILURE	
54HC00Z	XM-PA-IGG-0334	150299	15KRAD(Si)	100KRADS GO-NO-GO	
54HC02D	XM-PA-IGG-0109	151026	50KRAD(Si)	100KRADS GO-NO-GO	
54HC02D	XM-PA-IGG-0778	153673	100kRAD(Si)	100KRADS GO-NO-GO	
54HC02K	XM-PA-IGG-0110	150300	50KRAD(Si)	100KRADS GO-NO-GO	

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MANPARTYPE	PAD_NO	PLIN	TOTAL_DOSE	RAD TEST LEVEL @ FIRST PARAMAETRIC FAILURE	FAILED PARAMETER
54HC03D	XM-PA-IGG-0111	151027	50kRAD(Si)	100KRADS GO-NO-GO	
54HC03K	XM-PA-IGG-0112	150301	50kRAD(Si)	100KRADS GO-NO-GO	
54HC04D	XM-PA-IGG-0113	150796	50kRAD(Si)	100KRADS GO-NO-GO	
54HC04D	XM-PA-IGG-0113	153932	50kRAD(Si)	100KRADS GO-NO-GO	
54HC04K	XM-PA-IGG-0114	150302	50kRAD(Si)	100KRADS GO-NO-GO	
54HC08D	XM-PA-IGG-0115	151028	50kRAD(Si)	100KRADS GO-NO-GO	
54HC08K	XM-PA-IGG-0116	150303	50kRAD(Si)	100KRADS GO-NO-GO	
54HC08K	XM-PA-IGG-0779	153544	100kRAD(Si)	100KRADS GO-NO-GO	
54HC08Z	XM-PA-IGG-0001	150304	50kRAD(Si)	100KRADS GO-NO-GO	
54HC109D	XM-PA-IGG-0283	151937	50kRAD(Si)	50KRADS GO-NO-GO:RVT BY IGG DUE WK9748	
54HC10D	XM-PA-IGG-0274	151827	50kRAD(Si)	50KRADS GO-NO-GO:RVT BY IGG DUE WK9748	
54HC11D	XM-PA-IGG-0276	152259	50kRAD(Si)	100KRADS GO-NO-GO	
54HC11K	XM-PA-IGG-0117	151417	50kRAD(Si)	100KRADS GO-NO-GO	
54HC123D	XM-PA-IGG-0285	151469	50kRAD(Si)	100KRADS GO-NO-GO	
54HC123K	XM-PA-IGG-0131	151073	50kRAD(Si)	100KRADS GO-NO-GO	
54HC125D	XM-PA-IGG-0497	152278	50kRAD(Si)	100KRADS GO-NO-GO	
54HC125K	XM-PA-IGG-0132	150305	50kRAD(Si)	100KRADS GO-NO-GO	
54HC125K	XM-PA-IGG-0781	153938	100kRAD(Si)	100KRADS GO-NO-GO	
54HC137D	XM-PA-IGG-0135	151029	50kRAD(Si)	100KRADS GO-NO-GO	
54HC138D	XM-PA-IGG-0137	151505	50kRAD(Si)	100KRADS GO-NO-GO	
54HC138K	XM-PA-IGG-0139	150306	50kRAD(Si)	100KRADS GO-NO-GO	
54HC138K	XM-PA-IGG-0782	153939	100kRAD(Si)	100KRADS GO-NO-GO	
54HC138Z	XM-PA-IGG-0138	150307	50kRAD(Si)	100KRADS GO-NO-GO	
54HC139D	XM-PA-IGG-0140	151030	50kRAD(Si)	100KRADS GO-NO-GO	
54HC139K	XM-PA-IGG-0141	150308	50kRAD(Si)	100KRADS GO-NO-GO	
54HC14D	XM-PA-IGG-0118	151472	50kRAD(Si)	100KRADS GO-NO-GO	
54HC14K	XM-PA-IGG-0120	151074	50kRAD(Si)	100KRADS GO-NO-GO	
54HC14Z	XM-PA-IGG-0119	150087	50kRAD(Si)	100KRADS GO-NO-GO	
54HC151D	XM-PA-IGG-0321	152260	50kRAD(Si)	100KRADS GO-NO-GO	
54HC151K	XM-PA-IGG-0288	151524	50kRAD(Si)	100KRADS GO-NO-GO	
54HC157D	XM-PA-IGG-0494	152261	50kRAD(Si)	100KRADS GO-NO-GO	
54HC157K	XM-PA-IGG-0291	151938	50kRAD(Si)	100KRADS GO-NO-GO	
54HC163D	XM-PA-IGG-0294	151138	50kRAD(Si)	100KRADS GO-NO-GO	
54HC164D	XM-PA-IGG-0142	150799	50kRAD(Si)	100KRADS GO-NO-GO	
54HC164K	XM-PA-IGG-0143	150310	50kRAD(Si)	100KRADS GO-NO-GO	

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MANPARTTYPE	PAD_NO	PLIN	TOTAL_DOSE	RAD TEST LEVEL @ FIRST PARAMAETRIC FAILURE	FAILED PARAMETER
54HC164K	XM-PA-IGG-0143	154132	50kRAD(Si)	100KRADS GO-NO-GO	
54HC165D	XM-PA-IGG-0295	151476	50kRAD(Si)	100KRADS GO-NO-GO	
54HC165K	XM-PA-IGG-0144	150311	50kRAD(Si)	100KRADS GO-NO-GO	
54HC166K	XM-PA-IGG-0145	150312	50kRAD(Si)	100KRADS GO-NO-GO	
54HC174K	XM-PA-IGG-0146	151111	50kRAD(Si)	100KRADS GO-NO-GO	
54HC175D	XM-PA-IGG-0147	151031	50kRAD(Si)	100KRADS GO-NO-GO	
54HC175K	XM-PA-IGG-0148	150313	50kRAD(Si)	100KRADS GO-NO-GO	
54HC175K	XM-PA-IGG-0784	153940	100kRAD(Si)	100KRADS GO-NO-GO	
54HC191D	XM-PA-IGG-0322	151735	50kRAD(Si)	100KRADS GO-NO-GO	
54HC191K	XM-PA-IGG-0149	150314	50kRAD(Si)	100KRADS GO-NO-GO	
54HC193D	XM-PA-IGG-0150	151941	50kRAD(Si)	100KRADS GO-NO-GO	
54HC193K	XM-PA-IGG-0151	150315	50kRAD(Si)	100KRADS GO-NO-GO	
54HC21D	XM-PA-IGG-0495	152277	50kRAD(Si)	100KRADS GO-NO-GO	
54HC21K	XM-PA-IGG-0122	150316	50kRAD(Si)	100KRADS GO-NO-GO	
54HC21K	XM-PA-IGG-0122	154127	50kRAD(Si)	100KRADS GO-NO-GO	
54HC240D	XM-PA-IGG-0328	151886	15KRAD(Si)	100KRADS GO-NO-GO	
54HC240K	XM-PA-IGG-0327	150317	15KRAD(Si)	100KRADS GO-NO-GO	
54HC240K	XM-PA-IGG-0327	154238	15KRAD(Si)	100KRADS GO-NO-GO	
54HC240Z	XM-PA-IGG-0326	151890	15KRAD(Si)	100KRADS GO-NO-GO	
54HC242D	XM-PA-IGG-0154	151033	50kRAD(Si)	100KRADS GO-NO-GO	
54HC242K	XM-PA-IGG-0155	150319	50kRAD(Si)	100KRADS GO-NO-GO	
54HC243D	XM-PA-IGG-0156	151034	50kRAD(Si)	100KRADS GO-NO-GO	
54HC244D	XM-PA-IGG-0329	151035	15KRAD(Si)	100KRADS GO-NO-GO	
54HC244K	XM-PA-IGG-0330	150320	15KRAD(Si)	100KRADS GO-NO-GO	
54HC244K	XM-PA-IGG-0786	153943	100kRAD(Si)	100KRADS GO-NO-GO	
54HC244Z	XM-PA-IGG-0331	151893	15KRAD(Si)	100KRADS GO-NO-GO	
54HC245D	XM-PA-IGG-0332	151036	15KRAD(Si)	100KRADS GO-NO-GO	
54HC253D	XM-PA-IGG-0324	151942	50kRAD(Si)	100KRADS GO-NO-GO	
54HC257D	XM-PA-IGG-0157	151037	50kRAD(Si)	100KRADS GO-NO-GO	
54HC257K	XM-PA-IGG-0158	150802	50kRAD(Si)	100KRADS GO-NO-GO	
54HC273D	XM-PA-IGG-0159	151493	50kRAD(Si)	100KRADS GO-NO-GO	
54HC273K	XM-PA-IGG-0160	150322	50kRAD(Si)	100KRADS GO-NO-GO	
54HC280D	XM-PA-IGG-0161	151470	50kRAD(Si)	100KRADS GO-NO-GO	
54HC280K	XM-PA-IGG-0162	151079	50kRAD(Si)	100KRADS GO-NO-GO	
54HC283D	XM-PA-IGG-0496	152258	50kRAD(Si)	100KRADS GO-NO-GO	

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MANPARTTYPE	PAD_NO	PLIN	TOTAL_DOSE	RAD TEST LEVEL @ FIRST PARAMAETRIC FAILURE	FAILED PARAMETER
54HC283K	XM-PA-IGG-0298	151972	50kRAD(Si)	100KRADS GO-NO-GO	
54HC32D	XM-PA-IGG-0123	151038	50kRAD(Si)	100KRADS GO-NO-GO	
54HC32K	XM-PA-IGG-0125	150324	50kRAD(Si)	100KRADS GO-NO-GO	
54HC32Z	XM-PA-IGG-0124	150323	50kRAD(Si)	100KRADS GO-NO-GO	
54HC373D	XM-PA-IGG-0163	151039	50kRAD(Si)	100KRADS GO-NO-GO	
54HC373K	XM-PA-IGG-0164	151767	50kRAD(Si)	100KRADS GO-NO-GO	
54HC374K	XM-PA-IGG-0166	150326	50kRAD(Si)	100KRADS GO-NO-GO	
54HC374K	XM-PA-IGG-0166	154125	50kRAD(Si)	100KRADS GO-NO-GO	
54HC374Z	XM-PA-IGG-0165	151894	50kRAD(Si)	100KRADS GO-NO-GO	
54HC386K	XM-PA-IGG-0167	150327	50kRAD(Si)	100KRADS GO-NO-GO	
54HC393D	XM-PA-IGG-0450	152255	50kRAD(Si)	100KRADS GO-NO-GO	
54HC393D	XM-PA-IGG-0450	154107	50kRAD(Si)	5pcs. XMM STOCK : PLIN 152255. SEE ABOVE ENTRY.	
54HC393K	XM-PA-IGG-0168	151526	50kRAD(Si)	100KRADS GO-NO-GO	
54HC4002K	XM-PA-IGG-0172	150328	50kRAD(Si)	100KRADS GO-NO-GO	
54HC4040D	XM-PA-IGG-0304	151118	50kRAD(Si)	100KRADS GO-NO-GO	
54HC4040K	XM-PA-IGG-0176	151514	50kRAD(Si)	100KRADS GO-NO-GO	
54HC4049K	XM-PA-IGG-0177	150330	50kRAD(Si)	100KRADS GO-NO-GO	
54HC4050D	XM-PA-IGG-0449	152257	50kRAD(Si)	100KRADS GO-NO-GO	
54HC4050K	XM-PA-IGG-0179	150332	50kRAD(Si)	100KRADS GO-NO-GO	
54HC4050K	XM-PA-IGG-0791	153945	100kRAD(Si)	100KRADS GO-NO-GO	
54HC4050Z	XM-PA-IGG-0178	150331	50kRAD(Si)	100KRADS GO-NO-GO	
54HC4075K	XM-PA-IGG-0182	150333	50kRAD(Si)	100KRADS GO-NO-GO	
54HC4075K	XM-PA-IGG-0182	154121	50kRAD(Si)	100KRADS GO-NO-GO	
54HC541D	XM-PA-IGG-0325	151946	50kRAD(Si)	100KRADS GO-NO-GO	
54HC541K	XM-PA-IGG-0300	151120	50kRAD(Si)	100KRADS GO-NO-GO	
54HC541K	XM-PA-IGG-0300	153515	50kRAD(Si)	100KRADS GO-NO-GO	
54HC574D	XM-PA-IGG-0301	151480	50kRAD(Si)	100KRADS GO-NO-GO	
54HC574K	XM-PA-IGG-0302	150804	50kRAD(Si)	100KRADS GO-NO-GO	
54HC592K	XM-PA-IGG-0169	151424	50kRAD(Si)	LOT FAILURE MAJOR NCR	
54HC688K	XM-PA-IGG-0171	150335	50kRAD(Si)	100KRADS GO-NO-GO	
54HC74D	XM-PA-IGG-0127	151040	50kRAD(Si)	100KRADS GO-NO-GO	
54HC74K	XM-PA-IGG-0128	150336	50kRAD(Si)	100KRADS DIFFERENT LOT	
54HC85D	XM-PA-IGG-0129	150856	50kRAD(Si)	100KRADS GO-NO-GO	
54HC85K	XM-PA-IGG-0130	151122	50kRAD(Si)	100KRADS GO-NO-GO	
54HC86D	XM-PA-IGG-0281	151123	50kRAD(Si)	50KRADS GO-NO-GO:RVT BY IGG DUE WK9748	

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MANPARTTYPE	PAD_NO	PLIN	TOTAL_DOSE	RAD TEST LEVEL @ FIRST PARAMAETRIC FAILURE	FAILED PARAMETER
54HC86K	XM-PA-IGG-0282	151528	50kRAD(Si)	50KRADS GO-NO-GO	
54HCT240K	XM-PA-IGG-0333	150338	15KRAD(Si)	100KRADS GO-NO-GO	
54HCT373D	XM-PA-IGG-0362	151949	50KRAD(Si)	100KRADS GO-NO-GO	
M54HC148D	XM-PA-IGG-0286	151473	50kRAD(Si)	100KRADS GO-NO-GO	
UC1825J	XM-PA-IGG-0487	153119	INSENSITIVE	100KRADS NO PARAMETRIC FAILURE	-
UC1834J	XM-PA-IGG-0700	153471	INSENSITIVE	50KRADS	IBAIS,VSEN
AD571SD	XM-PA-IGG-0361	150073	50kRAD(Si)	30KRADS	VOUT,DNL,
UC1856	XM-PA-IGG-0067	150068	INSENSITIVE	15KRADS:IGG FAX XM-FX-IGG-6029	IIN LATCH
2N4392	XM-PA-IGG-0893	154239	20KRAD(Si)	100KRADS:SILICONIX LOT	IGSS
54AC244SSA-RH	XM-PA-IGG-0271	150295	100kRAD(Si)	100KRADS GO-NO-GO	
54AC245SSA-RH	XM-PA-IGG-0272	151023	100kRAD(Si)	100KRADS GO-NO-GO	
54ACT74FM-RH	XM-PA-IGG-0273	150297	100kRAD(Si)	LESS THAN 10KRADS NCR XM-NC-IGG-0358 REFERS	ICC

TABLE ABOVE DEFINE ALL THE AGREED RVT ON THE XMM PROGRAMME

RVT STATUS ON PARTTYPE WITH BIAS AND UNBIAS TEST IS AS FOLLOWS:

AD571SD	BIAS=FAILURES @ 30KRAD: VOH, DNL(UNIPOLAR). UNBIAS=FAILURES @ 50KRAD:VOH AND 75KRAD:DNL(UNIPOLAR).
DACO8	BIAS=FAILURE @ 40KRADS:IFSC,IFS,IREF:UNBIAS=FAILURE @ 20KRADS:IREF;30KRADS:IFS
OP43	BIAS=2PC FAILED PSRR @ 75KRADS. UNBIAS=ONE PC FAILED VOS @ 100KRADS:(ONLY PARAMETRIC FAILURE)
3C9IC	NO DIFFERENCE BETWEEN BIAS AND UNBIAS
2N2222A	NO DIFFERENCE BETWEEN BIAS AND UNBIAS
2N2905A	NO DIFFERENCE BETWEEN BIAS AND UNBIAS

MANPARTTYPE	PAD_NO	PLIN	TOTAL DOSE	RAD TEST LEVEL @ FIRST PARAMETRIC FAILURE	FAILED PARAMETER	USER
AD574ATD	XM-PA-IGG-0030	150373	30KRAD(S)	100KRADS	DLE	IALEDP XFINMT IGALSR XGALSR ILABRT XLABRT ELABEP IMMBFC XMMBFC EMSLOW ITEMCA XTEMCA ITERFP XTERFP
AD574AUD	XM-PA-IGG-0030	151756	30KRAD(S)	150KRADS	DLE	IETCRU XETCRU
AD585SQ	XM-PA-IGG-0071	150780	25KRAD(S)	150KRADS	CMRR	IGALSR XGALSR
AMP01A	XM-PA-IGG-0061	150689	20KRAD(S)	20KRADS	VOS,IOS,	IMMBFC XMMBFC ITEMCA XTEMCA ITERFP XTERFP
DAC-06A	XM-PA-IGG-0074	150760	30KRAD(S)	40KRADS	IFSC,IFS,REF,NL	IGALSR XGALSR IMMBFC XMMBFC EMSLOW
OP07AJ T099	XM-PA-IGG-0038	150377	25KRAD(S)	100KRADS	AVO @ -10V	XBPDPT ILABRT XLABRT IMMBFC XMMBFC IMMSWE XMMSWE
OP07AJ T099	XM-PA-IGG-0038	153554	25KRAD(S)	100KRADS	IBPDPT XBPDP	
OP16AJ T099	XM-PA-IGG-0058	150378	25KRAD(S)	75KRADS	IO	ILABCD XLABCD ILABRT XLABRT EMSLOW
OP16AJ T099	XM-PA-IGG-0058	153961	25KRAD(S)	75KRADS	IO	ILABCD XLABCD ILABRT XLABRT
OP27A	XM-PA-IGG-0039	150650	25KRAD(S)	75KRADS	SR	IETCRU XETCRU XFINMT ITEMCA XTEMCA
OP37A	XM-PA-IGG-0040	150651	30KRAD(S)	50KRADS	SR	IETCRU XETCRU
OP42AJ	XM-PA-IGG-0099	150745	50KRAD(S)	20KRADS	IBRES	IGALSR XGALSR IMMSWE XMMSWE
OP43AJ	XM-PA-IGG-0048	152057	20KRAD(S)	75KRADS	ISRR	IMMBFC XMMBFC
SMP11AY	XM-PA-IGG-0868	150382	50KRAD(S)	10KRADS;NCR XM-NC-IGG-0525 REFERS:USER ACCEPT	SR	ILABRT XLABRT ELABEP
3C91C	XM-PA-IGG-0005	150669	40KRAD(S)	100KRADS;NO PARAMETRIC FAILURE		ICRIAC XCRIAC XFINMT IGALSR XGALSR EIAAES ELABEP IMMBFC XMMBFC IMMSWE XMMSWE EMSLOW ISENPR XSENPR ITEMCA XTEMCA ITERFP XTERFP
BA CORE	XM-PA-IGG-0084	150340	45KRAD(S)	50KRADS	TRRVAL1	ILABRT XLABRT
GLUE LOGIC	XM-PA-IGG-0235	151042	45KRAD(S)	50KRADS	IOZHO (LSEF) & (DMAT)	ILA UP XLA UP
HM4-65687EBSB	XM-PA-IGG-0104	151044	35KRAD(S)	25KRADS	ICCSB1	ILA UP XLA UP
UBC	XM-PA-IGG-0085	150384	45KRAD(S)	50KRADS	ICCSB,ICCOOP	ILABRT XLABRT
MH67202FV-50	XM-PA-IGG-0057	150376	25KRAD(S)	50KRADS	ILOH,ILOL,ICCPD	IALEDP XFINMT EIAAES SIGGIN ILABCD XLABCD EMSLOW
SMDP-67205EV-40SC	XM-PA-IGG-0488	150904	20KRAD(S)	35KRADS	IDDPD	ELABEP
LM111 DIE	XM-PA-IGG-0702	150383	20KRAD(S)	TO BE RVT BY IGG_WAITING LABEN RESPONSE		ILABCD XLABCD ILABRT XLABRT
OP224	XM-PA-IGG-0748	151253	100KRAD(S)	SEE RD225 2PC WITH OKRAD ICON FAILURE:USER ACCEPT	ICON	IMMSWE XMMSWE
OP604	XM-PA-IGG-0748	151252	100KRAD(S)	SEE RD225 2PC WITH OKRAD ICON FAILURE:USER ACCEPT	ICON	IMMSWE XMMSWE
2N4392	XM-PA-IGG-0458	150772	30KRAD(S)	30KRADS;LOT REJECTED	IDSX	IXADCF'S XADCF'S XFINMT IGALSR XGALSR IMMSWE XMMSWE
2N4392	XM-PA-IGG-0458	154239	20KRAD(S)	30KRADS;LOT REJECTED	IDSX	XADCF'S XFINMT XGALSR XMMSWE
2N2222A	XM-PA-IGG-0012	150571	60KRAD(S)	100KRADS; NO PARAMETRIC FAILURE		ICRIAC XCRIAC IETCRU XETCRU XFINMT IGALSR XGALSR ILABCD XLABCD ILABRT XLABRT ELABEP IMMBFC XMMBFC ISENPR XSENPR ITEMCA XTEMCA ITERFP XTERFP
2N2222A DIE	XM-PA-IGG-0438	150582	60KRAD(S)	100KRADS; NO PARAMETRIC FAILURE		ILABCD XLABCD ILABRT XLABRT
2N2905A	XM-PA-IGG-0357	150779	80KRAD(S)	100KRADS; NO PARAMETRIC FAILURE		XFINMT IGALSR XGALSR
2N3810	XM-PA-IGG-0018	150115	60KRAD(S)	30KRADS;FAX XM-FX-IGG-6032	HFE1	IETCRU XFINMT IGALSR XSENPR ITERFP XTERFP
2N5154	XM-PA-IGG-0358	150574	25KRAD(S)	100KRADS; NO PARAMETRIC FAILURE		ISENPR XSENPR
54HC00Z	XM-PA-IGG-0334	150299	15KRAD(S)	100KRADS GO-NO-GO		XFINMT ILABCD XLABCD ILABRT XLABRT ELABEP
54HC02D	XM-PA-IGG-0109	151026	50KRAD(S)	100KRADS GO-NO-GO		XALCFD ILABCD XLABCD ILABRT XLABRT
54HC02D	XM-PA-IGG-0728	153673	100KRAD(S)	100KRADS GO-NO-GO		EIAAES ILA UP XLA UP EMSLOW ITEMCA XTEMCA ITERFP XTERFP
54HC03K	XM-PA-IGG-0110	150300	50KRAD(S)	100KRADS GO-NO-GO		ITERFP XTERFP
54HC03D	XM-PA-IGG-0111	151027	50KRAD(S)	100KRADS GO-NO-GO		XFINMT ILABCD XLABCD IMMBFC XMMBFC IMMSWE XMMSWE
54HC03K	XM-PA-IGG-0112	150301	50KRAD(S)	100KRADS GO-NO-GO		SIGGIN ILABCD XLABCD
54HC04D	XM-PA-IGG-0113	150796	50KRAD(S)	100KRADS GO-NO-GO		ICRIAC XCRIAC IGALSR XGALSR EIAAES EMSLOW ITEMCA XTEMCA ITERFP XTERFP
54HC04D	XM-PA-IGG-0113	153932	50KRAD(S)	100KRADS GO-NO-GO		EMSLOW
54HC04K	XM-PA-IGG-0114	150302	50KRAD(S)	100KRADS GO-NO-GO		XFINMT ILABCD XLABCD ILABRT XLABRT ELABEP IMMBFC XMMBFC
54HC08D	XM-PA-IGG-0115	151028	50KRAD(S)	100KRADS GO-NO-GO		IETCRU XETCRU IGALSR XGALSR EIAAES ILA UP XLA UP EMSLOW ITEMCA XTEMCA ITERFP XTERFP
54HC08K	XM-PA-IGG-0116	150303	50KRAD(S)	100KRADS GO-NO-GO		XFINMT ILABCD XLABCD ILABRT XLABRT ELABEP IMMBFC XMMBFC IMMSWE XMMSWE ISENPR XSENPR
54HC08K	XM-PA-IGG-0779	150344	100KRAD(S)	100KRADS GO-NO-GO		ILABRT XLABRT ELABEP IMMBFC XMMBFC ISENPR XSENPR
54HC08Z	XM-PA-IGG-0001	150304	50KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD ILABRT XLABRT
54HC109D	XM-PA-IGG-0283	151937	50KRAD(S)	50KRADS GO-NO-GO;RVT BY IGG DUE WK9748		IGALSR XGALSR EIAAES
54HC10D	XM-PA-IGG-0274	151827	50KRAD(S)	50KRADS GO-NO-GO;RVT BY IGG DUE WK9748		IGALSR XGALSR EIAAES EMSLOW ITEMCA XTEMCA
54HC11D	XM-PA-IGG-0278	152259	50KRAD(S)	100KRADS GO-NO-GO		EIAAES EMSLOW
54HC11K	XM-PA-IGG-0117	151417	50KRAD(S)	100KRADS GO-NO-GO		IMMBFC XMMBFC ISENPR XSENPR
54HC123D	XM-PA-IGG-0285	151469	50KRAD(S)	100KRADS GO-NO-GO		IETCRU XETCRU SIGGIN
54HC123K	XM-PA-IGG-0131	151073	50KRAD(S)	100KRADS GO-NO-GO		SIGGIN ISENPR XSENPR
54HC125D	XM-PA-IGG-0497	152278	50KRAD(S)	100KRADS GO-NO-GO		EMSLOW
54HC125K	XM-PA-IGG-0132	150305	50KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD ELABEP
54HC125K	XM-PA-IGG-0781	153938	100KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD
54HC137D	XM-PA-IGG-0135	151029	50KRAD(S)	100KRADS GO-NO-GO		ICRIAC XCRIAC ILA UP XLA UP
54HC138D	XM-PA-IGG-0137	151505	50KRAD(S)	100KRADS GO-NO-GO		IGALSR XGALSR EIAAES EMSLOW ITEMCA XTEMCA
54HC138K	XM-PA-IGG-0139	150306	50KRAD(S)	100KRADS GO-NO-GO		XFINMT ILABCD XLABCD ILABRT XLABRT ELABEP IMMSWE XMMSWE
54HC138K	XM-PA-IGG-0782	153939	100KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD ILABRT
54HC138Z	XM-PA-IGG-0138	150307	50KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD ILABRT XLABRT
54HC139D	XM-PA-IGG-0140	151030	50KRAD(S)	100KRADS GO-NO-GO		EIAAES ILA UP XLA UP ITEMCA XTEMCA
54HC139K	XM-PA-IGG-0141	150308	50KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD IMMBFC XMMBFC
54HC14D	XM-PA-IGG-0118	151472	50KRAD(S)	100KRADS GO-NO-GO		IETCRU XETCRU IGALSR XGALSR EIAAES EMSLOW ITEMCA XTEMCA ITERFP XTERFP
54HC14K	XM-PA-IGG-0120	151074	50KRAD(S)	100KRADS GO-NO-GO		XFINMT ILABCD XLABCD ILABRT XLABRT ELABEP IMMBFC XMMBFC IMMSWE XMMSWE ISENPR XSENPR
54HC14Z	XM-PA-IGG-0119	150087	50KRAD(S)	100KRADS GO-NO-GO		XALCFD
54HC151D	XM-PA-IGG-0321	152260	50KRAD(S)	100KRADS GO-NO-GO		EIAAES EMSLOW
54HC151K	XM-PA-IGG-0288	151524	50KRAD(S)	100KRADS GO-NO-GO		XFINMT ISENPR XSENPR
54HC157D	XM-PA-IGG-0494	152261	50KRAD(S)	100KRADS GO-NO-GO		EMSLOW
54HC157K	XM-PA-IGG-0291	151938	50KRAD(S)	100KRADS GO-NO-GO		ELABEP IMMBFC XMMBFC
54HC163D	XM-PA-IGG-0294	151138	50KRAD(S)	100KRADS GO-NO-GO		EMSLOW ITERFP XTERFP
54HC164D	XM-PA-IGG-0142	150799	50KRAD(S)	100KRADS GO-NO-GO		IETCRU XETCRU IGALSR XGALSR EIAAES EMSLOW ITERFP XTERFP
54HC164K	XM-PA-IGG-0143	150310	50KRAD(S)	100KRADS GO-NO-GO		XFINMT ILABCD XLABCD ILABRT XLABRT ELABEP IMMBFC XMMBFC ISENPR XSENPR
54HC164K	XM-PA-IGG-0143	154132	50KRAD(S)	100KRADS GO-NO-GO		IMMBFC XMMBFC
54HC165D	XM-PA-IGG-0295	151476	50KRAD(S)	100KRADS GO-NO-GO		EIAAES EMSLOW ITERFP XTERFP
54HC165K	XM-PA-IGG-0144	150311	50KRAD(S)	100KRADS GO-NO-GO		XFINMT IMMBFC XMMBFC ISENPR XSENPR
54HC166K	XM-PA-IGG-0145	150312	50KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD ILABRT XLABRT
54HC174K	XM-PA-IGG-0146	151111	50KRAD(S)	100KRADS GO-NO-GO		SIGGIN IMMBFC XMMBFC
54HC175D	XM-PA-IGG-0147	151031	50KRAD(S)	100KRADS GO-NO-GO		SIGGIN ILA UP XLA UP
54HC175K	XM-PA-IGG-0148	150313	50KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD ELABEP IMMBFC XMMBFC

MANPARTTYPE	PAD NO	PLIN	TOTAL DOSE	RAD TEST LEVEL @ FIRST PARAMETRIC FAILURE	FAILED PARAMETER	USER
54HC175K	XM-PA-IGG-0784	1513840	100KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD IMMBFC XMMBFC
54HC191D	XM-PA-IGG-0322	151735	50KRAD(S)	100KRADS GO-NO-GO		ITEMCA XTEMCA
54HC191K	XM-PA-IGG-0149	150314	50KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD IMMBFC XMMBFC
54HC193D	XM-PA-IGG-0150	151941	50KRAD(S)	100KRADS GO-NO-GO		IGALSR XGALSR EIAAES EMSL0M
54HC193K	XM-PA-IGG-0151	150315	50KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD LABRT IMMBFC XMMBFC
54HC21D	XM-PA-IGG-0495	152277	50KRAD(S)	100KRADS GO-NO-GO		EMSL0M
54HC21K	XM-PA-IGG-0122	150316	50KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD ELABEP IMMBFC XMMBFC
54HC21K	XM-PA-IGG-0122	154127	50KRAD(S)	100KRADS GO-NO-GO		IMMBFC XMMBFC
54HC240D	XM-PA-IGG-0328	151886	15KRAD(S)	100KRADS GO-NO-GO		ILA UP XLA UP
54HC240K	XM-PA-IGG-0327	150317	15KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD
54HC240K	XM-PA-IGG-0327	154238	15KRAD(S)	100KRADS GO-NO-GO		ILABCD
54HC240Z	XM-PA-IGG-0326	151890	15KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD LABRT XLABRT
54HC242D	XM-PA-IGG-0154	151033	50KRAD(S)	100KRADS GO-NO-GO		ILA UP XLA UP
54HC242K	XM-PA-IGG-0155	150319	50KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD
54HC243D	XM-PA-IGG-0156	151034	50KRAD(S)	100KRADS GO-NO-GO		ILA UP XLA UP
54HC244D	XM-PA-IGG-0329	151035	15KRAD(S)	100KRADS GO-NO-GO		ILA UP XLA UP EMSL0M
54HC244K	XM-PA-IGG-0330	150320	15KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD
54HC244K	XM-PA-IGG-0786	153943	100KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD
54HC244Z	XM-PA-IGG-0331	151893	15KRAD(S)	100KRADS GO-NO-GO		XALCFD LABRT XLABRT
54HC245D	XM-PA-IGG-0332	151036	15KRAD(S)	100KRADS GO-NO-GO		ILA UP XLA UP EMSL0M
54HC253D	XM-PA-IGG-0324	151942	50KRAD(S)	100KRADS GO-NO-GO		EMSL0M ITERFP XTERFP
54HC257D	XM-PA-IGG-0157	151037	50KRAD(S)	100KRADS GO-NO-GO		ILA UP XLA UP
54HC257K	XM-PA-IGG-0158	150802	50KRAD(S)	100KRADS GO-NO-GO		XFINMT
54HC273D	XM-PA-IGG-0159	151493	50KRAD(S)	100KRADS GO-NO-GO		IETCRU IETCRU EIAAES EMSL0M ITEMCA XTEMCA
54HC273K	XM-PA-IGG-0160	150322	50KRAD(S)	100KRADS GO-NO-GO		XFINMT LABCD XLABCD IMMBFC XMMBFC IMMSWE XMM5WE ISENPR XSENPR
54HC280D	XM-PA-IGG-0161	151470	50KRAD(S)	100KRADS GO-NO-GO		IETCRU IETCRU ITERFP XTERFP
54HC280K	XM-PA-IGG-0162	151079	50KRAD(S)	100KRADS GO-NO-GO		XFINMT ISENPR XSENPR
54HC283D	XM-PA-IGG-0496	152258	50KRAD(S)	100KRADS GO-NO-GO		SIGGIN EMSL0M
54HC283K	XM-PA-IGG-0298	151972	50KRAD(S)	100KRADS GO-NO-GO		IMMBFC XMMBFC
54HC32D	XM-PA-IGG-0123	151038	50KRAD(S)	100KRADS GO-NO-GO		IETCRU IETCRU IGALSR XGALSR EIAAES ILA UP XLA UP EMSL0M ITEMCA XTEMCA ITERFP XTERFP
54HC32K	XM-PA-IGG-0125	150324	50KRAD(S)	100KRADS GO-NO-GO		XFINMT LABCD XLABCD LABRT XLABRT ELABEP IMMBFC XMMBFC IMMSWE XMM5WE ISENPR XSENPR
54HC32Z	XM-PA-IGG-0124	150323	50KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD
54HC373D	XM-PA-IGG-0163	151039	50KRAD(S)	100KRADS GO-NO-GO		IGALSR XGALSR EIAAES ILA UP XLA UP EMSL0M ITEMCA XTEMCA
54HC373K	XM-PA-IGG-0164	151767	50KRAD(S)	100KRADS GO-NO-GO		SIGGIN IMMBFC XMMBFC
54HC374K	XM-PA-IGG-0166	150326	50KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD ELABEP IMMBFC XMMBFC
54HC374K	XM-PA-IGG-0166	154125	50KRAD(S)	100KRADS GO-NO-GO		IMMBFC XMMBFC
54HC374Z	XM-PA-IGG-0165	151894	50KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD LABRT XLABRT
54HC386K	XM-PA-IGG-0167	150327	50KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD LABRT XLABRT
54HC393D	XM-PA-IGG-0450	152255	50KRAD(S)	100KRADS GO-NO-GO		EIAAES
54HC393D	XM-PA-IGG-0450	154107	50KRAD(S)	Specs. XMM STOCK ; PLIN 152255, SEE ABOVE ENTRY.		EIAAES SIGGIN
54HC393K	XM-PA-IGG-0168	151526	50KRAD(S)	100KRADS GO-NO-GO		ISENPR XSENPR
54HC4002K	XM-PA-IGG-0172	150328	50KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD
54HC4040D	XM-PA-IGG-0304	151118	50KRAD(S)	100KRADS GO-NO-GO		EIAAES EMSL0M ITEMCA XTEMCA
54HC4040K	XM-PA-IGG-0176	151514	50KRAD(S)	100KRADS GO-NO-GO		XFINMT LABCD XLABCD IMMBFC XMMBFC IMMSWE XMM5WE
54HC4049K	XM-PA-IGG-0177	150330	50KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD LABRT XLABRT ISENPR XSENPR
54HC4050D	XM-PA-IGG-0449	152267	50KRAD(S)	100KRADS GO-NO-GO		EIAAES
54HC4050K	XM-PA-IGG-0179	150332	50KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD LABRT XLABRT ISENPR XSENPR
54HC4050K	XM-PA-IGG-0791	153945	100KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD LABRT XLABRT ISENPR XSENPR
54HC4050Z	XM-PA-IGG-0178	150331	50KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD LABRT XLABRT
54HC4075K	XM-PA-IGG-0182	150333	50KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD LABRT XLABRT IMMBFC XMMBFC
54HC4075K	XM-PA-IGG-0182	154121	50KRAD(S)	100KRADS GO-NO-GO		IMMBFC XMMBFC
54HC541D	XM-PA-IGG-0325	151946	50KRAD(S)	100KRADS GO-NO-GO		EMSL0M ITERFP XTERFP
54HC541K	XM-PA-IGG-0300	151120	50KRAD(S)	100KRADS GO-NO-GO		XFINMT IMMBFC XMMBFC
54HC541K	XM-PA-IGG-0300	153515	50KRAD(S)	100KRADS GO-NO-GO		XFINMT
54HC574D	XM-PA-IGG-0301	151480	50KRAD(S)	100KRADS GO-NO-GO		EIAAES ITEMCA XTEMCA ITERFP XTERFP
54HC574K	XM-PA-IGG-0302	150904	50KRAD(S)	100KRADS GO-NO-GO		IMMSWE XMM5WE
54HC592K	XM-PA-IGG-0189	151424	50KRAD(S)	LOT FAILURE MAJOR NCR		XFINMT
54HC596K	XM-PA-IGG-0171	150335	50KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD ELABEP
54HC74D	XM-PA-IGG-0127	151040	50KRAD(S)	100KRADS GO-NO-GO		IETCRU IETCRU IGALSR XGALSR EIAAES SIGGIN ILA UP XLA UP EMSL0M ITEMCA XTEMCA ITERFP XTERFP
54HC74K	XM-PA-IGG-0128	150336	50KRAD(S)	100KRADS DIFFERENT LOT		XFINMT LABCD XLABCD LABRT XLABRT ELABEP IMMBFC XMMBFC IMMSWE XMM5WE ISENPR XSENPR
54HC85D	XM-PA-IGG-0129	150856	50KRAD(S)	100KRADS GO-NO-GO		ICRIAC XCRIC EIAAES
54HC85K	XM-PA-IGG-0130	151122	50KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD ELABEP IMMBFC XMMBFC
54HC86D	XM-PA-IGG-0281	151123	50KRAD(S)	50KRADS GO-NO-GO-RVT BY IGG DJE WK9748		IETCRU IETCRU IGALSR XGALSR EMSL0M
54HC86K	XM-PA-IGG-0282	151528	50KRAD(S)	50KRADS GO-NO-GO		XFINMT IMMBFC XMMBFC
54HC7240K	XM-PA-IGG-0333	150338	15KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD
54HC7373D	XM-PA-IGG-0362	151949	50KRAD(S)	100KRADS GO-NO-GO		ITERFP XTERFP
MS4HC148D	XM-PA-IGG-0286	151473	50KRAD(S)	100KRADS GO-NO-GO		ITERFP XTERFP
UC1824J	XM-PA-IGG-0487	153119	INSENSITIVE	100KRADS NO PARAMETRIC FAILURE		ISENPR XSENPR
UC1834J	XM-PA-IGG-0700	153471	INSENSITIVE	30KRADS		XLAB
AD5715D	XM-PA-IGG-0361	150073	50KRAD(S)	30KRADS		IMMBFC XMMBFC
UC1856	XM-PA-IGG-0067	150068	INSENSITIVE	15KRADS-IGG FAX XM-FX-IGG-6029		IEN LATCH
2N4392	XM-PA-IGG-0893	154239	20KRAD(S)	100KRADS-SILICONIX LOT		IGSS
54AC244SSA-RH	XM-PA-IGG-0271	150295	100KRAD(S)	100KRADS GO-NO-GO		LADCF5 XADCF5 XFINMT IGALSR XGALSR IMMSWE XMM5WE
54AC245SSA-RH	XM-PA-IGG-0272	151023	100KRAD(S)	100KRADS GO-NO-GO		ILABCD XLABCD ELABEP
54AC74FM-RH	XM-PA-IGG-0273	150297	100KRAD(S)	LESS THAN 10KRADS NCR XM-NC-IGG-0358 REFERS		ILABCD XLABCD ELABEP

MANPARTTYPE	PAD_NO	PLIN	TOTAL DOSE	RAD TEST LEVEL @ FIRST PARAMAETRIC FAILURE	FAILED PARAMETER	USER
TABLE ABOVE DEFINE ALL THE AGREED RVT ON THE XMM PROGRAMME						

RVT STATUS ON PARTTYPE WITH BIAS AND UNBIAS TEST IS AS FOLLOWS:

AD571SD	BIAS=FAILURES @ 30KRAD: VOH, DNL(UNIPOLAR); UNBIAS=FAILURES @ 50KRAD:VOH AND 75KRAD:DNL(UNIPOLAR);
DAC08	BIAS=FAILURE @ 40KRADS:IFSC,IFS,IREF;UNBIAS=FAILURE @ 20KRADS:IREF;30KRADS:IFS
OP43	BIAS=2PC FAILED PSRR @ 75KRADS. UNBIAS=ONE PC FAILED VOS @ 100KRADS;(ONLY PARAMETRIC FAILURE)
3C9C	NO DIFFERENCE BETWEEN BIAS AND UNBIAS
2N2222A	NO DIFFERENCE BETWEEN BIAS AND UNBIAS
2N2905A	NO DIFFERENCE BETWEEN BIAS AND UNBIAS