ACCEPTANCE DATA PACKAGE

NASA CONTRACT NAS8-39409

SXI STEPPER MOTOR/ENCODER

AEROFLEX P/N 16187

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B- ACCEPTANCE DATA PACKAGE

SECTION B
ACCEPTANCE DATA PACKAGE
MOTOR/ENCODER P/N 16187
DRD N° 763CM-004
TABLE OF CONTENTS

SECTION B

SECTION I

RUNNING/OPERATING TIME & CYCLE LOG

AEROFLEX

AEROFLEX LABORATORIES
35 South Service Road • Plainview, NY 11803
TEL: 516-694-6700 • FAX: 516-694-6771

Running/Operating Time & Cycle Log

I. Part Number 16187, Serial N° 0002

A. Motor/Encoder

Manufacturing	_____	1.5 Hours
Test	_____	4.5 Hours
Total		6 Hours

B. Temperature Transducer _____ 612 Hours
(5VDC Applied during
Thermal Vacuum & Cycling)

II Part Number 16187, Serial N° 0003

A. Motor/Encoder

Manufacturing	_____	1.5 Hours
RE Assembly	_____	1.5 Hours
Test	_____	4.5 Hours
Total		7.5 Hours

B. Temperature Transducer _____ 345 Hours
(5VDC Applied during
Thermal Vacuum & Cycling)

SECTION II

SERIALIZED COMPONENTS LIST

AEROFLEX

AEROFLEX
LABORATORIES

35 South Service Road • Plainview, NY 11803
TEL: 516-694-6700 • FAX: 516-694-6771

Serialization - NASA SXI Motor/Encoder

Part Nº: 16187
Unit S/N: 0002

1. Temp Xducer Filter Circuit Assy
   P/N 303-216 S/N 0002

   Printed Wiring Board
   P/N 303-217 S/N 2294-0203

2. Encoder Printed Wiring Board Assy
   P/N 21664 S/N 0002

   Printed Wiring Board
   P/N 21665 S/N 2394-05-01

   Phototransistor
   P/N 565304-1
   CR1 - S/N 042
   CR2 - S/N 040
   CR3 - S/N 045
   CR4 - S/N 056
   CR5 - S/N 054

3. LED Printed Wiring Board Assy
   P/N 21774 S/N 0002

   Printed Wiring Board
   P/N 21775

   LED
   P/N 565305-1
   DS1 - S/N 141
   DS2 - S/N 158
   DS3 - S/N 218
   DS4 - S/N 187
   DS5 - S/N 221

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Serialization - NASA SXI Motor/Encoder

Part Nº: 16187
Unit S/N: 0003

1. Temp Xducer Filter Circuit Assy
   P/N 303-216 S/N 0003

   Printed Wiring Board
   P/N 303-217 S/N 2294-0301

2. Encoder Printed Wiring Board Assy
   P/N 21664 S/N 0003

   Printed Wiring Board
   P/N 21665 S/N 2394-11-01

   Phototransistor
   P/N 565304-1
   CR1 - S/N 036
   CR2 - S/N 037
   CR3 - S/N 038
   CR4 - S/N 048
   CR5 - S/N 049

3. LED Printed Wiring Board Assy
   P/N 21774 S/N 0003

   Printed Wiring Board
   P/N 21775

   LED
   P/N 565305-1
   DS1 - S/N 235
   DS2 - S/N 240
   DS3 - S/N 418
   DS4 - S/N 430
   DS5 - S/N 420

SECTION III

TEST HISTORY LOG

.TEST HISTORY LOG

(a) RECORDED MEASUREMENTS

All measurements made during testing are recorded in ATP 20049 - DS data sheets and are included in this log.

(b) TEST SUMMARY

The motor/encoder (henceforth referred to as the UUT) test sequence began with a baseline functional evaluation, which demonstrated that the motor satisfied the operating torque, cogging torque, winding resistance, and mechanical requirements of SOW. In addition, the encoder electrical requirements were verified, as well as the alignment of the encoder outputs relative to the motor shaft position. There were no discrepancies observed in this portion of the test.

The UUT was then exposed to a number of environments, including thermal vacuum, thermal cycling, random and sine vibration, and mechanical shock. During the thermal environments, the performance of the UUT under load was verified at specified points in the cycles, as described in ATP 20049. In addition, the UUT was bench tested between the two thermal environments. No anomalies were observed during the thermal tests.

The vibration and shock tests were performed by East-West Technology Corporation, West Babylon, New York. The UUT was delivered to the lab in a sealed vibration fixture in order to maintain the cleanliness levels required by the SOW. In addition, a three ounce load was attached to the motor shaft. The attachment method of this load caused damage to the shaft and bearing during random vibration of S/N 0003 on April 28,1995, and is described further in NCR 00168.

The load attachment method was subsequently corrected, and vibration of S/N 0002 began while 0003 was being repaired. The performance of the UUT was verified at Aeroflex after each environment was completed, as shown in ATP 20049. No additional failures were noted.

The final test of the UUT was a repeat of the baseline functional tests. Again, no anomalies were observed.

(c) UNACCOMPLISHED TESTS

This section is not applicable.

(d) RETEST STATUS

Serial number 0003 was retested after repair on June 1,1995 according to the following paragraphs in ATP -20049 - DS:

1.1 COGGING TORQUE

1.2 OPERATING TORQUE

1.3 STALL TORQUE

3.1 ENCODER POSITION 1 AND OUTPUT VOLTAGE

3.2 ENCODER POSITION VERIFICATION

4.3 RADIAL DEFLECTION

No anomalies were observed, and environmental testing resumed.

(e) SPECIAL TESTING PROBLEMS

The major difficulty encountered during testing was in securing the UUT inside the vibration fixture without causing damage to the wires, shaft, and bearing. These fixturing problems were anticipated prior to vibration, with the exception of the previously mentioned load attachment to the shaft.

(f) FAILURE AND CORRECTIVE ACTION DATA

Refer to NCR 00168 and Corrective Action Report M13640.

QA 7/20/95

Postscript: The motors were tested for 12 VDC stall and operating torque as a result of a verbal request by NASA Engineers, and was not officially incorporated in the ATP. This operating voltage is a more stringent requirement on the motor performance, and successful completion of these tests assures successful performance at the 22 V operating point called out in the SOW.

S/N 0002 was tested for 12 V stall at the final functional test and resulted in 8.5 oz-in stall torque, less cogging torque.

S/N 0003 was tested for 12V operating and stall torque at both the baseline functional and the final functional tests. The final functional test results were :

6.5 RPM at 5.5 oz-in load
8.5 oz-in stall torque, less cogging torque

In addition, in Par. 1.2 of the ATP data sheets for S/N 0003 (rework), the required operating voltage "22 VDC to 25 VDC" was not crossed out. Instead, the phrase "Checked at 12 V" was added and the test was performed at 12 VDC.

S/N 0002 WAS TESTED FOR ~~OPERATING~~ OPERATING TORQUE AT 22 VDC. D.H. 7/20/95

The rationale for not testing 0002 at the baseline functional for 12 V operation is that the request from NASA came after the baseline was completed and the unit was undergoing environmentals.

APPLICATION	
NEXT ASSY	USED ON

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
B	INITIAL RELEASE	9-1-94	

ACCEPTANCE TEST DATA SHEETS
ATP 20049
P/N 16187
STEP MOTOR/ENCODER

DATA REVIEW AND APPROVAL:

AEROFLEX QUALITY ASSURANCE _____

DCAS _____

AEROFLEX TEST ENGINEERING _____ 6/30/95

S/N 0002

ALL PAGES ARE OF ORIGINAL ISSUE EXCEPT AS NOTED	SHEET	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
	REV.	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B																			

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES TOLERANCES: FRAC. DEC. ANG.	ORIG. DATE OF DWG.	AEROFLEX LABORATORIES INCORPORATED, PLAINVIEW N.Y. 11803 (AN ARX COMPANY)	
	DRAWN		
	CHECKED		
MATERIAL	ENGNRG 9-1-94	Acceptance Test Data Sheets - For P/N 16187 Stepper Motor/Encoder	
	DESIGN 9-1-94		
FINISH	QA	SIZE A / CAGE CODE 88379 / ATP 20049 DS	
	MFG.	SCALE / WEIGHT / SHEET 1	

ARESCO, HICKSVILLE, N.Y. - OGILVIE 075/69

ARX-11-85

1.0 TORQUE AND OPERATING POINT

1.1 DETENT TORQUE

Cogging through three detent positions 0.25 oz-in min

1. 2.0 oz-in.
2. 3.1 oz-in.
3. 2.3 oz-in.

04.27.95

1.2 OPERATING TORQUE

Motor rotates 6 RPM min when 4.8 pps at 22 VDC to 25 VDC is applied with 5.5 oz-in load.

6 RPM

04.27.95

1.3 STALL TORQUE

6 oz-in minimum at 22 VDC

16 oz-in

- Detent torque in 1.1= 13.7 oz-in

Stall torque

04.27.95

2.0 MOTOR ELECTRICAL CHARACTERISTICS

2.1 STEP ANGLE

Motor lead #1(+22 VDC) to motor lead #3 (RTN) cw rotation ✓

7.5 +/- 0.75 degrees ✓

Motor lead #2 (+22 VDC) to motor lead #4 (RTN) cw rotation ✓

7.5 +/-0.75 degrees ✓

04.27.95

2.2 WINDING RESISTANCE AT 20 DEG C

Room ambient temperature 25 deg C

Resistance between wires 1 and 3 82.4 ohms

Resistance calculated for 20 degrees C 80.8 ohms

77.6 ohms minimum

04.27.95

SIZE	CAGE CODE	ATP 20049 A5
A	88379	
SCALE	REV. B	SHEET 2

ARESCO, HICKSVILLE, N.Y. - OGILVIE 075900

Resistance between wires 3 and 4 82.7 ohms

Resistance calculated for 20 degrees C 81.1 ohms
77.6 ohms minimum

2.3 WINDING INDUCTANCE

Inductance between wires 1 and 3 19.0 mH

Inductance between wires 2 and 4 19.0 mH
These values are for reference only.

04.27.95

2.4 INSULATION RESISTANCE AND DIELECTRIC STRENGTH POST-IMPREGNATION

Tie together motor leads 1 and 3, 2 and 4

2.4.1 INSULATION RESISTANCE

100 VDC between 1,3 and 2,4	>1000	Megohms (100 Megohms min)
100 VDC between 1,3 and housing	>1000	Megohms (100 Megohms min)
100 VDC between 2,4 and housing	>1000	Megohms (100 Megohms min)

04.27.95

2.4.2 DIELECTRIC STRENGTH

125 VRMS between 1,3 and 2,4	42	microamps (100 microamps max leakage)
125 VRMS between 1,3 and housing	26	microamps (100 microamps max leakage)
125 VRMS between 2,4 and housing	27	microamps (100 microamps max leakage)

04.27.95

3.0 ENCODER ELECTRICAL CHARACTERISTICS

3.1 ENCODER POSITION 1 AND OUTPUT VOLTAGE

Encoder position 1 is according to Table 1 ___✓___ check

Output voltage across bit 4 is 3.5 Vdc min at 4.8 VDC min
5.0 VDC max ___✓___ check

04.27.95

3.2 ENCODER POSITION VERIFICATION

Encoder position 2 through 12 is according to Table 1 ___✓___ check 04.27.95

4.0 MOTOR/ENCODER PHYSICAL CHARACTERISTICS

4.1 SIZE AND CONFIGURATION

Check that critical dimensions from MSFC drawing SXI-201 and Aeroflex drawing 200-38 are satisfied ___✓___ check

4.2 WEIGHT

Motor/Encoder weight 14.85 ounces
Lead wire weight - 2.8 ounces
= 12.05 ounces
15 ounces max

04.26.95

4.3 RADIAL DEFLECTION

9.0 +/- 0.1 lb force applied on the shaft in accordance with MSFC drawing SXI-201, Proof Load Diagram 0.0014 inches

0.0015 inches max

4/27/95

SIZE	CAGE CODE	ATP 20049 DS
A	88379	
SCALE	REV. B	SHEET 4

ARESCO, HICKSVILLE, N.Y. - OGILVIE 075980

5.0 ENVIRONMENTAL TESTS

5.1 THERMAL VACUUM

5.1.1 AMBIENT TEMPERATURE AND PRESSURE

Connect AD590 temperature sensor to the trim circuit in Figure 3. Record the output. 295 mv

Calculate the ambient temperature : mv output - 273 = temperature in degrees C 22 °C

Verify step rotation cw from zero position with wire # 1 (+ 22 VDC) and wire #3 (RTN) ✓ check

Verify encoder output at step 4 in table 1 ✓ check

Seal the vacuum container and remove from the clean room. D. Hubble 4/28/95

5.1.2 THERMAL VACUUM FUNCTIONAL TESTS

5.1.2.1 OPERATION UNDER LOAD

11 VDC min, 12.5 VDC max to the motor drive circuit.
5 VDC +/- 0.2 V to the encoder input wires.

a. Baseline, 25 degrees C recorder trace:

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check D. Hubble 5/1/95

b. Cycle 1, 50 degrees C recorder trace:

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check D. Hubble 5/4/95

c. Cycle 1, -40 degrees C recorder trace:

No interruptions in motor or encoder traces ___✓___ check

3.5 V minimum encoder output ___✓___ check 5/8/95

d. Cycle 2, 50 degrees C recorder trace :

No interruptions in motor or encoder traces ___✓___ check

3.5 V minimum encoder output ___✓___ check 5/11/95

e. Cycle 2, -40 degrees C recorder trace : ✓

No interruptions in motor or encoder traces _____ check

3.5 V minimum encoder output ___✓___ check 5/12/95

f. Cycle 3, 50 degrees C recorder trace :

No interruptions in motor or encoder traces ___✓___ check

3.5 V minimum encoder output ___✓___ check 5/12/95

g. Cycle 3, -40 degrees C recorder trace :

No interruptions in motor or encoder traces ___✓___ check

3.5 V minimum encoder output ___✓___ check 5/15/95

h. Final test, 25 degrees C recorder trace:

No interruptions in motor or encoder traces ___✓___ check

3.5 V minimum encoder output ___✓___ check 5/15/95

5.1.2.2 STALL OPERATION, THERMAL VACUUM

Disconnect the motor from the test circuit. Apply 200 ma through wires #1 and #3 for 30 seconds. Repeat according to paragraph 4.1.3.2 of the test procedure.

a. Baseline, 25 degrees C recorder trace:

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check D. Hubbell 5/1/95

b. Cycle 1, 50 degrees C recorder trace:

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check D. Hubbell 5/4/95

c. Cycle 1, -40 degrees C recorder trace:

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check D. Hubbell 5/8/95

d. Cycle 2, 50 degrees C recorder trace :

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check D. Hubbell 5/11/95

e. Cycle 2, -40 degrees C recorder trace :

No interruptions in motor or encoder traces ___✓___ check

3.5 V minimum encoder output ___✓___ check

f. Cycle 3, 50 degrees C recorder trace : S. Harlee 5/12/95

No interruptions in motor or encoder traces ___✓___ check

3.5 V minimum encoder output ___✓___ check S. Harlee 5/12/95

g. Cycle 3, -40 degrees C recorder trace :

No interruptions in motor or encoder traces ___✓___ check

3.5 V minimum encoder output ___✓___ check S. Harlee 5/15/95

h. Final test, 25 degrees C recorder trace:

No interruptions in motor or encoder traces ___✓___ check

3.5 V minimum encoder output ___✓___ check S. Harlee 5/15/95

5.2 THERMAL CYCLING TEST AMBIENT PRESSURE

5.2.1 PRE-THERMAL CYCLING PERFORMANCE TEST

5.2.1.1 STALL TORQUE

6 oz-in minimum at 22 VDC ___17.5___ oz-in

- Detent torque in 1.1= 2.3 oz-in

Stall torque ___15.2___ oz-in

5.2.1.2 STEP ANGLE

Motor lead #1(+22 VDC) to motor lead #3 (RTN) cw rotation ___✓___

7.5 +/- 0.75 degrees ___✓___

SIZE	CAGE CODE	
A	88379	ATP 20049 DS
SCALE	REV. B	SHEET 8

Motor lead #2 (+22 VDC) to motor lead #4 (RTN) cw rotation ✓
- 7.5 +/-0.75 degrees ✓

5.2.1.3 ENCODER POSITION 1 AND OUTPUT VOLTAGE

Encoder position 1 is according to Table 1 ✓ check

Output voltage across bit 4 is 3.5 Vdc min at 4.8 VDC min 5.0 VDC max ✓ check

5.2.1.4 ENCODER POSITION VERIFICATION

Encoder position 2 through 12 is according to Table 1 ✓ check
D. Hoehler 5/16/95

5.2.2 OPERATION UNDER LOAD

11 VDC min, 12.5 VDC max to the motor drive circuit.
5 VDC +/- 0.2 V to the encoder input wires.

a. Baseline, 25 degrees C recorder trace:

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check
STALL OK D. Hoehler 5/16/95

b. Cycle 1, 50 degrees C recorder trace:

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check
STALL OK D. Hoehler 5/16/95

c. Cycle 1, -40 degrees C recorder trace:

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check
STALL OK D. Hoehler 5/17/95

d. Cycle 24, 50 degrees C recorder trace :

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ STALL OK check [signature] 5/27/95

e. Cycle 24, -40 degrees C recorder trace :

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ STALL OK check [signature] 5/27/95

f. Final Test, 25 degree C recorder trace :

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ STALL OK check [signature] 5/27/95

5.3 VIBRATION AND SHOCK

5.3.1 SINE VIBRATION

Date(s) performed 6/6 - 6/7 1995

Visual Inspection 6/7/95 [signature]

5.3.1.1 STALL TORQUE

6 oz-in minimum at 22 VDC 19.0 oz-in

- Detent torque in 1.1= 2.3
Stall torque 16.7 oz-in

5.3.1.2 STEP ANGLE

Motor lead #1(+22 VDC) to motor lead #3 (RTN) cw rotation ✓
7.5 +/- 0.75 degrees ✓

Motor lead #2 (+22 VDC) to motor lead #4 (RTN) cw rotation ✓
7.5 +/-0.75
degrees ✓ D. Hurley 6/7/95

5.3.1.3 ENCODER POSITION 1 AND OUTPUT VOLTAGE

Encoder position 1 is according to Table 1 ✓ check

Output voltage across bit 4 is 3.5 Vdc min at 4.8 VDC min
5.0 VDC max ✓ check

5.3.1.4 ENCODER POSITION VERIFICATION

Encoder position 2 through 12 is according to Table 1 ✓ check D. Hurley 6/7/95

5.3.2 RANDOM VIBRATION

Date(s) performed 5/30/95

Visual Inspection ✓ D. Hurley 5/31/95

5.3.2.1 STALL TORQUE

6 oz-in minimum at 22 VDC

18.0 oz-in
- Detent torque in 1.1= 2.3 oz-in
Stall torque 15.7 oz-in

5.3.2.2 STEP ANGLE

Motor lead #1(+22 VDC) to motor lead #3 (RTN) cw rotation ✓
7.5 +/- 0.75
degrees ✓

Motor lead #2 (+22 VDC) to motor lead #4 (RTN) cw rotation ✓
7.5 +/-0.75
degrees ✓ D. Hurley 5/31/95

5.3.2.3 ENCODER POSITION 1 AND OUTPUT VOLTAGE

Encoder position 1 is according to Table 1 ✓ check

Output voltage across bit 4 is 3.5 Vdc min at 4.8 VDC min
5.0 VDC max ✓ check

5.3.2.4 ENCODER POSITION VERIFICATION

Encoder position 2 through 12 is according to Table 1 ✓ check

L. Hankle
5/31/95

5.3.3 MECHANICAL SHOCK

Date(s) performed 6/12 - 6/16 1995

Visual Inspection D Hankle

5.3.3.1 STALL TORQUE

6 oz-in minimum at 22 VDC

18.0 oz-in
- Detent torque in 1.1= 2.3 oz-in
Stall torque 15.7 oz-in

5.3.3.2 STEP ANGLE

John
06.19.95

Motor lead #1 (+22 VDC) to motor lead #3 (RTN) cw rotation ✓
7.5 +/- 0.5
degrees ✓

Motor lead #2 (+22 VDC) to motor lead #4 (RTN) cw rotation ✓
7.5 +/-0.75
degrees ✓

5.3.3.3 ENCODER POSITION 1 AND OUTPUT VOLTAGE

Encoder position 1 is according to Table 1 ✓ check

John
06.19.95

Output voltage across bit 4 is 3.5 Vdc min at 4.8 VDC min
5.0 VDC max ✓ check

5.3.3.4 ENCODER POSITION VERIFICATION

06.19.95

Encoder position 2 through 12 is according to Table 1 ✓ check

5.3.3.5 DIELECTRIC STRENGTH

06.19.95

100 VRMS between 1,3 and 2,4 — 35 microamps
100 microamps max leakage

100 VRMS between 1,3 and housing — 25 microamps
100 microamps max leakage

100 VRMS between 2,4 and housing — 25 microamps
100 microamps max leakage

5.4 FINAL FUNCTIONAL TEST

5.4.1 TORQUE AND OPERATING POINT

5.4.1.1 DETENT TORQUE

06.19.95

Cogging through three detent positions 0.25 oz-in min

1. 2.5 oz-in.
2. 2.5 oz-in.
3. 2.0 oz-in.

5.4.1.2 OPERATING TORQUE

06.19.95

Motor rotates 6 RPM min when 4.8 pps at 22 VDC to 25 VDC is applied with 5.5 oz-in load.

6.5 RPM

5.4.1.3 STALL TORQUE

06.19.95

6 oz-in minimum at 22 VDC

18. oz-in
- Detent torque in 1.1 = 2.5
Stall torque 15.5 oz-in

SIZE	CAGE CODE	
A	88379	ATP 20049 DS
SCALE	REV. B	SHEET 13

5.4.2 MOTOR ELECTRICAL CHARACTERISTICS

5.4.2.1 STEP ANGLE

Motor lead #1(+22 VDC) to motor lead #3 (RTN) cw rotation ✓
7.5 +/- 0.75 degrees ✓

Motor lead #2 (+22 VDC) to motor lead #4 (RTN) cw rotation ✓
7.5 +/-0.75 degrees ✓

06.19.95

5.4.2.2 WINDING RESISTANCE AT 20 DEG C

Room ambient temperature 24 deg C

Resistance between wires 1 and 3 81.7 ohms

Resistance calculated for 20 degrees C 80.4 ohms
77.6 ohms minimum

Resistance between wires 2 and 4 82.0 ohms

Resistance calculated for 20 degrees C 80.7 ohms
77.6 ohms minimum

06.19.95

5.4.2.3 WINDING INDUCTANCE

Inductance between wires 1 and 3 18.7 mH

Inductance between wires 2 and 4 18.6 mH
These values are for reference only.

06.19.95

5.4.3 ENCODER ELECTRICAL CHARACTERISTICS

5.4.3.1 ENCODER POSITION 1 AND OUTPUT VOLTAGE

Encoder position 1 is according to Table 1 ✓ check

Output voltage across bit 4 is 3.5 Vdc min at 4.8 VDC min
5.0 VDC max ✓ check

06.19.95

5.4.3.2 ENCODER POSITION VERIFICATION

Encoder position 2 through 12 is according to Table 1 ✓ check

06.19.95

5.4.4 RADIAL DEFLECTION

9.0 +/- 0.1 lb force applied on the shaft in accordance with MSFC drawing SXI-201, Proof Load Diagram

0.0014 inches

0.0015 inches max

6/19/95

Torque at 12.0 VDC = 10 - 2.5 = 7.5 oz-in

06.19.95

SIZE	CAGE CODE	ATP 20049 DS
A	88379	
SCALE	REV. B	SHEET 15

APPLICATION	
NEXT ASSY	USED ON

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
B	INITIAL RELEASE	9-1-94	[signature]

ACCEPTANCE TEST DATA SHEETS
ATP 20049
P/N 16187
STEP MOTOR/ENCODER

DATA REVIEW AND APPROVAL:

AEROFLEX QUALITY ASSURANCE [signature]

DCAS [signature]

AEROFLEX TEST ENGINEERING [signature] 6/30/95

S/N 0003

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	REV.	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B																			

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES TOLERANCES: FRAC. DEC. ANG.	ORIG. DATE OF DWG.	AEROFLEX LABORATORIES INCORPORATED, PLAINVIEW N.Y. 11803 — AN ARX COMPANY
	DRAWN	
	CHECKED	Acceptance Test Data Sheets - For P/N 16187 Step Motor Encoder
MATERIAL	ENGNRG [signature] 9-1-94	
	DESIGN [signature] 9-1-94	SIZE A — CAGE CODE 88379 — ATP 20049 DS
FINISH	QA	
	MFG.	SCALE — WEIGHT — SHEET 1

ARESCO, HICKSVILLE, N.Y. - OGILVIE 075769

ARX-11-85

1.0 TORQUE AND OPERATING POINT

1.1 DETENT TORQUE

Cogging through three detent positions 0.25 oz-in min

1. 1.7 oz-in.
2. 1.8 oz-in.
3. 1.7 oz-in.

04.26.95

1.2 OPERATING TORQUE

Motor rotates 6 RPM min when 4.8 pps at ~~22~~ 12 VDC to ~~25~~ 12 VDC is applied with 5.5 oz-in load.

6.5 RPM

04.26.95

1.3 STALL TORQUE

6 oz-in minimum at 22 VDC

15.5 oz-in
- Detent torque in 1.1=
Stall torque 13.7 oz-in

04.26.95

2.0 MOTOR ELECTRICAL CHARACTERISTICS

2.1 STEP ANGLE

Motor lead #1(+22 VDC) to motor lead #3 (RTN) cw rotation ✓
7.5 +/- 0.75 degrees ✓

Motor lead #2 (+22 VDC) to motor lead #4 (RTN) cw rotation ✓
7.5 +/-0.75 degrees ✓

04.26.95

2.2 WINDING RESISTANCE AT 20 DEG C

Room ambient temperature 25 deg C

Resistance between wires 1 and 3 82.8 ohms

Resistance calculated for 20 degrees C 81.2 ohms
77.6 ohms minimum

04.26.95

SIZE	CAGE CODE	
A	88379	ATP 20049 A5
SCALE	REV. B	SHEET 2

AMESCO, HICKSVILLE, N.Y. - OGILVIE 07/5900

Resistance between wires 2 and 4 83.3 ohms

Resistance calculated for 20 degrees C 81.6 ohms
77.6 ohms minimum

2.3 WINDING INDUCTANCE

Inductance between wires 1 and 3 19.0 mH

Inductance between wires 2 and 4 19.0 mH
These values are for reference only.

04.26.95

2.4 INSULATION RESISTANCE AND DIELECTRIC STRENGTH POST-IMPREGNATION

Tie together motor leads 1 and 3, 2 and 4

2.4.1 INSULATION RESISTANCE

04.28.95

100 VDC between 1,3 and 2,4	>1000 Megohms	100 Megohms min
100 VDC between 1,3 and housing	>1000 Megohms	100 Megohms min
100 VDC between 2,4 and housing	>1000 Megohms	100 Megohms min

2.4.2 DIELECTRIC STRENGTH

125 VRMS between 1,3 and 2,4	37 microamps	100 microamps max leakage
125 VRMS between 1,3 and housing	25 microamps	100 microamps max leakage
125 VRMS between 2,4 and housing	25 microamps	100 microamps max leakage

ARESCO, HICKSVILLE, N.Y. OGILVIE 075900

SIZE	CAGE CODE	
A	88379	ATP 20049 Δ5
SCALE	REV. B	SHEET 3

3.0 ENCODER ELECTRICAL CHARACTERISTICS

Julie 04.26.95

3.1 ENCODER POSITION 1 AND OUTPUT VOLTAGE

Encoder position 1 is according to Table 1 ✓ check

Output voltage across bit 4 is 3.5 Vdc min at 4.8 VDC min 5.0 VDC max ✓ check

3.2 ENCODER POSITION VERIFICATION

Encoder position 2 through 12 is according to Table 1 ✓ check Julie 04.26.95

4.0 MOTOR/ENCODER PHYSICAL CHARACTERISTICS

4.1 SIZE AND CONFIGURATION

Check that critical dimensions from MSFC drawing SXI-201 and Aeroflex drawing 200-38 are satisfied ✓ check TH

4.2 WEIGHT

Motor/Encoder weight 14.8 ounces
Lead wire weight − 2.8 ounces
= 12.0 ounces
15 ounces max

Julie 04.26.95

4.3 RADIAL DEFLECTION

3.0 +/- 0.1 lb force applied on the shaft in accordance with MSFC drawing SXI-201, Proof Load Diagram 0.0014 inches

0.0015 inches max

4/3/95

ARESCO, HICKSVILLE, N.Y. - OGILVIE 07/1980

SIZE	CAGE CODE	ATP 20049 Δ5
A	88379	
SCALE	REV. B	SHEET 4

0003 RETEST
NCR 00168

1.0 TORQUE AND OPERATING POINT

1.1. DETENT TORQUE

Cogging through three detent positions 0.25 oz-in min

Kelli M 06.01.95

1. 2.5 oz-in.
2. 1.5 oz-in.
3. 2.0 oz-in.

1.2 OPERATING TORQUE

Motor rotates 6 RPM min when 4.8 pps at 22 VDC to 25 VDC is applied with 5.5 oz-in load.

Kelli M 06.01.95

Checked at 12 V 6.5 RPM

1.3 STALL TORQUE

6 oz-in minimum at 22 VDC

18.0 oz-in
- Detent torque in 1.1= 2.5
Stall torque 15.5 oz-in

Kelli M 06.01.95

2.0 MOTOR ELECTRICAL CHARACTERISTICS

2.1 STEP ANGLE

Motor lead #1 (+22 VDC to motor lead #3 (RTN) cw rotation ✓
7.5 +/- 0.75 degrees ✓

Kelli M 06.01.95

Motor lead #2 (+22 VDC) to motor lead #4 (RTN) cw rotation ✓
7.5 +/-0.75 degrees ✓

2.2 WINDING RESISTANCE AT 20 DEG C

Room ambient temperature 22 deg C

Kelli M 06.01.95

Resistance between wires 1 and 3 82.1 ohms

Resistance calculated for 20 degrees C 81.5 ohms
77.6 ohms minimum

SIZE	CAGE CODE	ATP 20049 A5
A	88379	
SCALE	REV B	SHEET 2

ANESCO, HICKSVILLE, N.Y. - OGILVIE 075900

0003 RETEST
NCR 00168

Resistance between wires 2 and 4 835 ohms

Resistance calculated for 20 degrees C 820 ohms
77.6 ohms minimum

* 2.3 WINDING INDUCTANCE

Inductance between wires 1 and 3 19.0 mH

Inductance between wires 2 and 4 19.0 mH
These values are for reference only.

06.01.95

* 2.4 INSULATION RESISTANCE AND DIELECTRIC STRENGTH POST-IMPREGNATION

Tie together motor leads 1 and 3, 2 and 4

* 2.4.1 INSULATION RESISTANCE

100 VDC between 1,3 and 2,4 >1000 Megohms
100 Megohms min

100 VDC between 1,3 and housing >1000 Megohms
100 Megohms min

100 VDC between 2,4 and housing >1000 Megohms
100 Megohms min

* 2.4.2 DIELECTRIC STRENGTH

125 VRMS between 1,3 and 2,4 37 microamps
100 microamps max leakage

125 VRMS between 1,3 and housing 25 microamps
100 microamps max leakage

125 VRMS between 2,4 and housing 25 microamps
100 microamps max leakage

* PERFORMED DURING ORIGINAL FUNCTIONAL TEST

0003 RETEST
NCR 00168

3.0 ENCODER ELECTRICAL CHARACTERISTICS

3.1 ENCODER POSITION 1 AND OUTPUT VOLTAGE

Encoder position 1 is according to Table 1 ____✓____ check

Output voltage across bit 4 is 3.5 Vdc min at 4.8 VDC min
5.0 VDC max ____✓____ check

3.2 ENCODER POSITION VERIFICATION

Encoder position 2 through 12 is according to Table 1 ____✓____ check

4.0 MOTOR/ENCODER PHYSICAL CHARACTERISTICS

4.1 SIZE AND CONFIGURATION

Check that critical dimensions from MSFC drawing SXI-201 and Aeroflex drawing 200-38 are satisfied ____✓____ check

4.2 WEIGHT

Motor/Encoder weight 14.6 ounces
Lead wire weight - 2.3 ounces
= 12.3 ounces
15 ounces max

4.3 RADIAL DEFLECTION

9.0 +/- 0.1 lb force applied on the shaft in accordance with MSFC drawing SXI-201, Proof Load Diagram 0.0011 inches

0.0015 inches max

6/1/95

SIZE	CAGE CODE	ATP 20049 DS
A	88379	
SCALE	REV. B	SHEET 4

5.0 ENVIRONMENTAL TESTS

5.1 THERMAL VACUUM

5.1.1 AMBIENT TEMPERATURE AND PRESSURE

Connect AD590 temperature sensor to the trim circuit in Figure 3. Record the output. 295 mv

Calculate the ambient temperature :
mv output - 273 = temperature in degrees C 22 °C

Verify step rotation cw from zero position with wire # 1 (+ 22 VDC) and wire #3 (RTN) ✓ check

Verify encoder output at step 4 in table 1 ✓ check

Seal the vacuum container and remove from the clean room.

D. Hoehle 6/1/95

5.1.2 THERMAL VACUUM FUNCTIONAL TESTS

5.1.2.1 OPERATION UNDER LOAD

11 VDC min, 12.5 VDC max to the motor drive circuit.
5 VDC +/- 0.2 V to the encoder input wires.

a. Baseline, 25 degrees C recorder trace:

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check 6/12/95

b. Cycle 1, 50 degrees C recorder trace:

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check 6/13/95

SIZE	CAGE CODE	
A	88379	ATP 20049 DS
SCALE	REV. B	SHEET 5

c. Cycle 1, -40 degrees C recorder trace:

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check 6/14/95

d. Cycle 2, 50 degrees C recorder trace :

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check 6/15/95

e. Cycle 2, -40 degrees C recorder trace :

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check 6/15/95

f. Cycle 3, 50 degrees C recorder trace :

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check 6/16/95

g. Cycle 3, -40 degrees C recorder trace :

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check 6/16/95

h. Final test, 25 degrees C recorder trace:

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check 6/17/95

5.1.2.2 STALL OPERATION, THERMAL VACUUM

Disconnect the motor from the test circuit. Apply 200 ma through wires #1 and #3 for 30 seconds. Repeat according to paragraph 4.1.3.2 of the test procedure.

5.1.2.2

a. Baseline, 25 degrees C recorder trace:

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check

Julie M 6/12/95

b. Cycle 1, 50 degrees C recorder trace:

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check

Julie M 6/13/95

c. Cycle 1, -40 degrees C recorder trace:

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check

Julie M 6/14/95

d. Cycle 2, 50 degrees C recorder trace :

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check

Julie M 6/15/95

e. Cycle 2, -40 degrees C recorder trace :

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check 6/15/95

f. Cycle 3, 50 degrees C recorder trace :

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check 6/16/95

g. Cycle 3, -40 degrees C recorder trace :

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check 6/16/95

h. Final test, 25 degrees C recorder trace:

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check 6/17/95

5.2 THERMAL CYCLING TEST AMBIENT PRESSURE

5.2.1 PRE-THERMAL CYCLING PERFORMANCE TEST

5.2.1.1 STALL TORQUE

6 oz-in minimum at 22 VDC

15.0 oz-in
- Detent torque in 1.1= 2.5
Stall torque 13 oz-in
12.5 6/18/95

5.2.1.2 STEP ANGLE

Motor lead #1(+22 VDC) to motor lead #3 (RTN) cw rotation ✓
7.5 +/- 0.75
degrees ✓

Motor lead #2 (+22 VDC) to motor lead #4 (RTN) cw rotation ✓
7.5 +/-0.75
degrees ✓

5.2.1.3 ENCODER POSITION 1 AND OUTPUT VOLTAGE

Encoder position 1 is according to Table 1 ✓ check

Output voltage across bit 4 is 3.5 Vdc min at 4.8 VDC min
5.0 VDC max ✓ check

5.2.1.4 ENCODER POSITION VERIFICATION

Encoder position 2 through 12 is according to Table 1 ✓ check

5.2.2 OPERATION UNDER LOAD

11 VDC min, 12.5 VDC max to the motor drive circuit.
5 VDC +/- 0.2 V to the encoder input wires.

a. Baseline, 25 degrees C recorder trace:

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check
STALL TEST OK

6/2/95

b. Cycle 1, 50 degrees C recorder trace:

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check
STALL TEST OK

6/2/95

c. Cycle 1, -40 degrees C recorder trace:

No interruptions in motor or encoder traces ✓ check

3.5 V minimum encoder output ✓ check
STALL TEST OK

6/5/95

6/18/95

6/18/95

d. Cycle 24, 50 degrees C recorder trace :

No interruptions in motor or encoder traces ___✓___ check

3.5 V minimum encoder output ___✓___ check
STALL TEST OK 6/12/95

e. Cycle 24, -40 degrees C recorder trace :

No interruptions in motor or encoder traces ___✓___ check

3.5 V minimum encoder output ___✓___ check
STALL TEST OK 6/12/95

f. Final Test, 25 degree C recorder trace :

No interruptions in motor or encoder traces ___✓___ check

3.5 V minimum encoder output ___✓___ check
STALL TEST OK 6/12/95

5.3 VIBRATION AND SHOCK

5.3.1 SINE VIBRATION

Date(s) performed 6/19-6/21 1995

Visual Inspection D. Hartman

5.3.1.1 STALL TORQUE

6 oz-in minimum at 22 VDC

18.5 oz-in
- Detent torque in 1.1= 1.8 2.5
Stall torque 16.7 oz-in
16.0 DH. 6/21/95

5.3.1.2 STEP ANGLE

Motor lead #1(+22 VDC) to motor lead #3 (RTN) cw rotation ✓
7.5 +/- 0.75 degrees ✓

Motor lead #2 (+22 VDC) to motor lead #4 (RTN) cw rotation ✓
7.5 +/-0.75 degrees ✓

5.3.1.3 ENCODER POSITION 1 AND OUTPUT VOLTAGE

Encoder position 1 is according to Table 1 ✓ check

Output voltage across bit 4 is 3.5 Vdc min at 4.8 VDC min
5.0 VDC max ✓ check

5.3.1.4 ENCODER POSITION VERIFICATION

Encoder position 2 through 12 is according to Table 1 ✓ check

[signature]
6/21/95

5.3.2 RANDOM VIBRATION

Date(s) performed 6/22 - 6/23/95 RETEST NCR 00168

Visual Inspection [signature]

RANDOM WAS FIRST PERFORMED 4/28/95

5.3.2.1 STALL TORQUE

6 oz-in minimum at 22 VDC

18.5 oz-in
- Detent torque in 1.1= 2.5
Stall torque 16.0 oz-in

5.3.2.2 STEP ANGLE

Motor lead #1(+22 VDC) to motor lead #3 (RTN) cw rotation ✓
7.5 +/- 0.75 degrees ✓

Motor lead #2 (+22 VDC) to motor lead #4 (RTN) cw rotation ✓
7.5 +/-0.75 degrees ✓

5.3.2.3 ENCODER POSITION 1 AND OUTPUT VOLTAGE

Encoder position 1 is according to Table 1 ✓ check

Output voltage across bit 4 is 3.5 Vdc min at 4.8 VDC min
5.0 VDC max ✓ check

6/26/95

5.3.2.4 ENCODER POSITION VERIFICATION

Encoder position 2 through 12 is according to Table 1 ✓ check

5.3.3 MECHANICAL SHOCK

Date(s) performed 6/26 - 6/27/95

Visual Inspection

5.3.3.1 STALL TORQUE

6 oz-in minimum at 22 VDC

18.0 oz-in
- Detent torque in 1.1 = 2.5
Stall torque 15.5 oz-in

5.3.3.2 STEP ANGLE

Motor lead #1 (+22 VDC) to motor lead #3 (RTN) cw rotation ✓
7.5 +/- 0.75
degrees ✓

Motor lead #2 (+22 VDC) to motor lead #4 (RTN) cw rotation ✓
7.5 +/-0.75
degrees ✓

5.3.3.3 ENCODER POSITION 1 AND OUTPUT VOLTAGE

Encoder position 1 is according to Table 1 ✓ check

Output voltage across bit 4 is 3.5 Vdc min at 4.8 VDC min
5.0 VDC max ✓ check

5.3.3.4 ENCODER POSITION VERIFICATION

Encoder position 2 through 12 is according to Table 1 ✓ check

5.3.3.5 DIELECTRIC STRENGTH

100 VRMS between 1,3 and 2,4 — 32 microamps
100 microamps max leakage

100 VRMS between 1,3 and housing — 21 microamps
100 microamps max leakage

100 VRMS between 2,4 and housing — 22 microamps
100 microamps max leakage

[signature] 6/28/95

5.4 FINAL FUNCTIONAL TEST 6/28/95

5.4.1 TORQUE AND OPERATING POINT

5.4.1.1 DETENT TORQUE

Cogging through three detent positions 0.25 oz-in min

1. 2.5 oz-in.
2. 1.5 oz-in.
3. 2.5 oz-in.

[signature] 06.28.95

5.4.1.2 OPERATING TORQUE

Motor rotates 6 RPM min when 4.8 pps at ~~22~~ 12 VDC to ~~25~~ VDC is applied with 5.5 oz-in load.

6.5 RPM

[signature] 06.28.95

5.4.1.3 STALL TORQUE

6 oz-in minimum at ~~22~~ 12 VDC — 11.0 oz-in − 2.5
\- Detent torque in 1.1=
Stall torque 8.5 oz-in

[signature] 06.28.95

SIZE	CAGE CODE	
A	88379	ATP 20049 DS
SCALE	REV. B	SHEET 13

5.4.2 MOTOR ELECTRICAL CHARACTERISTICS

5.4.2.1 STEP ANGLE

Delia M 06.28.95

Motor lead #1(+22 VDC) to motor lead #3 (RTN) cw rotation ✓
7.5 +/- 0.75 degrees ✓

Motor lead #2 (+22 VDC) to motor lead #4 (RTN) cw rotation ✓
7.5 +/-0.75 degrees ✓

5.4.2.2 WINDING RESISTANCE AT 20 DEG C

Room ambient temperature 20 deg C

Delia M 06.28.95

Resistance between wires 1 and 3 81.4 ohms

Resistance calculated for 20 degrees C 81.4 ohms
77.6 ohms minimum

Resistance between wires 2 and 4 82.0 ohms

Resistance calculated for 20 degrees C 82.0 ohms
77.6 ohms minimum

5.4.2.3 WINDING INDUCTANCE

Delia M 06.28.95

Inductance between wires 1 and 3 18.5 mH

Inductance between wires 2 and 4 18.7 mH
These values are for reference only.

5.4.3 ENCODER ELECTRICAL CHARACTERISTICS

5.4.3.1 ENCODER POSITION 1 AND OUTPUT VOLTAGE

Encoder position 1 is according to Table 1 ✓ check

Output voltage across bit 4 is 3.5 Vdc min at 4.8 VDC min
5.0 VDC max ✓ check

5.4.3.2 ENCODER POSITION VERIFICATION

Encoder position 2 through 12 is according to Table 1 ✓ check

5.4.4 RADIAL DEFLECTION

9.0 +/- 0.1 lb force applied on the shaft in accordance with MSFC drawing SXI-201, Proof Load Diagram

0.0013 inches

0.0015 inches max

wt 416g w/wires
350g w/o

6/28/95

SIZE	CAGE CODE	ATP 20049 DS
A	88379	
SCALE	REV. B	SHEET 15

SECTION IV

INSPECTION RECORDS

EAST-WEST TECHNOLOGY CORP.
119 Cabot Street
West Babylon, NY 11704
(516) 420 0530 • Fax (516) 420 8067

LETTER OF CERTIFICATION

Prepared For: AEROFLEX LABORATORIES, INCORPORATED
35 South Service Road
Plainview, New York 11803

This is to certify that items listed herein were subjected to **Random Vibration, Sine Vibration, and Pyroshock** testing in accordance with the Aeroflex Laboratories Acceptance Test Procedure 20049, Revision B, as required by the referenced Purchase Orders. The test items were subjected to all of the tests in each of the 3 orthogonal axes.

Test Results: No damage or deterioration of the test items was noted during or upon completion of the referenced testing.

Test Specimens:

Motor/Encoder Assembly - 16187, Serial number 0003 (Subjected to Random Vibration only)

Motor/Encoder Assembly - 16187, Serial number 0002 (subjected to all tests)

Motor/Encoder Assembly - 16187 Test Fixture (subjected to Survey only using Random Vibration profile)

EWT Job No.: **8363/8286**		Certificate No.:	**8363.CRT**
Purchase Order No.: **10901 and 99593**		Certificate File No.:	**8363.CRT** Disk 143
Test Completion Date:	26 June 1995	Certificate Issue Date:	19 July 1995

CERTIFIED BY : _____ R. Borrelli, Quality Assurance Manager
EAST-WEST TECHNOLOGY

SPARE

JOB: 13640-0103	USED ON:	DATE ISSUED: 2/1	DATE DUE:
P/N: 16187	DESC: STEPPER/MOTOR ENCODER	PLANNER: MA	ASSOCIATED PART LIST AND REVISION
QTY: 1 REV: B	S/N: 0002	ESD SENSITIVE: YES, Class __ No	PL16187 REV. B

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED	PART NO	Unit QTY	TotalQTY	DATE	SHORT
16187 B Rev: X Rev: Rev: Rev: Rev: Rev:	ATP20049 D Rev: X Rev: Rev: Rev: Rev: Rev:	NHB6000.ID					

OP.#	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
15	Inspect Mechanical Per 16187	1	0	6/25/94	ARX
20	Test Per ATP20049	1	0	6/30/94	
25	Inspect ARX	1	0	6/30/94	
35	Government Source Inspection	1	0	95 JUL 94	
40	Stock, Pack And Ship Per NHB6000.ID				

REWORK/REPAIR:	1)	APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
	2)	DES:	6/27/94	ECN#:	ENG:
	3)	MFG:	6/23/94	MFG:	QA:
INSPECT:	4)	ENG:	6-24-94	OT-16187	REV:A
	5)	QA:	6/27/94	DATE: 6/07/94	SHEET: 1

SPACE

JOB#: 13640-0102	USED ON:	DATE ISSUED: 2/1	DATE DUE:
P/N: 16187 B	DESC: STEPPER/MOTOR ENCODER	PLANNER: LG	ASSOCIATED PART LIST AND REVISION
QTY: 1	REV: X S/N: 0003	ESD SENSITIVE: YES, Class __ No	PL16187 REV. B

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED	PART NO	Unit QTY	TotalQTY	DATE	SHORT
16187 B Rev: X	ATP20049 B Rev: X	NHB6000.ID					
Rev:	Rev:						
Rev:	Rev:						
Rev:	Rev:						
Rev:	Rev:						
Rev:	Rev:						

OP.#	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
15	Inspect Mechanical Per 16187	1	0	6/30/95	ARX
20	Test Per ATP20049	1	0	6/30/95	
25	Inspect ARX	1	0	6/30/95	
35	Government Source Inspection	1	0	95JUL11	
40	Stock, Pack And Ship Per NHB6000.ID				

REWORK/REPAIR:	1)	APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
	2)	DES:	6/27/94	ECN#:	ENG:
	3)	MFG:	6/30/94	MFG:	QA:
INSPECT:	4)	ENG:	6-29-94	OT-16187	REV: A
	5)	QA:	6/29/94	DATE: 6/07/94	SHEET: 1

SPACE

JO#: 13640 C10	USED ON: 16187	DATE ISSUED: 2/1	DATE DUE:
P/N: 200-89	DESC: MOTOR/ENCODER ASSY	PLANNER: LO	ASSOCIATED PART LIST AND REVISION
QTY: 1 REV: E	S/N: 0002	ESD SENSITIVE: YES, Class __ No	PL200-89 REV: E

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED	PART NO	Unit QTY	TotalQTY	DATE	SHORT
200-89 E Rev: E	S-294-0 B Rev: B	FED-STD-209					
532-2 C Rev: C	S-297-0 Rev: B	NHB 5300.4 (3J)					
Rev:	S-298-0 Rev: B	MIL-STD-454 REQ. 9					
Rev:	ATP20049 B Rev: B	NHB 5300.4 (3A-2)					
Rev:	Rev:						
Rev:	Rev:						

OP.#	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
10	CAUTION: ALL ASSEMBLY OPERATIONS SHALL BE PERFORMED IN A CLASS 100 ENVIRONMENT Assemble 303-216 Board Assembly And Bond Temperature Sensor Per 200-89	1	—	2/4/95	
20	Assemble And Aligne Stator, Rotor And Enconder Per 200-89 Note 5.	1	—	2/10/95	
25	Government Source Inspection	WAIVED			
27	Complete Assembly Per 200-89 And Bond Stator To Housing	1	—	2/10/95	
30	Functional Test Per ATP-20049	1	—	2/13/95	
35	Inspect For 10 And 20 Per MIL-STD-454 Req. 9 And 200-89	1	0		ARX 35
40	Stake All Fasteners Per NHB 5300.4 (3J)	1	—	2/18/95	
45	Inspect Visually For Operation #40	1	0		ARX 35
50	Wire Per 532-2 By NHB5300.4(3A-2) Certified Operator	1	—	3/3/95	
60	Functional Test	1	—	3/9/95	
65	Inspect ARX By Certified Inspector Per 200-89 And NHB 5300.4 (3A-2)	1	—	3/3/95	
75	Inspect GSI	1	—	3/9/95	
80	Mark Per 200-89	1	—	3-9-95	
90	Pot Lead Wires And Close Unit Per 200-89	1	—	3/9/95	
100	Vacuum Bake And Handle Per 5-298-0 Time In: 4:00 Date In: 3/10/95 Time Out: 5:00 Date Out: 3/15/95	1	—	3/10/95 3/15/95	
110	CAUTION: All Operations After Vacuum Bake To Be Performed Per 200-89 Note 3.				
115	Inspect	1	0	3/16/95	ARX 35
120	Stock. To NHA 16187, For ATP-20049 And Final Inspections				

REWORK/REPAIR:	1)	APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
	2)	QA: S. Bon	8/4/94	ECN#:	ENG:
	3)	MFG:	8/1/94	MFG:	QA:
INSPECT:	4)	ENG:	9-1-94	OT-200-89	REV: B
	5)	QA:	9-1-94	DATE: 9/01/94	SHEET: 1

Repair Traveler

JO#: 1364C-0101	USED ON: 16187	DATE ISSUED: 5/23	DATE DUE:
P/N: 200-89	DESC: MOTOR/ENCODER ASSY	PLANNER: Lea	ASSOCIATED PART LIST AND REVISION
QTY: 1 REV: ~~B~~ E	S/N: 0003	ESD SENSITIVE: YES, Class __ No	PL200-89 REV: ~~K~~ G

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED
200-89 Rev: ~~E~~ E	5-294-0 Rev: ~~B~~ C	FED-STD-209
532-2 Rev: ~~C~~ C	5-297-0 Rev: B	NHB 5300.4 (3J)
Rev:	5-298-0 Rev: B	MIL-STD-454 REQ. 9
Rev:	ATP20049 Rev: ~~B~~ C	NHB 5300.4 (3A-2)
Rev:	Rev:	
Rev:	Rev:	

PART NO	Unit QTY	TotalQTY	DATE	SHORT

OP.#	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
10	CAUTION: ALL ASSEMBLY OPERATIONS SHALL BE PERFORMED IN A CLASS 100 ENVIRONMENT Assemble 303-216 Board Assembly And Bond Temperature Sensor Per 200-89	N/A			
20	Assemble And Aligne Stator, Rotor And Enconder Per 200-89 Note 5.	1	—	5/23/95	JMS
25	Government Source Inspection	WAIVED			
27	Complete Assembly Per 200-89 And Bond Stator To Housing	1	—	5/23/95	JMS
30	Functional Test Per ATP-20049	1		5/24/95	
35	Inspect For 10 And 20 Per MIL-STD-454 Req. 9 And 200-89	1	0	5/24/95	ARX 36
40	Stake All Fasteners Per NHB 5300.4 (3J)	1	—	5/24/95	
45	Inspect Visually For Operation #40	1	0	5/24/95	ARX 36
50	Wire Per 532-2 By NHB5300.4(3A-2) Certified Operator	N/A			
60	Functional Test	1		5/25/95	
65	Inspect ARX By Certified Inspector Per 200-89 And NHB 5300.4 (3A-2)	N/A		5/25/95	
75	Inspect GSI	WAIVED			
80	Mark Per 200-89	N/A			
90	Pot Lead Wires And Close Unit Per 200-89	1	—	5/25/95	JMS
100	Vacuum Bake And Handle Per 5-298-0 Time In: 400pm Date In: 5/25/95 Time Out: 11 am Date Out: 5/31/95	1	—	5/31/95	JMS
110	CAUTION: All Operations After Vacuum Bake To Be Performed Per 200-89 Note 3.				
115	Inspect	1	0	5/31/95	RS
120	Stock. To NHA 16187, For ATP-20049 And Final Inspections				

REWORK/REPAIR:	1)	APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
	2)			ECN#:	ENG:
	3)	MFG:	9/1/94	MFG:	QA:
INSPECT:	4)	ENG:	9-1-94	DT-200-89	REV:B
	5)	QA:	9-1-94	DATE: 9/01/94	SHEET: 1

REPAIR TRAVELER

IO#: 13640 R	USED ON: 16187	DATE ISSUED:		DATE DUE:	
P/N:200-89	DESC: MOTOR/ENCODER ASSY	PLANNER:		ASSOCIATED PART LIST AND REVISION	
QTY: 1 REV: A	S/N: 0003	ESD SENSITIVE:	YES, Class _ No	REV.	

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED	PART NO	Unit QTY	TotalQTY	DATE	SHORT
Rev:	Rev:						
Rev:	Rev:						
Rev:	Rev:						
Rev:	Rev:						

OP. #	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
	CAUTION: All Operations In The Rework Procedure Are Subject To The Same Controls (MOD'S) And Requirements For Contamination Control, And Dimentional Integrity, That Were Implemented In The Assembly Of The Unit.				
	PURPOSE: To Successfully Disassemble The Unit In Such A Controled Manner, That Requires Minimum Intrusion, And Replace The Rotor Assy 400-29-6 And Bearings 403-1-7. (Both Components Are Suspected Damaged Due To Retaining Ring Vibration Failure).				
10	Remove Item 12 (4Pcs MS51957-3) From Cover/Housing Assy.	1	-	5/15/95	JMS
20	Carefully Remove Cover 301-61 By Starting On Opposite Side W/Rspt. To The Lead Wire. Hold Leadwire Gently But Firmly Against The Housing And Gently Peel The Wires Away From The Cover.	1	-	5/15/95	JMS
20	Remove The Cover.	1	-	5/15/95	JMS
35	Inspect The Unit For Any Visible Damage.	1	0	5/15/95	ARX 35
40	Remove The Nuts Holding Power Board 19868-21776 And Carefully Remove Power Board Away From The Center Of The Unit.	1	-	5/17/95	JMS

REWORK/REPAIR:	1) Ref: NCR 00168	APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
	2)	DES:		ECN#:	ENG:
	3)	MFG:	5/22/95	MFG:	QA:
INSPECT:	4)	ENG:	5/22/95	OT-200-89	REV:
	5)	QA:	5/22/95	DATE:	SHEET: 1

REPAIR TRAVELER

JO#:	USED ON: 16187	DATE ISSUED:	DATE DUE:
P/N:200-89	DESC: MOTOR/ENCODER ASSY	PLANNER:	ASSOCIATED PART LIST AND REVISION
QTY: REV: A	S/N:	ESD SENSITIVE: YES, Class __ No	REV.

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED	PART NO	Unit QTY	TotalQTY	DATE	SHORT
Rev:	Rev:						
Rev:	Rev:						
Rev:	Rev:						
Rev:	Rev:						

OP.#	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
50	Secure Power Board Against Any Movement, And Avoid Handling To Minimize Contact Problems.	1	-	5/17/95	JMS
55	Inspect For Visual Damage.	1	0	5/17	ARX 35
60	Remove Disc And Hub Assy 19868-21766.	1	-	5/17/95	JMS
70	Remove (4Pcs MS51957-4) Screws Holding Plate 19868-21670 To The Housing, And Carefully Remove The "ENTIRE ENCODER ASSEMBLY" From The Unit.	1	-	5/17/95	JMS
75	Inspect Encoder Assy For Any Visible Damage.	1	0	5/17	ARX 35
80	Store Encoder Assembly Per 110P371.	1	-	5/17/95	JMS
90	Remove 607-450 (Locking Pin) From Shaft.	1	-	5/18/95	JMS

REWORK/REPAIR:	1)	APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
	2)	DES:		ECN#:	ENG:
	3)	MFG:		MFG:	QA:
INSPECT:	4)	ENG:		OT-200-89	REV:
	5)	QA:		DATE:	SHEET: 2

REPAIR TRAVELER									
JO#:		USED ON: 16187		DATE ISSUED:			DATE DUE:		
P/N:200-89		DESC: MOTOR/ENCODER ASSY		PLANNER:			ASSOCIATED PART LIST AND REVISION		
QTY:	REV: A	S/N:		ESD SENSITIVE:	YES, Class __	No	REV.		

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED	PART NO	Unit QTY	TotalQTY	DATE	SHORT
Rev:	Rev:						
Rev:	Rev:						
Rev:	Rev:						
Rev:	Rev:						

OP. #	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
100	Loosen And Remove Bearing Retainer Nuts 607-448 And 607-449.	1	-	5/13/95	JMS
110	Clean	1	-	5/18/95	JMS
115	Inspect ARX	1	0	5/18/95	ARX 35
125	Insect Government	1	0	5/19/95	
130	Store For Re-Use.	1	-	5/13/95	JMS
135	BEARING REMOVAL: CAUTION: Prior To Removeng Bearings Or Rotor Assembly Frow The Unit The Stator MUST BE ISOLATED Frow The Rotor!.	1	-	5/19/95	JMS
140	To Accomplish The Isolation Use A Piece Of .010 X 5/8 X 6.25" Mylar Shim And Insert It Into The Gap Between The Stator And Rotor.	1	-	5/19/95	JMS

REWORK/REPAIR:	1)	APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
	2)	DES:		ECN#:	ENG:
	3)	MFG:		MFG:	QA:
INSPECT:	4)	ENG:		OT-200-89	REV:
	5)	QA:		DATE:	SHEET: 3

REPAIR TRAVELER

JO#:	USED ON: 16187	DATE ISSUED:	DATE DUE:
P/N:200-89	DESC: MOTOR/ENCODER ASSY	PLANNER:	ASSOCIATED PART LIST AND REVISION
QTY: REV: 0	S/N:	ESD SENSITIVE: YES, Class __ No	REV.

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED	PART NO	Unit QTY	TotalQTY	DATE	SHORT
Rev:	Rev:						
Rev:	Rev:						
Rev:	Rev:						
Rev:	Rev:						

OP. #	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
150	Remove Rotor Assembly 400-29-6 From Unit.	1	-	5/19/95	JMS
160	Remove Duplex Bearing 403-1-7 From Unit.	1	-	5/19/95	JMS
165	Inspect The Unit For Any Visible Damage.	1	0	5/19/95	ARX 35
175	Inspect Government.	1	0	5/19/95	
180	Re-Assemble Per 200-89. Return to original Traveler				

REWORK/REPAIR:	1)	APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
	2)	DES:		ECN#:	ENG:
	3)	MFG:		MFG:	QA:
INSPECT:	4)	ENG:		DT-200-89	REV:
	5)	QA:		DATE:	SHEET: 4

SPACE

JO#: 13640-0103	USED ON: 16187	DATE ISSUED: 2/1	DATE DUE:
P/N: 200-89	DESC: MOTOR/ENCODER ASSY	PLANNER: [illegible]	ASSOCIATED PART LIST AND REVISION
QTY: 1 REV: D	S/N: 0003	ESD SENSITIVE: YES, Class __ No	PL200-89 REV. E

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED	PART NO	Unit QTY	Total QTY	DATE	SHORT
200-89 C Rev:	5-294-0 B Rev:	FED-STD-209					
532-2 C Rev:	5-297-0 Rev: B	NHB 5300.4 (3J)					
Rev:	5-298-0 Rev: B	MIL-STD-454 REQ. 9					
Rev:	ATP20049 B Rev:	NHB 5300.4 (3A-2)					
Rev:	Rev:						
Rev:	Rev:						

OP.#	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
10	CAUTION: ALL ASSEMBLY OPERATIONS SHALL BE PERFORMED IN A CLASS 100 ENVIRONMENT Assemble 303-216 Board Assembly And Bond Temperature Sensor Per 200-89	1	-	2/4/95	[illegible]
20	Assemble And Aligne Stator, Rotor And Enconder Per 200-89 Note 5.	1	-	2/10/95	[illegible]
25	Government Source Inspection	WAIVED		S. [illegible]	[illegible]
27	Complete Assembly Per 200-89 And Bond Stator To Housing	1	-	2/12/95	[illegible]
30	Functional Test Per ATP-20049	1	-	2/13/95	[illegible]
35	Inspect For 10 And 20 Per MIL-STD-454 Req. 9 And 200-89	1	0		ARX 35
40	Stake All Fasteners Per NHB 5300.4 (3J)	1	0	2/18/95	[illegible]
45	Inspect Visually For Operation #40	1	0		ARX 35
50	Wire Per 532-2 By NHB5300.4(3A-2) Certified Operator	1		3/3/95	[illegible]
60	Functional Test	1	-	3/3/95	[illegible]
65	Inspect ARX By Certified Inspector Per 200-89 And NHB 5300.4 (3A-2)	1	-	3/3/95	[illegible]
75	Inspect GSI	1		3/9/95	D. [illegible]
80	Mark Per 200-89	1	-	3-9-95	[illegible]
90	Pot Lead Wires And Close Unit Per 200-89	1	-	3/9/95	[illegible]
100	Vacuum Bake And Handle Per 5-298-0 Time In: 4 p.m. Date In: 3/10/95 Time Out: 8 am Date Out: 3/15/95	1	-	3/10/95 3/15/95	[illegible]
110	CAUTION: All Operations After Vacuum Bake To Be Performed Per 200-89 Note 3.				
115	Inspect	1	-	3/16/95	ARX 35
120	Stock. To NHA 16187, For ATP-20049 And Final Inspections				

REWORK/REPAIR:	1)	APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
	2)	[illegible] S. [illegible]	9 SEP 94	ECN#:	ENG:
	3)	MFG: [illegible]	9/1/94	MFG:	QA:
INSPECT:	4)	ENG: [illegible]	9-1-94	OT-200-89	REV: B
	5)	QA: [illegible]	9-1-94	DATE: 9/01/94	SHEET: 1

SPACE APPLICATION

JOB: 13640-0102	USED ON: 200-89	DATE ISSUED: 7/21	DATE DUE:
P/N: 500-29-9	DESC: STATOR ASSY	PLANNER: wa	ASSOCIATED PART LIST AND REVISION
QTY: 1 REV: A	S/N:	ESD SENSITIVE: YES, Class __ No	PL500-29-9 REV. B

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED	PART NO	Unit QTY	Total QTY	DATE	SHORT
500-29-9 ~~Rev: A~~ Rev: B Rev: Rev: Rev: Rev:	5-128-0 Rev: B 5-129-0 Rev: A 5-130-0 Rev: B 5-296-0 Rev: B 5-071-0 Rev: C Rev:	NHB 5300.4(3A-2) NHB 5300.4 (3A-2) FED-STD-209 ATP-20049					

OP. #	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
10	Wind Per 500-29-9	1	—	7/25/94	SJ
20	Clean Coils Per 5-130-0	1	—	7/25/94	SJ
30	Clean Core Per 5-128-0	1	—	7/25/94	SJ
35	Inspect	1	0	7/26/94	SJ
40	Insert Per 500-29-9	1	—	7/26/94	SJ
50	Connect And Finish By Certified Operator ONLY	1		7/27/94	SJ
55	Inspect ARX By Certified Inspector ONLY	1	0	7/27/94	ARX 102
57	Government Source Inspection	1	0	7/27/94	ARX 102
60	Complete Finishing And Form Per 500-29-9 Note 7				
70	Check Per 500-29-9 Note 8 INS. RES. 71000 MΩ ALL CASES / HIPOT @ 1010VAC ALL CASES	1	—	7/29/94	SJ
80	Impregnate Per 500-29-9 Note 9	1		8/1/94	SJ
90	Check Per 500-29-9 Note 10	1	—	8/2/94	SJ
100	Clean Per 5-129-0	1	—	8/2/94	SJ
105	Inspect	1	0	8/2/94	SJ
110	Vacuum Bake And Handle Per 5-296-0 Time In: 11:30 Date In: 8/2/94 Time Out: 8:00 Date Out: 8/8/94	1		8/8/94	BH
120	CAUTION: All Operations After Vacuum Bake To Be Performed Per 500-29-9 Note 14.				
125	Inspect Per 500-29-9 And MIL-STD-454 Req. 9	1	0	8/11/94	ARX 80
127	Government Source Inspection	1	0	8/11/94	ARX 80
130	Stock Per 500-29-9 Note 14.				

REWORK/REPAIR:	1)	APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
	2)	DES:	6/21/94	ECN#:	ENG:
	3)	MFG:	6/23/94	MFG:	QA:
INSPECT:	4)	ENG:	6-27-94	OT-500-29-9	REV: A
	5)	QA:	6/27/94	DATE: 6/07/94	SHEET: 1

SPACE APPLICATION

JOB: 13640-0103	USED ON: 200-89	DATE ISSUED:	DATE DUE:
P/N: 500-29-9	DESC: STATOR ASSY	PLANNER: RA	ASSOCIATED PART LIST AND REVISION
QTY: 1 REV: A	S/N:	ESD SENSITIVE: YES, Class __ No	PL500-29-9 REV. B

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED	PART NO	Unit QTY	TotalQTY	DATE	SHORT
500-29-9 ~~Rev:A~~ Rev:B	5-128-0 Rev:B	NHB 5300.4(3A-2)					
	5-129-0 Rev:A	NHB 5300.4 (3A-2)					
	5-130-0 Rev:B	FED-STD-209					
	5-296-0 Rev:B	ATP-20049					
	5-071-0 Rev:C						
	Rev:						

OP.#	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
10	Wind Per 500-29-9			7/26/94	SJ
20	Clean Coils Per 5-130-0			7/25/94	SJ
30	Clean Core Per 5-128-0			7/25/94	SJ
35	Inspect	1	0	7/26/94	AHX 36
40	Insert Per 500-29-9	1	0	7/26/94	SJ
50	Connect And Finish By Certified Operator ONLY			7/27/94	AL
55	Inspect ARX By Certified Inspector ONLY	1	0	7/27/94	ARX 102
57	Government Source Inspection	1	0	8/1/94	
60	Complete Finishing And Form Per 500-29-9 Note 7	1	—	8/1/94	JK
70	Check Per 500-29-9 Note 8 Dielectric <100μA Ins >100MΩ	1	0	8/1/94	
80	Impregnate Per 500-29-9 Note 9	1	—	8/2/94	JK
90	Check Per 500-29-9 Note 10	1	—	8/3/94	JK
100	Clean Per 5-129-0	1	—	8/3/94	JK
105	Inspect	1	0	8/8/94	AHX 36
110	Vacuum Bake And Handle Per 5-296-0 Time In: 1:00 PM Date In: 8/4/94 Time Out: 8:00 Date Out: 8/9/94	1		8/9/94	
120	CAUTION: All Operations After Vacuum Bake To Be Performed Per 500-29-9 Note 14.				
125	Inspect Per 500-29-9 And MIL-STD-454 Req. 9	1	0	8/11/94	36 AHX
127	Government Source Inspection	1	0	8/11/94	
130	Stock Per 500-29-9 Note 14.				

REWORK/REPAIR:	1)	APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
	2)	DES:		ECN#:	ENG:
	3)	MFG:		MFG:	QA:
INSPECT:	4)	ENG:	8-8-94	OT-500-29-9	REV:A
	5)	QA:	8/8/94	DATE: 6/07/94	SHEET: 1

JO#: 13640-0103	USED ON:	DATE ISSUED: 4/5	DATE DUE:
P/N: 21664	DESC: P.W.Board Encoder	PLANNER: ka	ASSOCIATED PART LIST AND REVISION
QTY: 1 REV: D	S/N: 0003	ESD SENSITIVE: YES, Class __ No	PL21664 REV. A D

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED	PART NO	Unit QTY	Total QTY	DATE	SHORT
21664 D Rev: K	5-036-0 Rev: F	NHB5300.4(3A-2)					
Rev:	5-296-0 Rev: A	NHB5300.4(3J)					
Rev:	Rev:	21785					
Rev:	Rev:						
Rev:	Rev:						
Rev:	Rev:						

OP.#	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
10	Mark P.C. Board Per 21664 Note 6	1		8-15-94	MP
20	Install Terminals Per Note 4	1		8-15-94	MP
25	Inspect For Above Operations	1		8-16-94	
30	Install And Solder Components Per NHB5300.4(3A-2) By Certified Operator ONLY	1		8-19-94	ARX 102
35	Inspect Per NHB5300.4(3A-2) By Certified Inspector ONLY	1		12-06-94	
40	Functional Test Per 21785 R1 = 910Ω R3 = 1800Ω R5 = 510Ω R2 = 1200Ω R4 = 910Ω	1		12-19-94	D.I.
45	Inspect ARX	1		12/22/94	ARX 102
55	Government Source Inspection	1	0	BREEZE	
60	Bond Shields Per 21664 And Cure	1	—	12/23/94	
65	Inspect	1	0	1/4/95	
70	Clean Per NHB5300.4(3A-2)	~~1~~ 1/16/95		1/16/95	6879
80	Mask Per 21664	~~1~~ 1/16/95		1/16/95	6879
90	Conformal Coat Per 21664	~~1~~ 1/16/95		1/16/95	6879
100	Unmask P.C Board	~~1~~ 1/16/95		1/16/95	~~6879~~ ARX
105	Inspect	1	0	1/16/95	35
110	Vacuum Bake And Handle Per 5-296-0 Time In: 8am Date In: 1/26/95 Time Out: 11am Date Out: 1/31/95	1	—	1/31/95	ARX 35
115	Inspect	1	0	1/31/95	
120	Stock. To NHA				

S/N
CR-1—036
CR-2—037
CR-3—038
CR-4—048
CR-5—049

Pcb # 2394 11-01

REWORK/REPAIR:	1)	APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
	2)	DES:		ECN#:	ENG:
	3)	MFG:		MFG:	QA:
INSPECT:	4)	ENG:	4-27-94	OT-21664	REV:A
	5)	QA:		DATE: 6/24/94	SHEET: 1

JOB: 13640-0102	USED ON:	DATE ISSUED: 8/5	DATE DUE:
P/N: 21664	DESC: P.W.Board Encoder	PLANNER: [illegible]	ASSOCIATED PART LIST AND REVISION
QTY: 1 REV: D	S/N: 0002	ESD SENSITIVE: YES, Class __ No	PL21664 REV. A D

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED	PART NO	Unit QTY	Total QTY	DATE	SHORT
21664 D Rev: K	5-036-0 Rev: F	NHB5300.4(3A-2)					
Rev:	5-296-0 Rev: A	NHB5300.4(3J)					
Rev:	Rev:	21785					
Rev:	Rev:						
Rev:	Rev:						
Rev:	Rev:						

OP.#	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
10	Mark P.C. Board Per 21664 Note 6	1		8-15-94	[illegible]
20	Install Terminals Per Note 4	1		8-15-94	[illegible]
25	Inspect For Above Operations	1		8-16-94	[illegible]
30	Install And Solder Components Per NHB5300.4(3A-2) By Certified Operator ONLY	1		8-19-94	[illegible] ARX 102
35	Inspect Per NHB5300.4(3A-2) By Certified Inspector ONLY	1		12-06-94	
40	Functional Test Per 21785 R1 = 1005Ω R3 = 1102Ω R5 = 510Ω R2 = 1000Ω R4 = 680Ω	1		12.20.94	[illegible]
45	Inspect ARX	1		12/22/94	ARX 102
55	Government Source Inspection	1	0	94DEC22	
60	Bond Shields Per 21664 And Cure	1	0	12/23/94	[illegible]
65	Inspect	1	0	1/2/95	ARX 35
70	Clean Per NHB5300.4(3A-2)	1		1/16/95	6879
80	Mask Per 21664	1		1/16/95	6879
90	Conformal Coat Per 21664	1		1/16/95	6879
100	Unmask P.C Board	1		1/16/95	6879
105	Inspect	1	0	1/16/95	ARX 35
110	Vacuum Bake And Handle Per 5-296-0 Time In: 8am Date In: 1/26/95 Time Out: 11am Date Out: 1/31/95	1	-	1/31/95	[illegible]
115	Inspect	1	0	1/31/95	ARX 35
120	Stock. To NHA				

S/N

CR-1-042
CR-2-040
CR-3-045
CR-4-056
CR-5-054

Pcb # 2394 05-01

REWORK/REPAIR:	1)	APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
	2)	DES: [illegible]	6/27/94	ECN#:	ENG:
	3)	MFG:		MFG:	QA:
INSPECT:	4)	ENG:		OT-21664	REV:A
	5)	QA: [illegible]	6-27-94	DATE: 6/24/94	SHEET: 1

JO#: 13640-0102	USED ON:	DATE ISSUED: 8/5	DATE DUE:
P/N:21774	DESC: LED Board Assy	PLANNER: [illegible]	ASSOCIATED PART LIST AND REVISION
QTY: 1 REV: D	S/N: 0002	ESD SENSITIVE: YES,Class __ No	PL21664 REV. D

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED	PART NO	Unit QTY	TotalQTY	DATE	SHORT
21664 ~~Rev:K~~ D	5-036-0 Rev:A	NHB5300.4(3A-2)					
Rev:	5-296-0 Rev:A	NHB5300.4(3J)					
Rev:	Rev:	21786					
Rev:	Rev:						
Rev:	Rev:						
Rev:	Rev:						

OP.#	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
10	Mark P.C. Board Per 21774 Note 5	1	0	8-15-94	[illegible]
20	Install And Solder Components Per NHB5300.4(3A-2) By Certified Operator ONLY	1	~~8-15-94~~ 0	8-15-94	[illegible]
25	Inspect Per NHB5300.4(3A-2) By Certified Inspector ONLY	1		8-16-94	[illegible]
30	~~Functional Test Per 21786~~ N/A, TEST PERFORMED AT HIGHER ASSY LEVEL FUNCTIONAL TEST PER 21786	1 1		12.01.94 12.20.94	ARX 102
35	Inspect ARX	1	—	12-2-94	ARX 102
45	Government Source Inspection	1	0	94DEC02	[illegible]
50	Bond Shield Per 21774 And Cure	1	—	12/21/94	[illegible]
55	Inspect	1	0	12/22/94	ARX 102
60	Clean Per NHB5300.4(3A-2)	1		1/16/95	6279
70	Mask Per 21774	1		1/16/95	6279
80	Conformal Coat Per 21774	1		1/16/95	6279
90	Unmask P.C Board	1		1/16/95	6279
95	Inspect	1	0	1/16	ARX 35
100	Vacuum Bake And Handle Per 5-296-0 Time In: 8am Date In: 1/26/95 Time Out: 11am Date Out: 1/31/95	1		1/31/95	[illegible]
105	Inspect	1	0	1/31/95	ARX 35
110	Stock. To NHA				

S/Ns
DS1 – 141
DS2 – 158
DS3 – 218
DS4 – 187
DS5 – 221

Pcb#

REWORK/REPAIR:	1)	APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
	2)	DES: [signature]	6/27/94	ECN#:	ENG:
	3)	MFG:		MFG:	QA:
INSPECT:	4)	ENG: [signature]	6-27-94	OT-21774	REV:A
	5)	QA: [signature]	6/27/94	DATE: 6/24/94	SHEET: 1

JO#: 13640-0103	USED ON:	DATE ISSUED: 8/5	DATE DUE:
P/N: 21774	DESC: LED Board Assy	PLANNER: Lea	ASSOCIATED PART LIST AND REVISION
QTY: 1 REV: D	S/N: 0003	ESD SENSITIVE: YES, Class __ No	PL21664 REV: ~~A~~ D

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED	PART NO	Unit QTY	TotalQTY	DATE	SHORT
21664 D Rev: ~~A~~	5-036-0 Rev: G	NHB5300.4(3A-2)					
Rev:	5-296-0 Rev: A	NHB5300.4(3J)					
Rev:	Rev:	21786					
Rev:	Rev:						
Rev:	Rev:						
Rev:	Rev:						

OP.#	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
10	Mark P.C. Board Per 21774 Note 5	1	0	8-16-94	NP
20	Install And Solder Components Per NHB5300.4(3A-2) By Certified Operator ONLY	1	0	8-16-94	NP
25	Inspect Per NHB5300.4(3A-2) By Certified Inspector ONLY	1		8-16-94	[illegible]
30	~~Functional Test Per 21786~~ FUNCTIONAL TEST PER 21786 N/A TEST PERFORMED AT HIGHER ASSY LEVEL	D.F. 3.2.1		12.01.94	
35	Inspect ARX	1	-	12-19-94 12-2-94	ARX 102
45	Government Source Inspection	1	0	94DEC02	
50	Bond Shield Per 21774 And Cure	1	-	12/21/94	
55	Inspect	1	0	12/22/94	ARX 102
60	Clean Per NHB5300.4(3A-2)	1/16/95		1/16/95	6879
70	Mask Per 21774	1/16/95		1/16/95	6879
80	Conformal Coat Per 21774	1/16/95		1/16/95	6879
90	Unmask P.C Board	1/16/95		1/16/95	6879
95	Inspect	1	0	1/16/95	ARX 35
100	Vacuum Bake And Handle Per 5-296-0 Time In: 8am Date In: 1/24/95 Time Out: 11am Date Out: 1/31/95	1	-	1/31/95	[illegible]
105	Inspect	1	0	1/31/95	ARX 35
110	Stock. To NHA				

S/N
DS1 – 235
DS2 – 240
DS3 – 418
DS4 – 430
DS5 – 420

REWORK/REPAIR:		APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
	1)				
	2)	DES: [signature]	6/27/94	ECN#:	ENG:
	3)	MFG:		MFG:	QA:
INSPECT:	4)	ENG: [signature]	6-27-94	OT-21774	REV: A
	5)	QA: [signature]	6/27/94	DATE: 6/24/94	SHEET: 1

JOB: 13640-0102	USED ON:	DATE ISSUED: 8/5	DATE DUE:
P/N: 303-216	DESC: PW ASSY TEMP XDCR FLTR	PLANNER: KO	ASSOCIATED PART LIST AND REVISION
QTY: 1 REV: B	S/N: 0002	ESD SENSITIVE: YES, Class __ No	PL303-216 REV. B

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED	PART NO	Unit QTY	TotalQTY	DATE	SHORT
303-216 Rev: B	Rev:	NHB5300.4(3A-2)					
Rev:	Rev:	ATP-20049					
Rev:	Rev:						
Rev:	Rev:						
Rev:	Rev:						
Rev:	Rev:						

OP.#	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
10	Mark P.C.Board Per 303-216 Note 7	1	-	8-15-94	HP
20	Install And Solder Components Exept C1 Per 303-216 And NHB5300.4(3A-2) By Certified Operator. NOTE: IT# Of Components Must Be Recorded On Traveler.	1	-	8-15-94	HP
25	Inspect ARX By NHB5300.4(3A-2) Certified Inspector	1	-	8-16-94	Hweng
30	Install And Solder C1 By Certified Operator. Mark The + Lead Of The Twisted Pair	1	-	8-17-94	HP
35	Inspect ARX By Certified Operator	1	-	8-18-94	Hweng
40	Functional Test Per ATP-20049	1	-	8-18-94	O.I.
50	Clean Per NHB5300.4(3A-2)			11/16/95	[illegible]
55	Inspect ARX	1	-	12-2-94	ARX 102
65	Government Source Inspection	1	0	9/4 DECR	
70	Mask ESD Per 303-216	1		11/16/95	6879
80	Conformal Coat Per 303-216 Note 6	1		11/16/95	6879
90	Unmask ESD	1		11/16/95	6879
95	Inspect ARX	1	0	11/16	ARX 35
100	Vacuum Bake And Handle Per 5-296-0 Time In: 9am Date In: 1/26/95 Time Out: 11am Date Out: 1/31/95	1	-	1/31/95	GB
110	CAUTION: All Operations After Vacuum Bake To Be Performed Per 500-29-9 Note 14.				
115	Inspect	1	0	1/31/95	ARX 35
120	Stock. To NHA 200-89				

P.c.b. S/N 2294-02 03

REWORK/REPAIR:	1)	APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
	2)	DES: [signature]	6/27/94	ECN#:	ENG:
	3)	MFG:		MFG:	QA:
INSPECT:	4)	ENG: [signature]	6-27-94	OT-303-216	REV:A
	5)	QA: [signature]	6/27/94	DATE: 6/20/94	SHEET: 1

JO#: 13640-0103	USED ON:	DATE ISSUED: 8/5	DATE DUE:
P/N: 303-216	DESC: PW ASSY TEMP XDCR FLTR	PLANNER: LA	ASSOCIATED PART LIST AND REVISION
QTY: 1 REV: B	S/N: 0003	ESD SENSITIVE: YES, Class __ No	PL303-216 REV. A3

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED	PART NO	Unit QTY	TotalQTY	DATE	SHORT
303-216 Rev: B	Rev:	NHB5300.4(3A-2)					
Rev:	Rev:	ATP-20049					
Rev:	Rev:						
Rev:	Rev:						
Rev:	Rev:						
Rev:	Rev:						

OP.#	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
10	Mark P.C.Board Per 303-216 Note 7	1	-	8-15-94	[illegible]
20	Install And Solder Components Exept C1 Per 303-216 And NHB5300.4(3A-2) By Certified Operator. NOTE: IT# Of Components Must Be Recorded On Traveler.	1	-	8-15-94	[illegible]
25	Inspect ARX By NHB5300.4(3A-2) Certified Inspector	1	-	8-16-94	[illegible]
30	Install And Solder C1 By Certified Operator. Mark The + Lead Of The Twisted Pair	1	-	8-17-94	[illegible]
35	Inspect ARX By Certified Operator		-	8-18-94	[illegible]
40	Functional Test Per ATP-20049	1	-	8-18-94	D.J.
50	Clean Per NHB5300.4(3A-2)			9/16/95	[illegible]
55	Inspect ARX	1	-	12-2-94	ARX 102
65	Government Source Inspection	1	0	94DEC02	[illegible]
70	Mask ESD Per 303-216	1		1/16/95	[illegible]
80	Conformal Coat Per 303-216 Note 6	1		1/16/95	[illegible]
90	Unmask ESD	1		1/16/95	[illegible]
95	Inspect ARX	1	0	1/16/95	ARX 36
100	Vacuum Bake And Handle Per 5-296-0 Time In: 8 am Date In: 1/26/95 Time Out: 11 am Date Out: 1/31/95	1	-	1/31/95	[illegible]
110	CAUTION: All Operations After Vacuum Bake To Be Performed Per 500-29-9 Note 14.				
115	Inspect	1	0	1/31/95	ARX 36
120	Stock. To NHA 200-89				

P.C.b. 2294-0301

REWORK/REPAIR:	1)	APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
	2)	DES: [illegible]	6/27/94	ECN#:	ENG:
	3)	MFG:		MFG:	QA:
INSPECT:	4)	ENG: [illegible]	6-29-94	OT-303-216	REV:A
	5)	QA: [illegible]	6/27/94	DATE: 6/20/94	SHEET: 1

JOB: 13640-0102	USED ON:	DATE ISSUED: 8/5-	DATE DUE:
P/N:400-29-6	DESC: ROTOR ASSEMBLY	PLANNER: bo	ASSOCIATED PART LIST AND REVISION
QTY: 1 REV: ~~A~~	S/N: 0002	ESD SENSITIVE: YES,Class __ No	PL400-29-6 REV, ~~A~~ C

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED	PART NO	Unit QTY	TotalQTY	DATE	SHORT
400-29-6 C Rev:~~X~~	5-284-0 Rev:A	MIL-STD-454 REQ. 9					
Rev:	960-229 Rev:B	FED-STD-209					
Rev:	5-258-0 Rev:B						
Rev:	960-251 Rev:~~X~~ C						
Rev:	5-296-0 Rev:A						
Rev:	5-134-0 Rev:A						

OP.#	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
10	Clean Rotor Hub Per 5-284-0	1	-	7/1/94	
20	Vacuum Bake Rotor Hub Per Note 7 Of 400-29-6 Time In: 4:00 Date In: 7/1/94 Time Out: 8:00 Date Out: 7/18/94	1		7/18/94	
30	Bond Magnets To Rotor Hub Per 400-29-6 Note 4 And 5-285-0	1	-	8/5/94	
35	Inspect Per 400-29-6 And MIL-STD-454 Req. 9	1	0	8/8/94	ARX 35
40	Coat Rotor Per 400-29-6 Note 6 And 960-251	1	-	8/8/94	
50	Vacuum Bake And Handle Per 5-296-0 Time In: 2:00 Date In: 8/9/94 Time Out: 8:00 Date Out: 8/15/94	1		9/15/94	
60	CAUTION: All Operations After Vacuum Bake To Be Performed Per 500-29-9 Note 14.				
65	Inspect	1	0	8/15/94	ARX 35
75	Government Source Inspection	1	0	9/15/94	
80	Stock. To NHA 16187				

REWORK/REPAIR:		APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
	2)	DES:	6/27/94	ECN#:	ENG:
	3)	MFG:	6/27/94	MFG:	QA:
INSPECT:	4)	ENG:	6-27-94	OT-400-29-6	REV:A
	5)	QA:	6/27/94	DATE: 6/07/94	SHEET: 1

JO#: 13640-0103	USED ON:	DATE ISSUED: 3/5	DATE DUE:
P/N: 400-29-6 C	DESC: ROTOR ASSEMBLY	PLANNER: [illegible]	ASSOCIATED PART LIST AND REVISION
QTY: 1 REV: ~~A~~	S/N: 0003	ESD SENSITIVE: YES, Class __ No	PL400-29-6 REV. ~~A~~ C

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED	PART NO	Unit QTY	TotalQTY	DATE	SHORT
400-29-6 C Rev: ~~A~~ C	5-284-0 Rev:A	MIL-STD-454 REQ. 9					
Rev:	960-229 Rev:B	FED-STD-209					
Rev:	5-258-0 Rev:B						
Rev:	960-251 Rev: ~~B~~ C						
Rev:	5-296-0 Rev:A						
Rev:	5-134-0 Rev:A						

OP.#	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
10	Clean Rotor Hub Per 5-284-0	1		7/1/94	[illegible]
20	Vacuum Bake Rotor Hub Per Note 7 Of 400-29-6 Time In: 4:00 Date In: 7/1/94 Time Out: 8:00 Date Out: 7/18/94	1		7/18/94	[illegible]
30	Bond Magnets To Rotor Hub Per 400-29-6 Note 4 And 5-285-0	1		8/5/94	[illegible]
35	Inspect Per 400-29-6 And MIL-STD-454 Req. 9	1	0	8/6/94	[illegible]
40	Coat Rotor Per 400-29-6 Note 6 And 960-251	1		8/8/94	[illegible]
50	Vacuum Bake And Handle Per 5-296-0 Time In: 2:00 Date In: 8/9/94 Time Out: 9:00 Date Out: 8/15/94	1		8/15/94	[illegible]
60	CAUTION: All Operations After Vacuum Bake To Be Performed Per 500-29-9 Note 14.				
65	Inspect	1	0	8/15/94	[illegible]
75	Government Source Inspection	1	0	8/15/94	[illegible]
80	Stock. To NHA 16187				

Ja: NCR 00168

REWORK/REPAIR:	1)	APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
	2)	DES: [illegible]	6/27/94	ECN#:	ENG:
	3)	MFG: [illegible]	6/23/94	MFG:	QA:
INSPECT:	4)	ENG: [illegible]	6/27/94	OT-400-29-6	REV:A
	5)	QA: [illegible]	6/27/94	DATE: 6/07/94	SHEET: 1

JOB: 13640-0104	USED ON:	DATE ISSUED: 6/5	DATE DUE:
P/N: 400-29-6 C	DESC: ROTOR ASSEMBLY	PLANNER: LO	ASSOCIATED PART LIST AND REVISION
QTY: 1 REV: A	S/N: 0004	ESD SENSITIVE: YES, Class __ No	PL400-29-6 REV. C

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED	PART NO	Unit QTY	TotalQTY	DATE	SHORT
400-29-6 C Rev: C	5-284-0 Rev: A	MIL-STD-454 REQ. 9					
Rev:	960-229 Rev: B	FED-STD-209					
Rev:	5-258-0 Rev: B						
Rev:	960-251 Rev: C	C					
Rev:	5-296-0 Rev: A						
Rev:	5-134-0 Rev: A						

OP.#	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
10	Clean Rotor Hub Per 5-284-0	1	—	7/1/94	JP
20	Vacuum Bake Rotor Hub Per Note 7 Of 400-29-6 Time In: 4:00 Date In: 7/1/94 Time Out: 8:00 Date Out: 7/18/94	1		7/18/94	
30	Bond Magnets To Rotor Hub Per 400-29-6 Note 4 And 5-285-0	1	—	8/5/94	
35	Inspect Per 400-29-6 And MIL-STD-454 Req. 9	1	0	8/6/94	ARX 35
40	Coat Rotor Per 400-29-6 Note 6 And 960-251	1		8/8/94	
50	Vacuum Bake And Handle Per 5-296-0 Time In: 2:00 Date In: 8/9/94 Time Out: 8:00 Date Out: 8/15/94	1		8/15/94	
60	CAUTION: All Operations After Vacuum Bake To Be Performed Per 500-29-9 Note 14.				
65	Inspect	1	0	8/15/94	ARX 35
75	Government Source Inspection	1	0	94SEP12	
80	Stock. To NHA 16187				

REWORK/REPAIR:		APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
	2)	DES:	6/27/94	ECN#:	ENG:
	3)	MFG:	6/29/94	MFG:	QA:
INSPECT:	4)	ENG:	6-27-94	OT-400-29-6	REV: A
	5)	QA:	6/27/94	DATE: 6/07/94	SHEET: 1

STREET APPLICATION

JOB#: 13640*	USED ON: 500-29-9	DATE ISSUED: 6/13	DATE DUE: JLNG
P/N:502-29-9	DESC: STATOR CORE	PLANNER: LA	ASSOCIATED PART LIST AND REVISION
QTY: 1	REV: C S/N:	ESD SENSITIVE: YES, Class __ No	PL502-29-9 REV. C

DRAWINGS REQUIRED		PROCEDURES REQUIRED		SPECIFICATIONS REQUIRED	PART NO	Unit QTY	TotalQTY	DATE	SHORT
502-29-9	C Rev:~~A~~	960-251	Rev:~~A~~ C						
	Rev:	5-128-0	Rev:B						
	Rev:	5-222-0	Rev:A						
	Rev:		Rev:						
	Rev:		Rev:						
	Rev:		Rev:						

OP.#	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
10	Randos Stack, One Slot Skew, Laminations Per 502-29-9	1		6/13/94	
20	Bond Laminations Per 960-251	1		6/13/94	
25	Inspect	1		6/14	MW
30	Machine Stator Core Per 502-29-9 If Necessary	1		6/14/94	
35	Inspect	1		6/17	MW
40	Clean Stator Core Per 5-128-0	1		6/20/94	
50	Fluidize Bed Coat Core Per 5-222-0	1		6/21/94	

REWORK or REPAIR INSTRUCTIONS	OPERATOR	INSPECTION	APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
1)			DES:		ECN#:	ENG:
2)			MFG:	6/10/94	MFG:	QA:
3)			ENG:	6/10/94	DT-502-29-9	REV:A
4)			QA:	6/10/94	DATE: 6/09/94	SHEET: 1

JO#:	USED ON: 500-29-9	DATE ISSUED:	DATE DUE:
P/N:502-29-9	DESC: STATOR CORE	PLANNER:	ASSOCIATED PART LIST AND REVISION
QTY: REV: A	S/N:	ESD SENSITIVE: YES, Class __ No	PL502-29-9 REV. C

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED	PART NO	Unit QTY	TotalQTY	DATE	SHORT
502-29-9 Rev:A	960-251 Rev:B						
Rev:	5-128-0 Rev:B						
Rev:	5-222-0 Rev:A						
Rev:	Rev:						
Rev:	Rev:						
Rev:	Rev:						

OP. #	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
55	Inspect	1		6/22	[illegible]
60	Machine Stator Core If Necessary Per Note 6 Of 502-29-9	1		6/23/94	[illegible]
70	Clean Core Per 5-128-0 If Machined	1		6/24/94	[illegible]
75	Inspect If Machined			6/24	[illegible]
80	Stock. To NHA 500-29-9	1			

REWORK or REPAIR INSTRUCTIONS	OPERATOR	INSPECTION	APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.
1)			DES:		ECN#: ENG:
2)			MFG:	6/10/94	MFG: QA:
3)			ENG:	6/10/94	DT-502-29-9 REV:A
4)			QA:	6/10/94	DATE: 6/09/94 SHEET: 2

SPACE APPLICATION

JOB#: 13640 -	USED ON: 500-29-9	DATE ISSUED: 6/13	DATE DUE: JULY 6
P/N:502-29-9	DESC: STATOR CORE	PLANNER: LA	ASSOCIATED PART LIST AND REVISION
QTY: 1	REV: ~~A~~ C S/N:	ESD SENSITIVE: YES, Class __ No	PL502-29-9 REV. C

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED	PART NO	Unit QTY	TotalQTY	DATE	SHORT
502-29-9 Rev: ~~A~~ C	960-251 Rev: ~~A~~ C						
Rev:	5-128-0 Rev:B						
Rev:	5-222-0 Rev:A						
Rev:	Rev:						
Rev:	Rev:						
Rev:	Rev:						

OP.#	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
10	Random Stack, One Slot Skew, Laminations Per 502-29-9	1		6/13/94	JG
20	Bond Laminations Per 960-251	1		6/13/94	JG
25	Inspect	1	C	6/14	ACCEPTED
30	Machine Stator Core Per 502-29-9 If Necessary	1		6/14/94	MP
35	Inspect			6/17/94	ACCEPTED
40	Clean Stator Core Per 5-128-0	1		6/20/94	JG
50	Fluidize Bed Coat Core Per 5-222-0	1		6/21/94	JG

REWORK or REPAIR INSTRUCTIONS	OPERATOR	INSPECTION	APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
1)			DES:		ECN#:	ENG:
2)			MFG:	6/10/94	MFG:	QA:
3)			ENG:	6/10/94	OT-502-29-9	REV:A
4)			QA:	6/11/94	DATE: 6/09/94	SHEET: 1

JO#:	USED ON: 500-29-9	DATE ISSUED:	DATE DUE:
P/N:502-29-9	DESC: STATOR CORE	PLANNER:	ASSOCIATED PART LIST AND REVISION
QTY:	REV: C A	S/N:	ESD SENSITIVE: YES, Class __ No	PL502-29-9 REV. C

DRAWINGS REQUIRED		PROCEDURES REQUIRED		SPECIFICATIONS REQUIRED	PART NO	Unit QTY	TotalQTY	DATE	SHORT
502-29-9 C	Rev: A	960-251	Rev: C						
	Rev:	5-128-0	Rev:B						
	Rev:	5-222-0	Rev:A						
	Rev:		Rev:						
	Rev:		Rev:						
	Rev:		Rev:						

OP. #	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
55	Inspect	1		6/22	ARX 35
60	Machine Stator Core If Necessary Per Note 5 Of 502-29-9	1		6/23/94	JP
70	Clean Core Per 5-128-0 If Machined	1		6/24/94	
75	Inspect If Machined	1		6/24/94	ARX 35
80	Stock. To NHA 500-29-9				

REWORK or REPAIR INSTRUCTIONS	OPERATOR	INSPECTION	APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
1)			DES:		ECN#:	ENG:
2)			MFG:	6/10/94	MFG:	QA:
3)			ENG:	6/10/94	OT-502-29-9	REV:A
4)			QA:	6/11/94	DATE: 6/09/94	SHEET: 2

AEROFLEX
LABORATORIES

35 South Service Road • Plainview, NY 11803
TEL: 516-694-6700 • FAX: 516-694-6771

Serialization - NASA SXI Motor/Encoder

Part Nº: 16187
Unit S/N: 0002

1. Temp Xducer Filter Circuit Assy
   P/N 303-216 S/N 0002

   Printed Wiring Board
   P/N 303-217 S/N 2294-0203

2. Encoder Printed Wiring Board Assy
   P/N 21664 S/N 0002

   Printed Wiring Board
   P/N 21665 S/N 2394-05-01

   Phototransistor
   P/N 565304-1
   CR1 - S/N 042
   CR2 - S/N 040
   CR3 - S/N 045
   CR4 - S/N 056
   CR5 - S/N 054

3. LED Printed Wiring Board Assy
   P/N 21774 S/N 0002

   Printed Wiring Board
   P/N 21775

   LED
   P/N 565305-1
   DS1 - S/N 141
   DS2 - S/N 158
   DS3 - S/N 218
   DS4 - S/N 187
   DS5 - S/N 221

B.G. INSTRUMENT CORP.

ULTRA-HIGH PRECISION MACHINING
METROLOGY LAB SERVICE
PRECISION MECHANICAL ASSEMBLIES
BERYLLIUM MACHINING

1 CROSSWAYS PARK WEST, WOODBURY, L. I., N. Y. 11797 • (516) 921-7340

**** CERTIFICATE OF COMPLIANCE ****

TO: Aeroflex Laboratories, Inc.
35 South Service Road
Plainview, N.Y. 11803

GENTLEMEN:

WE HEREBY CERTIFY THAT THIS MATERIAL AND OR WORK APPROVED IN THE QUANTITIES AS CALLED FOR ON

PART # ..... 301-61 Cover
P.O. # ..... ~~913136~~ 91956

ARE IN CONFORMANCE WITH THE REQUIREMENTS, SPECIFICATIONS AND DRAWINGS LISTED ON THIS ORDER AS FOLLOWS:

DATE SHIPPED 7/21/94
PACKING # .. 8508

ALL THE FOLLOWING MATERIALS & SERVICES WERE PURCHASED FRESH WITH APPROPRIATE BATCH NUMBERS

MATERIAL ... T6061 Aluminum #
HEAT TREAT . #
FINISH ..... E.C.Sumereau & Sons, #Inc.
ADDITIONAL . #

INSPECTION DATA, PROCESS CONTROL AND TEST DATA ARE ON FILE FOR CUSTOMER QUALITY ENGINEERING REVIEW FOR A MAXIMUM OF SEVEN YEARS.

QUALITY CONTROL MANAGER

7/21/94
DATE

ALLIED DEVICES CORPORATION
2365 MILBURN AVENUE • P.O. BOX 502 • BALDWIN, N.Y. 11510
Tel: 516-223-9100 FAX: 516-223-9172

CERTIFICATE OF COMPLIANCE

TO: AEROFLEX LABS

Purchase Order No. 91742

Date: 3/17/94

Certification:

Allied Devices Corporation hereby certifies that the materials and processes supplied herewith (as delineated below) conform to all applicable specifications in Allied Devices publications or on customer's prints. The parts were manufactured from materials for which physical and chemical test reports are on file at our plant in Baldwin, NY. All parts were produced under quality control standards contained in our Quality Control manual, which fulfills the requirements of MIL-I-45208A. All such records and reports will be made available for review by the above-named corporation by prior appointment.

Al Chisare
Corporate Quality Control Director

Witness:
Flo Klapthor
Inventory Control

I.O: 13628
P.O. 91742
R.R. 64180
DATE 3-22-94
ARX 35

Description

10 pcs. DE2D15 BEARINGS

10 pcs. DC13 COLLARS

10 pcs. DB8D7 SPACERS

NORDEX INCORPORATED
50 NEWTOWN ROAD
DANBURY, CONNECTICUT 06810
(203) 792-9050

J. O. 13610
P. O. 91661
R. [illegible] 64229
[illegible] 3-2254
[illegible] APX 35

CERTIFICATE OF COMPLIANCE

****

THIS IS TO CERTIFY THAT ALL MATERIAL USED IN MANUFACTURE OF PARTS CALLED FOR ON PURCHASE ORDER # 91661 CONFORM TO MATERIAL AND MANUFACTURING SPECIFICATIONS AND/OR SPECIAL PROCESS INDICATED ON DRAWING OR SPECIFICATIONS: AND THAT THESE GOODS WERE PRODUCED IN COMPLIANCE WITH ALL APPLICABLE REQUIREMENTS OF SECTION 6, 7 AND 12 OF THE FAIR LABOR STANDARDS ACT, AS AMENDED, AND OF REGULATIONS AND ORDERS OF THE UNITED STATES DEPARTMENT OF LABOR.

Jerome G. Agius /EP
JEROME G. AGIUS PRESIDENT

3-18-94
DATE

T.T.I., INC.
2441 NORTH... PKWY
FT WORTH ... 761061896

CAGE # ...N...

SHIP TO
AEROFLEX LABORATORIES, INC
35 S SERVICE RD
PLAINVIEW NY
11803

Packing List

ORDER - PL #
3362237-01

CUSTOMER ACCT #	ORDER DATE	DATE SHIPPED
NYA041	060794	

BUYER	SALES ID	SHIP VIA
ROSE	L10313	UPSREDONLY

WH	PAGE	CUSTOMER P.O. NUMBER
TX	1	92878

...TIFICATION OF COMPLIANCE - Seller hereby certifies, to the best of Sellers knowledge, that the products furnished on this shipment were manufactured by the referenced manufacturers in accordance with and form to the applicable manufacturers and military specifications, including MIL-STD-202. Certifications to this effect are on file with the seller or available from the manufacturer. Any value added work performed ...er on any such product has been done in accordance with applicable Customers specifications relating to such work, provided, however, that Seller's liability with respect to any product not meeting any such specificatio... limited as set forth in the DISCLAIMER OF WARRANTIES AND LIMITATION OF REMEDIES ON REVERSE SIDE HEREOF.

QPL CERTIFICATE - Seller certifies, to the best of Sellers knowledge, that the articles furnished in the quantities indicated, and against the referenced purchase order were produced by the named manufacturer, qualif... er the Reference Test Number, and QPL (or interim approval) number shown in the corresponding column on this document. The manufacturers Certificate to this effect is on file with Seller or will be requested fr... manufacturer.

...RCURY CERTIFICATE - Seller certifies, to the best of Sellers knowledge, that the components supplied for your order were manufactured without Mercury compounds and do not contain any Mercury. Data suppor... ...is statement is on file with the seller or available from the manufacturer.

Rodney L. Spear
RODNEY L. SPEAR
DIRECTOR, QUALITY ASSURANCE

THANK YOU FOR YOUR ORDER

...G	PART NUMBER / CUSTOMER REFERENCE /REV # / QPL INFORMATION	LINE	DATE CODE	VALUE ADDED SERVICES PROVIDED	QUANTITY SHIPPED
	ITEM M39014/0...-1858 CKR06BX... TEST NO. 39... ...-73 CAGE# MFG QPL# 39...	1			50
	A/B RCR050... TEST NO. 39... ...-20 CAGE# MFG QPL# 39...	2	9416		100

J.O. 13640
P.O. 92878
R.R. 66717
DATE 6-16-94
INSPR. AVX 302

...STRUCTIONS:

WAYBILL #	QA INSPECTOR

...MS: BUYER is deemed to have accepted the Products unless notice of rejection is given within a reasonable time, which is agreed to be within ten (10) days after receipt. CLAIMS OF LATE DELIVERY are void ...s made prior to receipt of Products. and receipt of Products shall constitute a waiver of any claim of late delivery. No return will be accepted without prior "Return Material Authorization #" (R.M.A.#). Material ...e returned as directed by the location issuing the R.M.A. # and be in its original packaging. Returns of product packaged in electrostatic packaging will not be accepted if electrostatic packaging has been opened. ...SPECTOR is authorized by Q A MANAGER to certify conformance to the customer or military requirements referenced on this document.
...YOU FOR YOUR ORDER ... CONFIDENCE IN US. We want to provide you the best ...

ROBERT McKEOWN COMPANY Inc.
111 Chambers Brook Road, Branchburg, N.J. 08876
(908) 218-9000

CERTIFICATE OF CONFORMANCE

DATE: 6-28-94

PURCHASE ORDER NUMBER 93348

TO: Aeroflex Labs, Inc.

ATTENTION: QUALITY CONTROL MANAGER

This is to certify that material furnished for referenced purchase order has been manufactured in accordance with applicable Government and / or Customer specifications.

Test reports and / or evidence of complete inspection are on file subject to examination and indicate conformance to applicable military and commercial requirements.

Shelf life begins at Date of Manufacture indicated below

Quantity / Item: (1) PC18M qrt

Lot Numbers(s): 407511

Date Rec'd RMC: 5-31-94

Date of Manufacture: 3-16-94

Expiration Date: 9-30-95

BY: D.M. Brey QC

Title: Robert McKeown Company, Inc.

J.O. 13640
P.O. 93348
R.R. 67216
DATE 7-20-94
INSPR.
ANA 102

DIAMOND FASTENERS INC.

8 COMMERCE DRIVE
FARMINGDALE, NY 11735

TELEPHONE: 516-694-2766
FAX: 516-694-2805

CERTIFICATE OF CONFORMANCE

No. 002571

BILL TO [AER LBS]	SHIP TO
AEROFLEX LABORATORIES, INC. 35 SOUTH SERVICE ROAD PLAINVIEW, NY 11803 USA Attn: ACCOUNTS PAYABLE	AEROFLEX LABORATORIES, INC. 35 SOUTH SERVICE ROAD PLAINVIEW, NY 11803 USA

INVOICE No.	PURCHASE ORDER No.	F.O.B. / C.I.F.	SHIP VIA	SHIPMENT No.
002571	97741	FARMINGDALE, NY	UPS	
INVOICE DATE	SALES ORDER	TERMS	SHIP DATE	INV DUE DATE
JAN-16-95	1754	NET 30	JAN-16-95	FEB-15-95
OUR REF #	YOUR REF#	MASTER AWB	HOUSE AWB	ORIGIN

Item	CERTIFICATE OF CONFORMANCE	Shipped	B. Order	Unit Price	Amount
1	MS21209C0815 3585-2CN246 **AL#:** 3585-2CN246	15 EA	85		
2	08C08FSCSS 8-32X1/2 FLAT SKT CAP S/S	100 EA	0		
3	5100-18C RET RING COPPER	10 EA	0		

J.O. 13640
P.O. 97741
R.R. 74398
DATE 01-27-95
INSPR. MSL 102

WE HERBY CERTIFY THAT MATERIALS AND /OR PARTS AS LISTED HEREON HAVE BEEN MANUFACTURED IN ACCORDANCE WITH ALL APPLICABLE INSTRUCTIONS AND SPECIFICATIONS.

Authorized Signatures _____

WORK ORDER

SHIP DATE	PAGE NO.	WORK ORDER NO.	CANCELLATION DATE	CUST NO.
3/21/94	1	15291	/ /	00053

DIAMOND FASTENERS INC.
8 Commerce Drive
Farmingdale, NY 11735

Phone: (516) 694-2766 Fax: (516) 694-2805

AEROFLEX LABORATORIES
35 SOUTH SERVICE ROAD
PLAINVIEW, NY 11803

SHIP TO
AEROFLEX LABORATORIES
35 SOUTH SERVICE ROAD
PLAINVIEW, NY 11803
ORDER# 91751

2.35

ORDER DATE	PURCHASE ORDER NO.	SHIP VIA	F.O.B.	TERMS
03/18/94	91751	UPS 1.6 2.35	S. P.	NET 30

BUYER	DATE REQUESTED	LOCATION	SALESPERSON	TERRITORY
SAL	03/18/94			

ITEM NO. BIN LOCATION NO.	DESCRIPTION	QUANTITY ORDERED	QUANTITY BACK ORD.	QUANTITY SHIPPED	UNIT PRICE	EXTENSION	TAX
	MS51957-3	250	—	250	0.03	7.50	
	MS15795-802	250	—	250	0.01	2.50	
	MA8620C2	250	—	250	0.01	2.50	

SUB TOTAL 12.50

We hereby certify that materials and/or parts as listed hereon have been manufactured in accordance with all applicable instructions and specifications.

DIAMOND FASTENERS INC. QUALITY MGR.

WORK ORDER NO. 15291

12.50

TOTAL ORDER VALUE

DIAMOND FASTENERS INC.
8 COMMERCE DRIVE
FARMINGDALE, NY 11735
TELEPHONE: 516-694-2766
FAX: 516-694-2805

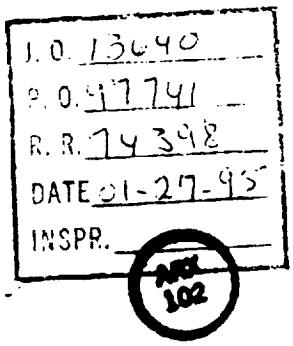
CERTIFICATE OF CONFORMANCE

No. 002571

BILL TO [AER LBS]	SHIP TO
AEROFLEX LABORATORIES, INC. 35 SOUTH SERVICE ROAD PLAINVIEW, NY 11803 USA Attn: ACCOUNTS PAYABLE	AEROFLEX LABORATORIES, INC. 35 SOUTH SERVICE ROAD PLAINVIEW, NY 11803 USA

INVOICE No.	PURCHASE ORDER No.	F.O.B. / C.I.F.	SHIP VIA	SHIPMENT No.
002571	97741	FARMINGDALE, NY	UPS	
INVOICE DATE	SALES ORDER	TERMS	SHIP DATE	INV DUE DATE
JAN-16-95	1754	NET 30	JAN-16-95	FEB-15-95
OUR REF #	YOUR REF#	MASTER AWB	HOUSE AWB	ORIGIN

Item	CERTIFICATE OF CONFORMANCE	Shipped	B. Order	Unit Price	Amount
1	MS21209C0815 3585-2CN246 AL#: 3585-2CN246	15 EA	85		
2	08C08FSCSS 8-32X1/2 FLAT SKT CAP S/S	100 EA	0		
3	5100-18C RET RING COPPER	10 EA	0		



WE HEREBY CERTIFY THAT MATERIALS AND /OR PARTS AS LISTED HEREON HAVE BEEN MANUFACTURED IN ACCORDANCE WITH ALL APPLICABLE INSTRUCTIONS AND SPECIFICATIONS.

Authorized Signatures

INVOICE [redacted]

03/30/94 73521

WEICO WIRE & CABLE INC.
181 RODEO DRIVE
EDGEWOOD, N.Y. 11717
(516) 254-2970
FAX # (516) 254-2099

SOLD TO
AEROFLEX LABORATORIES
35 S SERVICE ROAD
PLAINVIEW, NY 11714

SHIP TO
AEROFLEX LABORATORIES
35 SOUTH SERVICE ROAD
PLAINVIEW, NY 11714

ATT: ACCOUNTS PAYABLE

COMPLETE SHIPMENT

ORDER NO.	ORDER DATE	CUSTOMER	SALES	PURCHASE	SHIP VIA	SHIP DATE	TERMS
65836	03/30/94	103	4	91877	U P S	03/30/94	Net 30

ORDERED	SHIPPED	ITEM NUMBER	ITEM DESCRIPTION	UNIT PRICE	PER UOM	AMOUNT
10	9	MISC-ITEM LB	M1177/14-01C036 36SEI	6.35	LB	57.15
10	9	MISC-ITEM LB	M1177/14-01C037 37SEI	6.53	LB	58.77
100	100	SKY-[illegible]/16 CLR	TUBING SHRINK KYNAR 1/16 CLR M23053/8-002-C	.4323	FT	43.23

SALE AMOUNT	159.15
MISC. CHARGES	.00
FREIGHT	8.45
SALES TAX	.00
TOTAL	

CERTIFICATION OF COMPLIANCE
THIS IS TO CERTIFY THAT THE MATERIAL SUPPLIED FOR YOUR PURCHASE ORDER WAS MANUFACTURED IN COMPLIANCE WITH SPECIFICATIONS AS REQUIRED ON THIS ORDER.

DIAMOND FASTENERS INC.
8 Commerce Drive
Farmingdale, NY 11735

Phone: (516) 694-2766 Fax: (516) 694-2805

SHIP DATE	PAGE NO.	WORK ORDER NO.	CANCELLATION DATE	CUST. NO.
3/21/94	1	15291	/ /	00053

SOLD TO
AEROFLEX LABORATORIES
35 SOUTH SERVICE ROAD
PLAINVIEW, NY 11803

SHIP TO
AEROFLEX LABORATORIES
35 SOUTH SERVICE ROAD
PLAINVIEW, NY 11803
ORDER# 91751

J. O. 13640
P. O. 91751
R. R. 64283
DATE 3-23-94
INSPR.

ORDER DATE	PURCHASE ORDER NO.	SHIP VIA	F.O.B.	TERMS
03/ /94	150	UPS	S. P.	NET 30
BUYER	DATE REQUESTED	LOCATION	SALESPERSON	TERRITORY
	03/ /94			

ITEM NO. / BIN LOCATION NO.	DESCRIPTION	QUANTITY ORDERED	QUANTITY BACK ORD.	QUANTITY SHIPPED	LN NO
	MS51957-3	250	—	250	1
	MS15795-802	250	—	250	2
	NAS620C2	250	—	250	3
					4
					5
					6

CERTIFICATION

We hereby certify that materials and/or parts as listed hereon have been manufactured in accordance with all applicable instructions and specifications.

DIAMOND FASTENERS INC.

QUALITY MGR.

WORK ORDER NO.

FRED R. RIPPY, INC.

12471 E. Washington Boulevard
Whittier, California 90602-1075
Telephone: (213) 698-9801
Fax: (213) 945-1892

CERTIFICATION OF COMPLIANCE WITH PURCHASE ORDER

DATE 2.15.94 CUSTOMER'S ORDER NO. 90323

CUSTOMER Amphenol Interconnect PART NUMBER 512-11-14

QUANTITY 100 CHANGE LETTER "B"

Seller certifies that the parts furnished on referenced purchase order were produced either from materials furnished by Purchaser for the production of such parts or from materials for which the seller has available for examination chemical and/or physical test reports or other evidence of conformance to applicable specifications.

Seller also certifies that these parts were produced in accordance with specifications referenced or furnished by the Buyer in connection with the purchase order number shown above, for which Seller has available for examination certifications of conformance to applicable specifications.

Seller also certifies that any processes required to be performed by a government approved processing source were in fact performed by such approved source.

FRED R. RIPPY, INC.

By Ryan Hoffman

J.O. 13640
P.O. 90323
63052
DATE 2-28-94
INSPR.
APX 102

DIAMOND FASTENERS INC.
8 COMMERCE DRIVE
FARMINGDALE, NY 11735

TELEPHONE: 516-694-2766
FAX: 516-694-2805

CERTIFICATE OF CONFORMANCE

No. 002571

BILL TO [AER LBS]	SHIP TO
AEROFLEX LABORATORIES, INC. 35 SOUTH SERVICE ROAD PLAINVIEW, NY 11803 USA Attn: ACCOUNTS PAYABLE	AEROFLEX LABORATORIES, INC. 35 SOUTH SERVICE ROAD PLAINVIEW, NY 11803 USA

INVOICE No.	PURCHASE ORDER No.	F.O.B. / C.I.F.	SHIP VIA	SHIPMENT No.
002571	97741	FARMINGDALE, NY	UPS	
INVOICE DATE	**SALES ORDER**	**TERMS**	**SHIP DATE**	**INV DUE DATE**
JAN-16-95	1754	NET 30	JAN-16-95	FEB-15-95
OUR REF #	**YOUR REF#**	**MASTER AWB**	**HOUSE AWB**	**ORIGIN**

Item	CERTIFICATE OF CONFORMANCE	Shipped	B. Order	Unit Price	Amount
1	**MS21209C0815** 3585-2CN246 **AL#:** 3585-2CN246	15 EA	85		
2	**08C08FSCSS** 8-32X1/2 FLAT SKT CAP S/S	100 EA	0		
3	**5100-18C** RET RING COPPER	10 EA	0		

J.O. 13640
P.O. 97741
R.R. 74398
DATE 01-27-95
INSPR. MRB 102

WE HERBY CERTIFY THAT MATERIALS AND /OR PARTS AS LISTED HEREON HAVE BEEN MANUFACTURED IN ACCORDANCE WITH ALL APPLICABLE INSTRUCTIONS AND SPECIFICATIONS.

Authorized Signatures _____

... 64 EXECUTIVE AVENUE EDISON NJ 08817

...OICE NO	SCN	ORDER DATE	DUE DATE	ORIG CO	CUSTOMER NO	OT	IS	TX	PAGE
111293831	B111 2135725	06-20-94	06-20-94	B111	B111 12984 000	M	009	N	01 OF 01

AEROFLEX LAB, INC.
35 S. SERVICE ROAD
PLAINVIEW
NY 11803

TERMS	PAYMENT METHOD	HOT	COD
NET 30 DAYS	CHARGE OPEN ACCOUNT	RUSH	

...MMENTS CALL OUR NEW NATIONAL 800 # (800-805-4636)
... OF C, LOT#, DOM, S/L = 80% MINIMUM!!!
...EASE SHIP TODAY!!!

PO # 93191
REL #
GOVT
PRTY

	ORDER QTY	BO QTY	SHIP QTY	PART NO / BIN LOCATION	UM	RESALE	EXT PRICE
				RRRRR U U SSSSS H H R R U U S H H RRRRR U U SSSSS HHHHH R R U U S H H R R UUUUU SSSSS H H		10	
1	6.0	0	6.0	3M-1205-1/4 88F1 PP1412 ... P/S TAPE IS			

F4135 82

TOTAL PACK	CRT	WEIGHT	CHARGES	SHIPPED VIA	TAX	SHIP DATE	COD CTL	TOTAL	B/L NO	UZ

FGT CH	COD CH	CARRIER	FRT	MSCCH 1	MSCCH 2	INS
		UPS	ADD			

/20/94 12:22:21 PACK SLIP - CERTIFICATE OF COMPLIANCE ON BACK ORDBOK B1110293831

UGIMAG, Inc.

VALPARAISO, IN 46383 (219) 462-3131
UGIMAX, Incor, Cunife, Recoma & UGISTAB
Permanent Magnets

CERTIFICATE OF COMPLIANCE

UGIMAG Part No. 7204176 REV Customer P.O. No. 90157 ITEM 2

UGIMAG Order No. 008422 Customer Part No. 411-291-3

REV B

UGIMAG, INC. certifies that (quantity) 24.0 pieces of the above part number, shipped on (date) FEBRUARY 03, 1994 against the above order number conforms to the specifications for LT26-1 (material) in respect to physical and magnetic properties, and further certifies that these parts are in compliance with the referenced purchase order and print. Inspection has been made in accordance with MIL-I-45208A. Inspection and test data proving compliance to applicable specifications is on file at UGIMAG, INC. and available for customer examination upon request.

J.O. 13640
P.O. 90157
R R. 62681
DATE 3-8-94
INSPR. ARX 102

UGIMAG, INC.

Quality Assurance Director

FEBRUARY 03, 1994

Date

FORM NO. 27-010-0004, Rev.-B

UGIMAG, Inc.

VALPARAISO, IN 46383 (219) 462-3131
UGIMAX, Incor, Cunife, Recoma & UGISTAB
Permanent Magnets

CERTIFICATE OF COMPLIANCE

UGIMAG Part No. 7204175 REV Customer P.O. No. 90157 ITEM 1

UGIMAG Order No. 008421 Customer Part No. 411-291-2

REV B

UGIMAG, INC. certifies that (quantity) 24.0 pieces of the above part number, shipped on (date) FEBRUARY 03, 1994 against the above order number conforms to the specifications for LT26-1 (material) in respect to physical and magnetic properties, and further certifies that these parts are in compliance with the referenced purchase order and print. Inspection has been made in accordance with MIL-I-45208A. Inspection and test data proving compliance to applicable specifications is on file at UGIMAG, INC. and available for customer examination upon request.

UGIMAG, INC.

Linda A Lapson

Quality Assurance Director

FEBRUARY 03, 1994

Date

FORM NO. 27-010-0004, Rev -B

J. O. 13640
P. O. 90157
R. R. 62681
DATE 3-8-94
INSPR. Abx 102

UGIMAG, Inc.

VALPARAISO, IN 46383 (219) 462-3131
UGIMAX, Incor, Cunife, Recoma & UGISTAB
Permanent Magnets

CERTIFICATE OF COMPLIANCE

UGIMAG Part No. 7204175 REV Customer P.O. No. 90226 ITEM 1

UGIMAG Order No. 008437 Customer Part No. 411-291-2

REV B

UGIMAG, INC. certifies that (quantity) 64.0 pieces of the above part number, shipped on (date) FEBRUARY 03, 1994 against the above order number conforms to the specifications for LT26-1 (material) in respect to physical and magnetic properties, and further certifies that these parts are in compliance with the referenced purchase order and print. Inspection has been made in accordance with MIL-I-45208A. Inspection and test data proving compliance to applicable specifications is on file at UGIMAG, INC. and available for customer examination upon request.

UGIMAG, INC.

Linda A Thompson

Quality Assurance Director

FEBRUARY 03, 1994

Date

FORM NO 27-010-0004 Rev -B

13640
90226
62682
2-16-94
APX 102

ACCEPTED
NO INSPECTION REQUIRED

UGIMAG, Inc.

VALPARAISO, IN 46383 (219) 462-3131
UGIMAX, Incor, Cunife, Recoma & UGISTAB
Permanent Magnets

CERTIFICATE OF COMPLIANCE

UGIMAG Part No. 7204176 REV Customer P.O. No. 90226 ITEM 2

UGIMAG Order No. 008438 Customer Part No. 411-291-3

REV B

UGIMAG, INC. certifies that (quantity) 64.0 pieces of the above part number, shipped on (date) FEBRUARY 03, 1994 against the above order number conforms to the specifications for LT26-1 (material) in respect to physical and magnetic properties, and further certifies that these parts are in compliance with the referenced purchase order and print. Inspection has been made in accordance with MIL-I-45208A. Inspection and test data proving compliance to applicable specifications is on file at UGIMAG, INC. and available for customer examination upon request.

UGIMAG, INC.

Linda A Simpson

Quality Assurance Director

FEBRUARY 03, 1994

Date

FORM NO. 27-010-0004, Rev -B

J.O. 13640
P.O. 90226
R.R. 62682
DATE 2-16-94
INSPR. AVK 102

ACCEPTED
NO INSPECTION REQUIRED

JIG BORING SPECIALTIES OF L.I.N.Y.
TELEPHONE 516-586-7400 FAX 516-586-7460

60-S South 2nd Street
Deer Park 11729

CERTIFICATE OF COMPLIANCE

DATE 5/23/94

TO: AEROFLEX LAB. INC.
35 SOUTH SERVICE ROAD
PLAINVIEW, N.Y. 11803

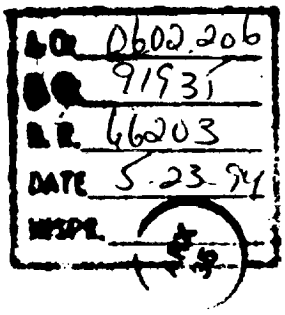
PURCHASE ORDER NO. 91935 JOB NO. 0601-206

PART NO. 607-449 QUANTITY 4 EA

402-29-9

INVOICE NUMBER _____ OTHER _____

It is hereby certified that the above parts called for are in conformance with the requirements, specifications, and drawings listed on the Purchase Order to the best of our knowledge. Test reports are on file subject to examination and indicate conformance with applicate specifications. Specific material and/or parts furnished by your company and only such company furnished material was incorporated and/or used in completion of the purchase order.



Very truly yours,

Leo Allentuch

QUALITY CONTROL INSPECTION

UNITED PRINTED CIRCUITS, INC.

1860 Sparkman Drive
Huntsville, AL 35816

Telephone: (205) 830-5998
Fax: (205) 830-5997

CERTIFICATION OF ELECTRICAL TESTING

This is to certify that the listed materials or assemblies have been tested by me or under my supervision and meet the requirements of all applicable drawings, specifications, and purchase orders.

CUSTOMER: Aeroflex Kato

P. O. NUMBER: 92646 REVISION: A

PART OR ASSEMBLY NUMBER: 303-217

QUANTITY SHIPPED: 6 DATE OF MANUFACTURE: 2294

AUTHORIZED SIGNATURE: Amy C. Christmas

DATE: June 3, 1994

S/N 2294-01-01
2294-02-01
2294-03-01
2294-04-01
2294-01-03
2294-02-03

UNITED PRINTED CIRCUITS, INC.

1860 Sparkman Drive
Huntsville, AL 35816

Telephone: (205) 830-5998
Fax: (205) 830-5997

CERTIFICATION OF COMPLIANCE

This is to certify that the listed materials or assemblies have been inspected by me or under my supervision and meet the requirements of all applicable drawings, specifications, and purchase orders. Evidence supporting this certificate of compliance is available upon request.

CUSTOMER: Aeroflex Labs

P. O. NUMBER: 92646 REVISION: A

PART OR ASSEMBLY NUMBER: 303-317

QUANTITY SHIPPED: 6 DATE OF MANUFACTURE: 2294

AUTHORIZED SIGNATURE: Amy C. Christmas

DATE: June 3, 1994

S/N 2294-01-01
2294-02-01
2294-03-01
2294-04-01

2294-01-03
2294-02-03

J.O. 13640
P.O. 92646
R.R. 66748
DATE 6-16-94
INSPR. ARK 102

JIG BORING SPECIALTIES OF L.I.N.Y.
TELEPHONE 516-586-7400 FAX 516-586-7460

60-S South 2nd Street
Deer Park 11729

CERTIFICATE OF COMPLIANCE

DATE 7/25/94

TO: AEROFLEX LABORATORIES INC
35 SOUTH SERVICE ROAD
PLAINVIEW, N.Y. 11803

PURCHASE ORDER NO. 91935 JOB NO. 13640 4

PART NO. 301-60 QUANTITY 4

HOUSING MOTOR ENCODER

INVOICE NUMBER 1311 OTHER

It is hereby certified that the above parts called for are in conformance with the requirements, specifications, and drawings listed on the Purchase Order to the best of our knowledge. Test reports are on file subject to examination and indicate conformance with applicate specifications. Specific material and/or parts furnished by your company and only such company furnished material was incorporated and/or used in completion of the purchase order.

J.O. 13640
P.O. 91935
R.R. 67977
DATE 8/3/94
INSPR.

rejected
1pc

Very truly yours,

Leo Alicastro

QUALITY CONTROL INSPECTION

DEANCO™ EMD DIVISION
HEADQUARTERS
87 Concord Street, North Reading, MA 01864 Tel: (508) 664-9355

CERTIFICATION

PLEASE REFERENCE OUR ORDER NUMBER ON ALL INQUIRIES OR CORRESPONDENCE

SHIP ORDER NUMBER	REL	PAGE

ASSEMBLED BY _____ CHECKED BY _____

DATE _____ TIME _____ P/C _____

CARTON	1	2	3	4	5	6	7	8
WEIGHT								

TOTAL PACKAGES _____ TOTAL WEIGHT _____

BILL TO

SHIP TO

R F	OUTSIDE SALESMAN NUMBER	CUSTOMER NUMBER	COPIES	CUSTOMER ORDER NUMBER	INSIDE SALESMAN NUMBER	CREDIT APPROVAL	TX CO	DATE	SHIPPING INFORMATION VIA	FRT IN CODE	FREIGHT IN AMOU

CERTIFICATION

This is to certify that the material shipped on your Purchase Order number noted above will meet all requirements of specifications listed.

Quality Assurance Manager

GENERAL ELECTRIC

We hereby certify that material being shipped to you against your above purchase order is the General Electric Product described on this document and is manufactured by the Silicone Products Department of General Electric Co. As authorized distributors for GE Silicone Products, we have in our files certification received from General Electric Company that this material was produced in compliance with their standard manufacturing procedures for the product. It is being shipped to you in the original containers in which it was packaged by General Electric Company after testing by them in accordance with their normal quality control procedures.

Quality Assurance Manager

SHIPPED	CATALOG NUMBER AND DESCRIPTION	EDP TX	LOT NUMBER	SHELF LIFE
			202-102	
			DATE OF MFG	EXPIRATION DAT

J. O. 13640
P. O. 1087
R. R. 80180
DATE 6-14-
INSPR. AP 10

HISCO
55 VERONICA AVENUE / SOMERSET, NEW JERSEY 08873-3492
FAX (908) 745-2820
(908) 745-2828

~~FH~~ CC222-6631

J. O. 13640
P. O. 93194
R. R. 67071
DATE 6-30-94
INSPR. ARK 10%

TO: Aeroflex

DATE: 6-29-94

913617-00

ATTN: Sal

OUR FILE NO.: WT 3234

Fax 516-694-6770

CERTIFICATE OF COMPLIANCE

THIS IS TO CERTIFY THAT THE MATERIAL SUPPLIED ON YOUR P.O. NO. 93194 HAS BEEN MANUFACTURED IN ACCORDANCE WITH AND CONFORMS TO APPLICABLE SPECIFICATIONS AND/OR STANDARDS.

QUANTITY	MFG	DESCRIPTION	LOT NUMBER	MFG DATE	SHELF LIFE	SPEC NO.
12 lbs	3M	SC 280	1031-1140	10/93	18 mo	

HISCO

John O. Finke

EXCEPTIONS:

THE FOLLOWING IS MADE IN LIEU OF ALL WARRANTIES, EXPRESSED OR IMPLIED.

ALL MATERIALS ARE GUARANTEED, PROVIDED THEY HAVE NOT BEEN DAMAGED OR USED IMPROPERLY. SELLER'S ONLY OBLIGATION SHALL BE TO REPLACE SUCH QUANTITIES OF MATERIAL PROVIDED TO BE DEFECTIVED. SELLER SHALL NOT BE LIABLE FOR ANY INJURY, OR LOSS OR DAMAGE, DIRECT OR CONSEQUENTIAL, ARISING OUT OF USER'S USE OF, OR INABILITY TO USE THE PRODUCT. BEFORE USING, USER SHALL DETERMINE THE SUITABILITY OF THE PRODUCT FOR HIS INTENDED USE, AND USER ASSUMES ALL RISK AND LIABILITY WHATSOEVER IN CONNECTION THEREWITH.

BRUNELL ELECTRO, INC. 84 EXECUTIVE AVENUE EDISON NJ 08817

INVOICE NO	SCN	ORDER DATE	DUE DATE	ORIG CO	CUSTOMER NO	OT	IS	TX	PAGE
111291433	B111 2134840	06-10-94	06-10-94	B111	B111 12984 000	M	009	N	01 OF 01

AEROFLEX LAB, INC.
35 S. SERVICE ROAD
PLAINVIEW
NY 11803

TERMS	PAYMENT METHOD	HOT	COD
NET 30 DAYS	CHARGE OPEN ACCOUNT		

COMMENTS CALL OUR NEW NATIONAL 800 # (800-805-4636)
C OF C, LOT#, DOM, S/L

<<ALL SHELF LIFE ITEMS MUST HAVE MINIMUM 80% LEFT>>

PO # 92911
REL #
GOVT
PRTY

	ORDER QTY	BO QTY	SHIP QTY	PART NO / BIN LOCATION	UM	RESALE	EXT PRICE
1	2.0	0	2.0	3M-281-1 SCOTCHCAST RESIN IS SHIP LOT#1209-1228	PT	10	

J.O. 13640
P.O. 92911
R.R. 66806
DATE 6-27-94
INSPR.

AUCH 102

TAL		CHARGES		TAX		TOTAL	

PACK	CRT	WEIGHT	SHIPPED VIA	SHIP DATE	COD CTL	B/L NO	UZ
D	1		UPS GS	6-10-94			

FRT CH	COD CH	CARRIER	FRT	MSCCH 1	MSCCH 2	INS
		UPS	ADD			

10/94 06:03:56 PACK SLIP - CERTIFICATE OF COMPLIANCE ON BACK ORDBOK B1110291433

O.

I. O. 13640
P. O. 10429
R. R. 79182
DATE 5-15-95
INSPR. Alex 102

ILL TO

DEANCO EMD DIVISION
HEADQUARTERS
87 Concord Street, North Reading, MA 01864 Tel: (508) 664-9355

SHIP TO

CERTIFICATION

PLEASE REFERENCE OUR ORDER NUMBER ON ALL INQUIRIES OR CORRESPONDENCE

SHIP ORDER NUMBER	REL	PAGE

ASSEMBLED BY (R) CHECKED BY NS.

DATE _____ TIME _____ P/C _____

CARTON	1	2	3	4	5	6	7	8	9
WEIGHT									

TOTAL PACKAGES 1 TOTAL WEIGHT 6

OUTSIDE SALESMAN NUMBER	CUSTOMER NUMBER	COPIES	CUSTOMER ORDER NUMBER	INSIDE SALESMAN NUMBER	CREDIT APPROVAL	TX CO.	DATE	SHIPPING INFORMATION VIA	FRT. IN CODE	FREIGHT IN AMOUNT
							5/ /95			

CERTIFICATION

This is to certify that the material shipped on your Purchase Order number noted above will meet all requirements of specifications listed.

Quality Assurance Manager

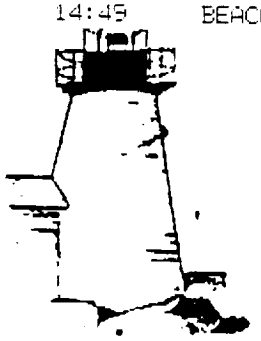
GENERAL ELECTRIC

We hereby certify that material being shipped to you against your above purchase order is the General Electric Product described on this document and is manufactured by the Silicone Products Department of General Electric Co. As authorized distributors for GE Silicone Products, we have in our files certification received from General Electric Company that this material was produced in compliance with their standard manufacturing procedures for the product. It is being shipped to you in the original containers in which it was packaged by General Electric Company after testing by them in accordance with their normal quality control procedures.

Quality Assurance Manager

SHIPPED	CATALOG NUMBER AND DESCRIPTION	EDP TX	LOT NUMBER	SHELF LIFE
			2850FT	
			2150T416	1 YEAR
1			CAT. 9	
			2150S216	

DATE OF MFG	EXPIRATION DATE
2-16-95	2-16-96
2-16-95	2-16-96



BEACON

BEACON CHEMICAL CO., INC.
Manufacturing Chemist Since 1926
125 MacQuesten Parkway South, Mount Vernon, N.Y. 10550 • (914) 699-3400

J. O. 13640
P. O. 92169
R. R. 64961
DATE 4-20-94
INSPR. 102

PRODUCT CERTIFICATION

RE: YOUR ORDER NUMBER 92169

WE CERTIFY THAT THE MATERIALS LISTED BELOW ARE THOSE WHICH WERE SHIPPED TO YOU. THEY WERE MANUFACTURED BY BEACON CHEMICAL CO. TO THEIR APPLICABLE SPECIFICATION LIMITS.

PRODUCT DESCRIPTION	QUANTITY	LOT NUMBER
E645 Part I	1 gallon	13023
E645 Part II	1 quart	13025

Shelf Life 12 months
as of 04/11/94 Expires
04/11/95,

VERY TRULY YOURS
BEACON CHEMICAL CO., INC

David Morrison

DAVID MORRISON
SALES COORDINATOR

SELLER CERTIFICATE OF COMPLIANCE

PAGE 1 OF 1

1. PART NUMBER	2. REV. LETTER	3. SELLER NAME AND ADRESS			
607-451	A	UNITED MACHINING, INC. 77-19 WINDSOR PLACE CENTRAL ISLIP, N.Y. 11722 (516) 582-4766			
4. S.M.R.R. NUMBER	5. QTY. SHIPPED	6. PKG. SLIP NO.	7. P.O. NUMBER	8. INSP. STAMP	9. SELLER P.O. NUMBER
	6 PCS.	1872	93448		1645
10. MATERIAL TYPE AND SPECIFICATION	HEAT/LOT NO.	11. MATERIAL REL. NO.	12. PROVISIONAL REL. NO.	13. MATERIAL SUPPLIER NAME	
CRES 303				UNITED	

14. PROCESS PERFORMED	15. SPECIFICATION	16. DATE PERFORMED	17. SELLER NAME AND ADRESS WHERE PROCESS PERFORMED	18. SELLER P.O. NO.	19. LOT SIZE
Machining	TO B/P	6-25-94	UNITED MACHINING, INC. 77-19 WINDSOR PLACE, CENTRAL ISLIP, N.Y. 11722	1645	6 PCS

J. O. 13640
P. O. 93448
R. R. 67443
DATE 7-20-94
INSPR.

ADDITIONAL NOTES OR INSTRUCTIONS

SIGNATURE OF CERTIFIER

TITLE OF CERTIFIER

DATE 6-26

SELLER CERTIFICATE OF COMPLIANCE

1. PART NUMBER	2. REV. LETTER	3. SELLER NAME AND ADRESS			
CLAMO 617-1 P/N 667-450	A	UNITED MACHINING, INC. 77-19 WINDSOR PLACE CENTRAL ISLIP, N.Y. 11722 (516) 582-4766			
4. S.M.R.R. NUMBER	**5. QTY. SHIPPED**	**6. PKG. SLIP NO.**	**7. P.O. NUMBER**	**8. INSP. STAMP**	**9. SELLER P.O. NUMBER**
	9/6	1840	92579	(stamp)	6120
10. MATERIAL TYPE AND SPECIFICATION		**HEAT/LOT NO.**	**11. MATERIAL REL. NO.**	**12. PROVISIONAL REL. NO.**	**13. MATERIAL SUPPLIER NAME**
303 SST/455 SST					UNITED

14. PROCESS PERFORMED	15. SPECIFICATION	16. DATE PERFORMED	17. SELLER NAME AND ADRESS WHERE PROCESS PERFORMED	18. SELLER P.O. NO.	19. LOT SIZE
MACHINING	TO B/P	5-10-94	UNITED MACHINING, INC. 77-19 WINDSOR PLACE, CENTRAL ISLIP, N.Y. 11722	6120	15 PCS
			J.O. 13640 P.O. 92579 R.P. 66175 66175T DATE 6-3-94 APR. 102		

ADDITIONAL NOTES OR INSTRUCTIONS

SIGNATURE OF CERTIFIER [signature]

TITLE OF CERTIFIER QC MGR

DATE [illegible]

JIG BORING SPECIALTIES OF L.I.N.Y.
TELEPHONE 516-586-7400 FAX 516-586-7460

60-S South 2nd Street
Deer Park 11729

CERTIFICATE OF COMPLIANCE

DATE 5/23/94

TO: AEROFLEX LAB. INC.
35 SOUTH SERVICE ROAD
PLAINVIEW, N.Y. 11803

PURCHASE ORDER NO. 91935 JOB NO. 0601-206

PART NO. 607-449 QUANTITY 4 EA

402-29-9

INVOICE NUMBER _____ OTHER _____

It is hereby certified that the above parts called for are in conformance with the requirements, specifications, and drawings listed on the Purchase Order to the best of our knowledge. Test reports are on file subject to examination and indicate conformance with applicate specifications. Specific material and/or parts furnished by your company and only such company furnished material was incorporated and/or used in completion of the purchase order.

Very truly yours,

Leo Allentuo

QUALITY CONTROL INSPECTION

Pioneer

ORDER DATE	SHIP DATE	CUSTOMER NO.

OUR ORDER NO.	CUSTOMER P O NO.

SHIP VIA	F.O.B.	SALESMAN NO.	TERMS

PIONEER has handled the enclosed product in accordance with the requirements of JEDEC Publication 108 and JEDEC Publication 109

The undersigned certifies that all articles included in each shipment under the above Purchase Order are in accordance with said Purchase Order and with all requirements, specification and drawings referenced therein, and that records of inspection and test providing objective evidence of the foregoing are on file and available upon request. It is also certified that all devices in this shipment are ... manufacturer's conformation.

Quality Assurance Signed: Debra Cheney Date 3-17-94

-BIN-

ITEM NO.	QUANTITY ORDERED	QUANTITY SHIPPED	BACK ORDERED	VENDOR - PRODUCT DESCRIPTION	UNIT PRICE	AMOUNT
				J.O. 13640 P.O. 91789 R.R. 64225 DATE 3-24-94 INSPR. 102	[redacted]	[redacted]

[redacted]

CERTIFICATE OF CONFORMANCE

SELLER CERTIFICATE OF COMPLIANCE

PAGE 1 OF 1

1. PART NUMBER	2. REV. LETTER	3. SELLER NAME AND ADDRESS
527-197 CB1700-75245	A	UNITED MACHINING, INC. 77-18 WINDSOR PLACE CENTRAL ISLIP, N.Y. 11722 (516) 582-4788

4. S.M.R.R. NUMBER	5. QTY. SHIPPED	6. PKG. SLIP NO.	7. P.O. NUMBER	8. DISP. STAMP	9. SELLER P.O. NUMBER
	3 PCS	2069	97775		2104

10. MATERIAL TYPE AND SPECIFICATION	HEAT/LOT NO.	11. MATERIAL REL. NO.	12. PROVISIONAL REL. NO.	13. MATERIAL SUPPLIER NAME
Alum				United

14. PROCESS PERFORMED	15. SPECIFICATION	16. DATE PERFORMED	17. SELLER NAME AND ADRESS WHERE PROCESS PERFORMED	18. SELLER P.O. NO.	19. LOT SIZE
Machining	TOB/P	1-25-95	UNITED MACHINING, INC. 77-18 WINDSOR PLACE, CENTRAL ISLIP, N.Y. 11722	2104	3PCS

J.O. 13640
P.O. 97775
R.R. 75285
DATE 2/27/95
INSPR. ARX 46

ADDITIONAL NOTES OR INSTRUCTIONS

SIGNATURE OF CERTIFIER [signature]

TITLE OF CERTIFIER MGR QC DEPT

DATE 2/25/95

AEROFLEX
LABORATORIES

35 South Service Road • Plainview, NY 11803
TEL: 516-694-6700 • FAX: 516-694-6771

Serialization - NASA SXI Motor/Encoder

Part Nº: 16187
Unit S/N: 0003

1. Temp Xducer Filter Circuit Assy
   P/N 303-216 S/N 0003

   Printed Wiring Board
   P/N 303-217 S/N 2294-0301

2. Encoder Printed Wiring Board Assy
   P/N 21664 S/N 0003

   Printed Wiring Board
   P/N 21665 S/N 2394-11-01

   Phototransistor
   P/N 565304-1
   CR1 - S/N 036
   CR2 - S/N 037
   CR3 - S/N 038
   CR4 - S/N 048
   CR5 - S/N 049

3. LED Printed Wiring Board Assy
   P/N 21774 S/N 0003

   Printed Wiring Board
   P/N 21775

   LED
   P/N 565305-1
   DS1 - S/N 235
   DS2 - S/N 240
   DS3 - S/N 418
   DS4 - S/N 430
   DS5 - S/N 420

B.G. INSTRUMENT CORP.

ULTRA-HIGH PRECISION MACHINING
METROLOGY LAB SERVICE
PRECISION MECHANICAL ASSEMBLIES
BERYLLIUM MACHINING

1 CROSSWAYS PARK WEST, WOODBURY, L. I., N. Y. 11797 • (516) 921-7340

****** CERTIFICATE OF COMPLIANCE ******

TO: Aeroflex Laboratories, Inc.
35 South Service Road
Plainview, N.Y. 11803

GENTLEMEN:

WE HEREBY CERTIFY THAT THE MATERIAL AND OR WORK PERFORMED IN THE QUANTITIES AS CALLED FOR ON

PART # ..... 301-61 Cover
P.O. # ..... ~~913136~~ 91956

ARE IN CONFORMANCE WITH THE REQUIREMENTS, SPECIFICATIONS AND DRAWINGS LISTED ON THIS ORDER AS FOLLOWS:

DATE SHIPPED 7/21/94
PACKING # .. 8508

ALL THE FOLLOWING MATERIALS & SERVICES WERE PURCHASED FROM WITH APPROPRIATE BATCH NUMBERS

MATERIAL ... T6061 Aluminum #
HEAT TREAT . #
FINISH ..... E.C.Sumereau & Sons, #Inc.
ADDITIONAL . #

INSPECTION DATA, PROCESS CONTROL AND TEST DATA ARE ON FILE FOR CUSTOMER QUALITY ENGINEERING REVIEW FOR A MAXIMUM OF SEVEN YEARS.

QUALITY CONTROL MANAGER

7/21/94
DATE

ALLIED DEVICES CORPORATION
2365 MILBURN AVENUE • P.O. BOX 502 • BALDWIN, N.Y. 11510
Tel: 516-223-9100 FAX: 516-223-9172

CERTIFICATE OF COMPLIANCE

TO: AEROFLEX LABS

Purchase Order No. 91742

Date: 3/17/94

Certification:

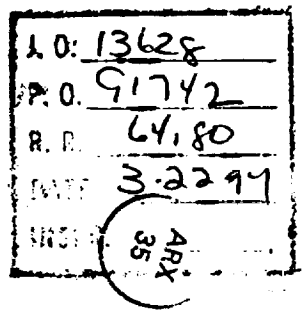
Allied Devices Corporation hereby certifies that the materials and processes supplied herewith (as delineated below) conform to all applicable specifications in Allied Devices publications or on customer's prints. The parts were manufactured from materials for which physical and chemical test reports are on file at our plant in Baldwin, NY. All parts were produced under quality control standards contained in our Quality Control manual, which fulfills the requirements of MIL-I-45208A. All such records and reports will be made available for review by the above-named corporation by prior appointment.

Al Chisare
Corporate Quality Control Director

Witness:
Flo Klapthor
Inventory Control

Description

10 pcs. DE2D15 BEARINGS
10 pcs. DC13 COLLARS
10 pcs. DB8D7 SPACERS



NORDEX INCORPORATED
50 NEWTOWN ROAD
DANBURY, CONNECTICUT 06810
(203) 792-9050

J. O. 13610
P. O. 91661
R. C. 64229
DATE 3-22-94
ARX 35

CERTIFICATE OF COMPLIANCE
****

THIS IS TO CERTIFY THAT ALL MATERIAL USED IN MANUFACTURE OF PARTS CALLED FOR ON PURCHASE ORDER # 91661 CONFORM TO MATERIAL AND MANUFACTURING SPECIFICATIONS AND/OR SPECIAL PROCESS INDICATED ON DRAWING OR SPECIFICATIONS: AND THAT THESE GOODS WERE PRODUCED IN COMPLIANCE WITH ALL APPLICABLE REQUIREMENTS OF SECTION 6, 7 AND 12 OF THE FAIR LABOR STANDARDS ACT, AS AMENDED, AND OF REGULATIONS AND ORDERS OF THE UNITED STATES DEPARTMENT OF LABOR.

Jerome G. Agius /EP
JEROME G. AGIUS PRESIDENT

3-18-94
DATE

T.T.I., INC.
2441 NOR[illegible] ACT [illegible]WY
FT WORTH, [illegible] 76106-1896

CAGE # [illegible]

SHIP TO
AEROFLEX [illegible] LABORATORIES, INC
35 S SER[illegible] RD
PLAINVIEW NY
11803

Packing List

ORDER - PL #: 3362237-01

CUSTOMER ACCT #	ORDER DATE	DATE SHIPPED
NYA041	060794	

BUYER	SALES ID	SHIP VIA
ROSE	L10313	JFSREDONLY

WH	PAGE	CUSTOMER P.O. NUMBER
TX	1	92878

CERTIFICATION OF COMPLIANCE - Seller hereby certifies, to the best of Sellers knowledge, that the products furnished on this shipment were manufactured by the referenced manufacturers in accordance with and conform to the applicable manufacturers and military specifications, including MIL-STD-202. Certifications to this effect are on file with the seller or available from the manufacturer. Any value added work performed seller on any such product has been done in accordance with applicable Customers specifications relating to such work, provided, however, that Seller's liability with respect to any product not meeting any such specificat is limited as set forth in the DISCLAIMER OF WARRANTIES AND LIMITATION OF REMEDIES ON REVERSE SIDE HEREOF.

QPL CERTIFICATE - Seller certifies, to the best of Sellers knowledge, that the articles furnished in the quantities indicated, and against the referenced purchase order were produced by the named manufacturer, quali per the Reference Test Number, and QPL (or interim approval) number shown in the corresponding column on this document. The manufacturers Certificate to this effect is on file with Seller or will be requested f manufacturer.

MERCURY CERTIFICATE - Seller certifies, to the best of Sellers knowledge, that the components supplied for your order were manufactured without Mercury compounds and do not contain any Mercury. Data suppor this statement is on file with the seller or available from the manufacturer.

Rodney L. Spear
RODNEY L. SPEAR
DIRECTOR, QUALITY ASSURANCE

THANK YOU FOR YOUR ORDER

MFG	PART NUMBER / CUSTOMER REFERENCE / REV # / QPL INFORMATION	QUANTITY SHIPPED	VALUE ADDED SERVICES PROVIDED
	LINE 1 KEM M39014/01-1358 CKR06BX[illegible] DATE CODE TEST NO. 39[illegible] 9[illegible]-73 CAGE# MFG QPL# 39[illegible]	50	[redacted]
	LINE 2 /B RCR05G[illegible] DATE CODE 1416 TEST NO. 39[illegible]-30 CAGE# MFG QPL# 39[illegible]	100	[redacted]
	LINE DATE CODE		[redacted]

J.O. 13640
P.O. 92878
R.R. 66717
DATE 6-16-94
INSPR. [illegible]

INSTRUCTIONS:

WAYBILL #	QA INSPECTOR

CLAIMS: BUYER is deemed to have accepted the Products unless notice of rejection is given within a reasonable time, which is agreed to be within ten (10) days after receipt. CLAIMS OF LATE DELIVERY are void unless made prior to receipt of Products, and receipt of Products shall constitute a waiver of any claim of late delivery. No return will be accepted without prior "Return Material Authorization #" (R.M.A.#). Material must be returned as directed by the location issuing the R.M.A. # and be in its original packaging. Returns of product packaged in electrostatic packaging will not be accepted if electrostatic packaging has been opened.

QA INSPECTOR is authorized by Q A MANAGER to certify conformance to the customer or military requirements referenced on this document.

THANK YOU FOR YOUR ORDER [illegible] CONFIDENCE IN US. We want to provide you the best service available. If you have any questions or problems, please have your buyer call your TTI representative

ROBERT McKEOWN COMPANY Inc.
111 Chambers Brook Road, Branchburg, N.J. 08876
(908) 218-9000

CERTIFICATE OF CONFORMANCE

DATE: 6-28-94

PURCHASE ORDER NUMBER 93348

TO: Aeroflex Labs, Inc.

ATTENTION: QUALITY CONTROL MANAGER

This is to certify that material furnished for referenced purchase order has been manufactured in accordance with applicable Government and / or Customer specifications.

Test reports and / or evidence of complete inspection are on file subject to examination and indicate conformance to applicable military and commercial requirements.

Shelf life begins at Date of Manufacture indicated below

Quantity / Item: (1) PC18M qrt

Lot Numbers(s): 407511

Date Rec'd RMC: 5-31-94

Date of Manufacture: 3-16-94

Expiration Date: 9-30-95

BY: D.M. Brey

Title: QC

Robert McKeown Company, Inc.

J.O. 13640
P.O. 93348
R.R. 6726
DATE 7-20-94
INSPR.

ATP 102

DIAMOND FASTENERS INC.

8 COMMERCE DRIVE
FARMINGDALE, NY 11735

TELEPHONE: 516-694-2766
FAX: 516-694-2805

CERTIFICATE OF CONFORMANCE

No. 002571

BILL TO [AER LBS]	SHIP TO
AEROFLEX LABORATORIES, INC. 35 SOUTH SERVICE ROAD PLAINVIEW, NY 11803 USA Attn: ACCOUNTS PAYABLE	AEROFLEX LABORATORIES, INC. 35 SOUTH SERVICE ROAD PLAINVIEW, NY 11803 USA

INVOICE No.	PURCHASE ORDER No.	F.O.B. / C.I.F.	SHIP VIA	SHIPMENT No.
002571	97741	FARMINGDALE, NY	UPS	
INVOICE DATE	SALES ORDER	TERMS	SHIP DATE	INV DUE DATE
JAN-16-95	1754	NET 30	JAN-16-95	FEB-15-95
OUR REF #	YOUR REF#	MASTER AWB	HOUSE AWB	ORIGIN

Item	CERTIFICATE OF CONFORMANCE	Shipped	B. Order	Unit Price	Amount
1	MS21209C0815 3585-2CN246 **AL#:** 3585-2CN246	15 EA	85		
2	08C08FSCSS 8-32X1/2 FLAT SKT CAP S/S	100 EA	0		
3	5100-18C RET RING COPPER	10 EA	0		

J.O. 13640
P.O. 97741
R.R. 74398
DATE 01-27-95
INSPR. MGI 102

WE HERBY CERTIFY THAT MATERIALS AND /OR PARTS AS LISTED HEREON HAVE BEEN MANUFACTURED IN ACCORDANCE WITH ALL APPLICABLE INSTRUCTIONS AND SPECIFICATIONS.

Authorized Signatures _____

DIAMOND FASTENERS INC.

8 Commerce Drive
Farmingdale, NY 11735
Phone: (516) 694-2766 Fax: (516) 694-2805

SHIP DATE	PAGE NO.	WORK ORDER NO.	CANCELLATION DATE	CUST. NO.
3/21/94	1	15291	/ /	00053

SOLD TO
AEROFLEX LABORATORIES
35 SOUTH SERVICE ROAD
PLAINVIEW, NY 11803

SHIP TO
AEROFLEX LABORATORIES
35 SOUTH SERVICE ROAD
PLAINVIEW, NY 11803
ORDER# 91751

J.O. 13640
P.O. 91751
R.R. 64283
DATE 3-23-94
INSPR.

ORDER DATE	PURCHASE ORDER NO.	SHIP VIA	F.O.B.	TERMS
		UPS		NET 30

SOLD	DATE REQUIRED	LOCATION	SALESPERSON #	TERRITORY
	3/23/94			

SPECIFICATION NO.	DESCRIPTION	QUANTITY ORDERED	QUANTITY BACK ORD.	QUANTITY SHIPPED	
		250	—	250	1
	8815/95-002	250	—	250	2
	MS6208C2	250	—	250	3
					4
					5
					6

CERTIFICATION

We hereby certify that materials and/or parts as listed hereon have been manufactured in accordance with all applicable instructions and specifications.

DIAMOND FASTENERS INC.

QUALITY MGR.

WORK ORDER NO. 15291

DIAMOND FASTENERS INC.

8 COMMERCE DRIVE
FARMINGDALE, NY 11735

TELEPHONE: 516-694-2766
FAX: 516-694-2805

CERTIFICATE OF CONFORMANCE

No. 002571

BILL TO [AER LBS]	SHIP TO
AEROFLEX LABORATORIES, INC. 35 SOUTH SERVICE ROAD PLAINVIEW, NY 11803 USA Attn: ACCOUNTS PAYABLE	AEROFLEX LABORATORIES, INC. 35 SOUTH SERVICE ROAD PLAINVIEW, NY 11803 USA

INVOICE No.	PURCHASE ORDER No.	F.O.B. / C.I.F.	SHIP VIA	SHIPMENT No.
002571	97741	FARMINGDALE, NY	UPS	
INVOICE DATE	SALES ORDER	TERMS	SHIP DATE	INV DUE DATE
JAN-16-95	1754	NET 30	JAN-16-95	FEB-15-95
OUR REF #	YOUR REF#	MASTER AWB	HOUSE AWB	ORIGIN

Item	CERTIFICATE OF CONFORMANCE	Shipped	B. Order	Unit Price	Amount
1	MS21209C0815 3585-2CN246 AL#: 3585-2CN246	15 EA	85		
2	08C08FSCSS 8-32X1/2 FLAT SKT CAP S/S	100 EA	0		
3	5100-18C RET RING COPPER	10 EA	0		

J.O. 13640
P.O. 97741
R.R. 74398
DATE 01-27-95
INSPR. MGL 102

WE HERBY CERTIFY THAT MATERIALS AND /OR PARTS AS LISTED HEREON HAVE BEEN MANUFACTURED IN ACCORDANCE WITH ALL APPLICABLE INSTRUCTIONS AND SPECIFICATIONS.

Authorized Signatures _____

INVOICE [redacted]

03/30/94 73521 1

WEICO WIRE & CABLE INC.
181 RODEC DRIVE
EDGEWOOD, N.Y. 11717
(516) 254-2970
FAX # (516) 254-2099

SOLD TO
AEROFLEX LABORATORIES
35 S SERVICE ROAD
PLAINVIEW, NY 11714

SHIP TO
AEROFLEX LABORATORIES
35 SOUTH SERVICE ROAD
PLAINVIEW, NY 11714

ATT: ACCOUNTS PAYABLE

COMPLETE SHIPMENT

ORDER NO.	ORDER DATE	CUSTOMER	SALES	PURCHASE	SHIP VIA	SHIP DATE	TERMS
65836	03/30/94	103	4	91877	U P S	03/30/94	Net 30

QUANTITY ORDERED	QUANTITY SHIPPED	ITEM NUMBER	ITEM DESCRIPTION	UNIT PRICE	PER UNIT	AMOUNT
10	9	MISC-ITEM LB	M1177/14-01C036 36SEI	6.35	LB	57.15
10	9	MISC-ITEM LB	M1177/14-01C037 37SEI	6.53	LB	58.77
100	100	SKY-[illegible]/16 CLR	TUBING SHRINK KYNAR 1/16 CLR M23053/8-002-C	.4323	FT	43.23

SALE AMOUNT	159.15
MISC. CHARGES	.00
FREIGHT	9.45
SALES TAX	.00
TOTAL	

CERTIFICATION OF COMPLIANCE

THIS IS TO CERTIFY THAT THE MATERIAL SUPPLIED FOR YOUR PURCHASE ORDER WAS MANUFACTURED IN COMPLIANCE WITH SPECIFICATIONS AS REQUIRED ON THIS ORDER.

DIAMOND FASTENERS INC.

8 Commerce Drive
Farmingdale, NY 11735

Phone: (516) 694-2766 Fax: (516) 694-2805

SHIP DATE	PAGE NO.	WORK ORDER NO.	CANCELLATION DATE	CUST. NO.
3/21/94	1	15291	/ /	00053

SOLD TO
AEROFLEX LABORATORIES
35 SOUTH SERVICE ROAD
PLAINVIEW, NY 11803

SHIP TO
AEROFLEX LABORATORIES
35 SOUTH SERVICE ROAD
PLAINVIEW, NY 11803
ORDER# 91751

J. O. 13640
P. O. 91751
R. R. 64283
DATE 3-23-94
INSPR.

ORDER DATE	PURCHASE ORDER NO.	SHIP VIA	F.O.B.	TERMS
03/18/94	91751	UPS	S. P.	NET 30

BUYER	DATE REQUESTED	LOCATION	SALESPERSON	TERRITORY
BAI	03/18/94			

ITEM NO. / BIN LOCATION NO.	DESCRIPTION	QUANTITY ORDERED	QUANTITY BACK ORD.	QUANTITY SHIPPED	LN NO
	MS51957-3	250	—	250	1
	MS15795-802	250	—	250	2
	NAS620C2	250	—	250	3
					4
					5
					6

CERTIFICATION

We hereby certify that materials and/or parts as listed hereon have been manufactured in accordance with all applicable instructions and specifications.

DIAMOND FASTENERS INC. QUALITY MGR.

WORK ORDER NO.

FRED R. RIPPY, INC.

12471 E. Washington Boulevard
Whittier, California 90602-1075
Telephone: (213) 698-9801
Fax: (213) 945-1892

CERTIFICATION OF COMPLIANCE WITH PURCHASE ORDER

DATE 2.15.94 CUSTOMER'S ORDER NO. 90323

CUSTOMER Amphenol Laboratories PART NUMBER 512-11-14

QUANTITY 100 CHANGE LETTER "B"

Seller certifies that the parts furnished on referenced purchase order were produced either from materials furnished by Purchaser for the production of such parts or from materials for which the seller has available for examination chemical and/or physical test reports or other evidence of conformance to applicable specifications.

Seller also certifies that these parts were produced in accordance with specifications referenced or furnished by the Buyer in connection with the purchase order number shown above, for which Seller has available for examination certifications of conformance to applicable specifications.

Seller also certifies that any processes required to be performed by a government approved processing source were in fact performed by such approved source.

FRED R. RIPPY, INC.

By Ryan Hoffman

J. O. 13640
P. O. 90323
P 63052
DATE 2-28-94
INSPR. ADX 102

DIAMOND FASTENERS INC.
8 COMMERCE DRIVE
FARMINGDALE, NY 11735
TELEPHONE: 516-694-2766
FAX: 516-694-2805

CERTIFICATE OF CONFORMANCE

No. 002571

BILL TO [AER LBS]	SHIP TO
AEROFLEX LABORATORIES, INC. 35 SOUTH SERVICE ROAD PLAINVIEW, NY 11803 USA Attn: ACCOUNTS PAYABLE	AEROFLEX LABORATORIES, INC. 35 SOUTH SERVICE ROAD PLAINVIEW, NY 11803 USA

INVOICE No.	PURCHASE ORDER No.	F.O.B. / C.I.F.	SHIP VIA	SHIPMENT No.
002571	97741	FARMINGDALE, NY	UPS	
INVOICE DATE	**SALES ORDER**	**TERMS**	**SHIP DATE**	**INV DUE DATE**
JAN-16-95	1754	NET 30	JAN-16-95	FEB-15-95
OUR REF #	**YOUR REF#**	**MASTER AWB**	**HOUSE AWB**	**ORIGIN**

Item	CERTIFICATE OF CONFORMANCE	Shipped	B. Order	Unit Price	Amount
1	MS21209C0815 3585-2CN246 AL#: 3585-2CN246	15 EA	85		
2	08C08FSCSS 8-32X1/2 FLAT SKT CAP S/S	100 EA	0		
3	5100-18C RET RING COPPER	10 EA	0		

J.O. 13640
P.O. 97741
R.R. 74398
DATE 01-27-95
INSPR. MSK 102

WE HERBY CERTIFY THAT MATERIALS AND /OR PARTS AS LISTED HEREON HAVE BEEN MANUFACTURED IN ACCORDANCE WITH ALL APPLICABLE INSTRUCTIONS AND SPECIFICATIONS.

Authorized Signatures _____

[illegible] 84 EXECUTIVE AVENUE EDISON NJ 08817

VOICE NO	SCN	ORDER DATE	DUE DATE	ORIG CO	CUSTOMER NO	OT	IS	TX	PAGE
.11293831	B111 2135725	06-20-94	06-20-94	B111	B111 12984 000	M	009	N	01 OF 01

AEROFLEX LAB, INC.
35 S. SERVICE ROAD
PLAINVIEW
NY 11803

TERMS	PAYMENT METHOD	HOT	COD
NET 30 DAYS	CHARGE OPEN ACCOUNT	RUSH	

COMMENTS CALL OUR NEW NATIONAL 800 # (800-805-4636)
C OF C, LOT#, DOM, S/L = 80% MINIMUM!!!
EASE SHIP TODAY!!!

PO # 93191
REL #
GOVT
PRTY

ORDER QTY	BO QTY	SHIP QTY	PART NO / BIN LOCATION	UM	RESALE	EXT PRICE
			RRRRR U U SSSSS H H R R U U S H H RRRRR U U SSSSS HHHHH R R U U S H H R R UUUUU SSSSS H H		10	
6.0	0	6.0	3M-1205-1/4 P/S TAPE IS			

F4135-82

TOTAL		CHARGES		TAX		TOTAL	
PACK	CRT	WEIGHT	SHIPPED VIA	SHIP DATE	COD CTL	B/L NO	UZ
	RGT CH	COD CH	CARRIER	TRT	MSCCH 1	MSCCH 2	INS
			UPS	ADD			

6/20/94 12:22:21 PACK SLIP - CERTIFICATE OF COMPLIANCE ON BACK ORDBOK B1110293831

UGIMAG, Inc.
VALPARAISO, IN 46383 (219) 462-3131
UGIMAX, Incor, Cunife, Recoma & UGISTAB
Permanent Magnets

CERTIFICATE OF COMPLIANCE

UGIMAG Part No. 7204176 REV Customer P.O. No. 90157 ITEM 2

UGIMAG Order No. 008422 Customer Part No. 411-291-3

REV B

UGIMAG, INC. certifies that (quantity) 24.0 pieces of the above part number, shipped on (date) FEBRUARY 03, 1994 against the above order number conforms to the specifications for LT26-1 (material) in respect to physical and magnetic properties, and further certifies that these parts are in compliance with the referenced purchase order and print. Inspection has been made in accordance with MIL-I-45208A. Inspection and test data proving compliance to applicable specifications is on file at UGIMAG, INC. and available for customer examination upon request.

J. O. 13640
P. O. 90157
R R. 62681
DATE 3-8-94
INSPR. ARX 102

UGIMAG, INC.

Quality Assurance Director

FEBRUARY 03, 1994

Date

FORM NO. 27-010-0004, Rev.-B

UGIMAG, Inc.
VALPARAISO, IN 46383 (219) 462-3131
UGIMAX, Incor, Cunife, Recoma & UGISTAB
Permanent Magnets

CERTIFICATE OF COMPLIANCE

UGIMAG Part No. 7204175 REV Customer P.O. No. 90157 ITEM 1

UGIMAG Order No. 008421 Customer Part No. 411-291-2

REV B

UGIMAG, INC. certifies that (quantity) 24.0 pieces of the above part number, shipped on (date) FEBRUARY 03, 1994 against the above order number conforms to the specifications for LT26-1 (material) in respect to physical and magnetic properties, and further certifies that these parts are in compliance with the referenced purchase order and print. Inspection has been made in accordance with MIL-I-45208A. Inspection and test data proving compliance to applicable specifications is on file at UGIMAG, INC. and available for customer examination upon request.

UGIMAG, INC.

Linda A. Lapsom

Quality Assurance Director

FEBRUARY 03, 1994

Date

FORM NO. 27-010-0004, Rev.-B

J.O. 13640
P.O. 90157
R.R. 62681
DATE 3-8-94
INSPR. Alex 102

UGIMAG, Inc.
VALPARAISO, IN 46383 (219) 462-3131
UGIMAX, Incor, Cunife, Recoma & UGISTAB
Permanent Magnets

CERTIFICATE OF COMPLIANCE

UGIMAG Part No. 7204175 REV Customer P.O. No. 90226 ITEM 1

UGIMAG Order No. 008437 Customer Part No. 411-291-2

REV B

UGIMAG, INC. certifies that (quantity) 64.0 pieces of the above part number, shipped on (date) FEBRUARY 03, 1994 against the above order number conforms to the specifications for LT26-1 (material) in respect to physical and magnetic properties, and further certifies that these parts are in compliance with the referenced purchase order and print. Inspection has been made in accordance with MIL-I-45208A. Inspection and test data proving compliance to applicable specifications is on file at UGIMAG, INC. and available for customer examination upon request.

UGIMAG, INC.

Linda A. Lapsem

Quality Assurance Director

FEBRUARY 03, 1994

Date

FORM NO. 27-010-0004, Rev -B

P.O. 13640
P.O. 90226
P.N. 62682
DATE 2-16-94
ARX 102

ACCEPTED
NO INSPECTION REQUIRED

UGIMAG, Inc.

VALPARAISO, IN 46383 (219) 462-3131
UGIMAX, Incor, Cunife, Recoma & UGISTAB
Permanent Magnets

CERTIFICATE OF COMPLIANCE

UGIMAG Part No. 7204176 REV Customer P.O. No. 90226 ITEM 2

UGIMAG Order No. 008438 Customer Part No. 411-291-3

REV B

UGIMAG, INC. certifies that (quantity) 64.0 pieces of the above part number, shipped on (date) FEBRUARY 03, 1994 against the above order number conforms to the specifications for LT26-1 (material) in respect to physical and magnetic properties, and further certifies that these parts are in compliance with the referenced purchase order and print. Inspection has been made in accordance with MIL-I-45208A. Inspection and test data proving compliance to applicable specifications is on file at UGIMAG, INC. and available for customer examination upon request.

UGIMAG, INC.

Linda A. Simpson

Quality Assurance Director

FEBRUARY 03, 1994

Date

FORM NO. 27-010-0004, Rev - B

J.O. 13640
P.O. 90226
R.R. 62682
DATE 2-16-94
INSPR. APK 102

ACCEPTED
NO INSPECTION REQUIRED

JIG BORING SPECIALTIES OF L.I.N.Y.
TELEPHONE 516-586-7400 FAX 516-586-7460

60-S South 2nd Street
Deer Park 11729

CERTIFICATE OF COMPLIANCE

DATE 5/23/94

TO: AEROFLEX LAB. INC.
35 SOUTH SERVICE ROAD.
PLAINVIEW, N.Y. 11803

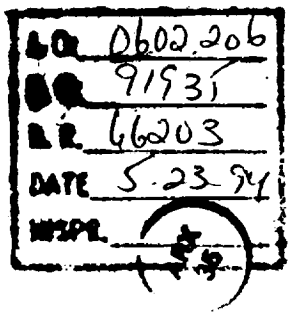
PURCHASE ORDER NO. 91935 JOB NO. 0601-206

PART NO. 607-449 QUANTITY 4 EA

402.-29-9

INVOICE NUMBER OTHER

It is hereby certified that the above parts called for are in conformance with the requirements, specifications, and drawings listed on the Purchase Order to the best of our knowledge. Test reports are on file subject to examination and indicate conformance with applicate specifications. Specific material and/or parts furnished by your company and only such company furnished material was incorporated and/or used in completion of the purchase order.



Very truly yours,

Leo Allentuo

QUALITY CONTROL INSPECTION

UNITED PRINTED CIRCUITS, INC.

1860 Sparkman Drive
Huntsville, AL 35816

Telephone: (205) 830-5998
Fax: (205) 830-5997

CERTIFICATION OF ELECTRICAL TESTING

This is to certify that the listed materials or assemblies have been tested by me or under my supervision and meet the requirements of all applicable drawings, specifications, and purchase orders.

CUSTOMER: Aeroflex Kako

P. O. NUMBER: 92646 REVISION: A

PART OR ASSEMBLY NUMBER: 303-217

QUANTITY SHIPPED: 6 DATE OF MANUFACTURE: 2294

AUTHORIZED SIGNATURE: Amy C. Christmas

DATE: June 3, 1994

S/N 2294-01-01
2294-02-01
2294-03-01
2294-04-01
2294-01-03
2294-02-03

UNITED PRINTED CIRCUITS, INC.

1860 Sparkman Drive
Huntsville, AL 35816

Telephone: (205) 830-5998
Fax: (205) 830-5997

CERTIFICATION OF COMPLIANCE

This is to certify that the listed materials or assemblies have been inspected by me or under my supervision and meet the requirements of all applicable drawings, specifications, and purchase orders. Evidence supporting this certificate of compliance is available upon request.

CUSTOMER: Aeroflex Labs

P. O. NUMBER: 92646 REVISION: A

PART OR ASSEMBLY NUMBER: 303-317

QUANTITY SHIPPED: 6 DATE OF MANUFACTURE: 2294

AUTHORIZED SIGNATURE: Amy D. Christmas

DATE: June 3, 1994

S/N 2294-01-01
2294-02-01
2294-03-01
2294-04-01

2294-01-03
2294-02-03

J.O. 13640
P.O. 92646
R.R. 66748
DATE 6-16-94
INSPR. ARX 302

JIG BORING SPECIALTIES OF L.I.N.Y.
TELEPHONE 516-586-7400 FAX 516-586-7460

60-S South 2nd Street
Deer Park 11729

CERTIFICATE OF COMPLIANCE

DATE 7/25/94

TO: AEROFLEX LABORATORIES INC
35 SOUTH SERVICE ROAD
PLAINVIEW, N.Y. 11803

PURCHASE ORDER NO. 91935 JOB NO. 13640 9

PART NO. 301-60 QUANTITY 4

HOUSING MOTOR ENCODER

INVOICE NUMBER 1311 OTHER

It is hereby certified that the above parts called for are in conformance with the requirements, specifications, and drawings listed on the Purchase Order to the best of our knowledge. Test reports are on file subject to examination and indicate conformance with applicate specifications. Specific material and/or parts furnished by your company and only such company furnished material was incorporated and/or used in completion of the purchase order.

J.O. 13640
P.O. 91935
R.R. 67977
DATE 8/3/94
INSPR. 37

rejected 1pc

Very truly yours,

Leo Alleostio

QUALITY CONTROL INSPECTION

DEANCO™ EMD DIVISION
HEADQUARTERS
87 Concord Street, North Reading, MA 01864 Tel: (508) 664-9355

CERTIFICATION

PLEASE REFERENCE OUR ORDER NUMBER ON ALL INQUIRIES OR CORRESPONDENCE

SHIP ORDER NUMBER	REL	PAGE

ASSEMBLED BY _____ CHECKED BY _____

DATE _____ TIME _____ P/C _____

CARTON	1	2	3	4	5	6	7	8
WEIGHT								

TOTAL PACKAGES _____ TOTAL WEIGHT _____

BILL TO

SHIP TO

OUTSIDE SALESMAN NUMBER	CUSTOMER NUMBER	COPIES	CUSTOMER ORDER NUMBER	INSIDE SALESMAN NUMBER	CREDIT APPROVAL	TX CO.	DATE	SHIPPING INFORMATION VIA	FRT. IN CODE	FREIGHT IN AMOU

CERTIFICATION

This is to certify that the material shipped on your Purchase Order number noted above will meet all requirements of specifications listed.

Quality Assurance Manager

GENERAL ELECTRIC

We hereby certify that material being shipped to you against your above purchase order is the General Electric Product described on this document and is manufactured by the Silicone Products Department of General Electric Co. As authorized distributors for GE Silicone Products, we have in our files certification received from General Electric Company that this material was produced in compliance with their standard manufacturing procedures for the product. It is being shipped to you in the original containers in which it was packaged by General Electric Company after testing by them in accordance with their normal quality control procedures.

Quality Assurance Manager

SHIPPED	CATALOG NUMBER AND DESCRIPTION	EDP TX	LOT NUMBER	SHELF LIFE
			302-102-	
			DATE OF MFG	EXPIRATION DAT

J. O. 13640
P. O. 1087
R. R. 80180
DATE 6-14-
INSPR.

HISCO

55 VERONICA AVENUE / SOMERSET, NEW JERSEY 08873-3492

FAX (908) 745-2820
(908) 745 2828

FT# 00222-6631

J. O. 13640
P. O. 93194
R. R. 67071
DATE 6-30-94
INSPR. ARX 10%

TO: Aeroflex

DATE: 6-29-94

913617-00

ATTN: Sal

OUR FILE NO.: WT 3234

Fax 516-694-6770

CERTIFICATE OF COMPLIANCE

THIS IS TO CERTIFY THAT THE MATERIAL SUPPLIED ON YOUR P.O. NO. 93194 HAS BEEN MANUFACTURED IN ACCORDANCE WITH AND CONFORMS TO APPLICABLE SPECIFICATIONS AND/OR STANDARDS.

QUANTITY	MFG	DESCRIPTION	LOT NUMBER	MFG DATE	SHELF LIFE	SPEC NO.
12 lbs	3m	Sc 280	1031-1140	10/93	18 mo	

HISCO

John O. Finder

EXCEPTIONS:

THE FOLLOWING IS MADE IN LIEU OF ALL WARRANTIES, EXPRESSED OR IMPLIE

ALL MATERIALS ARE GUARANTEED, PROVIDED THEY HAVE NOT BEEN DAMAGED OR USED IMPROPERLY. SELLER'S ONLY OBLIGATION SHALL BE TO REPLACE SUCH QUANTITIES OF MATERIAL PROVIDED TO BE DEFECTIVED. SELLER SHALL NOT BE LIABLE FOR ANY INJURY, OR LOSS OR DAMAGE, DIRECT OR CONSEQUENTIAL, ARISING OUT OF USER'S USE OF, OR INABILITY TO USE THE PRODUCT. BEFORE USING, USER SHALL DETERMINE THE SUITABILITY OF THE PRODUCT FOR HIS INTENDED USE, AND USER ASSUMES ALL RISK AND LIABILITY WHATSOEVER IN CONNECTION THEREWITH.

BROWNELL ELECTRO, INC. 84 EXECUTIVE AVENUE EDISON NJ 08817

INVOICE NO	SCN	ORDER DATE	DUE DATE	ORIG CO	CUSTOMER NO	OT	IS	TX	PAGE
111291433	B111 2134840	06-10-94	06-10-94	B111	B111 12984 000	M	009	N	01 OF 01

AEROFLEX LAB, INC.
35 S. SERVICE ROAD
PLAINVIEW
NY 11803

TERMS	PAYMENT METHOD	HOT	COD
NET 30 DAYS	CHARGE OPEN ACCOUNT		

COMMENTS CALL OUR NEW NATIONAL 800 # (800-805-4636)
C OF C, LOT#, DOM, S/L

PO # 92911
REL #
GOVT
PRTY

>>ALL SHELF LIFE ITEMS MUST HAVE MINIMUM 80% LEFT<<

ORDER QTY	BO QTY	SHIP QTY	PART NO / BIN LOCATION	UM	RESALE	EXT PRICE
2.0	0	2.0	3M-281-1 SCOTCHCAST RESIN IS SHIP LOT#1209-1228	PT	10	

J. O. 13640
P. O. 92911
R. R. 66806
DATE 6-27-94
INSPR.

TAL		CHARGES		TAX		TOTAL	
PACK	CRT	WEIGHT	SHIPPED VIA	SHIP DATE	COD CTL	B/L NO	UZ
	FGT CH	COD CH	CARRIER	FRT	MSCCH 1	MSCCH 2	INS
			UPS	ADD			

10/94 06:03:56 PACK SLIP - CERTIFICATE OF COMPLIANCE ON BACK ORDBOK ' B1110291433

O.

I. O. 13640
P. O. 10429
R. R. 79182
DATE 5-15-95
INSPR. ABX 102

BILL TO

SHIP TO

DEANCO EMD DIVISION
HEADQUARTERS
87 Concord Street, North Reading, MA 01864 Tel: (508) 664-9355

CERTIFICATION

PLEASE REFERENCE OUR ORDER NUMBER ON ALL INQUIRIES OR CORRESPONDENCE

SHIP ORDER NUMBER	REL	PAGE

ASSEMBLED BY (P) CHECKED BY NS

DATE _____ TIME _____ P/C _____

CARTON	1	2	3	4	5	6	7	8	9
WEIGHT									

TOTAL PACKAGES 1 TOTAL WEIGHT 6

OUTSIDE SALESMAN NUMBER	CUSTOMER NUMBER	COPIES	CUSTOMER ORDER NUMBER	INSIDE SALESMAN NUMBER	CREDIT APPROVAL	TX CO.	DATE	SHIPPING INFORMATION VIA	FRT. IN CODE	FREIGHT IN AMOUNT
							5/15/95			

CERTIFICATION

This is to certify that the material shipped on your Purchase Order number noted above will meet all requirements of specifications listed.

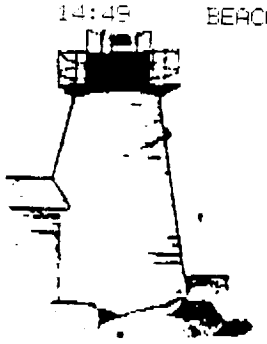
Quality Assurance Manager

GENERAL ELECTRIC

We hereby certify that material being shipped to you against your above purchase order is the General Electric Product described on this document and is manufactured by the Silicone Products Department of General Electric Co. As authorized distributors for GE Silicone Products, we have in our files certification received from General Electric Company that this material was produced in compliance with their standard manufacturing procedures for the product. It is being shipped to you in the original containers in which it was packaged by General Electric Company after testing by them in accordance with their normal quality control procedures.

Quality Assurance Manager

SHIPPED	CATALOG NUMBER AND DESCRIPTION	EDP TX	LOT NUMBER	SHELF LIFE	DATE OF MFG	EXPIRATION DATE
			2850FT			
			215072416	3 YEAR		
0			CAT. 9			
			215051216			
					2-16-95	2-16-96
					2-16-95	2-16-96



BEACON

BEACON CHEMICAL CO., INC.

Manufacturing Chemist Since 1926

125 MacQuesten Parkway South, Mount Vernon, N.Y. 10550 • (914) 699-3400

J. O. 13640
P. O. 92169
R. R. 64961
DATE 4-20-94
INSPR. [illegible]

PRODUCT CERTIFICATION

RE: YOUR ORDER NUMBER 92169

WE CERTIFY THAT THE MATERIALS LISTED BELOW ARE THOSE WHICH WERE SHIPPED TO YOU. THEY WERE MANUFACTURED BY BEACON CHEMICAL CO. TO THEIR APPLICABLE SPECIFICATION LIMITS.

PRODUCT DESCRIPTION	QUANTITY	LOT NUMBER
E645 Part I	1 gallon	13023
E645 Part II	1 gallon	13025

Shelf Life 12 months
Mfg 04/11/94 Expires
04/11/95

VERY TRULY YOURS
BEACON CHEMICAL CO., INC

David Morrison

DAVID MORRISON
SALES COORDINATOR

SELLER CERTIFICATE OF COMPLIANCE

PAGE 1 OF 1

1. PART NUMBER	2. REV. LETTER	3. SELLER NAME AND ADRESS			
607-451	A	UNITED MACHINING, INC. 77-19 WINDSOR PLACE CENTRAL ISLIP, N.Y. 11722 (516) 582-4766			
4. S.M.R.R. NUMBER	5. QTY. SHIPPED	6. PKG. SLIP NO.	7. P.O. NUMBER	8. INSP. STAMP	9. SELLER P.O. NUMBER
	6 PCS.	1872	93448		1645
10. MATERIAL TYPE AND SPECIFICATION	HEAT/LOT NO.	11. MATERIAL REL. NO.	12. PROVISIONAL REL. NO.	13. MATERIAL SUPPLIER NAME	
CRES 303				UNITED	

14. PROCESS PERFORMED	15. SPECIFICATION	16. DATE PERFORMED	17. SELLER NAME AND ADRESS WHERE PROCESS PERFORMED	18. SELLER P.O. NO.	19. LOT SIZE
Machining	TO B/P	6-25-94	UNITED MACHINING, INC. 77-19 WINDSOR PLACE, CENTRAL ISLIP, N.Y. 11722	1645	6 PCS

J. O. 13640
P. O. 93448
R. R. 67443
DATE 7-20-94
INSPR.

ADDITIONAL NOTES OR INSTRUCTIONS

SIGNATURE OF CERTIFIER | TITLE OF CERTIFIER | DATE 6/20/94

SELLER CERTIFICATE OF COMPLIANCE

1. PART NUMBER	2. REV. LETTER	3. SELLER NAME AND ADRESS
CLAMP 617-1 P/N 667-450	A	UNITED MACHINING, INC. 77-19 WINDSOR PLACE CENTRAL ISLIP, N.Y. 11722 (516) 582-4766

4. S.M.R.R. NUMBER	5. QTY. SHIPPED	6. PKG. SLIP NO.	7. P.O. NUMBER	8. DISP. STAMP	9. SELLER P.O. NUMBER
	9/6	1840	92579	1	6120

10. MATERIAL TYPE AND SPECIFICATION	HEAT/LOT NO.	11. MATERIAL REL. NO.	12. PROVISIONAL REL. NO.	13. MATERIAL SUPPLIER NAME
303 SST/455 SST				UNITED

14. PROCESS PERFORMED	15. SPECIFICATION	16. DATE PERFORMED	17. SELLER NAME AND ADRESS WHERE PROCESS PERFORMED	18. SELLER P.O. NO.	19. LOT SIZE
MACHINING	TO B/P	5-10-94	UNITED MACHINING, INC. 77-19 WINDSOR PLACE, CENTRAL ISLIP, N.Y. 11722	6120	15 PCS
			I.O. 13640 P.O. 92579 R.R. 66175 66175 DATE 6-3-94 INSPR. AER 102		

ADDITIONAL NOTES OR INSTRUCTIONS

SIGNATURE OF CERTIFIER [signature]

TITLE OF CERTIFIER QC MGR

DATE 5/1/94

JIG BORING SPECIALTIES OF L.I.N.Y.
TELEPHONE 516-586-7400 FAX 516-586-7460

60-S South 2nd Street
Deer Park 11729

CERTIFICATE OF COMPLIANCE

DATE 5/23/94

TO: AEROFLEX LAB. INC.
35 SOUTH SERVICE ROAD
PLAINVIEW, N.Y. 11803

PURCHASE ORDER NO. 91935 JOB NO. 0601-206

PART NO. 607-449 QUANTITY 4 EA

402-29-9

INVOICE NUMBER _____ OTHER _____

It is hereby certified that the above parts called for are in conformance with the requirements, specifications, and drawings listed on the Purchase Order to the best of our knowledge. Test reports are on file subject to examination and indicate conformance with applicate specifications. Specific material and/or parts furnished by your company and only such company furnished material was incorporated and/or used in completion of the purchase order.

Very truly yours,

Leo Alicastro

QUALITY CONTROL INSPECTION

PIONEER

ORDER DATE	SHIP DATE	CUSTOMER NO.

OUR ORDER NO.	CUSTOMER P O NO.

SHIP VIA	F.O.B.	SALESMAN NO.	TERMS

PIONEER has handled the enclosed product in accordance with the requirements of JEDEC Publication 108 and JEDEC Publication 109

The undersigned certifies that all articles included in each shipment under the above Purchase Order are in accordance with said Purchase Order and with all requirements, specification and drawings referenced therein, and that records of inspection and test providing objective evidence of the foregoing are on file and available upon request. It is also certified that all devices in this shipment are part of the shipment ... manufacturer's ... confirmation
Quality Assurance Dept. Signed *Debra Cheny* Date *3-17-94*

ITEM NO.	QUANTITY ORDERED	QUANTITY SHIPPED	BACK ORDERED	-BIN- VENDOR - PRODUCT DESCRIPTION	UNIT PRICE	AMOUNT
				J. O. *13640* P. O. *91789* R. R. *64225* DATE *3-24-94* INSPR. ARX 102	[redacted]	

[redacted]

CERTIFICATE OF CONFORMANCE

SELLER CERTIFICATE OF COMPLIANCE

PAGE 1 OF 1

1. PART NUMBER	2. REV. LETTER	3. SELLER NAME AND ADRESS			
527-197 CB1700-75245	A	UNITED MACHINING, INC. 77-19 WINDSOR PLACE CENTRAL ISLIP, N.Y. 11722 (516) 582-4766			
4. S.M.R.R. NUMBER	5. QTY. SHIPPED	6. PKG. SLIP NO.	7. P.O. NUMBER	8. INSP. STAMP	9. SELLER P.O. NUMBER
	3 PCS	2069	97775		2104
10. MATERIAL TYPE AND SPECIFICATION	HEAT/LOT NO.	11. MATERIAL REL. NO.	12. PROVISIONAL REL. NO.	13. MATERIAL SUPPLIER NAME	
Alum				UNITED	

14. PROCESS PERFORMED	15. SPECIFICATION	16. DATE PERFORMED	17. SELLER NAME AND ADRESS WHERE PROCESS PERFORMED	18. SELLER P.O. NO.	19. LOT SIZE
Machining	TOB/P	1-25-95	UNITED MACHINING, INC. 77-19 WINDSOR PLACE, CENTRAL ISLIP, N.Y. 11722	2104	3PCS

J. O. 13640
P. O. 97775
R. R. 75285
DATE 1/27/95
INSPR. ARX 46

ADDITIONAL NOTES OR INSTRUCTIONS

SIGNATURE OF CERTIFIER

TITLE OF CERTIFIER MGR Q.C. DEPT

DATE 1/25/95

SECTION V

TRANSFER RECORDS

CEI TRANSFER RECORDS

The following list summarizes CEI movement until time of transfer to the government.

S/N 0002

5/29/95 Left Aeroflex to East-West Laboratories for Random Vibration

5/31/95 Returned to Aeroflex

6/2/95 Left Aeroflex for Sine Vibration

6/7/95 Returned to Aeroflex

6/9/95 Left Aeroflex for Shock

6/16/95 Returned to Aeroflex

S/N 0003

4/26/95 Left Aeroflex for Random Vibration

5/1/95 Returned to Aeroflex (NCR 00168)

6/19/95 Left Aeroflex for Sine Vibration

6/21/95 Returned to Aeroflex

6/22/95 Left Aeroflex for Random Vibration (repeated)

6/23/95 Returned to Aeroflex

6/26/95 Left Aeroflex for Shock

6/27/95 Returned to Aeroflex

SECTION VI

ALIGNMENT DATA

APPLICATION	
NEXT ASSY	USED ON
	16187

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
B	INITIAL RELEASE	8-8-94	

ALL PAGES ARE OF ORIGINAL ISSUE EXCEPT AS NOTED	SHEET	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
	REV.																																		

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES TOLERANCES: FRAC. DEC. ANG.	ORIG. DATE OF DWG.	AEROFLEX LABORATORIES INCORPORATED — PLAINVIEW NY 11803	
	DRAWN I.H. 2-1-94		
	CHECKED		
MATERIAL	ENGNRG 8-8-94	ALIGNMENT PROCEDURE - MOTOR / ENCODER	
	DESIGN 8-8-94		
FINISH	QA J. Lubin 8/9/94	SIZE A — FSCM NO. 88379	5-297-0
	MFG. 8/9/94	SCALE — WEIGHT	SHEET 1 OF 3

1.0 SCOPE

The purpose of this procedure is to describe the methods required to mechanically and electrically align the stator, rotor, and encoder of P/N 16187 to step position 1 , as required by MSFC drawing SXI-201 and Aeroflex drawing 200-89.

2.0 STATOR- ROTOR ALIGNMENT AND STEP ANGLE VERIFICATION

2.1 Assemble the stator, P/N 500-29-9 and rotor P/N 400-29-6 in the motor housing, P/N 301-60. Attach fixture 527-191-1 to the rotor shaft and fixture 527-191-2 to the housing.

2.2 Rotate the stator until the rotor is in a mechanically stable position and the indicator on the fixture reads the 60 +/- 0.5 degree requirement in accordance with 200-89. This shall be position 1. In addition, apply 22 VDC to a motor phase and verify the shaft moves to the 7.5 degrees +/- .75 degree cw position on the indicator dial. Tag the wires causing this rotation # 1 (+22 VDC) and #3 (-22 VDC). Next, excite the remaining motor lead pair with 22 VDC in order to step to the next 7.5 degree position. Tag these wires # 2 (+22 VDC) and # 4 (-22 VDC). Finally, check that the cogging torque is greater than 0.25 in-oz . Once the mechanical and electrical step positions have been verified, scribe a line on the stator and housing in order to repeat position 1. Remove the rotor from the housing. Bond the stator into the housing using Stycast 2850 FT, catalyst 9 per 5-068-0, after realigning the scribe marks on the stator and housing.

3.0 ENCODER POSITION 1 VERIFICATION

3.1 After the stator bonding is completed, insert the rotor and reassemble the fixtures 527-191-1 and 521-191-2 as in paragraph 2.1. Re-check the stable position and step angle as in paragraph 2.2 .Assemble the encoder disk in accordance with 110E381, paying attention to the etched line on the outer edge of the disc. This mark should line up with the outermost slot on the reticle when the motor is aligned for position 1. Make sure the disc to reticle gap is 0.010" to 0.015". Lightly tighten the set screw on the encoder hub. Apply +5.0 VDC to wire #12 and the return to wire #13 . Verify that the encoder output when the stator and rotor are aligned as per paragraph 2.2 is the following:

OUTPUT BIT 1 : 0
OUTPUT BIT 2 : 0
OUTPUT BIT 3 : 0
OUTPUT BIT 4 : 1

4.2 If the encoder output does not agree with this sequence, loosen the set screws and rotate the disk until there is agreement. Rotate the motor shaft cw and ccw between the +/- 2 degree marks on the indicator dial. The sequence shown in 4.1 shall remain. If not, readjust the encoder disc until this occurs. Verify that encoder output 0010 occurs at the fourth sequential step (30 mechanical degrees) cw from position 1. In addition, verify that 1100 occurs 30 mechanical degrees ccw from position 1 by stepping the motor ccw. Once these position are verified, fill in the encoder end of the shaft P/N 402-29-9 with Stycast 2850 FT,catalyst 9 per 5-068-0. Lock the set screw threads with Stycast 2850 FT, catalyst 9, per 5-068-0.

SECTION VII

DRAWING LIST

June 12, 1995

DRAWING LIST

Motor/Encoder Documentation
P/N 16187

Document No	Rev	Description
16187	B	Motor/Encoder
PL16187	B	Motor/Encoder
200-88	C	Drawing Tree
200-89	E	Motor/Encoder Assy
PL200-89	E	Motor/Encoder Assy
301-60	E	Housing
PL301-60	E	Housing
301-61	A	Cover
303-216	B	Temp Xducer Filter Cir Assy
PL303-216	B	Temp Xducer Filter Cir Assy
303-217	A	P.W. Board
400-29-6	C	Rotor Assy
PL400-29-6	C	Rotor Assy
402-29-9	B	Rotor Hub & Shaft
403-1-7	B	Bearing, Duplex
404-13-61	B	Liner, Bearing
411-291-2&3	B	Magnet
500-29-9	C	Stator Assy
PL500-29-9	C	Stator Assy
502-29-9	C	Stator Core
PL502-29-9	C	Stator Core
512-11-14	B	Lamination
520-248	A	Inspection Data
521-425	C	Coil Winding
522-472	A	Finish Data
531-56	A	Schematic Temp Xducer Filter Cir
532-2	C	Connection Diagram
607-448	B	Bearing Retainer
607-449	B	Bearing Retainer
607-450	B	Pin, Locking
110E381	B	Encoder, Optical

June 12, 1995

DRAWING LIST

Motor/Encoder Documentation
P/N 16187

Documentation	Rev	Description
5-068-0	A	Bonding Proc - 2650
5-071-0	C	Bonding Proc - 280
5-125-0	-	Bonding Proc - 2651
5-128-0	B	Cleaning Procedure
5-129-0	A	Cleaning Procedure
5-130-0	B	Cleaning Procedure
5-134-0	A	Cleaning Procedure
5-222-0	A	Fluidize Bed Coat Proc
5-258-0	B	Magnet Inspect Proc
5-283-0	A	Bonding Proc - 1564
5-284-0	A	Cleaning Procedure
5-294-0	B	Bond/Staking Procedure
5-296-0	A	Vacuum Bake Procedure
5-297-0	B	Encoder Align. Procedure
5-298-0	B	Vacuum Bake Procedure
5-305-0	A	Cleanliness Control
5-316-0	A	Cleaning Procedure
960-229	B	Bonding Procedure - M620
960-251	C	Bonding Procedure - E645
960-295	C	Assembly Flow Chart
110P371	B	Contamination Control
110P374	B	Packaging Procedure
ATP20049	B	Acceptance Test
612-3	A	Bondmaster E645
612-20	A	Bondmaster M620
612-38-2	D	Stycast Resin
612-54	A	Scotchcast 5230

Aug 9,1995

DRAWING LIST

Motor/Encoder Documentation
P/N 16187
Sequential P/N's - Part of 110E381

Document No.	Rev	Description
19868-21664	D	PW Bd Assy -Encoder
19868-21665	B	PW Board
19868-21667	D	Schematic
19868-21666	A	Reticle, Carrier
19868-21668	A	Isometric
19868-21670	A	Plate
19868-21672	A	Readout Holder
19868-21680	A	Disc. Hub
19868-21759	A	Shield
19868-21760	A	Shield
19868-21761	A	Shield
19868-21764	A	Readout Holder Assy
19868-21765	-	Encoder Mtg Plate Assy
19868-21766	B	Disc & Hub Assy
19868-21770	-	Encoder Assy
19868-21788	D	Disc
19868-21763	A	Reticle & Carrier Assy
19868-21774	D	PW80 Assy Led
19868-21775	B	PW Board
19868-21781	-	Outline - Encoder
19868-21787	D	Reticle
19868-21796	A	Shield
19868-21819	A	Shield
19868-21785	A	Encoder Bd Test Procedure
19868-21786	A	LED Bd Test Procedure

SECTION VIII

COMPONENTS LOG

June 12, 1995

AS- BUILT CONFIGURATION LIST

Motor/Encoder Documentation
P/N 16187

Document No	Rev	Description
16187	B	Motor/Encoder
PL16187	B	Motor/Encoder
200-88	C	Drawing Tree
200-89	E	Motor/Encoder Assy
PL200-89	E	Motor/Encoder Assy
301-60	E	Housing
PL301-60	E	Housing
301-61	A	Cover
303-216	B	Temp Xducer Filter Cir Assy
PL303-216	B	Temp Xducer Filter Cir Assy
303-217	A	P.W. Board
400-29-6	C	Rotor Assy
PL400-29-6	C	Rotor Assy
402-29-9	B	Rotor Hub & Shaft
403-1-7	B	Bearing, Duplex
404-13-61	B	Liner, Bearing
411-291-2&3	B	Magnet
500-29-9	C	Stator Assy
PL500-29-9	C	Stator Assy
502-29-9	C	Stator Core
PL502-29-9	C	Stator Core
512-11-14	B	Lamination
520-248	A	Inspection Data
521-425	C	Coil Winding
522-472	A	Finish Data
531-56	A	Schematic Temp Xducer Filter Cir
532-2	C	Connection Diagram
607-448	B	Bearing Retainer
607-449	B	Bearing Retainer
607-450	B	Pin, Locking
110E381	B	Encoder, Optical

June 12, 1995

AS- BUILT CONFIGURATION LIST

Motor/Encoder Documentation
P/N 16187

Documentation	Rev	Description
5-068-0	A	Bonding Proc - 2650
5-071-0	C	Bonding Proc - 280
5-125-0	-	Bonding Proc - 2651
5-128-0	B	Cleaning Procedure
5-129-0	A	Cleaning Procedure
5-130-0	B	Cleaning Procedure
5-134-0	A	Cleaning Procedure
5-222-0	A	Fluidize Bed Coat Proc
5-258-0	B	Magnet Inspect Proc
5-283-0	A	Bonding Proc - 1564
5-284-0	A	Cleaning Procedure
5-294-0	B	Bond/Staking Procedure
5-296-0	A	Vacuum Bake Procedure
5-297-0	B	Encoder Align. Procedure
5-298-0	B	Vacuum Bake Procedure
5-305-0	A	Cleanliness Control
5-316-0	A	Cleaning Procedure
960-229	B	Bonding Procedure - M620
960-251	C	Bonding Procedure - E645
960-295	C	Assembly Flow Chart
110P371	B	Contamination Control
110P374	B	Packaging Procedure
ATP20049	B	Acceptance Test
612-3	A	Bondmaster E645
612-20	A	Bondmaster M620
612-38-2	D	Stycast Resin
612-54	A	Scotchcast 5230

Aug 9,1995

AS- BUILT CONFIGURATION LIST

Motor/Encoder Documentation
P/N 16187
Sequential P/N's - Part of 110E381

Document No.	Rev	Description
19868-21664	D	PW Bd Assy -Encoder
19868-21665	B	PW Board
19868-21667	D	Schematic
19868-21666	A	Reticle, Carrier
19868-21668	A	Isometric
19868-21670	A	Plate
19868-21672	A	Readout Holder
19868-21680	A	Disc. Hub
19868-21759	A	Shield
19868-21760	A	Shield
19868-21761	A	Shield
19868-21764	A	Readout Holder Assy
19868-21765	-	Encoder Mtg Plate Assy
19868-21766	B	Disc & Hub Assy
19868-21770	-	Encoder Assy
19868-21788	D	Disc
19868-21763	A	Reticle & Carrier Assy
19868-21774	D	PW80 Assy Led
19868-21775	B	PW Board
19868-21781	-	Outline - Encoder
19868-21787	D	Reticle
19868-21796	A	Shield
19868-21819	A	Shield
19868-21785	A	Encoder Bd Test Procedure
19868-21786	A	LED Bd Test Procedure

MOTOR/ENCODER P/L
CONTRACT NO.

CHK _____ _____ _

DES _ _____

AEROFLEX LABORATORIES
LONG ISLAND, NY [illegible]
CAGE NO.

ENG __ __ _____ .

MFG __ ___ ___ ___ .

REV LTR B [illegible] UNDENCED BIL
REV DATE [illegible]
SHT NO 1

ECN

QA _____ ___ __

LVL	FNO NO	QTY REQ	UM	CAGE	PART OR IDENT NO	NOMEN or DESCRIPTION	REF DESIG	DOCUMENT	SEQ NO
0	1	1	EA		200-89	MOTOR/ENCODER ASSY			1
1	1	1	EA		PL200-89	MOTOR/ENCODER ASSY P/L			2
2	1	1	EA		301-60	HOUSING MOTOR/ENCODER			3
3	1	1	EA		PL301-60	HOUSING MOTOR/ENCODER P/L			4
4	1	1	EA		301-60-01	HOUSING			5
4	2	1	EA		404-13-61	LINER BEARING			6
4	3	3	EA		M45932/1-7CL	INSERT SCREW 8-32UNC-2B		MIL-I-45932	7
4	4	10	EA		M45932/1-1CL	INSERT SCREW 2-56UNC-2B		MIL-I-45932	8
4	5	AR	EA		5-284-0	CLEANING PROCEDURE	REFERENCE		9
4	6	AR	EA		5-296-0	VACUUM BAKEOUT, PRE-ASSEMBLY	REFERENCE		10
2	2	1	EA		403-1-7	BEARING DUPLEX			11
2	3	1	EA		500-29-9	STATOR ASSY			12
3	1	1	EA		PL500-29-9	STATOR ASSY P/L			13
4	1	1	EA		502-29-9	STATOR CORE			14
5	1	1	EA		PL502-29-9	STATOR CORE P/L			15
6	1	18	EA		512-11-14	STEEL LAMINATION			16
6	2	AR	EA		612-3	CEMENT BONDMASTER E645			17
6	3	AR	LB		612-54	EPOXY POWDER, 5230 SCOTCH CAST			18
6	4	AR	EA		960-251	CEMENTING PROCEDURE	REFERENCE		19
6	5	AR	EA		5-222-0	BED COAT FLUID PROCEDURE	REFERENCE		20
6	6	AR	EA		5-128-0	STATOR CLEAN PROC INTERMEDIATE	REFERENCE		21
4	2	AR	EA		M1177/14-01C034	WIRE MAGNET			22
4	4	AR	FT		M22759/18-26-9	WIRE 26AWG WHITE		MIL-W-22759	23
4	6	AR	FT		507-39-25	TAPE			24
4	7	AR	EA		508-22-7	CORD LACING			25
4	8	AR	EA		280A&B	SCOTCHCAST ELEC RESIN			26
4	9	AR	EA		520-248	INSERTION DATA	REFERENCE		27
4	10	AR	EA		521-425	COIL WINDING DATA	REFERENCE		28
4	11	AR	EA		522-472	FINISH DATA	REFERENCE		29
4	12	AR	EA		5-130-0	COIL CLEANING PROCEDURE	REFERENCE		30
4	13	AR	EA		5-128-0	STATOR CLEAN PROC INTERMEDIATE	REFERENCE		31
4	14	AR	EA		ATP20049	ACCEPTANCE TEST PROCEDURE	REFERENCE		32
2	5	1	EA		303-216	PW ASSY TEMP XDCR FLTR CIRCUIT			33
3	1	1	EA		PL303-216	PW ASSY TEMP XDCR FLTR CKT P/L			34
4	1	1	EA		303-217	P W. BOARD			35
4	2	2	EA		RCR05G102JR	RESISTOR 1K +-5% 1/8W	R1,R2	MIL-R-39008/4	36
4	3	1	EA		M39014/02-1358	CAPACITOR CER .33UF +-10% 50V	C1	MIL-C-39014/2	37
4	4	AR	OZ		SN63WRMAP3	SOLDER		QQ-S-571	38
4	5	AR	FT		M22759/18-26-9	WIRE 26AWG WHITE		MIL-W-22759	39
4	6	AR	EA		M43553-1-WHT	WHITE EPOXY INK		MIL-I-43553	40
4	7	AR	EA		531-56	SCHEMATIC DIAGRAM	REFERENCE DRAWING		41
4	8	1	EA		5962-8757103XX	TEMP XDCR	TC1		42
4	9	AR	EA		CONATHANE/CE-1155	CONFORMAL COAT, POLYURETHANE			43
4	10	AR	EA		5-296-0	VACUUM BAKEOUT, PRE-ASSEMBLY			44
2	6	1	EA		400-29-6	ROTOR ASSEMBLY			45
3	1	1	EA		PL400-29-6	ROTOR ASSY P/L			46
4	1	1	EA		402-29-9	ROTOR HUB & SHAFT			47

LVL	FND NO	QTY REQ	UM	CAGE	PART OR IDENT NO	NOMEN or DESCRIPTION	REF DESIG	DOCUMENT	SEQ NO
									48
4	2	12	EA		411-291-2	COBALT MAGNETS NORTH			49
4	3	12	EA		411-291-3	COBALT MAGNETS SOUTH			50
4	4	AR	EA		612-3	CEMENT BONDMASTER E645			51
4	5	AR	EA		612-20	CEMENT BONDMASTER M620			52
4	6	AR	EA		5-284-0	CLEANING PROCEDURE	REFERENCE		53
4	7	AR	EA		5-258-0	MAGNET INSPECTION PROCEDURE	REFERENCE		54
4	8	AR	EA		5-134-0	ROTOR CLEANING PROCEDURE	REFERENCE		55
4	9	AR	EA		5-296-0	VACUUM BAKEOUT, PRE-ASSEMBLY	REFERENCE		56
4	10	AR	EA		960-229	CEMENTING PROCEDURE	REFERENCE		57
4	11	AR	EA		960-251	CEMENTING PROCEDURE	REFERENCE		58
2	7	1	EA		607-448	BEARING RET-OUTER			59
2	8	1	EA		607-449	BEARING RET-INNER			60
2	9	1	EA		110E381	ENCODER-OPTICAL			61
2	10	1	EA		607-450	LOCKING PIN			62
2	11	1	EA		301-61	COVER			63
2	12	8	EA		MS51957-3	SCREW PNHD 2-56X.250		MS51957	64
2	13	4	EA		MS15795-802	WASHER FLT #2		MS15795	65
2	14	6	EA		NAS620-C2	WASHER, FLAT #2 SM PAT		NAS620-C2	66
2	15	AR	KIT		612-38-2	STYCAST 2850FT/CATALYST#9			67
2	16	2	EA		MS51957-2	SCREW PNHD 2-56X.187	REFERENCE	MS51957	68
2	18	AR	EA		285/CAT9	EPOXY THERMAL - ECCOBOND	REFERENCE		69
2	20	AR	EA		2850/CAT9	EPOXY ADHESIVE - STYCAST	REFERENCE		70
2	21	AR	LB		SN60WRMAP3	SOLDER	REFERENCE	QQ-S-571	71
2	26	AR	EA		5-068-0	BONDING PROCEDURE	REFERENCE		72
2	30	AR	EA		5-294-0	BONDING AND STAKING PROCEDURE	REFERENCE		73
2	33	AR	EA		5-297-0	ALIGNMENT AND ASSEMBLY PROC	REFERENCE		74
2	34	AR	EA		5-298-0	VACUUM BAKEOUT, POST ASSEMBLY	REFERENCE		75
2	41	AR	EA		A1P20049	ACCEPTANCE TEST PROCEDURE	REFERENCE		76
2	42	AR	EA		5-305-0	CLEANLINESS CONTROL PROC	REFERENCE		77
2	43	AR	EA		110P371	CONTAMINATION CTRL & IMPL PLAN			78
2	44	AR	FT		M22759/18-26-9	WIRE 26AWG WHITE		MIL-W-22759	79
2	45	AR	EA		PR-1564	POLYURETHANE PARTS A & B			80
2	46	AR	EA		5-283-0	SEALING PROCEDURE	REFERENCE		

08:15:14 10 AUG 1995
PA[illegible] IST [illegible] P[illegible] 7
MOTOR/ENCODER P/L
CONTRACT NO. NAS8-39409

A[illegible] LEX[illegible] RAT[illegible] S
LONG ISLAND, NY 11803
CAGE NO. 88379

[illegible] LTR [illegible] [illegible] SING[illegible] SHT
REV DATE 05-13-94
SHT NO 1

CHK _____

ENG _____

ECN

DES _____ _____

MFG __ _____ ____

QA _____ __

LVL	FNO NO	QTY REQ	UM	CAGE	PART OR IDENT NO	NOMEN or DESCRIPTION	REF DESIG	DOCUMENT	SEQ NO
0	1	1	EA		200-89	MOTOR/ENCODER ASSY			1

08:15:31 10 AUG 1995
PA[illegible] LIST [illegible] PA[illegible] 89
MOTOR/ENCODER ASSY P/L
CONTRACT NO. NAS8-39409

[illegible] LORATORIES
LONG ISLAND, NY 11803
CAGE NO. 88379

[illegible] LTR [illegible] SINGLE DILL
REV DATE 08-12-95
SHT NO 1

CHK ___ _____

DES _____ _____

ENG _____

MFG _____

ECN 11869

QA _____ _____

LVL	FND NO	QTY REQ	UM	CAGE	PART OR IDENT NO	NOMEN or DESCRIPTION	REF DESIG	DOCUMENT	SEQ NO
0	1	1	EA		301-60	HOUSING MOTOR/ENCODER			1
0	2	1	EA		403-1-7	BEARING DUPLEX			2
0	3	1	EA		500-29-9	STATOR ASSY			3
0	5	1	EA		303-216	PW ASSY TEMP XDCR FLTR CIRCUIT			4
0	6	1	EA		400-29-6	ROTOR ASSEMBLY			5
0	7	1	EA		607-448	BEARING RET-OUTER			6
0	8	1	EA		607-449	BEARING RET-INNER			7
0	9	1	EA		110E381	ENCODER-OPTICAL			8
0	10	1	EA		607-450	LOCKING PIN			9
0	11	1	EA		301-61	COVER			10
0	12	8	EA	96906	MS51957-3	SCREW PNHD 2-56X.250		MS51957	11
0	13	4	EA	96906	MS15795-802	WASHER FLT #2		MS15795	12
0	14	6	EA		NAS620-C2	WASHER, FLAT #2 SM PAT		NAS620-C2	13
0	15	AR	KIT		612-38-2	STYCAST 2850FT/CATALYST#9			14
0	16	2	EA	96906	MS51957-2	SCREW PNHD 2-56X.187	REFERENCE	MS51957	15
0	18	AR	EA		285/CAT9	EPOXY THERMAL - ECCOBOND	REFERENCE		16
0	20	AR	EA		2850/CAT9	EPOXY ADHESIVE - STYCAST	REFERENCE		17
0	21	AR	LB		SN60WRMAP3	SOLDER	REFERENCE	QQ-S-571	18
0	26	AR	EA		5-068-0	BONDING PROCEDURE	REFERENCE		19
0	30	AR	EA		5-294-0	BONDING AND STAKING PROCEDURE	REFERENCE		20
0	33	AR	EA		5-297-0	ALIGNMENT AND ASSEMBLY PROC	REFERENCE		21
0	34	AR	EA		5-298-0	VACUUM BAKEOUT, POST ASSEMBLY	REFERENCE		22
0	41	AR	EA		ATP20049	ACCEPTANCE TEST PROCEDURE	REFERENCE		23
0	42	AR	EA		5-305-0	CLEANLINESS CONTROL PROC	REFERENCE		24
0	43	AR	EA		110P371	CONTAMINATION CTRL & IMPL PLAN			25
0	44	AR	FT		M22759/18-26-9	WIRE 26AWG WHITE		MIL-W-22759	26
0	45	AR	EA		PR-1564	POLYURETHANE PARTS A & B			27
0	46	AR	EA		5-283-0	SEALING PROCEDURE	REFERENCE		28

08:15:45 10 AUG 1995
PARTS LIST PL301-60
HOUSING MOTOR/ENCODER P/L
CONTRACT NO. NAS8-39409

ACCUFLEX LABORATORIES
LONG ISLAND, NY 11803
CAGE NO. 88379

DEV LTR [illegible] DRAWING TITLE
REV DATE 09-14-94
SHT NO 1

CHK _____

ENG _____

ECN 11861

DES _____ _____

MFG _____ _____

QA _____ _____

LVL	FND NO	QTY REQ	UM	CAGE	PART OR IDENT NO	NOMEN or DESCRIPTION	REF DESIG	DOCUMENT	SEQ NO
0	1	1	EA		301-60-01	HOUSING			1
0	2	1	EA		404-13-61	LINER BEARING			2
0	3	3	EA		M45932/1-7CL	INSERT SCREW 8-32UNC-2B		MIL-I-45932	3
0	4	10	EA		M45932/1-1CL	INSERT SCREW 2-56UNC-2B		MIL-I-45932	4
0	5	AR	EA		5-294-0	CLEANING PROCEDURE	REFERENCE		5
0	6	AR	EA		5-296-0	VACUUM BAKEOUT, PRE-ASSEMBLY	REFERENCE		6

08:15:57 10 AUG 1995

PART LIST PAGE 216

PW ASSY TEMP XDCR FLTR CKT P/L

CONTRACT NO. NAS8-39409

ANTEX CORPORATION
LONG ISLAND, NY 11803

CAGE NO. 88379

DCN LTR [illegible] DRAWING TITLE

REV DATE 09-14-94

SHT NO 1

CHK ___ _____

DES _____

ENG ___.___._____

MFG _____ _____

ECN 11861

QA __ _____

LVL	FND NO	QTY REQ	UM	CAGE	PART OR IDENT NO	NOMEN or DESCRIPTION	REF DESIG	DOCUMENT	SEQ NO
0	1	1	EA		303-217	P.W. BOARD			1
0	2	2	EA		RCR05G102JR	RESISTOR 1K +-5% 1/8W	R1,R2	MIL-R-39008/4	2
0	3	1	EA		M39014/02-1358	CAPACITOR CER .33UF +-10% 50V	C1	MIL-C-39014/2	3
0	4	AR	OZ		SN63WRMAP3	SOLDER		QQ-S-571	4
0	5	AR	FT		M22759/18-26-9	WIRE 26AWG WHITE		MIL-W-22759	5
0	6	AR	EA		M43553-I-WHT	WHITE EPOXY INK		MIL-I-43553	6
0	7	AR	EA		531-56	SCHEMATIC DIAGRAM	REFERENCE DRAWING		7
0	8	1	EA	51640	5962-8757103XX	TEMP XDCR	TC1		8
0	9	AR	EA		CONATHANE/CE-1155	CONFORMAL COAT, POLYURETHANE			9
0	10	AR	EA		5-296-0	VACUUM BAKEOUT, PRE-ASSEMBLY			10

08:16:11 10 AUG 1995
PA[illegible]IST [illegible] PN[illegible]-29-[illegible]
ROTOR ASSY P/L
CONTRACT NO. NAS8-39409

A[illegible]FLEX [illegible]ORATORIES
LONG ISLAND, NY [illegible]
CAGE NO. 88379

[illegible] LTR [illegible] [illegible]SING [illegible]ILL
REV DATE 08-12-95
SHT NO 1

CHK _____ _

ENG _____ _

ECN 11869

DES _ _____ _

MFG _____ _____ _

QA ___ ___ _____

LVL	FND NO	QTY REQ	UM	CAGE	PART OR IDENT NO	NOMEN or DESCRIPTION	REF DESIG	DOCUMENT	SEQ NO
0	1	1	EA		402-29-9	ROTOR HUB & SHAFT			1
0	2	12	EA		411-291-2	COBALT MAGNETS NORTH			2
0	3	12	EA		411-291-3	COBALT MAGNETS SOUTH			3
0	4	AR	EA		612-3	CEMENT BONDMASTER E645			4
0	5	AR	EA		612-20	CEMENT BONDMASTER M620			5
0	6	AR	EA		S-284-0	CLEANING PROCEDURE	REFERENCE		6
0	7	AR	EA		S-258-0	MAGNET INSPECTION PROCEDURE	REFERENCE		7
0	8	AR	EA		S-134-0	ROTOR CLEANING PROCEDURE	REFERENCE		8
0	9	AR	EA		S-296-0	VACUUM BAKEOUT, PRE-ASSEMBLY	REFERENCE		9
0	10	AR	EA		960-229	CEMENTING PROCEDURE	REFERENCE		10
0	11	AR	EA		960-251	CEMENTING PROCEDURE	REFERENCE		11

08:16:25 10 AUG 1995
PAR [illegible] ISr PL [illegible] 29-9
STATOR ASSY P/L
CONTRACT NO. NAS8-39409

A[illegible]LEX [illegible]ORATORIES
LONG ISLAND, NY [illegible]
CAGE NO. 88379

REV LTR C
DATE 14-
SHT NO 1

SINGLE BILL

CHK ____________

DES ____________

ENG ____________

MFG ____________

ECN

QA ____________

LVL	FNO NO	QTY REQ	UM	CAGE	PART OR IDENT NO	NOMEN or DESCRIPTION	REF DESIG	DOCUMENT	SEQ NO
0	1	1	EA		502-29-9	STATOR CORE			1
0	2	AR	EA		M1177/14-01C034	WIRE MAGNET			2
0	4	AR	FT		M22759/18-26-9	WIRE 26AWG WHITE		MIL-W-22759	3
0	6	AR	FT		507-39-25	TAPE			4
0	7	AR	EA		508-22-7	CORD LACING			5
0	8	AR	EA		280A&B	SCOTCHCAST ELEC RESIN			6
0	9	AR	EA		520-248	INSERTION DATA	REFERENCE		7
0	10	AR	EA		521-425	COIL WINDING DATA	REFERENCE		8
0	11	AR	EA		522-472	FINISH DATA	REFERENCE		9
0	12	AR	EA		5-130-0	COIL CLEANING PROCEDURE	REFERENCE		10
0	13	AR	EA		5-128-0	STATOR CLEAN PROC INTERMEDIATE	REFERENCE		11
0	14	AR	EA		ATP20049	ACCEPTANCE TEST PROCEDURE	REFERENCE		12

08:16:42 10 AUG 1995
PARTS LIST PAGE 29-0
STATOR CORE P/L
CONTRACT NO. NAS8-39409

AEROFLEX LABORATORIES
LONG ISLAND, NY 11803
CAGE NO. 88379

REV LTR C SINGLE SHEET
REV DATE 09-14-94
SHT NO 1

CHK _____

ENG _____

ECN 11861

DES __ _____ ____

MFG _____

QA _____ ___ _____

LVL	FND NO	QTY REQ	UM	CAGE	PART OR IDENT NO	NOMEN or DESCRIPTION	REF DESIG	DOCUMENT	SEQ NO
0	1	18	EA		512-11-14	STEEL LAMINATION			1
0	2	AR	EA		612-3	CEMENT BONDMASTER E645			2
0	3	AR	LB		612-54	EPOXY POWDER, 5230 SCOTCH CAST			3
0	4	AR	EA		960-251	CEMENTING PROCEDURE	REFERENCE		4
0	5	AR	EA		S-222-0	BED COAT FLUID PROCEDURE	REFERENCE		5
0	6	AR	EA		S-128-0	STATOR CLEAN PROC INTERMEDIATE	REFERENCE		6

FIGURE 8

ENCODER ELECTRONIC COMPONENTS

ITEM	SYMBOL	PART NO.	DESCRIPTION	QTY
1	CR1-CR5	565304-1	Phototransistor OP604	5
2	CR6-CR11	JANS1N4464	Zener Diode, Voltage Regulator, 9.1V	5
3	U1	M38510/11201BCA (or B)	Quad Comparator LM139J	1
4	U2	M38510/00801BCA	Hex Inverter SN5406J	1
5	C1	M39014/02-1350	Ceramic Capacitor CKR06 0.1uF ±10% 100V FRL=S	1
6	C2	M39003/02-2040	Tantalum Electrolytic Capacitor CSR09 6.8uF ±10% 20V FRL=B Case B1	1
7	R1-5	RCR05GXXXXX	Fixed Composition Resistor Select At Test	5
8	R6-R9	RCR05G103JR (or P)	Fixed Composition Resistor 10K ±5% 1/8W	4
9	R10-R13	RCR05C105JR (or P)	Fixed Composition Resistor 1M ±5% 1/8W	4
10	R14-R21	RCR05G512JR (or P)	Fixed Composition Resistor 5.1K ±5% 1/8W	8
11	R22-R25	RCR05G102JR (or P)	Fixed Composition Resistor 1K ±5% 1/8W	4
12	R26-R27	RCR05G201JR (or P)	Fixed Composition Resistor 200 Ω ±5% 1/8W	2
13	R28	RCR05G391JR (or P)	Fixed Composition Resistor 390 Ω ±5% 1/8W	1
14	DS1-DS5	565305-1	LED OP604	5

NOTE:
Item 1-13: Used on Encoder Printed Wire Board Assembly
Item 14: Used on LFD Printed Wiring Board Assembly

SIZE A | CAGE CODE 88379 | REV. B | SCALE — | SHEET 24 | 110E381

SECTION IX

LOOSE HARDWARE LIST

No loose hardware is associated with these units.

SECTION X

NONCOMPLIANCE DOCUMENT LIST

No. 00168 PAGE 1 OF 1

NO.	DATE	PART NO.	REV.	PART NAME	VEND	LOT SIZE	SAMPLE SIZE	QTY. WITHHELD	TOT. ACC.	TOTAL WITHHELD
13640	5/8/95	16187	B	MOTOR/ENCODER	ARX	1	1	1	0	1

D/C - L/N (S/N)	TEST SPEC. NO.	REV.	PARA	INSP. POINT
0003	ATP-20049	B	4.3	RECEIVING ○ IN-PROCESS ○ FINAL ○ OTHER ○

RESP. CODES: V- VENDOR, E- ENGINEERING, T- TEST, I- INSPECTION, A- ASSEMBLY, S- SHOP, W- WIRING, P- SPEC. PROC., N- UNKNOWN

DEFECT CODES: 11 SOLDERING, 12 WIRING, 13 HARNESS/CABLE, 14 POLARITY/ORIENT, 21 IMPROPER ASSY, 22 WRONG PART, 23 DAMAGED PART, 24 MISSING PART, 25 EXTRA PART, 31 MATERIAL, 32 INCOMPL. OPN, 33 MAT'L HANDLING, 34 DIM OUT, 41 POTTING/COATING, 42 WELDING, 43 FINISHES, 44 CORROSION, 45 CASTING, 46 MARKING, 51 EXPIRED LIFE, 52 DOCUMENTATION, 53 PACKAGING, 54 DRAWING/SPEC, 61 ELEC. PARA OUT, 62 COMP FAIL, 71 GEN APPEAR

ITEM NO.	QTY WITH-HELD	INSP LEVEL (AOL)	REASONS FOR WITHHOLDING	RESP.	FREQ.	DEFECT CLASS	DEFECT CODE	SCREEN	USE AS IS	RE-WORK	SCRAP	RET TO VEN	MRB
1	1	100%	After subjecting the Motor / Encoder Assembly part number 16187, serial number 0003 to the random vibration portion of the ATP, the vibration fixture cover was removed to expose the shaft end of the Motor / Encoder in preparation to remove the Motor / Encoder from the fixture to run a functional test of the unit. At this point, it was observed that the retaining ring which holds the dummy load to the shaft, had become loose and permitted the dummy load to travel on the shaft during vibration. The fixture cover prevented the dummy load from coming completely off the shaft. This up and down movement of the dummy load caused a scraping of the shaft which left small whisker like magnetic particles to become attached to the magnetic field in the shaft and the two bearing retainer units. The above anomaly was caused by the mis-application of the ATP fixture hardware.	T	1x	MAJ	71						*

TOTAL →

INSPECTION	DATE	TEST	DATE	QUALITY ASSURANCE	DATE	ENGINEERING	DATE	CUSTOMER	DATE	OTHER	DATE
R. Sou[illegible] (ARX 35 stamp)	5-8-95			C. V. Ledesko	5/12/95					Brian Mu[illegible]	5/13/9[illegible]

OPER. NO.	DEPT.	QTY.	SET UP	TOT. R T	RWK ACC.	RWK RET.	REWORK INSTRUCTIONS / DISPOSITION RATIONALE (MUST BE COMPLETED FOR ALL USE AS IS DISPOSITIONS)
							Submit NCR to NASA for concurrence on Corrective Action Request & Report #M 13640
							All rework for the disassembly and the reassembly of the Motor / Encoder, 16187, will be accomplished in accordance with Assembly Flow Chart 960-295. As indicated on the flow chart, all the rework will be accomplished in a Class 100 environment.

AEROFLEX LABORATORIES, INC.
NONCONFORMANCE REPORT
FORM QA-515 (12/94)

TRAVELER

AEROFLEX LABORATORIES INCORPORATED
SOUTH SERVICE ROAD, PLAINVIEW, L.I., NEW YORK

NO M13640

CORRECTIVE ACTION REQUEST AND REPORT

TO EMO DIVISION
AEROFLEX LABORATORIES

OUR PURCHASE ORDER NO
PART NO 16187
DESCRIPTION MOTOR/ENCODER
DATE RECEIVED R.R. NO.
QUANTITY REJECTED 1 REJECT NO. 00168
PART RETURNED YES NO
SERIAL NUMBER 0003
FROM

ATTN. A FERRI - PROGRAM MANAGER

DISCREPANCY OR CONDITION: SEE NCR # 00168.

ACTION REQUIRED BY DATE SIGNED C.V. Fodeski DATE 5/12/95

REPLY

CAUSE OF DISCREPANCY OR CONDITION: The root cause of the vibration fixture failure was the improper installation of the retaining ring which secures the dummy load to the Motor / Enclder shaft plus the lack of shims under the retaining ring to remove the end play.

CORRECTIVE ACTION: (NOTE EFFECTIVE DATES AND REFERENCE DOCUMENTS)

a) Shim clearances between retaining ring and dummy load to eliminate end play

b) Install retaining ring per manufacturer's specification by adjusting and setting stops on installation tool.

DO NOT WRITE BELOW THIS LINE

EVALUATION OF CORRECTIVE ACTION

CORRECTIVE ACTION SATISFACTORY	YES	NO	FOLLOW UP	YES	NO	DATE	NEW C.A.R.R. NO.

REMARKS

SIGNED DATE

ARX-072

Attachment No.00168

After subjecting the Motor / Encoder Assembly part number 16187, serial number 0003 to the random vibration portion of the ATP, the vibration fixture cover was removed to expose the shaft end of the Motor / Encoder in preperation to remove the Motor / Encoder from the fixture to run a functional test of the unit. At this point, it was observed that the retaining ring which holds the dummy load to the shaft, had become loose and permitted the dummy load to travel on the shaft during vibration. The fixture cover prevented the dummy load from coming completely off the shaft. This up and down movement of the dummy load caused a scraping of the shaft which left small whisker like magnetic particles to become attached to the magnetic field in the shaft and the two bearing retainer units. The above aromaly was caused by the mis-application of the ATP fixture hardware

All rework for the disassembly and the reassembly of the Motor / Encoder, 16187, will be accomplished in accordance with Assembly Flow Chart 960-295. As indicated on the flow chart, all the rework will be accomplished in a Class 100 environment.

Dis-assemble the Motor/Encoder to permit the replacement of the Rotor Assembly 400-29-6 and the Duplex Bearings (403-1-7) SSRI-8516LLDB10RA7P68LY328UB. Re-assemble the Motor/Encoder in accordance with assembly flow chart 960-295 starting with housing and bearing assembly 200-89.

AEROFLEX

REPAIR TRAVELER

JO#: 13640 R	USED ON: 16187	DATE ISSUED:	DATE DUE:
P/N: 200-89	DESC: MOTOR/ENCODER ASSY	PLANNER:	ASSOCIATED PART LIST AND REVISION
QTY: 1 REV: A	S/N: 0003	ESD SENSITIVE: YES, Class __ No	REV.

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED
Rev:	Rev:	
Rev:	Rev:	
Rev:	Rev:	
Rev:	Rev:	

PART NO	Unit QTY	TotalQTY	DATE	SHORT

NO. #	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
	CAUTION: All Operations In The Rework Procedure Are Subject To The Same Controls (MOO'S) And Requirements For Contamination Control, And Dimentional Integrity, That Were Implemented In The Assembly Of The Unit.				
	PURPOSE: To Successfully Disassemble The Unit In Such A Controled Manner, That Requires Minimum Intrusion, And Replace The Rotor Assy 400-29-6 And Bearings 403-1-7. (Both Components Are Suspected Damaged Due To Retaining Ring Vibration Failure).				
10	Remove Item 12 (4Pcs MS51957-3) From Cover/Housing Assy.	1	—	5/15/95	JMS
20	Carefully Remove Cover 301-61 By Starting On Opposite Side W/Rspt. To The Lead Wire. Hold Leadwire Gently But Firmly Against The Housing And Gently Peel The Wires Away From The Cover.	1	—	5/15/95	JMS
30	Remove The Cover.	1	—	5/15/95	JMS
35	Inspect The Unit For Any Visible Damage.	1	0	5/15/95	ARX 35
40	Remove The Nuts Holding Power Board 19868-21776 And Carefully Remove Power Board Away From The Center Of The Unit.	1	-	5/17/95	JMS

REWORK/REPAIR:	1) Ref: NCR 00168	APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
	2)	DES:		ECN#:	ENG:
	3)	MFG: [signature]	5/22/95	MFG:	QA:
INSPECT:	4)	ENG: [signature]	5/22/95	OT-200-89	REV:
	5)	QA: [signature]	5/22/95	DATE:	SHEET: 1

REPAIR TRAVELER

JO#:	USED ON: 16187	DATE ISSUED:	DATE DUE:
P/N:200-89	DESC: MOTOR/ENCODER ASSY	PLANNER:	ASSOCIATED PART LIST AND REVISION
QTY:	REV: A S/N:	ESD SENSITIVE: YES, Class __ No	REV.

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED	PART NO	Unit QTY	TotalQTY	DATE	SHORT
Rev:	Rev:						
Rev:	Rev:						
Rev:	Rev:						
Rev:	Rev:						

OP. #	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
50	Secure Power Board Against Any Movement, And Avoid Handling To Minimize Contact Problems.	1	-	5/13/93	JWS
55	Inspect For Visual Damage.	1	0	5/13	ARX 35
60	Remove Disc And Hub Assy 19868-21766.	1	-	5/13/93	JWS
70	Remove (4Pcs MS51957-4) Screws Holding Plate 19868-21670 To The Housing, And Carefully Remove The "ENTIRE ENCODER ASSEMBLY" From The Unit.	1	-	5/13/93	JWS
75	Inspect Encoder Assy For Any Visible Damage.	1	0	5/13	ARX 35
80	Store Encoder Assembly Per 1100371.	1	-	5/13/93	JWS
90	Remove 507-450 (Locking Pin) From Shaft.	1	-	5/13/93	JWS

REWORK/REPAIR:		APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
	2)	DES:		ECN#:	ENG:
	3)	MFG:		MFG:	QA:
INSPECT:	4)	ENG:		DT-200-89	REV:
	5)	QA:		DATE:	SHEET: 2

REPAIR TRAVELER

IO#:	USED ON: 16187	DATE ISSUED:	DATE DUE:
P/N:200-89	DESC: MOTOR/ENCODER ASSY	PLANNER:	ASSOCIATED PART LIST AND REVISION
QTY: REV: A	S/N:	ESD SENSITIVE: YES, Class __ No	REV.

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED	PART NO	Unit QTY	TotalQTY	DATE	SHORT
Rev:	Rev:						
Rev:	Rev:						
Rev:	Rev:						
Rev:	Rev:						

OP. #	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
100	Loosen And Remove Bearing Retainer Nuts 607-448 And 607-449.	1	-	5/13/95	JMS
110	Clean	1	-	5/15/95	JMS
115	Inspect ARX	1	0	5/18/95	ARX 35
125	Insect Government	1	0	5/19/95	[illegible]
130	Store For Re-Use.	1	-	5/13/95	JMS
135	BEARING REMOVAL: CAUTION: Prior To Removing Bearings Or Rotor Assembly From The Unit The Stator MUST BE ISOLATED From The Rotor!.	1	-	5/19/95	JMS
140	To Accomplish The Isolation Use A Piece Of .010 X 5/8 X 6.25" Mylar Shim And Insert It Into The Gap Between The Stator And Rotor.	1	-	5/19/95	JMS

REWORK/REPAIR:		APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
	2)	DES:		ECN#:	ENG:
	3)	MFG:		MFG:	QA:
INSPECT:	4)	ENG:		DT-200-89	REV:
	5)	QA:		DATE:	SHEET: 3

REPAIR TRAVELER

IO#:	USED ON: 16187	DATE ISSUED:	DATE DUE:
P/N: 200-89	DESC: MOTOR/ENCODER ASSY	PLANNER:	ASSOCIATED PART LIST AND REVISION
QTY:	REV: A S/N:	ESD SENSITIVE: YES, Class __ No	REV.

DRAWINGS REQUIRED	PROCEDURES REQUIRED	SPECIFICATIONS REQUIRED
Rev:	Rev:	
Rev:	Rev:	
Rev:	Rev:	
Rev:	Rev:	

PART NO	Unit QTY	TotalQTY	DATE	SHORT

OP. #	DESCRIPTION	ACCEPTED	REJECTED	DATE	BY
150	Remove Rotor Assembly 400-29-6 From Unit.	1	-	5/12/95	JMS
160	Remove Duplex Bearing 403-1-7 From Unit.	1	-	5/12/95	JMS
165	Inspect The Unit For Any Visible Damage.	1	0	5/19/95	ARX 35
175	Inspect Government.	1	0	5/19/95	
180	Re-Assemble Per 200-89. Return to Orginal Traveler				

REWORK/REPAIR:	1)	APPROVAL SIGNATURE	DATE	AEROFLEX LABORATORIES INC.	
	2)	DES:		ECN#:	ENG:
	3)	MFG:		MFG:	QA:
INSPECT:	4)	ENG:		OT-200-89	REV:
	5)	QA:		DATE:	SHEET: 4

SECTION XI

WEIGHT & BALANCE LOG

Unit weights:

S/N 0002 : 12.05 oz. (15.0 oz max)

S/N 0003 : 12.30 oz.

SECTION XII

DEVIATION LIST

Deviation list is not applicable.

SECTION XIII

SHIPPING DOCUMENT

AEROFLEX

MATERIAL INSPECTION AND RECEIVING REPORT

Form Approved
OMB No. 0704-0248

1. PROC. INSTRUMENT IDEN. (CONTRACT)	(ORDER) NO.	5. INVOICE NO./DATE	7. PAGE	OF	8. ACCEPTANCE POINT
NAS8-39409		23591	1	1	S

2. SHIPMENT NO.	3. DATE SHIPPED	4. B/L	6. DISCOUNT TERMS
ALP0001Z	7/20/95	TCN	NET 30 DAYS

9. PRIME CONTRACTOR CODE	88379	10. ADMINISTERED BY CODE GP24-L
AEROFLEX LABORATORIES 35 SOUTH SERVICE ROAD PLAINVIEW, NY 11803		PROCUREMENT OFFICE, GEORGE C. MARSHALL SPACE FLIGHT CTR. NATIONAL AERONAUTICS AND SPACE ADMINIS MARSHALL SPACE FLIGHT CTR. AL 35812

SHIPPED FROM (If other than 9) CODE	FOB:	12. PAYMENT WILL BE MADE BY CODE BF52
SAME AS BLOCK # 9	S	FINANCIAL MGMT OFFICE , GEO. MARSHALL SPACE FLT CTR MARSHALL FLT CTR, AL 35812

13. SHIPPED TO CODE	14. MARKED FOR CODE
TRANSPORTATION OFFICER NASA, BUILDING 4471 GEO C. MARSHALL SPACE FLT MARSHALL SPACE FLT CTR. AL 35812	ACCOUNTABILITY PROPERTY OFFICER BLDG 4471, notify EB 24/ bill JACOBS

15. ITEM NO.	16. STOCK/PART NO. DESCRIPTION (Indicate number of shipping container - type of container - container number.)	17. QUANTITY SHIP / REC'D *	18. UNIT	19. UNIT PRICE	20. AMOUNT
0001	PART# 16187 CUST P/N REF DCN 1-2-EB-15996 STEPPER/MOTOR ENCODER FLIGHT QUALIFIED UNIT	2	@	239,633.000	479,266.000

21. CONTRACT QUALITY ASSURANCE

A. ORIGIN

[X] CQA [X] ACCEPTANCE of listed items has been made by me or under my supervision and they conform to contract, except as noted herein or on supporting documents.

DATE: 20 JULY 95
SIGNATURE OF AUTH GOVT REP: S. Sebastian
TYPED NAME AND OFFICE: SEBASTIAN 53309

B. DESTINATION

[ ] CQA [ ] ACCEPTANCE of listed items has been made by me or under my supervision and they conform to contract, except as noted herein or on supporting documents.

DATE
SIGNATURE OF AUTH GOVT REP
TYPED NAME AND TITLE

22. RECEIVER'S USE

Quantities shown in column 17 were received in apparent good condition except as noted.

DATE RECEIVED
SIGNATURE OF AUTH GOVT REP
TYPED NAME AND OFFICE

* If quantity received by the Government is the same as quantity shipped, indicate by (✓) mark. If different, enter actual quantity received below quantity shipped and encircle.

23. CONTRACTOR USE ONLY

JO# 13640
INV# 23591