RIR IN:- 79598

RIR OUT:- 79598

PARTS HISTORY LOG

Radiation Testing

PROGRAMME:- XMM

PART TYPE:- 54HC86

RADIATION REPORT:- RD 250

IGG TASK NUMBER:- 1500

SUMMARY OF TEST RESULTS

All test samples failed all measured parameters after 100KRad(Si) but fully recovered after the 168 hours annealing.

Radiation Report Number:- RD 250

Project:- XMM

Part Type:- 54HC86 Date Code:- 9642A

Manufacturer:- STM/F IGG Task No:- 1500

Project Approval of Lot Traveller:-

Signed........................ Date.20-1-98

Position.COMPONENT ENGINEER

Serial Number Range:-

036 through 039 (inclusive)

I certify that the subject component has been tested in accordance with the following radiation specifications:-

Test Method - ESA/SCC22900 ISSUE- 4 DATE- Apr '95

Irradiation Test Plan- XM-PL-IGG-0031 Appendix B ISSUE- 2A DATE- Jun '96

Closed/Approved NCR No:- N N/A

Approved Waiver No:- WAR N/A

Signed.....P.B. Russell..... Date.17/12/97

Upscreening Engineer

Signed................ Date.18/12/97.

Upscreening Manager

RADIATION REPORT NUMBER:- RD 250 DATE:- 16.12.97

PROJECT:- XMM RIR IN:- 79598

PART NUMBER:- 54HC86 MANUFACTURER:- STM/F

PROCUREMENT LEVEL:- ESA/SCC9201/119-04BF DATE CODE:- 9642A

TEST METHOD:- ESA/SCC22900 ISSUE:- 4 DATE:- Apr'9

IRRADIATION TEST PLAN:-XM-PL-IGG-0031 Appendix B ISSUE:- 2A DATE:- Jun'96

START QUANTITY:- 4

No.	Test (Sample Size)	XM-PL-IGG-0031 Test Method and Conditions	Date in	Qty in	Date out	Qty out	SIGNED Op/QA
1	Serialisation and Selection of Control Samples (100%)	Control Samples= SN 36 (Unbiased)	3/11/97	4	3/11/97	3 + CONTROL SAMPLE	P.A.R. IGG 16 CT
2	Initial Electrical Measurements (100% read and record)	Table 2dc of Detail Spec. Testing at IGG	3/11/97	3	3/11/97	3	P.A.R. IGG 16 CT
3	Initial Electrical Measurements (100% read and record)	Table 7 of Detail Spec. Testing at ERA	2/12/97	3	2/12/97	3	P.A.R. IGG 16 CT
4	Set-up and apply Bias per Figure 1	Verify Bias Circuit and conditions (in-situ) for all 3 test samples	2/12/97	3	2/12/97	3	P.A.R. IGG 16 CT
5	Irradiation 1 (3 samples)	Dose=100kRAD(Si) Rate=36KRAD(Si) per hour Time=2.78 hours	2/12/97	3	2/12/97	3	P.A.R. IGG 16 CT
6	Final Electrical Measurements (100% read and record)	As Test 3 At ERA	2/12/97	3	2/12/97	0	P.A.R. IGG 16 CT

Report No: RD 250	Part Type: 54HC86	Date: 16.12.97

No.	Test (Sample Size)	XM-PL-IGG-0031 Test Method and Conditions	Date in	Qty in	Date out	Qty out	SIGNED Op/QA
7	Annealing Electrical Measurements (100% read and record)	After 168 hours bias at +100°C Perform Table 2 dc and Table 7	10/12/97	3	10/12/97	3	IGG 16 CT
8	Test Report Collation				18/12/97		IGG 2 CT
9	Test Report Approval				18/12/97		IGG 2 CT
10	NOTES:-						

Report No: RD 250 Part Type: 54HC86 Date: 16.12.97

TEST EQUIPMENT LIST

Item, Type Number and Serial Number	CT Inventory Number	Function	Calibration Due
Item: Radiation Source Type No: Cobalt 60 Serial No: N/A	ERA's Facility	Irradiation	1 / 1 /1998
Item: SZ Type No: M3000 Serial No: 884769	CT339	ATE	28 / 3 /1998
Item: TEKTRONIX Type No: 370 Serial No: 300553	CT217	CURVE TRACER	12 / 2 /1998
Item: THURLBY Type No: PL320 Serial No: 26P0246	CT296	PSU	30 / 3 /1998
Item: Type No: Serial No:			/ /199
Item: Type No: Serial No:			/ /199
Item: Type No: Serial No:			/ /199
Item: Type No: Serial No:			/ /199
Item: Type No: Serial No:			/ /199
Item: Type No: Serial No:			/ /199
Item: Type No: Serial No:			/ /199
Item: Type No: Serial No:			/ /199

DELTEST 3300

DIGITAL CMOS FAMILY DATA ENTRY S/W V:5.30

TEST PGM: SCC9201/119 V:1.1
DEVICE : 54HC86/218RH TYPE: 14-PIN

PIN NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	PARAMETRICS			
ASSIGNMENT	I	I	O	I	I	O	G	O	I	I	O	I	I	D	OH	OL	OZ	ON
[illegible] 0000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	—	—	—	—
0001	0	0	L	0	0	L	.	L	0	0	L	0	0	.	—	Y	—	—
0002	1	1	L	1	1	L	.	L	1	1	L	1	1	.	—	—	—	—
0003	1	1	L	1	1	L	.	L	1	1	L	1	1	.	—	—	—	—
0004	1	0	H	1	0	H	.	H	0	1	H	0	1	.	Y	—	—	—
0005	0	0	L	0	0	L	.	L	0	0	L	0	0	.	—	—	—	—
0006	0	1	H	0	0	L	.	L	0	0	L	0	0	.	—	—	—	—
0007	1	1	L	0	0	L	.	L	0	0	L	0	0	.	—	—	—	—
0008	1	0	H	0	0	L	.	L	0	0	L	0	0	.	—	—	—	—
0009	0	0	L	0	1	H	.	L	0	0	L	0	0	.	—	—	—	—
0010	0	0	L	1	1	L	.	L	0	0	L	0	0	.	—	—	—	—
0011	0	0	L	1	0	H	.	L	0	0	L	0	0	.	—	—	—	—
0012	0	0	L	0	0	L	.	H	1	0	L	0	0	.	—	—	—	—
0013	0	0	L	0	0	L	.	L	1	1	L	0	0	.	—	—	—	—
0014	0	0	L	0	0	L	.	H	0	1	L	0	0	.	—	—	—	—
0015	0	0	L	0	0	L	.	L	0	0	H	1	0	.	—	—	—	—
0016	0	0	L	0	0	L	.	L	0	0	L	1	1	.	—	—	—	—
0017	0	1	H	0	1	H	.	H	1	0	H	1	0	.	—	—	—	—
0018	0	0	L	0	1	H	.	H	1	0	H	1	0	.	—	—	—	—
0019	1	1	L	0	1	H	.	H	1	0	H	1	0	.	—	—	—	—
0020	1	0	H	0	1	H	.	H	1	0	H	1	0	.	—	—	—	—
0021	0	1	H	0	0	L	.	H	1	0	H	1	0	.	—	—	—	—
0022	0	1	H	1	1	L	.	H	1	0	H	1	0	.	—	—	—	—
0023	0	1	H	1	0	H	.	H	1	0	H	1	0	.	—	—	—	—
0024	0	1	H	0	1	H	.	L	0	0	H	1	0	.	—	—	—	—
0025	0	1	H	0	1	H	.	L	1	1	H	1	0	.	—	—	—	—
0026	0	1	H	0	1	H	.	H	1	0	H	1	0	.	—	—	—	—
0027	0	1	H	0	1	H	.	H	1	0	L	0	0	.	—	—	—	—
0028	0	1	H	0	1	H	.	H	1	0	L	1	1	.	—	—	—	—
0029	0	1	H	0	1	H	.	H	1	0	H	0	1	.	—	—	—	—
0030	0	1	H	0	1	H	.	H	1	0	H	1	0	.	—	—	—	—

DELTEST 3300*

GITAL CMOS FAMILY DATA ENTRY S/W V:5.30

ST PGM: SCC9201/119 V:1.1

VICE : 54HC86/21BRH TYPE: 14-PIN

DEFAULT CONDITIONS*

ESTS*	*LIMITS*	*CONDITIONS*
1- FUNCTIONAL		VDD= 6.00 S/D=200
2- IDD	0.1 UA	VDD= 6.00 VIN=VSS
3- IDD	0.1 UA	VDD= 6.00 VIN=VDD
4- IIN	50 NA	VDD= 6.00 VIN=VSS
5- IIN	50 NA	VDD= 6.00 VIN=VDD
6- VOL	0.10 V	VDD= 6.00
7- VOH	5.90 V	VDD= 6.00

VICE: [illegible]

TESTS*		*RESULTS*
- FUNCTIONAL		PASS
- IDD		76 NA
- IDD		66 NA
- IIN	5:	21 NA
- IIN	10:	-26 NA
- VOL	3:	< 0.01 V
- VOH	3:	6.01 V

ST	IIN (NA)	IIN (NA)	VOL (V)	VOH (V)
N				
	2	-7	.....	.....
	2	6	.....	.....
	.....	.....	< 0.01	6.01
	2	6	.....	.....
	21	2	.....	.....
	.....	.....	< 0.01	6.01
	.....	.....	.....	.....
	.....	.....	< 0.01	6.01
	2	6	.....	.....
	2	-26	.....	.....
	.....	.....	< 0.01	6.01
	2	5	.....	.....
	1	7	.....	.....
	.....	.....	.....	.....

VICE: 39

TESTS*		*RESULTS*
- FUNCTIONAL		PASS
- IDD		76 NA
- IDD		66 NA
- IIN	9:	2 NA
- IIN	10:	-26 NA
- VOL	3:	< 0.01 V
- VOH	3:	6.01 V

ST	IIN (NA)	IIN (NA)	VOL (V)	VOH (V)
N				
	2	-23	.....	.....
	2	24	.....	.....
	.....	.....	< 0.01	6.01
	2	5	.....	.....
	1	18	.....	.....
	.....	.....	< 0.01	6.01
	.....	.....	.....	.....
	.....	.....	< 0.01	6.01
	2	6	.....	.....
	2	-26	.....	.....
	.....	.....	< 0.01	6.01
	2	5	.....	.....
	1	7	.....	.....
	.....	.....	.....	.....

VICE: 36

TESTS*		*RESULTS*
- FUNCTIONAL		PASS
- IDD		77 NA
- IDD		66 NA
- IIN	9:	2 NA
- IIN	10:	-26 NA
- VOL	3:	< 0.01 V
- VOH	3:	6.01 V

EST IN	IIN (NA)	IIN (NA)	VOL (V)	VOH (V)
:	2	-23	.....	.....
2	1	6	.....	.....
3	.....	.....	< 0.01	6.01
4	2	25	.....	.....
5	1	2	.....	.....
6	.....	.....	< 0.01	6.01
7	.....	.....	.....	.....
8	.....	.....	< 0.01	6.01
9	2	24	.....	.....
0	2	-26	.....	.....
1	.....	.....	< 0.01	6.01
2	2	5	.....	.....
3	1	7	.....	.....
4	.....	.....	.....	.....

EVICE: 37

TESTS		*RESULTS*
1- FUNCTIONAL		PASS
2- IDD		76 NA
3- IDD		66 NA
4- IIN	9:	2 NA
5- IIN	10:	-26 NA
6- VOL	3:	< 0.01 V
7- VOH	3:	6.01 V

EST IN	IIN (NA)	IIN (NA)	VOL (V)	VOH (V)
1	2	-7	.....	.....
2	2	6	.....	.....
3	.....	.....	< 0.01	6.01
4	2	6	.....	.....
5	1	2	.....	.....
6	.....	.....	< 0.01	6.01
7	.....	.....	.....	.....
8	.....	.....	< 0.01	6.01
9	2	6	.....	.....
10	2	-26	.....	.....
11	.....	.....	< 0.01	6.01
12	2	5	.....	.....
13	1	7	.....	.....
14	.....	.....	.....	.....

SZ-TESTSYSTEME Statistics 03 Vers. 2.15 for TA10
RD250_54HC86_INIT_EMS_@_IGG / 1.0 IR 31OCT97 14 PIN CMOS

Results file	:	RD250_54HC86_INIT_EMS_@_IGG from: 03.11.97 / 11:44:49
Operator	:	PAUL RUSSELL
Part number	:	54HC86
Lot number	:	RD250
Order number	:	D/C 9642A
Vendor	:	SGS THOMSON
	:	CONTROL 36 ; 37-39
	:	INITIAL EMS @ IGG
	:	54HC86 SCC9201/119 ISS1C RM DC 1.0 IR 31OCT97 14 PIN CMOS

Test steps

No.	Test	Min		Max	Unit
1.	Continuity test	-2.00	...	0.01	V
2.	IDD	0	...	100	nA
3.	Functional Test	0	...	0	
4.	Functional Test	0	...	0	
5.	Functional Test	0	...	0	
6.	Iil	-50.0	...	50.0	nA
7.	Iih	-50.0	...	50.0	nA
8.	Vol1	-10.0	...	100.0	mV
9.	Vol2	-10.0	...	100.0	mV
10.	Vol3	-10.0	...	100.0	mV
11.	Vol4	-10.0	...	260.0	mV
12.	Vol5	-10.0	...	260.0	mV
13.	Voh1	1.90	...	2.10	V
14.	Voh2	4.40	...	4.60	V
15.	Voh3	5.90	...	6.10	V
16.	Voh4	3.98	...	4.60	V
17.	Voh5	5.48	...	6.10	V

SZ-TESTSYSTEME Statistics 03 Vers. 2.15 for TA10
RD250_54HC86_INIT_EMS_@_IGG / 1.0 IR 31OCT97 14 PIN CMOS

==

Results file	: RD250_54HC86_INIT_EMS_@_IGG	from: 03.11.97 / 11:44:49
Operator	: PAUL RUSSELL	
Part number	: 54HC86	
Lot number	: RD250	
Order number	: D/C 9642A	
Vendor	: SGS THOMSON	
	: CONTROL 36 ; 37-39	
	: INITIAL EMS @ IGG	
	: 54HC86 SCC9201/119 ISSIC RM DC 1.0 IR 31OCT97 14 PIN CMOS	

Test steps

Step	Min		Max	Unit
1. Continuity test	-2.00	...	0.01	V
2. IDD	0	...	100	nA
3. Functional Test	0	...	0	
4. Functional Test	0	...	0	
5. Functional Test	0	...	0	
6. Iil	-50.0	...	50.0	nA
7. Iih	-50.0	...	50.0	nA
8. Vol1	-10.0	...	100.0	mV
9. Vol2	-10.0	...	100.0	mV
10. Vol3	-10.0	...	100.0	mV
11. Vol4	-10.0	...	260.0	mV
12. Vol5	-10.0	...	260.0	mV
13. Voh1	1.90	...	2.10	V
14. Voh2	4.40	...	4.60	V
15. Voh3	5.90	...	6.10	V
16. Voh4	3.98	...	4.60	V
17. Voh5	5.48	...	6.10	V

	36	37	38	39
1.1 [V]	-0.61	-0.61	-0.61	-0.61
1.2 [V]	-0.51	-0.53	-0.54	-0.53
2.1 [nA]	0	0	0	0
2.2 [nA]	0	0	0	0
3.1 [ ]	0	0	0	0
3.2 [ ]	0	0	0	0
4.1 [ ]	0	0	0	0
4.2 [ ]	0	0	0	0
5.1 [ ]	0	0	0	0
5.2 [ ]	0	0	0	0
6.1 [nA]	-0.1	-0.0	-0.1	-0.0
6.2 [nA]	-0.0	0.0	0.0	0.0
7.1 [nA]	-0.0	-0.0	-0.0	-0.0
7.2 [nA]	0.0	0.0	0.0	0.0
8.1 [mV]	1.9	1.9	1.9	1.9
8.2 [mV]	2.0	2.0	2.0	2.0
9.1 [mV]	0.7	0.7	0.7	0.7
9.2 [mV]	0.8	0.8	0.8	0.8
10.1 [mV]	0.6	0.6	0.6	0.6
10.2 [mV]	0.7	0.7	0.7	0.7
11.1 [mV]	115.5	116.3	115.1	115.1
11.2 [mV]	120.2	122.7	123.3	120.7
12.1 [mV]	113.9	114.6	113.9	113.5
12.2 [mV]	119.3	122.0	123.7	119.8
13.1 [V]	2.00	2.00	2.00	2.00
13.2 [V]	2.00	2.00	2.00	2.00
14.1 [V]	4.49	4.50	4.49	4.49
14.2 [V]	4.50	4.50	4.50	4.50
15.1 [V]	5.99	5.99	5.99	5.99
15.2 [V]	5.99	5.99	5.99	5.99
16.1 [V]	4.36	4.36	4.36	4.36
16.2 [V]	4.37	4.37	4.37	4.37
17.1 [V]	5.85	5.85	5.85	5.85
17.2 [V]	5.86	5.85	5.85	5.85

SZ-TESTSYSTEME Statistics 03 Vers. 2.15 for TA10
RD250_54HC86_POST_ANNEAL_EMS / 1.0 IR 31OCT97 14 PIN CMOS

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Results file : RD250_54HC86_POST_ANNEAL_EMS from: 10.12.97 / 13:55:30
Operator : PAUL RUSSELL
Part number : 54HC86
Lot number : RD250
Order number : D/C 9642A
Vendor : SGS THOMSON
: CONTROL 36 ; RAD 37-39
: POST ANNEAL EMS
: 54HC86 SCC9201/119 ISSIC RM DC 1.0 IR 31OCT97 14 PIN CMOS

Test steps

1.	Continuity test	-2.00	...	0.01	V
2.	IDD	0	...	100	nA
3.	Functional Test	0	...	0	
4.	Functional Test	0	...	0	
5.	Functional Test	0	...	0	
6.	Iil	-50.0	...	50.0	nA
7.	Iih	-50.0	...	50.0	nA
8.	Vol1	-10.0	...	100.0	mV
9.	Vol2	-10.0	...	100.0	mV
10.	Vol3	-10.0	...	100.0	mV
11.	Vol4	-10.0	...	260.0	mV
12.	Vol5	-10.0	...	260.0	mV
13.	Voh1	1.90	...	2.10	V
14.	Voh2	4.40	...	4.60	V
15.	Voh3	5.90	...	6.10	V
16.	Voh4	3.98	...	4.60	V
17.	Voh5	5.48	...	6.10	V

	36	37	38	39
1.1 [V]	-0.51	-0.50	-0.50	-0.50
1.2 [V]	-0.54	-0.53	-0.52	-0.52
2.1 [nA]	11	9	7	25
2.2 [nA]	11	9	7	25
3.1 [ ]	0	0	0	0
3.2 [ ]	0	0	0	0
4.1 [ ]	0	0	0	0
4.2 [ ]	0	0	0	0
5.1 [ ]	0	0	0	0
5.2 [ ]	0	0	0	0
6.1 [nA]	-0.1	-0.1	-0.1	-0.1
6.2 [nA]	-0.0	-0.0	-0.0	-0.0
7.1 [nA]	-0.0	-0.0	-0.0	-0.0
7.2 [nA]	0.0	0.0	0.0	0.0
8.1 [mV]	2.0	2.6	2.5	2.6
8.2 [mV]	2.2	2.8	2.6	2.8
9.1 [mV]	0.9	1.0	1.0	1.0
9.2 [mV]	1.0	1.1	1.1	1.1
10.1 [mV]	0.7	0.8	0.8	0.8
10.2 [mV]	0.8	0.9	0.9	0.9
11.1 [mV]	116.5	136.1	132.3	137.3
11.2 [mV]	122.1	141.6	138.3	143.6
12.1 [mV]	114.9	129.9	127.2	131.0
12.2 [mV]	121.5	136.1	134.2	137.7
13.1 [V]	2.00	2.00	2.00	2.00
13.2 [V]	2.00	2.00	2.00	2.00
14.1 [V]	4.49	4.50	4.50	4.50
14.2 [V]	4.50	4.50	4.50	4.50
15.1 [V]	5.99	5.99	5.99	5.99
15.2 [V]	5.99	5.99	5.99	6.00
16.1 [V]	4.36	4.35	4.35	4.35
16.2 [V]	4.37	4.36	4.36	4.36
17.1 [V]	5.84	5.84	5.84	5.84
17.2 [V]	5.85	5.85	5.85	5.85

I.G.G. COMPONENT TECHNOLOGY LTD.

REPORT NO. RD250

PART TYPE 54HC86 OPTION SHEET 1 OF 3

ELECTRICAL MEASUREMENTS w.r.t. XM-PL-166-0031 Table

INITIAL EMS

Parameter Serial No's	V_{THN} (V)	V_{THP} (V)	I_{DD} (nA) PATTERN 1	I_{DD} (nA) PATTERN 2	I_{DD} (nA) PATTERN 3	I_{DD} (nA) PATTERN 4	
36	-1.01	0.67	24	26	26	50	
37	-1.02	0.67	23	25	27	49	
38	-1.02	0.68	24	25	27	49	
39	-1.01	0.68	24	25	26	49	
Limit	≥ -1.45V ≤ -0.45V	≥ 0.45V ≤ 1.35V	≤ 100nA	≤ 100nA	≤ 100nA	≤ 100nA	
Condition	$V_{IN} = V_{DD} = 5V$ $I_{SS} = -10mA$ 1A = GND	$V_{IN} = V_{SS} = -5V$ $I_{DD} = 10mA$ 1A, 1B = GND	$V_{DD} = 6V$ $V_{SS} = 0V$	→	→	→	

Measured by [signature] Date 2ND DEC '97

Test Equipment used:-

EQUIPMENT	CT NUMBER
TEKTRONIX 370 CURVE TRACER	CT217

QA/4/02/001 Issue 2

I.G.G. COMPONENT TECHNOLOGY LTD.

REPORT NO. RD250

PART TYPE 54HC86 OPTION SHEET 2 OF 3

ELECTRICAL MEASUREMENTS w.r.t. XM-PL-166-0031 Table

POST RAD EMS

Parameter Serial No's	VTHN (V)	VTHP (V)	IDD (nA) PATTERN 1	IDD (nA) PATTERN 2	IDD (nA) PATTERN 3	IDD (nA) PATTERN 4	
36	-1.02	0.67	-6	-6	-6	-16	
37 FAIL	+1.3 *	-0.83 *	8 mA	8.0 mA	500 μA	4.4 mA	
38 FAIL	+1.7 *	-0.84 *	9.7 mA	9.8 mA	636 μA	5.7 mA	
39 FAIL	+2.0 *	-0.85 *	12.4 mA	12.7 mA	721 μA	7.4 mA	
Limit	≥ -2.00V ≤ -0.20V	≥ 0.40 V ≤ 1.90 V	≤ 50 nA	≤ 50 nA	≤ 50 nA	≤ 50 nA	
Condition	VIN = VDD = 5V ISS = -10mA 1A = GND	VIN = VSS = 5V IDD = 10mA 1A, 1B = GND	VDD = 6V VSS = 0V	→	→	→	

Measured by [signature] Date 2ND DEC 1997

Test Equipment used:- EQUIPMENT CT NUMBER

	EQUIPMENT	CT NUMBER
	TEKTRONIX 370 CURVE TRACER	CT217

* NOTE : ISS GREATER THAN ±10 mA DRAWN BY DEVICES

I.G.G. COMPONENT TECHNOLOGY LTD.

REPORT NO. R0250

PART TYPE 54HC86 OPTION SHEET 3 OF 3

ELECTRICAL MEASUREMENTS w.r.t. XM-PL-166-0031 Table

POST ANNEAL EMS

Parameter Serial No's	V_{THN} (V)	V_{THP} (V)	I_{DD} (nA) PATTERN 1	I_{DD} (nA) PATTERN 2	I_{DD} (nA) PATTERN 3	I_{DD} (nA) PATTERN 4	
36	-1.02	0.67	8	8	8	14	
37	-0.99	0.95	18	11	18	25	
38	-0.97	0.96	18	11	18	25	
39	-0.97	0.98	26	13	26	34	
Limit	$\geq$ -1.45V $\leq$ -0.45V	$\geq$ 0.45V $\leq$ 1.35V	$\leq$ 100nA	$\leq$ 100nA	$\leq$ 100nA	$\leq$ 100nA	
Condition	$V_{IN} = V_{DD} = 5V$ $I_{SS} = -10\mu A$ 1A = GND	$V_{IN} = V_{SS} = -5V$ $I_{DD} = 10\mu A$ 1A, 1B = GND	$V_{DD} = 6V$ $V_{SS} = 0V$	→	→	→	

Measured by P.A. Russell Date 10TH DEC '97

Test Equipment used:-

EQUIPMENT	CT NUMBER
TEKTRONIX 370 CURVE TRACER	CT217

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~~Report~~ No:
79598

Part Type: 54HC86D

Date: 19/9/97

TEST EQUIPMENT LIST

Item, Type Number and Serial Number	CT Inventory Number	Function	Calibration Due
Item: DELTEST Type No: 3300 Serial No: 84141	CT180	A.T.E	4 /10/1997
Item: Type No: Serial No:			/ /199
Item: Type No: Serial No:			/ /199
Item: Type No: Serial No:			/ /199
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Item: Type No: Serial No:			/ /199
Item: Type No: Serial No:			/ /199

SERIAL NUMBER CHECKLIST

KEY TO CODES USED ON THIS LIST

RIR 79598

0	=	DELIVERED TO IGG
DPA	=	IGG DPA SAMPLE
RM	=	REJECT AT MANUFACTURER
NCR	=	REJECT AT IGG
L3E	=	LAT3 ELECTRICAL MEASUREMENT
L3D	=	LAT3 DESTRUCT
L2	=	LAT 2
INSPECTION STAMP	=	S/NO's DELIVERED TO USER

START No 001

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	(36)	(37)	(38)	(39)	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	00

TRAVEL VISUAL INSPECTION

RIR No. 79598 TASK: 1500 PART TYPE: MICRO CIRCUIT

ACTUAL PART MARKING: 9201119 04BF (MANU LOGO) 9642A #

DATE CODE/LOT IDENTITY: 9642A

PACKAGE MARKING: 2027242818 ITKMIO 9201-119-04BF CT 12452 IGG SGS-THOMSON M54HC86D S/N° 36-39 9642A

LEAD FINISH: SAT PART CONDITION: SAT PACKAGE CONDITION: SAT

COMMENTS: ~~YES~~/NO MECHANICAL DIMENSIONS: SAT

INSPECTED BY: D Crocker DATE: 19-9-97

COMMENTS/OBSERVATIONS

XMM RIR 79598 RD 250	IRRADIATION TEST PLAN NO. XM-PL-IGG-0031 1	Issue No. 2 Rev. A Date: June 1996 Page: 1/8 2

Component No. 54HCXXX 3	Component Designation:Integrated Circuit, Silicon Monolithic, High Speed CMOS 4	Irradiation Spec No. N/A Iss. Rev. 5

Specifications Generic ESA/SCC 9000 Iss.8 Rev. E Detail As Applicable. 6	Acceptance Evaluation X Element ___ Diffusion ___ Lot X 7	Electrical Meas In-situ ___ Remote X 8	Project/Programme **XMM** 9

Manufacturer: Name:SGS Thomson Address: 3 Rue de Suisse BP 4199 35041 Rennes-Cedex FRANCE 10	Test Facility: Name: Oris-Labra Address: CEA Saclay FRANCE 11	Originator: IGG CT Name: J. Guymer Telephone: 01329 829311 12

Radiation Source COBALT 60 13	Sample Size: 4 Control Devices: 1 14	Exposure Single ___ Multiple X 15	Annealing Test YES X NO ___ 16	Radiation Level: 50KRad(Si) 75KRad(Si) 100KRad(Si) 17

Single Exposure
Dose [KRad(Si)]
Dose Rate [Rad(Si)/s]
Not Applicable
Exposure Time
18

Multiple Exposure:

Irradiation Steps	1	2	3
Dose [Krad(Si)]	50	25	25
Dose Rate [rad(Si)/hr]	200	200	200
Exposure Time(hours)	250	125	125

19

Bias Requirements: During Exposure (for in-situ elec. measure): N/A
During and after Exposure (for remote elec. measure): YES

Bias Conditions:
Test Circuits: The Electrical Bias circuit is given in Figure 1 herein.
Voltages: See Figure 1 Tolerance: See Figure 1

Shielding: Shielding is required to minimize dose enhancement effects caused by low energy, scattered radiation. The test specimens shall be enclosed in a Pb/Al container of Pb 1.5mm minimum, surrounding on inner shield of 0.7 to 1.0mm Al.
20

Irradiation Test Sequence 21

Test Step	Description	Requirements
1	Initial Radiation Test per Appendix B	If parts fail, a further 5 pieces will be submitted for RVT Plan XM-PL-IGG-0031, tested from test steps No 2 of the irradiation test sequence.
2	Serialisation Goods Receiving Inspection	If parts are not serialised, serialise them (permanently) sequentially from 1 to 5 inclusive.
3	Initial Electrical Measurements at Room Temperature only	Table 2 of applicable detail specification (see Appendix A herein)
4	Set-up of Test	Verify Figure 1 Bias Circuit and Voltages (In-situ) for all 4 test samples.

Irradiation Test Sequence (Cont.) 21

Test Step	Description	Requirements
5	Irradiation Exposure	Verify Radiation dose rate and position in the chamber to achieve required dose. Verify and witness duration of exposure to achieve required dose
6	Intermediate Electrical Measurements	Bias to be maintained until test is performed. Test per Table 7 of applicable detail specification (see Appendix A herein) - Read and Record - 5 parts. Test to be performed immediately upon removal from chamber (less than 10 mins interval). Upon completion of test devices to be replaced in bias circuit (4 parts) and returned to chamber. Maximum interval between two consecutive exposures to be (30 mins).
7 to 12	Repeat Set-up/Exposure/Test sequence up to Total Dose of 100KRad(Si) as per Plan above	Repeat Step 4, 5, 6 for a total of 3 cycles up to the total dose of 100KRad(Si) at accumulated dose of 50, 75, and 100KRad(Si). (See Remark 1).
13	Annealing	To be 24 hours at +25°C under Figure 1 bias.
14	Post Annealing Electrical Measurements	As per Step 6.
15	Accelerated ageing under bias	Bake at +100°C under Figure 1 bias for 168 hours.
16	Final Electrical Measurements	Per Table A herein - Read and Record - 5 parts.
17	Total Dose Irradiation Test Report	ESA/SCC No. 22900.

Remarks 22

1. The set-up/exposure/test sequence shall be stopped for any device that exhibits repeated functional failure.
2. Electrical testing shall be performed on the same test equipment from test steps 2 to step 16.

FIGURE 1 - ELECTRICAL CIRCUIT FOR IRRADIATION

As per applicable detail specification
(see Appendix A herein)

APPENDIX A

DEVICE TYPE	ESA/SCC DETAIL SPECIFICATION	ISSUE	REV	USER	UNIT
54HC00	9201/105	1	C	AEO LABEN	DBU RTU, CDMU, 1750 μPR
54HC02	9201/113	1	A	LABEN TERMA EKU MSSL	RTU, CDMU, 1750 μPR PDU EXP EXP
54HC03	9201/114	1	A	LABEN	RTU, CDMU, 1750 μPR
54HC04	9401/033	1	A	LABEN GALILEO TERMA EKU EPIC MSSL	RTU, CDMU, 1750 μPR STR PDU EXP EXP EXP
54HC08	9201/106	1	A	MSSL EPIC LABEN EKU ETCA GALILEO TERMA	EXP EXP RTU, CDMU, 1750 μPR EXP MRU STR PDU
54HC11	9201/117	1	A	MSSL EKU	EXP EXP
54HC14	9409/007	1	A	MSSL EPIC EKU ETCA GALILEO TERMA AEO LABEN	EXP EXP EXP MRU STR PDU DBU RTU, CDMU, 1750 μPR
54HC21	9201/108	1	A	EPIC LABEN MSSL	EXP RTU, CDMU, 1750 μPR EXP
54HC32	9201/111	1	A	MSSL EPIC EKU LABEN ETCA GALILEO TERMA	EXP EXP EXP RTU, CDMU, 1750 μPR MRU STR PDU

APPENDIX A

DEVICE TYPE	ESA/SCC DETAIL SPECIFICATION	ISSUE	REV	USER	UNIT
54HC74	9203/050	1	C	EKU ETCA GALILEO TERMA LABEN EPIC MSSL	EXP MRU STR PDU RTU, CDMU, 1750 μPR EXP EXP
54HC85	9209/004	1	B	EKU LABEN EPIC	EXP RTU, CDMU, 1750 μPR EXP
54HC123	9207/006	1	B	ETCA	MRU
54HC125	9401/039	1	B	MSSL EPIC LABEN	EXP EXP RTU, CDMU, 1750 μPR
54HC137	9205/013	1	B	LABEN	RTU, CDMU, 1750 μPR
54HC138	9408/046	1	B	MSSL EPIC GALILEO EKU LABEN	EXP EXP STR EXP RTU, CDMU, 1750 μPR
54HC139	9205/017	1	B	LABEN EKU	RTU, CDMU, 1750 μPR EXP
54HC148	9410/017	1	B	TERMA	PDU
54HC151	9408/054	1	B	MSSL EKU	EXP EXP
54HC157	9408/057	1	B	MSSL EPIC	EXP EXP
54HC163	9204/073	1	B	MSSL TERMA	EXP PDU
54HC164	9306/041	1	A	MSSL EPIC ETCA GALILEO TERMA EKU LABEN	EXP EXP MRU STR PDU EXP RTU, CDMU, 1750 μPR
54HC165	9306/042	1	B	MSSL TERMA EKU	EXP PDU EXP
54HC166	9306/043	1	B	LABEN	RTU, CDMU, 1750 μPR

APPENDIX A

DEVICE TYPE	ESA/SCC DETAIL SPECIFICATION	ISSUE	REV	USER	UNIT
54HC175	9203/052	1	B	EPIC LABEN	EXP RTU, CDMU, 1750 μPR
54HC191	9204/066	1	B	LABEN	RTU, CDMU, 1750 μPR
54HC193	9204/065	1	B	MSSL GALILEO EKU LABEN	EXP STR EXP RTU, CDMU, 1750 μPR
54HC240	9401/034	1	A	GALILEO LABEN	STR RTU, CDMU, 1750 μPR
54HC242	9405/011	1	A	LABEN	RTU, CDMU, 1750 μPR
54HC243	9405/012	1	A	LABEN	RTU, CDMU, 1750 μPR
54HC244	9401/048	1	A	MSSL EKU ETCA GALILEO TERMA LABEN AEO	EXP EXP MRU STR PDU RTU, CDMU, 1750 μPR DBU
54HC245	9405/013	1	A	MSSL GALILEO LABEN EKU	EXP STR RTU, CDMU, 1750 μPR EXP
54HC253	9408/058	1	B	MSSL TERMA	EXP PDU
54HC257	9408/047	1	B	LABEN	RTU, CDMU, 1750 μPR
54HC273	9203/053	1	A	MSSL ETCA EKU LABEN	EXP MRU EXP RTU, CDMU, 1750 μPR
54HC280	9208/003	1	A	ETCA TERMA	MRU PDU
54HC283	9202/075	1	B	MSSL	EXP
54HC373	9203/059	1	A	GALILEO LABEN EKU	STR RTU, CDMU, 1750 μPR EXP
54HC374	9203/060	1	C	MSSL EPIC LABEN	EXP EXP RTU, CDMU, 1750 μPR

APPENDIX A

DEVICE TYPE	ESA/SCC DETAIL SPECIFICATION	ISSUE	REV	USER	UNIT
54HC386	9201/121	1	A	LABEN	RTU, CDMU, 1750 μPR
54HC393	9204/074	1	B	EKU	EXP
54HC541	9401/047	1	C	MSSL TERMA	EXP PDU
54HC574	9203/054	1	C	EKU TERMA	EXP PDU
54HC688	9209/005	1	A	LABEN EPIC	RTU, CDMU, 1750 μPR EXP
54HC4002	9201/130	1	A	LABEN	RTU, CDMU, 1750 μPR
54HC4040	9204/069	1	B	MSSL EKU LABEN	EXP EXP RTU, CDMU, 1750 μPR
54HC4049	9401/037	1	B	LABEN	RTU, CDMU, 1750 μPR
54HC4050	9401/038	1	B	LABEN	RTU, CDMU, 1750 μPR
54HC4075	9201/129	1	A	LABEN	RTU, CDMU, 1750 μPR
54HCT240	9401/045	1	A	LABEN	CDMU

APPENDIX B

UDCS#0109648

54HCMOS 100KRad RAD Method Issue C Dec 95

Sample Size: 4 + 1 Control device

Conditions: Dose Rate = 3.6KRad to 36KRad hr^{-1} per ESA/SCC 22900 Issue 4, Para 3.3, Window 1.

6V @ Room temperature worst case bias conditions fig 6 ESA/SCC Relevant Detail Specification.

Source Location: ORIS-LABRA, CEA, SACLAY, FRANCE

Operating Mode: If parts not serialised, serialise them (permanently) sequentially from 1 to 5 inclusive.
Pre-rad Table 2 - GO-NO-GO.
Table 7 - Read & Record
Non-stop irradiation
4 hours under worst case bias transportation
168 hours 6V 100°C annealing
Table 2 - GO-NO-GO, including 2.5V function test
Table 7 - Read & record

Parameters guaranteed by Design: Switching times <1.50x pre-rad individual value.

Measurement tables: Per Table 2 of relevant detail spec.

Characteristic	Symbol	Pre-Rad	100KRad	Delta
Quiescent Current	I_{DD}	100nA	50μA	-
Threshold Voltage N-Channel	V_{THN}	-0.45/1.45V	-0.20/-2.00V	1.5V
Threshold Voltage P-Channel	V_{THP}	+0.45/+1.35V	+0.40/+1.9V	1.5V

Remarks: If no part exhibits a failure then accept the lot.

Report: A total dose irradiation test report shall be submitted including a summary of pre and post Table 2 Go-no-Go and pre and post results for Table 7 - Read and Record.