RIR IN:- 79597

RIR OUT:- 79597

PARTS HISTORY LOG

Radiation Testing

PROGRAMME:- XMM

PART TYPE:- 54HC10

RADIATION REPORT:- RD 252

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 252

Project:- XMM

Part Type:- 54HC10 Date Code:- 9646

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

Project Approval of Lot Traveller:-

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

Position.Component Engineer.

Serial Number Range:-

067 through 071 (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.A. Russell........ Date.17/12/97

Upscreening Engineer

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

Upscreening Manager

RADIATION REPORT NUMBER:- RD 252 DATE:- 16.12.97

PROJECT:- XMM RIR IN:- 79597

PART NUMBER:- 54HC10 MANUFACTURER:- STM/F

PROCUREMENT LEVEL:- ESA/SCC9201/107-04BF DATE CODE:- 9646

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:- 5

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 67 (Unbiased)	3/11/97	5	3/11/97	4 + CONTROL SAMPLE	P.O'R. IGG 16 CT
2	Initial Electrical Measurements (100% read and record)	Table 2dc of Detail Spec. Testing at IGG	3/11/97	4	3/11/97	4	P.O'R. IGG 16 CT
3	Initial Electrical Measurements (100% read and record)	Table 7 of Detail Spec. Testing at ERA	1/12/97	4	1/12/97	4	P.O'R. IGG 16 CT
4	Set-up and apply Bias per Figure 1	Verify Bias Circuit and conditions (in-situ) for all 4 test samples	1/12/97	4	1/12/97	4	P.O'R. IGG 16 CT
5	Irradiation 1 (4 samples)	Dose=100kRAD(Si) Rate=36KRAD(Si) per hour Time=2.78 hours	1/12/97	4	1/12/97	4	P.O'R. IGG 16 CT
6	Final Electrical Measurements (100% read and record)	As Test 3 At ERA	1/12/97	4	1/12/97	0	P.O'R. IGG 16 CT

Report No: RD 252	Part Type: 54HC10	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	4	10/12/97	4	IGG 18 CT
8	Test Report Collation	[redacted]	[redacted]	[redacted]	18/12/97	[redacted]	IGG 2 CT
9	Test Report Approval	[redacted]	[redacted]	[redacted]	18/12/97	[redacted]	IGG 2 CT
10	NOTES:-						

Report No: RD 252 Part Type: 54HC10 Date: 16.12.97

FAILURE LIST AND APPLICABLE NCR

Test No.	Serial Number(s)	Failed Parameter and Failure Mode	Applicable NCR
6	68, 69, 70, 71	FAIL V_{THN}, V_{THP} AND I_{DD} (PATTERNS 2-4)	–

Report No: RD 252 Part Type: 54HC10 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: 260246	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

XMM RIR 79597 RD 252	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	Acceptance	Electrical Meas	Project/Programme
Generic ESA/SCC 9000 Iss.8 Rev. E Detail As Applicable. 6	Evaluation X Element ___ Diffusion ___ Lot X 7	In-situ ___ Remote X 8	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	Sample Size: 4	Exposure	Annealing Test	Radiation Level:
COBALT 60 13	Control Devices: 1 14	Single ___ Multiple X 15	YES X NO ___ 16	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 (etc) of applicable detail specification (see Appendix A herein) excepting V_{IC} and V_{TH} measurements.
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.

SZ-TESTSYSTEME Statistics 03 Vers. 2.15 for TA10
RD252_54HC10_INIT_EMS_@_I66 / 1.0 IR 01NOV97 14 PIN CMOS

Results file : RD252_54HC10_INIT_EMS_@_I66 from: 03.11.97 / 11:32:18
Operator : PAUL RUSSELL
Part number : 54HC10
Lot number : RD252
Order number : D/C 9646
Vendor : SGS THOMSON
: CONTROL 67 ; RAD 68-71
: INITIAL EMS @ I66
: 54HC10 SCC9201/107 ISS1A RM DC 1.0 IR 01NOV97 14 PIN CMOS

Test steps

1.	Continuity test	-1.00	...	-0.30 V
2.	IDD	0	...	100 nA
3.	Func Test VCC=2V	0	...	0
4.	Func Test VCC=4.5V	0	...	0
5.	Func Test VCC=6V	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

	67	68	69	70	71
1.1 [V]	-0.61	-0.61	-0.61	-0.61	-0.61
1.2 [V]	-0.55	-0.55	-0.54	-0.54	-0.55
2.1 [nA]	1	0	0	0	0
2.2 [nA]	1	0	0	0	0
3.1 [ ]	0	0	0	0	0
3.2 [ ]	0	0	0	0	0
4.1 [ ]	0	0	0	0	0
4.2 [ ]	0	0	0	0	0
5.1 [ ]	0	0	0	0	0
5.2 [ ]	0	0	0	0	0
6.1 [nA]	-0.0	-0.0	-0.0	-0.0	-0.0
6.2 [nA]	-0.0	0.0	-0.0	0.0	0.0
7.1 [nA]	-0.0	-0.0	-0.0	0.0	-0.0
7.2 [nA]	0.0	0.0	0.0	0.0	0.0
8.1 [mV]	1.9	2.0	2.0	2.0	2.0
8.2 [mV]	2.0	2.1	2.1	2.1	2.1
9.1 [mV]	1.3	1.3	1.2	1.2	1.3
9.2 [mV]	1.9	1.9	1.8	1.8	2.0
10.1 [mV]	1.9	1.9	1.7	1.6	2.0
10.2 [mV]	3.6	3.5	3.3	3.2	3.7
11.1 [mV]	105.4	106.8	106.5	106.5	104.7
11.2 [mV]	115.0	118.4	118.3	118.2	115.9
12.1 [mV]	104.4	105.5	105.2	105.1	103.6
12.2 [mV]	115.8	118.9	118.8	118.6	116.5
13.1 [V]	2.00	2.00	2.00	2.00	2.00
13.2 [V]	2.00	2.00	2.00	2.00	2.00
14.1 [V]	4.50	4.50	4.50	4.50	4.50
14.2 [V]	4.50	4.50	4.50	4.50	4.50
15.1 [V]	5.99	5.99	5.99	5.99	5.99
15.2 [V]	5.99	5.99	5.99	5.99	5.99
16.1 [V]	4.37	4.37	4.37	4.37	4.37
16.2 [V]	4.38	4.37	4.37	4.37	4.38
17.1 [V]	5.86	5.86	5.86	5.86	5.86
17.2 [V]	5.86	5.86	5.86	5.86	5.86

SZ-TESTSYSTEME Statistics 03 Vers. 2.15 for TA10
RD252_54HC10_POST_ANNEAL_EMS / 1.0 IR 01NOV97 14 PIN CMOS

Results file : RD252_54HC10_POST_ANNEAL_EMS from: 10.12.97 / 14:03:34
Operator : PAUL RUSSELL
Part number : 54HC10
Lot number : RD252
Order number : D/C 9646
Vendor : SGS THOMSON
: CONTROL 67 ; RAD 68-71
: POST ANNEAL EMS
: 54HC10 SCC9201/107 ISS1A RM DC 1.0 IR 01NOV97 14 PIN CMOS

Test steps

1.	Continuity test	-1.00	...	-0.30	V
2.	IDD	0	...	100	nA
3.	Func Test VCC=2V	0	...	0	
4.	Func Test VCC=4.5V	0	...	0	
5.	Func Test VCC=6V	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

	67	68	69	70	71
1.1 [V]	-0.61	-0.60	-0.60	-0.60	-0.60
1.2 [V]	-0.54	-0.52	-0.53	-0.52	-0.53
2.1 [nA]	11	9	13	13	14
2.2 [nA]	11	9	13	13	14
3.1 [ ]	0	0	0	0	0
3.2 [ ]	0	0	0	0	0
4.1 [ ]	0	0	0	0	0
4.2 [ ]	0	0	0	0	0
5.1 [ ]	0	0	0	0	0
5.2 [ ]	0	0	0	0	0
6.1 [nA]	-0.1	-0.1	-0.1	-0.1	-0.1
6.2 [nA]	-0.0	-0.0	-0.0	-0.0	-0.0
7.1 [nA]	-0.0	-0.0	-0.0	0.0	-0.0
7.2 [nA]	0.0	0.0	0.0	0.0	0.0
8.1 [mV]	2.0	2.6	2.5	2.6	2.6
8.2 [mV]	2.1	2.7	2.6	2.7	2.8
9.1 [mV]	1.4	1.1	1.2	1.1	1.0
9.2 [mV]	2.0	1.3	1.4	1.2	1.2
10.1 [mV]	2.0	1.5	1.8	1.3	1.2
10.2 [mV]	3.7	2.4	2.7	2.1	2.0
11.1 [mV]	107.0	125.6	124.9	128.5	125.9
11.2 [mV]	117.4	138.9	137.1	141.2	138.5
12.1 [mV]	106.4	119.8	119.8	122.0	119.0
12.2 [mV]	118.6	134.5	133.4	136.0	132.5
13.1 [V]	2.00	2.00	2.00	2.00	2.00
13.2 [V]	2.00	2.00	2.00	2.00	2.00
14.1 [V]	4.50	4.50	4.50	4.50	4.50
14.2 [V]	4.50	4.50	4.50	4.50	4.50
15.1 [V]	5.99	6.00	6.00	6.00	6.00
15.2 [V]	5.99	6.00	6.00	6.00	6.00
16.1 [V]	4.37	4.36	4.36	4.35	4.36
16.2 [V]	4.37	4.36	4.36	4.36	4.36
17.1 [V]	5.86	5.85	5.85	5.85	5.85
17.2 [V]	5.86	5.85	5.85	5.85	5.85

I.G.G. COMPONENT TECHNOLOGY LTD.

REPORT NO. RD252

PART TYPE 54HC10 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	
67	-1.12	0.71	18	30	28	26	
68	-1.13	0.71	18	30	27	25	
69	-1.11	0.72	18	30	27	25	
70	-1.12	0.72	18	29	26	24	
71	-1.13	0.70	18	30	24	25	
Limit	$\geq$ -1.45 V $\leq$ -0.45 V	$\geq$ 0.45 V $\leq$ 1.35 V	$\leq$ 100 nA	$\leq$ 100 nA	$\leq$ 100 nA	$\leq$ 100 nA	
Condition	$V_{IN} = V_{DD} = 5V$ $I_{SS} = -10mA$ 2C = GND	$V_{IN} = V_{SS} = -5V$ $I_{DD} = 10mA$ 2C = GND	$V_{DD} = 6V$ $V_{SS} = 0V$	→	→	→	

Measured by P.A. Russell Date 1ST DEC '97

Test Equipment used:-

EQUIPMENT	CT NUMBER
TEKTRONIX 370 CURVE TRACER	CT217

I.G.G. COMPONENT TECHNOLOGY LTD.

REPORT NO. RD252

PART TYPE 54HC10 OPTION SHEET 2 OF 3

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

POST RAD 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	
67	-1.12	0.71	-8	-18	-15	-12	
68 FAIL	+0.94	-0.87	-7	5.1 mA	5.6 mA	4.9 mA	
69 FAIL	+0.92	-0.86	-7	4.1 mA	4.6 mA	3.9 mA	
70 FAIL	+1.00	-0.90	-3	9.7 mA	9.8 mA	8.4 mA	
71 FAIL	+0.98	-0.89	-5	7.7 mA	8.5 mA	7.3 mA	
Limit	≥ -2.00 V ≤ -0.20 V	≥ 0.40 V ≤ 1.90 V	≤ 50 μA	≤ 50 μA	≤ 50 μA	≤ 50 μA	
Condition	$V_{IN} = V_{DD} = 5V$ $I_{SS} = -10mA$ 2C = GND	$V_{IN} = V_{SS} = -5V$ $I_{DD} = 10mA$ 2C = GND	$V_{DD} = 6V$ $V_{SS} = 0V$	→	→	→	

Measured by P.A. Russell Date 1ST DEC '97

Test Equipment used:-

EQUIPMENT	CT NUMBER
TEKTRONIX 370 CURVE TRACER	CT217

I.G.G. COMPONENT TECHNOLOGY LTD.

REPORT NO. R252

PART TYPE 54HC10 OPTION SHEET 3 OF 3

ELECTRICAL MEASUREMENTS w.r.t. XM-PL-IGG-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	
67	-1.12	0.72	6	13	10	10	
68	-1.10	1.02	6	14	11	11	
69	-1.10	1.01	7	14	11	11	
70	-1.03	1.07	7	15	12	12	
71	-1.12	1.05	7	14	12	11	
Limit	≥ -1.45 V ≤ -0.45 V	≥ 0.45 V ≤ 1.35 V	$\leq$ 100 nA	$\leq$ 100 nA	$\leq$ 100 nA	$\leq$ 100 nA	
Condition	$V_{IN} = V_{DD} = 5$V $I_{SS} = -10$ mA 2C = GND	$V_{IN} = V_{SS} = -5$V $I_{DD} = 10$ mA 2C = GND	$V_{DD} = 6$V $V_{SS} = 0$V	→	→	→	

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

Test Equipment used:-

EQUIPMENT	CT NUMBER
TEKTRONIX 370 CURVE TRACER	CT217

Page of

Report No: 79597 Part Type: 54HC10D 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
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*
ITAL CMOS FAMILY DATA ENTRY S/W V:5.30

T PGM: SCC9201/107 V:2.0
ICE : 54HC10/2I1RH TYPE: 14-PIN

EFAULT CONDITIONS*

STS*	*LIMITS*	*CONDITIONS*
FUNCTIONAL		VDD= 6.00 S/D=300
VOH	5.90 V	VDD= 6.00
VOL	0.10 V	VDD= 6.00
IIN	50 NA	VDD= 6.00 VIN=VSS
IIN	50 NA	VDD= 6.00 VIN=VDD
IDD	0.1 UA	VDD= 6.00 VIN=VSS
IDD	0.1 UA	VDD= 6.00 VIN=VDD

DELTEST 3300*

GITAL CMOS FAMILY DATA ENTRY S/W V:5.20

ST PGM: SCC9201/107 V:2.0

/ICE : 54HC10/2I1RH TYPE: 14-PIN

PIN NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	PARAMETRICS			
SSIGNMENT	I	I	I	I	I	O	G	C	I	I	I	O	I	D	H	L	Z	N
TEP 0000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	-	-	-	-
0001	0	0	0	0	0	H	.	H	0	0	0	H	0	.	Y	-	-	-
0002	1	0	1	0	0	H	.	H	1	0	0	H	0	.	Y	-	-	-
0003	0	1	0	1	0	H	.	H	0	1	0	H	0	.	Y	-	-	-
0004	0	0	0	0	1	H	.	H	0	0	1	H	1	.	Y	-	-	-
0005	0	1	0	1	1	H	.	H	0	1	1	H	1	.	Y	-	-	-
0006	1	0	1	0	1	H	.	H	1	0	1	H	1	.	Y	-	-	-
0007	1	1	1	1	0	H	.	H	1	1	0	H	0	.	Y	-	-	-
0008	1	1	1	1	1	L	.	L	1	1	1	L	1	.	-	Y	-	-
0009	0	1	1	1	1	L	.	L	1	1	1	H	1	.	-	-	-	-
0010	1	0	1	1	1	L	.	L	1	1	1	H	1	.	-	-	-	-
0011	1	1	0	1	1	H	.	L	1	1	1	L	1	.	-	-	-	-
0012	1	1	1	0	1	H	.	L	1	1	1	L	1	.	-	-	-	-
0013	1	1	1	1	0	H	.	L	1	1	1	L	1	.	-	-	-	-
0014	1	1	1	1	1	L	.	H	0	1	1	L	1	.	-	-	-	-
0015	1	1	1	1	1	L	.	H	1	0	1	L	1	.	-	-	-	-
0016	1	1	1	1	1	L	.	H	1	1	0	L	1	.	-	-	-	-
0017	1	1	1	1	1	L	.	L	1	1	1	H	0	.	-	-	-	-
0018	1	0	0	0	0	H	.	H	0	0	0	H	0	.	-	-	-	-
0019	0	1	0	0	0	H	.	H	0	0	0	H	0	.	-	-	-	-
0020	0	0	1	0	0	H	.	H	0	0	0	H	0	.	-	-	-	-
0021	0	0	0	1	0	H	.	H	0	0	0	H	0	.	-	-	-	-
0022	0	0	0	0	1	H	.	H	0	0	0	H	0	.	-	-	-	-
0023	0	0	0	0	0	H	.	H	1	0	0	H	0	.	-	-	-	-
0024	0	0	0	0	0	H	.	H	0	1	0	H	0	.	-	-	-	-
0025	0	0	0	0	0	H	.	H	0	0	1	H	0	.	-	-	-	-
0026	0	0	0	0	0	H	.	H	0	0	0	H	1	.	-	-	-	-

DELTEST 3300
DIGITAL CMOS FAMILY RUN-TEST S/W V:5.30

TEST PGM: SCD9201/107 V:2.0
DEVICE : 54HC10/2I1RH TYPE: 14-PIN

OPERATOR: CONAN SWATTON
DATE   : 18/09/97
BATCH   : RIP:79597
MANF LOT: D/C:9646
DISC LOG: DISABLED

(GUARD BAND IN)

DEVICE: 67

TESTS		*RESULTS*
1- FUNCTIONAL		PASS
2- VOH	6:	6.01 V
3- VOL	6:	< 0.01 V
4- IIN	1:	3 NA
5- IIN	9:	18 NA
6- IDD		19 NA
7- IDD		50 NA

TEST PIN	VOH (V)	VOL (V)	IIN (NA)	IIN (NA)
1	.....	.....	3	-18
2	.....	.....	2	-6
3	.....	.....	3	6
4	.....	.....	2	3
5	.....	.....	1	3
6	6.01	< 0.01	.....	.....
7	.....	.....	.....	.....
8	6.01	< 0.01	.....	.....
9	.....	.....	2	18
10	.....	.....	2	5
11	.....	.....	3	5
12	6.01	< 0.01	.....	.....
13	.....	.....	2	2
14	.....	.....	.....	.....

DEVICE: 68

TESTS		*RESULTS*
1- FUNCTIONAL		PASS
2- VOH	6:	6.00 V
3- VOL	6:	< 0.01 V

```
IIN              1:       3 NA
IIN              9:      18 NA
IDD                      19 NA
IDD                      50 NA


T   VOH      VOL      IIN      IIN
    (V)      (V)      (NA)     (NA)

   .....    .....        3      -18
   .....    .....        2       -6
   .....    .....        3        6
   .....    .....        2        6
   .....    .....        1        3
    6.00   < 0.01     .....    .....
   .....    .....    .....    .....
    6.00   < 0.01     .....    .....
   .....    .....        2       18
   .....    .....        2        5
   .....    .....        3        5
    6.00   < 0.01     .....    .....
   .....    .....        1        2
   .....    .....    .....    .....
```

```
ICE:     69

ESTS*              *RESULTS*
 FUNCTIONAL            PASS
 VOH              6:    6.00 V
 VOL              6:  < 0.01 V
 IIN              1:       3 NA
 IIN              2:     -24 NA
 IDD                      19 NA
 IDD                      50 NA


T   VOH      VOL      IIN      IIN
    (V)      (V)      (NA)     (NA)

   .....    .....        3      -18
   .....    .....        2      -24
   .....    .....        3        6
   .....    .....        2        6
   .....    .....        1       17
    6.00   < 0.01     .....    .....
   .....    .....    .....    .....
    6.00   < 0.01     .....    .....
   .....    .....        2        2
   .....    .....        2        5
   .....    .....        3        5
    6.00   < 0.01     .....    .....
   .....    .....        2        2
   .....    .....    .....    .....
```

```
ICE:     70

ESTS*              *RESULTS*
 FUNCTIONAL            PASS
 VOH              6:    6.01 V
 VOL              6:  < 0.01 V
```

	1:	3 NA
N	9:	18 NA
D		19 NA
D		50 NA

VOH (V)	VOL (V)	IIN (NA)	IIN (NA)
.....	.....	3	-18
.....	.....	2	-6
.....	.....	3	6
.....	.....	2	6
.....	.....	1	3
6.00	< 0.01	.....	.....
.....	.....	.....	.....
6.00	< 0.01	.....	.....
.....	.....	2	18
.....	.....	2	5
.....	.....	3	5
6.00	< 0.01	.....	.....
.....	.....	1	2
.....	.....	.....	.....

E: 69

TS*		*RESULTS*
JNCTIONAL		PASS
JH	6:	6.00 V
JL	6:	< 0.01 V
IN	1:	3 NA
IN	2:	-24 NA
DD		19 NA
DD		50 NA

VOH (V)	VOL (V)	IIN (NA)	IIN (NA)
.....	.....	3	-18
.....	.....	2	-24
.....	.....	3	6
.....	.....	2	6
.....	.....	1	17
6.00	< 0.01	.....	.....
.....	.....	.....	.....
6.00	< 0.01	.....	.....
.....	.....	2	2
.....	.....	2	5
.....	.....	3	5
6.00	< 0.01	.....	.....
.....	.....	2	2
.....	.....	.....	.....

E: 70

TS*		*RESULTS*
JNCTIONAL		PASS
OH	6:	6.01 V

```
IIN                1:        3 NA
IIN                3:       24 NA
IDD                           . NA
IDD                          50 NA
```

VOH (V)	VOL (V)	IIN (NA)	IIN (NA)
.....	.....	3	-2
.....	.....	2	-24
.....	.....	3	24
.....	.....	3	6
.....	.....	1	17
6.01	< 0.01	.....	.....
.....	.....	.....	.....
6.01	< 0.01	.....	.....
.....	.....	2	2
.....	.....	3	5
6.01	< 0.01	.....	.....
.....	.....	2	18
.....	.....	.....	.....

```
ICE:     71

ESTS*                  *RESULTS*
 FUNCTIONAL              PASS
 VOH                6:    6.01 V
 VOL                6: < 0.01 V
 IIN                1:       3 NA
 IIN                9:      18 NA
 IDD                          19 NA
 IDD                          50 NA
```

T	VOH (V)	VOL (V)	IIN (NA)	IIN (NA)
	.....	.....	3	-18
	.....	.....	2	-6
	.....	.....	3	6
	.....	.....	2	6
	.....	.....	1	3
	6.01	< 0.01	.....	.....
	.....	.....	.....	.....
	6.01	< 0.01	.....	.....
	.....	.....	2	18
	.....	.....	2	5
	.....	.....	3	5
	6.01	< 0.01	.....	.....
	.....	.....	2	2
	.....	.....	.....	.....

IGG

TRAVEL VISUAL INSPECTION

RIR No. 79597 TASK: 1500 PART TYPE: MICRO-CIRCUIT

ACTUAL PART MARKING: 9201107048F. MANU LOGO. 9646.

DATE CODE/LOT IDENTITY: 9646.

PACKAGE MARKING: SGS. THOMSON. M54HC10D. 9201-107-048F. Lot 9646. MANU LOGO. 2027292812 ITEM 30. CT12452.

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

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

INSPECTED BY: S French. DATE: 19-9-97

COMMENTS/OBSERVATIONS

SERIAL NUMBER CHECKLIST

KEY TO CODES USED ON THIS LIST

0	=	DELIVERED TO IGG	L3E	=	LAT3 ELECTRICAL MEASUREMENT
DPA	=	IGG DPA SAMPLE	L3D	=	LAT3 DESTRUCT
RM	=	REJECT AT MANUFACTURER	L2	=	LAT 2
NCR	=	REJECT AT IGG	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