The equipment bought under this project is used to study the reliability of devices fabricated on SIMOX substrates. SIMOX (separation-by-implantation-of-oxygen) material is used primarily for low power IC application. The reliability of devices fabricated on SIMOX substrates is influenced by oxide degradation due to charge trapping, interface state generation, and bulk trap generation in SIMOX.
FINAL TECHNICAL REPORT
ON
SIMOX EVALUATION PROGRAM
(Grant #F49620-97-0516)

Submitted to
AIR FORCE OFFICE OF SCIENTIFIC RESEARCH /NE
110 Duncan Avenue Room B115
Bolling AFB DC 20332-8050

BY
Dr. Tarak Bhar
Dept. of Arch. Engr. and Tech.
University of the District of Columbia
4200 Connecticut Avenue NW
Washington DC 20008
FINAL TECHNICAL REPORT ON
SIMOX EVALUATION PROGRAM

Period Covered: 15 July 1997- 14 March 1998 (including two months extension)

A. The “SIMOX (separation-by-implantation-of-oxygen) Evaluation Program” funded by AFOSR/NE is intended for acquisition of scientific equipment to do research on the evaluation of SIMOX material by avalanche injection technique. Due to unavoidable circumstances in the DC government approval process (Exhibit 1), the specified period of the project was extended for an additional two months ending on 14 March 1998

B. The following is a list of equipment acquired under the project:

1. Keithly Instruments Inc. (Exhibit 2)
   C/O Technical Representatives
   PO Box 5176
   Cleveland, OH 44190

   Date of Order: 02/17/98

   Equipment bought:                          Cost:  
   1 Model 82 Win C-V System                  $28,722.99  
   1 Model 237 SMU                            5,756.40  
   1 Test Point Software Package              895.50  
   1 Model 7001 80 Channel Switch System      1,705.50  
   1 Model 7153 4X5 H/V Low Current Matrix Card 2,308.50  
   2 Model 7153 TR X Low Noise Cable          1,215.00  
   4 237-BNC-TRX3 Lug Female Triax to Male BNC Adapter 342.00
   Subtotal:                                 $40,945.89

2. Manufacturer: Hewlett Packard Company (Exhibit 3)
   2101 Gaither Road
   Rockville, MD 20850

   Date of Order: 02/14/98

   Equipment bought:                          Cost:  
   1 Model 3245A Function Generator           $4,545.00  
   1 Option 002 10 X High Voltage Amplifier   1,431.00  
   Subtotal:                                 $5,976.00
2. Manufacturer: COMP USA (Exhibit 4)
8357 Leesburg Pike
Vienna, VA 22182
Date of Purchase: 03/13/98

Equipment bought:                                      Cost:
1 HP 8275 PII 300 48/8 Computer                       $1,924.97
1 HP 17.28 M70 MM Monitor                             624.97
1 HP Deskjet 722C                                     274.97
1 CUSA CBL Gold IEEE #128V                            34.99
1 PNY 32 MB SDRAM                                      129.99
Subtotal:                                              $2,989.89

Total:                                                $49,911.78

C. The following is a list of changes to the equipment listed in the proposal:

Model 5958 Software
Model 6157 Electrometer is replaced by:
Model 7058 Switch Card
(All from Keithly Insts)

237 High Voltage SMU
237 Test Point Software Package
7153 Matrix Card
7153 Low Noise Cable
237 Female to Male Adapter
(All from Keithley Insts)

D. The equipment bought under this project is used to study the reliability of devices fabricated on SIMOX substrates. SIMOX (separation-by-implantation-of-oxygen) material is used primarily for low power IC application. The reliability of devices fabricated on SIMOX substrates is influenced by oxide degradation due to charge trapping, interface state generation, and bulk trap generation in SIMOX BOX. Also, the SIMOX BOX must be radiation hardened for defense and space applications. It is therefore necessary to precisely determine and control the densities and cross-sections of electron and hole traps in the BOX. Avalanche injection of charge is used to fill traps. High frequency capacitance-voltage (C-V) curves is used to measure and characterize the trapped charge.
December 3, 1997

Ms. Jennifer L. Bell
Post Award Specialist
U.S. Air Force Office of Scientific Research
110 Duncan Avenue (Room B115)
Bolling Air Force Base
Washington, D.C. 20332-8050
(Re:F49620-97-0516)

Dear Ms. Bell:

We refer to the currently awarded AFOSR grant, reference number F49620-97-0516, entitled, “Simox Evaluation Program”. The University has experienced innumerable delays in getting the grant’s spending authority established, relative to FY-1998, in the D.C. Government’s Management System. These delays have materially affected our ability to successfully order and subsequently pay for the equipment specified in the grant. Therefore, a change in the grant’s ending date, until March 14, 1998, is hereby requested.

Please feel free to contact me (on 202-274-5263) or Dr. Bhar, the project director (on 274-5836) concerning this matter.

Yours truly,

Mr. L.H. Barnes
Director, Grant Administration

Dr. Tarak Bhar
Project Director
### PURCHASE ORDER

**Purchaser:**
- **Name:** Keithley Instruments, Inc.
- **Address:** C/O Technical Representatives, PO Box 5176, Cleveland, OH 44190

**Supplier:**
- **Vendor Code:** CA 0041041900

**Terms:**
- **Order Placed in Accordance With:** UDC Proc. Reg. Quot.
- **Invitation No.:** 00000000
- **Date:** 02/17/98
- **Date of Order:** 02/17/98

**Line No.** | **Fund** | **Area** | **Org** | **Sub Org** | **Function** | **OBJ** | **Job Number** | **Category** | **Amount** |
---|---|---|---|---|---|---|---|---|---|
01 | 413 | 04 | F050 | | U300 | 702 | | | 40,605.89 |
02 | 413 | 04 | F050 | | U300 | 702 | | | 342.00 |

**Line No.** | **Item No.** | **Quantity** | **Unit** | **Unit Cost** | **Extended Cost** |
---|---|---|---|---|---|
001 | 82WIN C-V SYSTEM | 1.00 EA | 1 | 28,722.90 | 28,722.99 |
002 | 257 SMU 257 H/V SOURCE MEASURE UNIT DENO | 1.00 EA | 1 | 5,756.40 | 5,756.40 |
003 | 257 TEST POINT SOFTWARE PACKAGE | 1.00 EA | 1 | 895.00 | 895.00 |
004 | 7000 80 CHANNEL SWITCH SYSTEM MAINFRAME | 1.00 EA | 1 | 1,705.50 | 1,705.50 |
005 | 7153 4X5 H/V LOW CURRENT MATRIX CARD | 2.00 EA | 1 | 2,300.75 | 2,300.50 |
006 | 7153 TRX LOW NOISE M-SERIES TO 3-SLOT TRIAX CABLE | 4.00 EA | 1 | 2,215.00 | 2,215.00 |
007 | 257 BNC-TRX 5 LUG FEMALE TRIAX TO MALE BNC ADAPTER | 1.00 EA | 1 | 342.00 | 342.00 |

**Total Extended Cost:** 60,965.89

---

**Agency Certification:**

*Signature*

**Date:** 02/19/98

---

**Vendor: Whoever**

*Signature*

**Date:** 02/19/98

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**Page:** 01/01

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**Vendor Copy**
**GOVERNMENT OF THE DISTRICT OF COLUMBIA**

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**NAME:** HEWLETT PACKARD COMPANY

**ADDRESS:** 2101 GAITHER ROAD

**ROCKVILLE** MD 20850

**VENDOR CODE**

[CA | 0551 | 8973200]

**ALL CHARGES PREPAID TO:**

UNIVERSITY OF DC

4200 CONNECTICUT AVE N.W.

WASHINGTON DC 20008

RECEIVING BLDG 38 C-LEVEL

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MARKED FOR: DR. TARAK BHAR, BLDG. 42/109

AUTHORIZED PROCUREMENT SIGNATURE

PR#30460

AJ

[Signature]

**SEND INVOICES WITH IDENTIFYING PURCHASE ORDER NUMBER TO:**

University of D.C.-Van Ness Campus

Accounting Office-Bldg 48/Room 538

4200 Connecticut Avenue, N.W.

Washington, D.C. 20008

**AGENCY CERTIFICATION:**

I certify that the items herein have been charged to the correct accounting data listed above. These accounting codes are under the jurisdiction of the agency.

[Signature]

**CERTIFICATE OF ACCEPTANCE INTO PMS**

I certify that this document was accepted into PMS.

DATE ACCEPTED: 01-31-98

BY: [Signature]

**TOTAL EXTENDED COST:**

5,976.00

**CHECK IF THIS DOCUMENT IS CONTINUED:**

☐

**PAGE:**

01 OF 1

**VENDOR COPY**

[Stamp: FAXED 9/98]
**GOVERNMENT OF THE DISTRICT OF COLUMBIA**

**EXHIBIT 4**

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- **ADDRESS:** 8357 LEESBURG PIKE VIENNA VA 22182

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**QUOTE NO.** 93980, DATED 02/21/98

MARKED FOR: SIMOX, BLDG. 42/109, TARAK BHAR

AUTHORIZED PROCUREMENT SIGNATURE

PR#30824 AJ

FAXED

SEND INVOICES WITH IDENTIFYING PURCHASE ORDER NUMBER TO:

University of D.C.-Van Ness Campus Accounting Office-Bldg 48/Room 338 4200 Connecticut Avenue, N.W. Washington, D.C. 20008

AGENCY CERTIFICATION

I certify that the items herein have been charged to the correct accounting codes listed above. These accounting codes are under the jurisdiction of this agency.

BY:    DATE:    

CERTIFICATE OF ACCEPTANCE INTO FMIS

I certify that this document was accepted into FMIS.

DATE ACCEPTED:  02/21/98    

BY:   DATE:    

TOTAL EXTENDED COST

2,989.89