

LASERMARK

MP5



SERVICE MANUAL
2003, rev. 01

CST/berger

WARRANTY COVERAGE

This Lasermark product is warranted to the original purchaser to be free from defects in workmanship and material. CST Corporation will repair or replace any defects, which may develop under normal and proper use, storage, and handling of the product. The product warranty periods are included in the warranty insert. CST must be allowed to make the changes necessary for instrument repair. Our goal is 5 days to repair and return the product.

To validate the warranty the product delivered, shipped prepaid, to CST must be accompanied by a **proof of date and place of purchase**.

This warranty is not subject to **misuse, abuse, assignment, or transfer**. The exclusive remedy under any and all warrants or implied, is limited to repair and or replacement as provided herein, and CST shall not be liable for damages from loss or delay of equipment uses, consequential, or incidental damages.

WARRANTY REGISTRATION

Model Name/Number: _____ Serial Number: _____

Date of Purchased: _____ Company Name: _____

Contact/Title: _____ Comments or Suggestions: _____

Address: _____

City: _____

State/Providence: _____ Zip: _____

Phone/Fax: _____ Dealer Name/Location: _____

What influenced you to purchase this equipment?

☐ Owned other CST Equipment ☐ National ad

☐ Saw at trade show ☐ Local dealer ad

☐ Recommended by someone ☐ Dealer

-Other: _____

Updated Warranties

Tracer_____	90 Days
Laser Rail Level_____	90 Days
8" Torpedo Level_____	90 Days
58-Gizmo_____	90 Days
Gizmo II-III _____	90 Days
Gizmo Lite _____	90 Days
Laser Plumb Bob_____	90 Days
Laser Detectors _____	1 YEAR
Automatic Level _____	5 YEAR
Magnetic Locator _____	5 YEAR
Wizard Rotary Lasers_____	1 YEAR
LM100, 200, 300_____	2 YEAR
MP5 _____	1 YEAR
LMH, LMHC/GR, LMH600_____	2 YEAR
54-203BU_____	3 YEAR
LM400_____	2 YEAR
LM500_____	2 YEAR
DGT10_____	1 YEAR

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TROUBLESHOOTING

I. EXTERNAL CHECK

- 1) Instrument fails to produce dot when switch button is pressed on.
 - A. Check batteries for proper voltage and proper positioning. Replace blank battery door with new door with battery diagram.
 - B. Attach power supply to battery contacts. If instrument now lights, trim excess plastic from battery contact and clean with alcohol.
 - C. Instrument still fails to light, go to Internal Check (page 7).
- 2) Instrument side window is broken replace Housing Sub-Assembly (Left Housing Sub-Assembly 58-6413 Figure A) (Right Housing Sub-Assembly 58-6414 Figure B).
- 3) Front, Top, and Bottom Windows are separate sub assemblies that may be replaced.

Note: If gasket is loose-remove old adhesive. Apply new 2-sided adhesive (58-6513).

Figure A Left Housing Sub Assembly

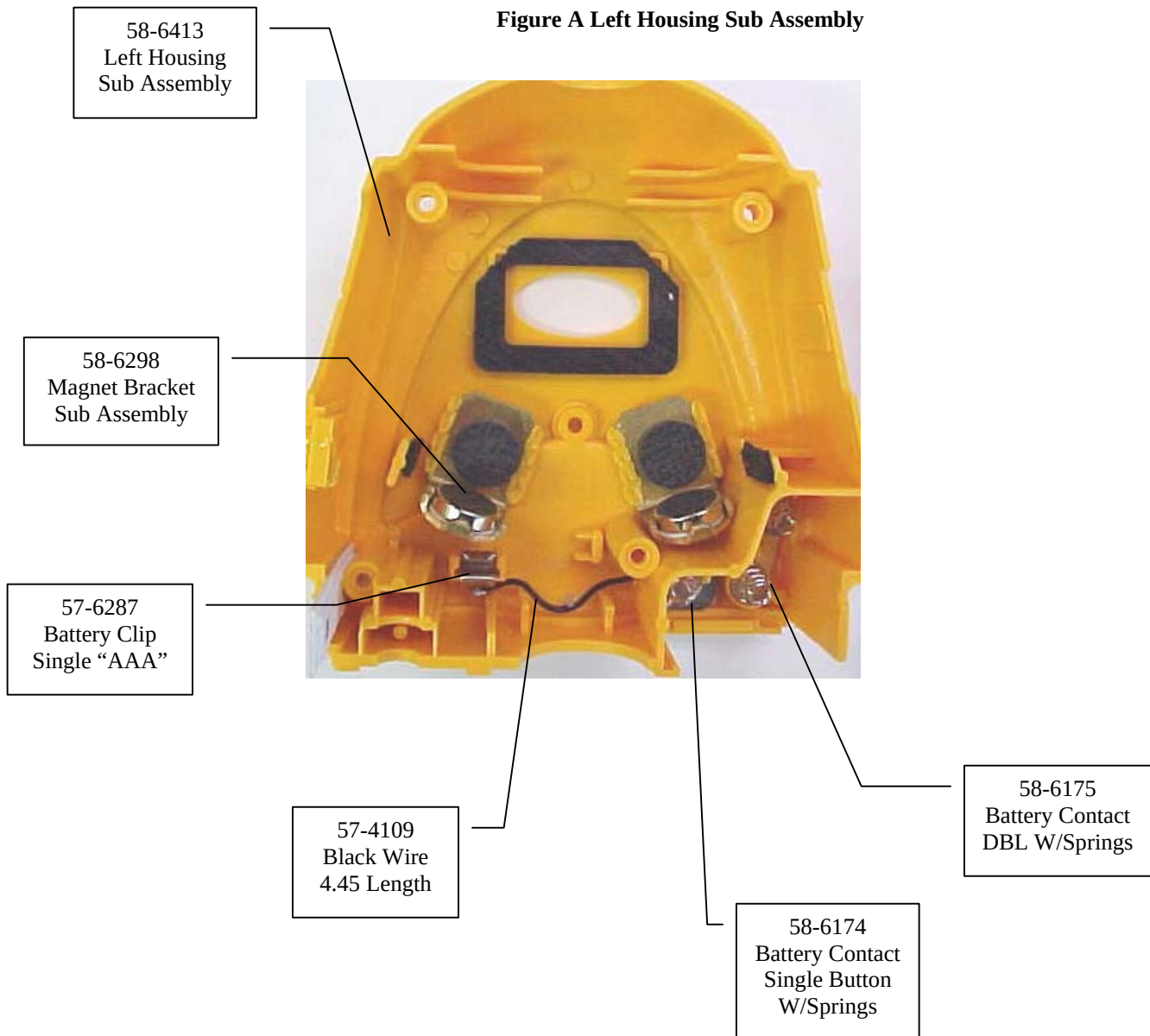
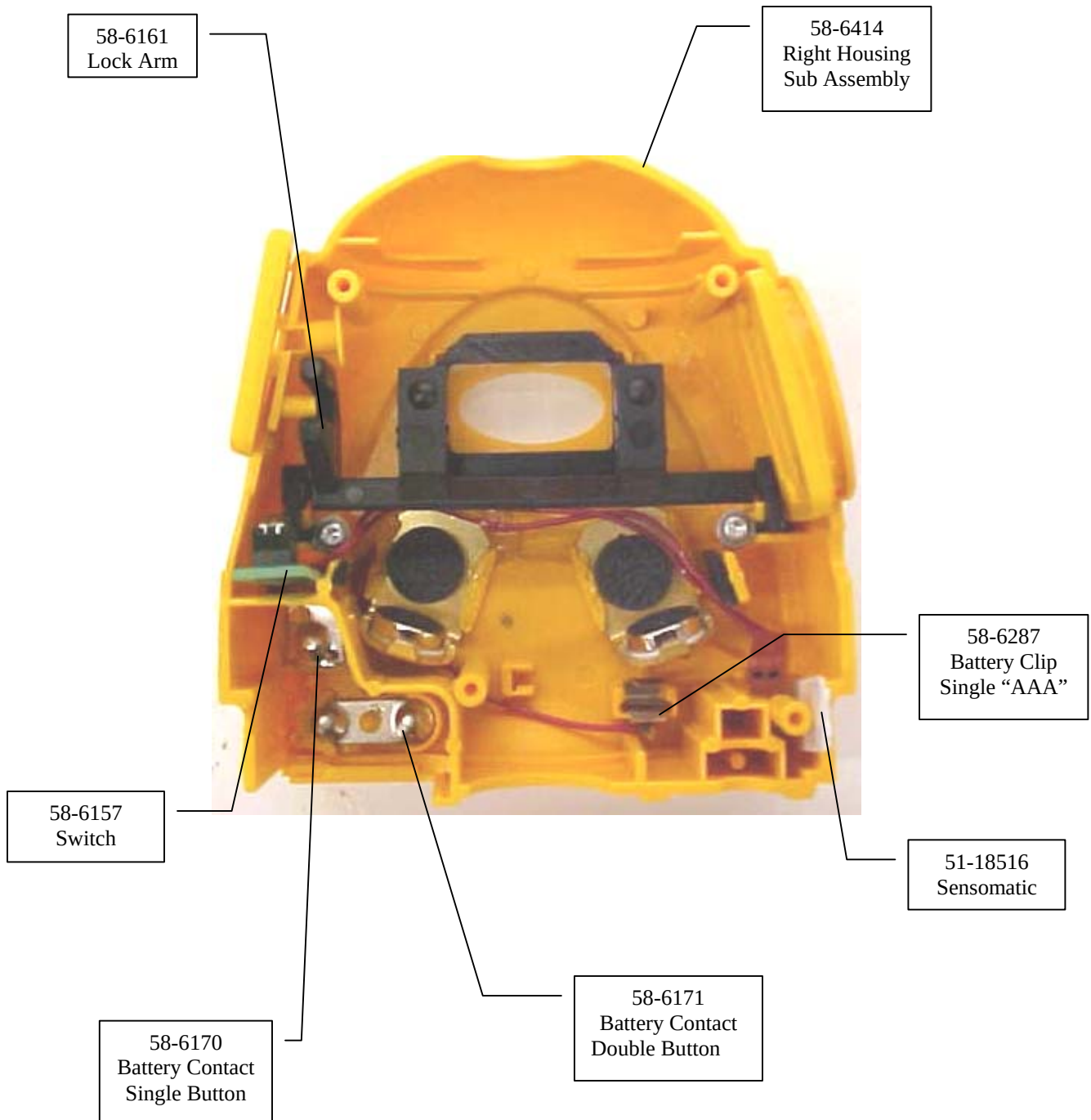


Figure B Right Housing Sub Assembly



II. INTERNAL CHECK

1) REMOVAL OF MAIN HOUSING

A. Remove rubber bumper.

Figure C

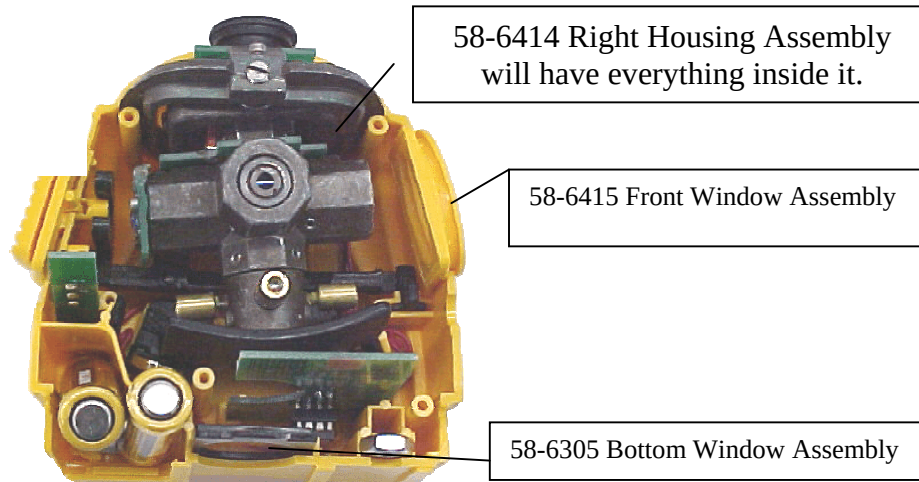


B. Remove (4) four (57-3758) #2 X ¾" lg torx pan head screws.

C. Remove caution label and cut or remove serial # label inside battery compartment.

D. Pull Housing Assembly apart.

Figure D

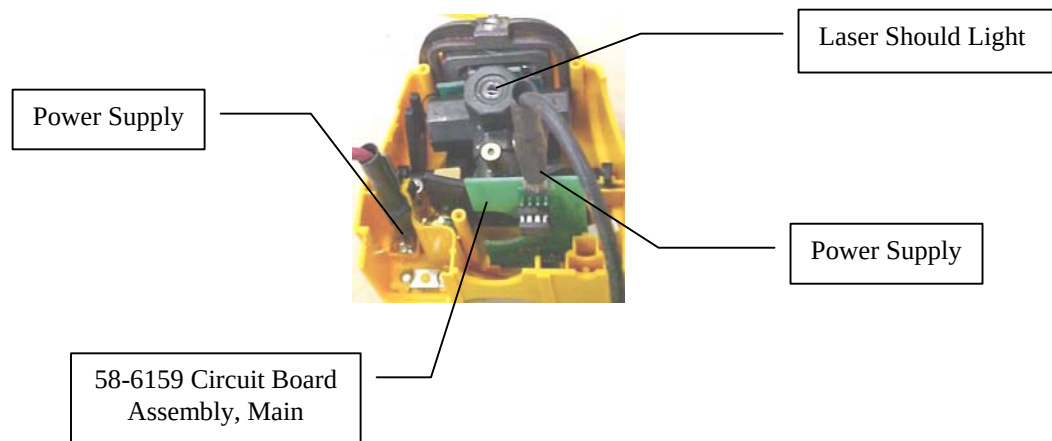


2) Check power to (58-6159) Main Circuit Board Assembly.

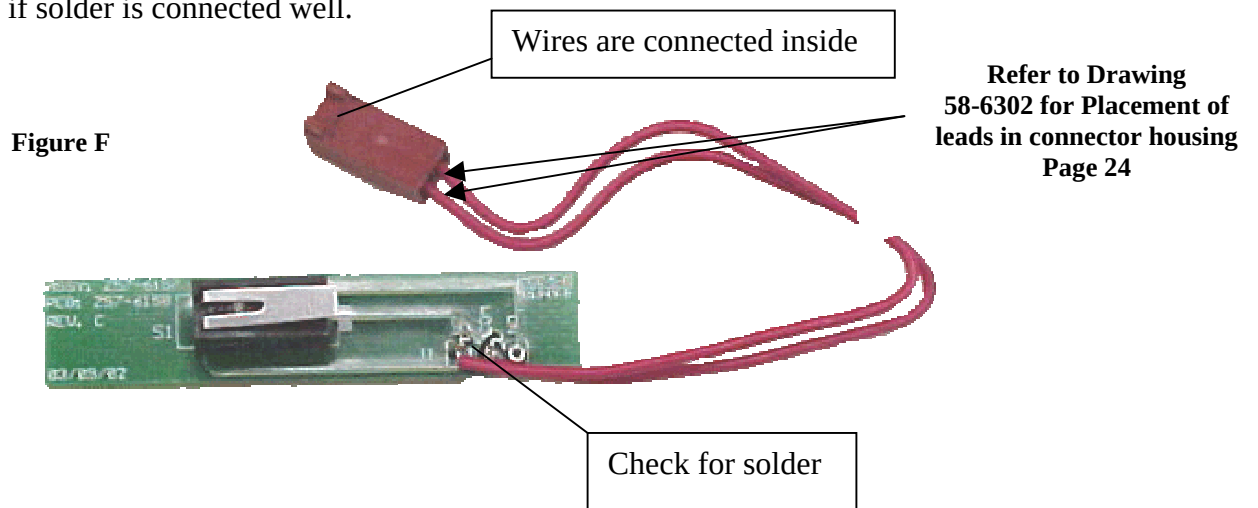
A. Connect positive power supply to single button positive battery contact and connect negative (ground) power supply to ground connect pad (J3) on main board (Figure E). This checks battery contact wire and solder connections. If the instrument still fails to light continue through processes that check solder connection on switchboard, upper board, lower board, and spring connection.

B. Check switch and laser connections on main board.

Figure E

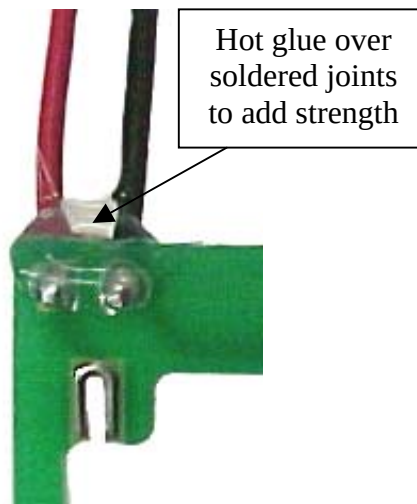


- 3) Check (58-6302) Switch Circuit Board Assembly (Figure F).
- 4) See if solder is connected well.



- 5) Check solder on Upper (58-6299) Circuit Board Upper Sub-Assembly.
- 6) If needed replace, follow process.

Figure G

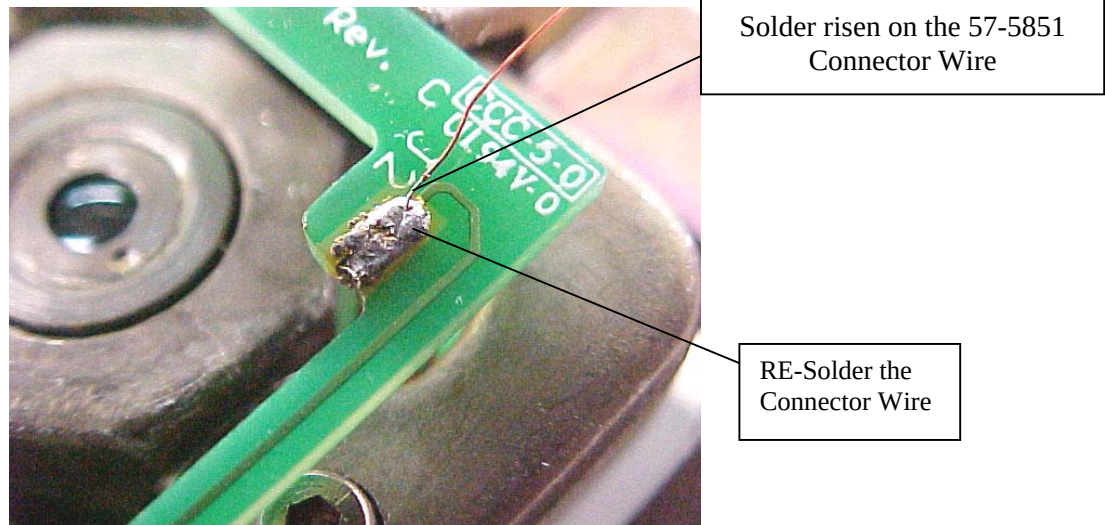


- 7) Check (57-5851) Connector Wire making sure it has a good connection.
- 8) If not go to next process.

III. Replace the (58-6151) Circuit Board Upper.

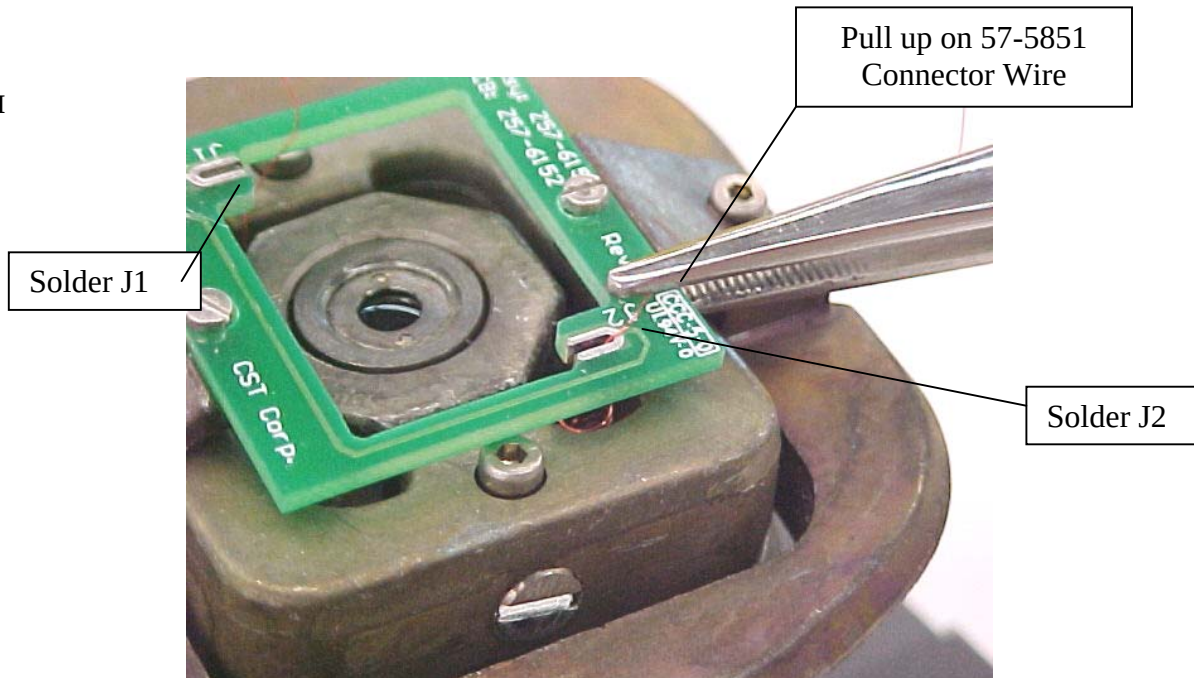
- 1) Reheat solder that holds (57-5851) Connector Wire to Circuit Board.

Figure H



- 2) Pull up (57-5851) Connector Wire and re-solder to J2 on board once again. Leaving $\frac{1}{4}$ " trim off excess wire.

Figure I



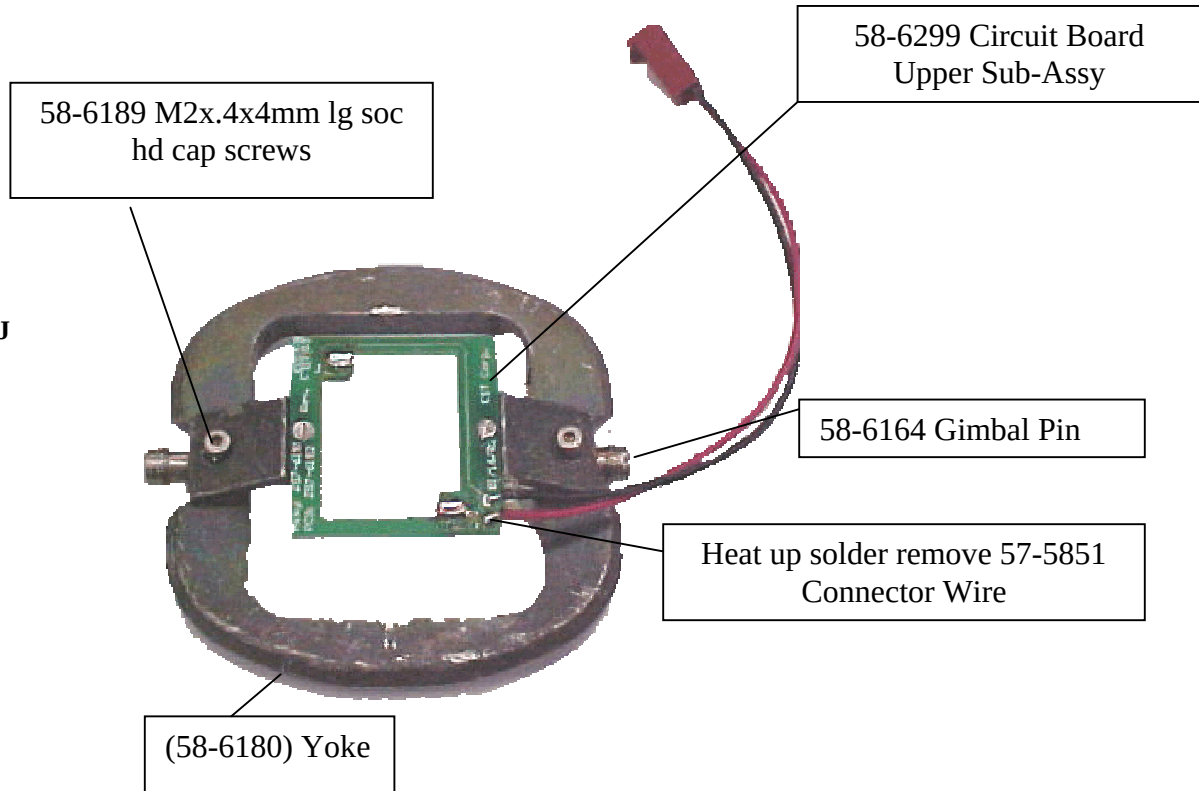
- 3) Do Step 2 to J1
- 4) Check for good connection.
- 5) Reverse procedure to re-assemble.
- 6) If not go to next process.

IV. Replace Circuit Board Lower

Note: A range capable of the balance process for the MP5 is necessary for this procedure.

- 1) Remove (58-6300) Yoke Sub Assembly
 - A. Heat up the solder on the (57-5851) Connector Wire
 - B. Loosen (2) 58-6189M2x.4x4mm lg soc hd cap screws
 - C. Remove (2) 58-6164 Gimbal pins
 - D. Remove 58-6300 Yoke Sub-Assembly

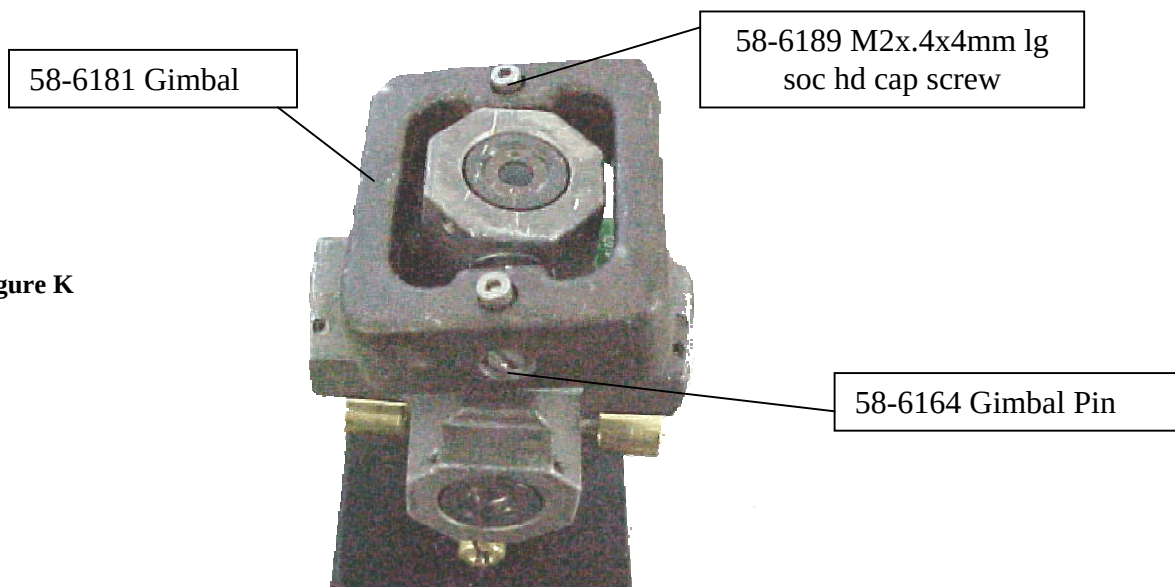
Figure J



V. Remove (58-6181) Gimbal

1. Loosen (2) 58-6189 M2 x .4 x 4mm lg. Soc. HD cap screws.
2. Remove (2) 58-6164 Gimbal pins.
3. Remove 58-6181 Gimbal

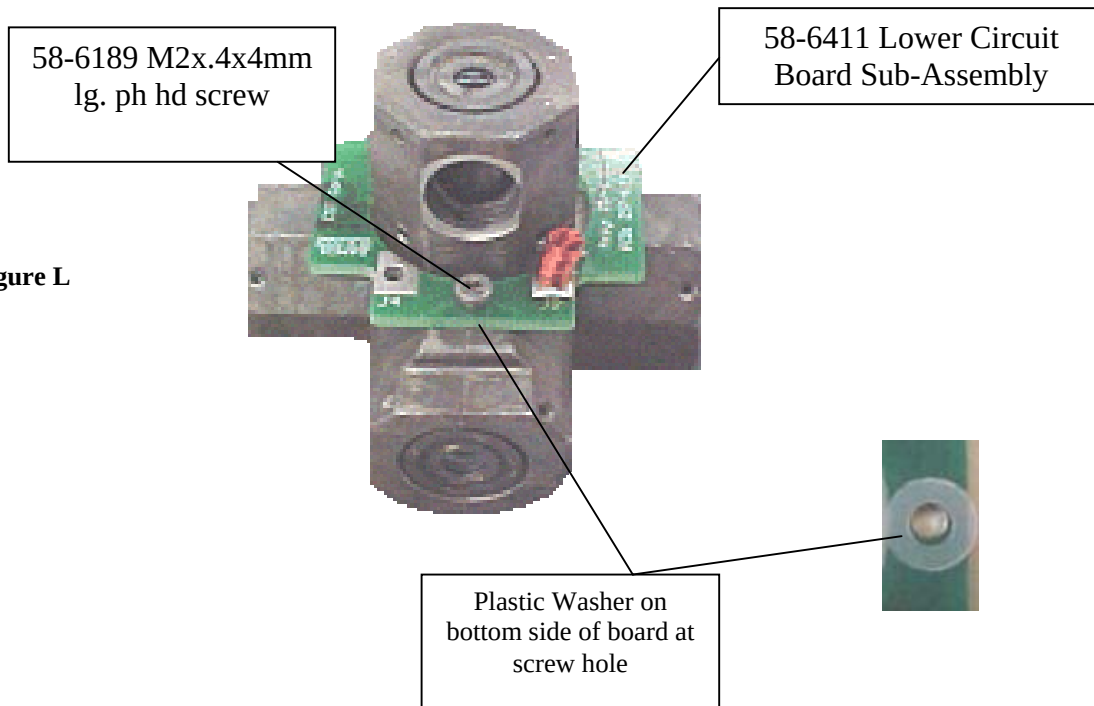
Figure K



VI. Remove (58-6411) Lower Circuit Board Assembly

1. Remove (2) 58-6189 M2x.4x4mm lg ph pan hd screws
2. Remove 58-6411 Lower Circuit Board SA. Replace with new one
3. Reverse procedure for re-assembly.

Figure L



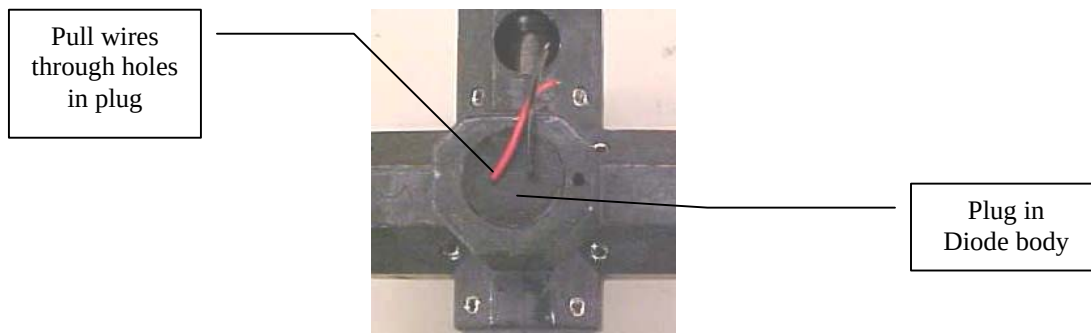
VII. Laser Diode – Non-working

Attach power supply to red and black wires coming out of back of diode body assembly. If one diode fails to light check solder connections behind black plug. **If diode must be replaced, you must have a range capable of calibration of the diode body assembly.**

1. Plug Placement

- A. Remove black plug from back of diode body.
- B. Pull red and black wires through plug and desolder leads of failed diode.

Figure M



VIII. Removal - Laser Diode

- 1) Remove Diode from 58-6182 Main Diode Body
- 2) Loosen 6 setscrews of failed diode and remove diode from diode body.
- 3) Reverse procedure for reassemble

IX. Pre-calibration – Note: Must check 58-6196/58-6169 screws.

- 1) Place Diode Body in fixture, assuring body is straight, and clamp is tight.
- 2) Connect power supply clips to lead wires
- 3) Shooting beam at target adjust the beam by turning the 58-6197 setscrew in or out bringing the beam into alignment.
- 4) Repeat Step C for all five lasers diodes adjusting each beam with the adjacent target.
- 5) After tightening (20) screws each laser must hit the center of the target

NOTE: ALL SCREWS MUST BE TIGHT.

Figure N

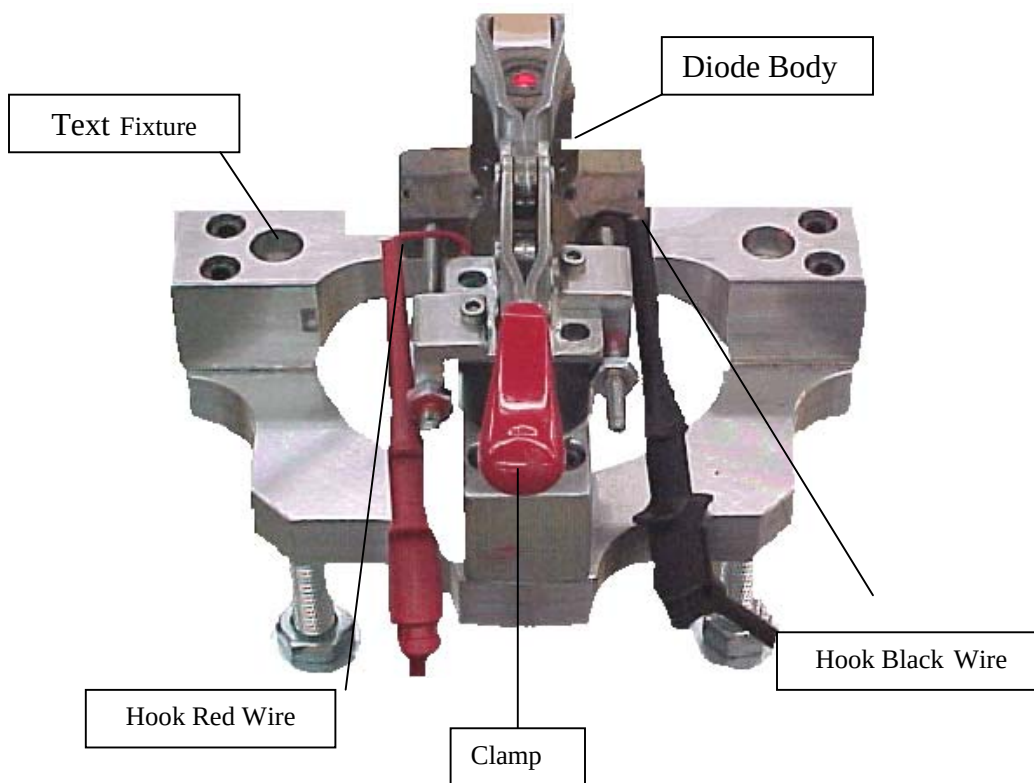


Figure O Assure all screws are tighten

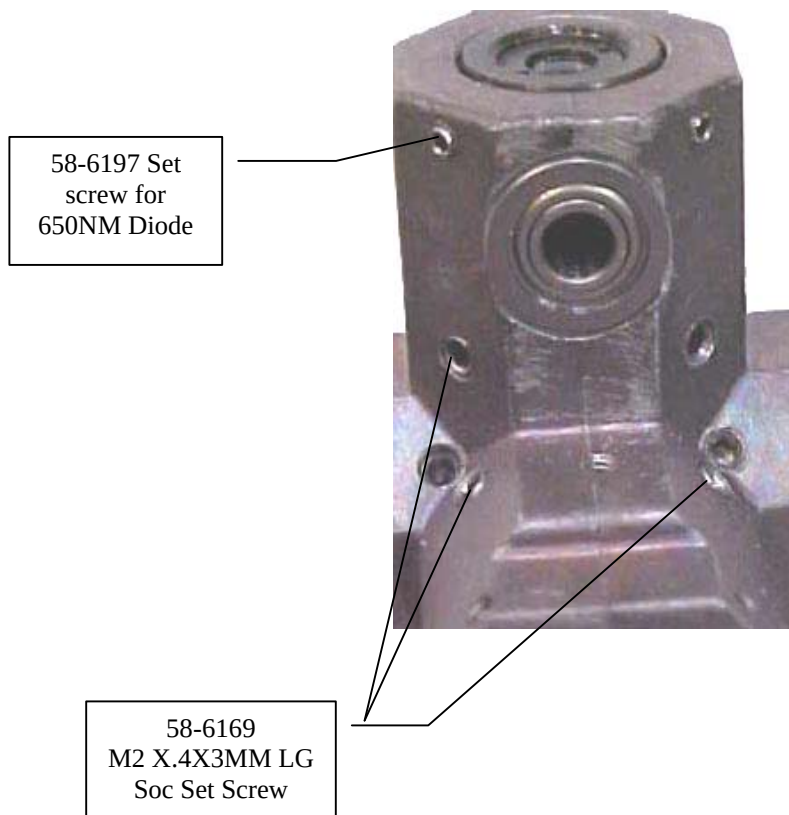
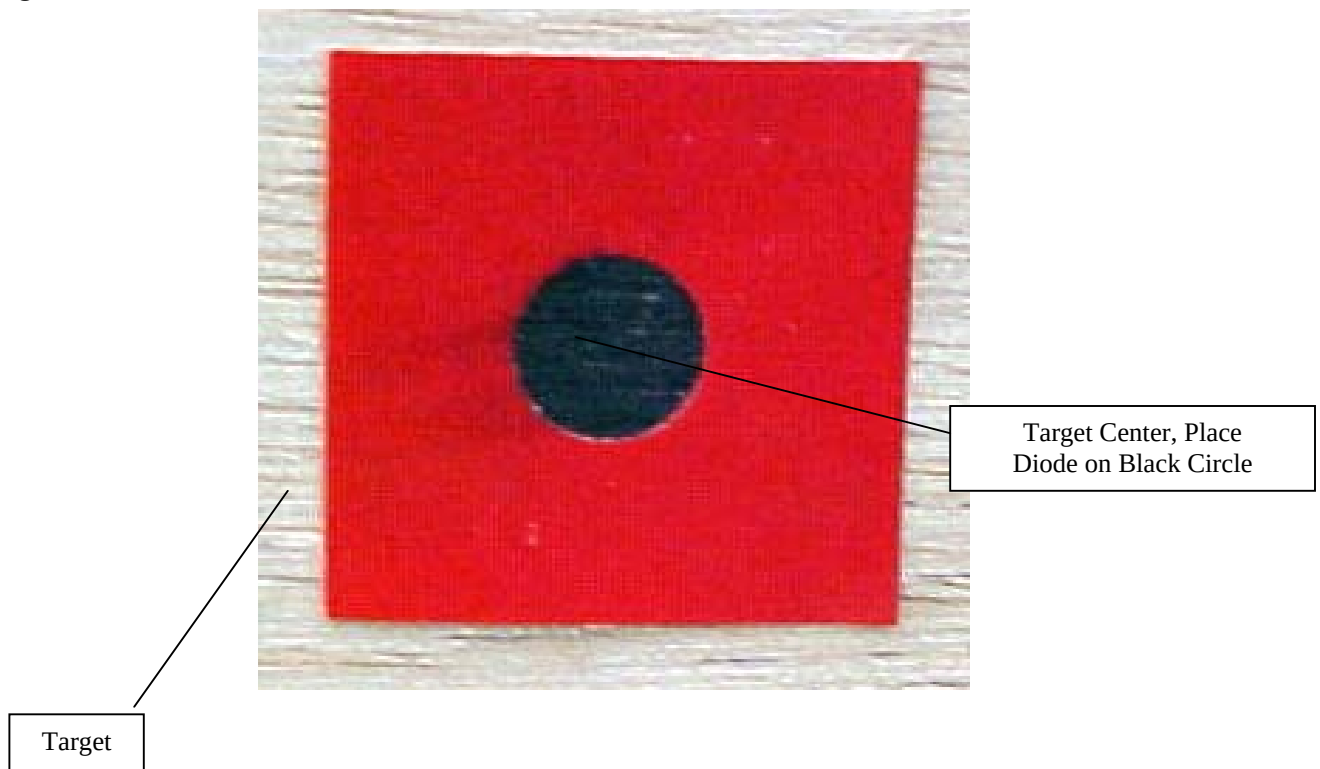


Figure P



X. Calibration

- 1) Place 58-6292 Diode Body Sub-Assembly in fixture.
- 2) Hook power supply to Diode Body Leads.
- 3) With front laser facing the target center the dot on the target
- 4) Adjust the dot into the target by tightening/loosening the (58-6197) M3 X .5 X 5MM lg soc set screw.
 - A. "Top" (58-6197) Screws: By tightening the screw the dot goes up
Loosening the screw the dot goes down.
 - B. "Bottom" (58-6197) Screws: By tightening the screw the dot goes down.
Loosening the screw the dot goes up.
- 5) Set the Digital Theodolite at 00.00 degrees.
- 6) Move the Digital Theodolite 90 degrees.
- 7) Adjust the dot to the target as in Step 4.
- 8) Move the Digital Theodolite back to 00 degrees to make sure the dot is still on the target.
- 9) If necessary re-adjust the dot.
- 10) Repeat Step D and E.
- 11) Move the Digital Theodolite 180degrees.
- 12) Adjust the dot to the target as in Step 4.
- 13) If necessary to re-adjust the dot repeat Step 4 and 5.
- 14) All three sides should all be on the target area.
- 15) Roll the Top Plumb on itself by adjusting the (4) screws.
- 16) Make sure all screws are tight.
- 17) Roll the Bottom plumb on itself by adjusting the (4) screws.
- 18) Make sure all the screws are tight.
- 19) Recheck all Dots again making sure they are correct.

Figure Q

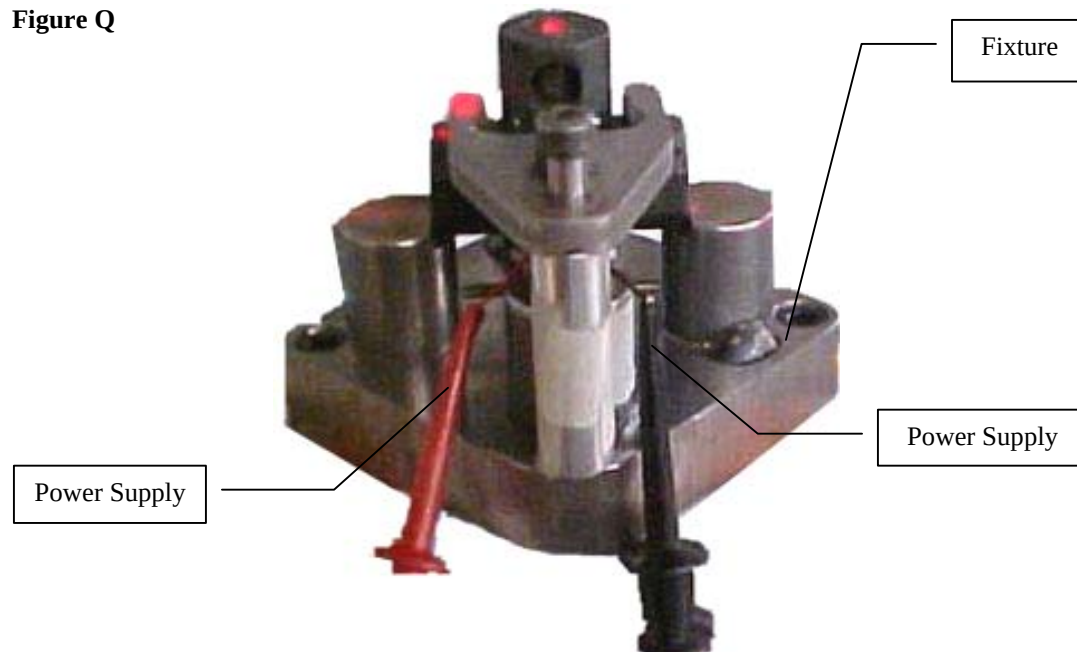


Figure R

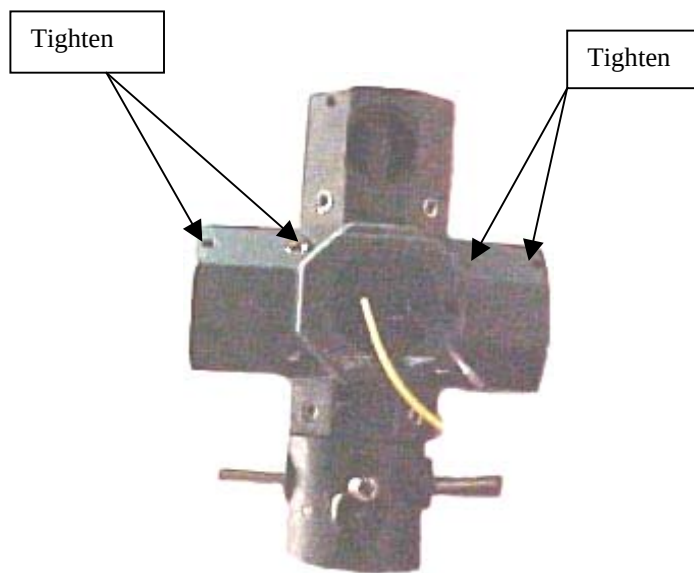


Figure S

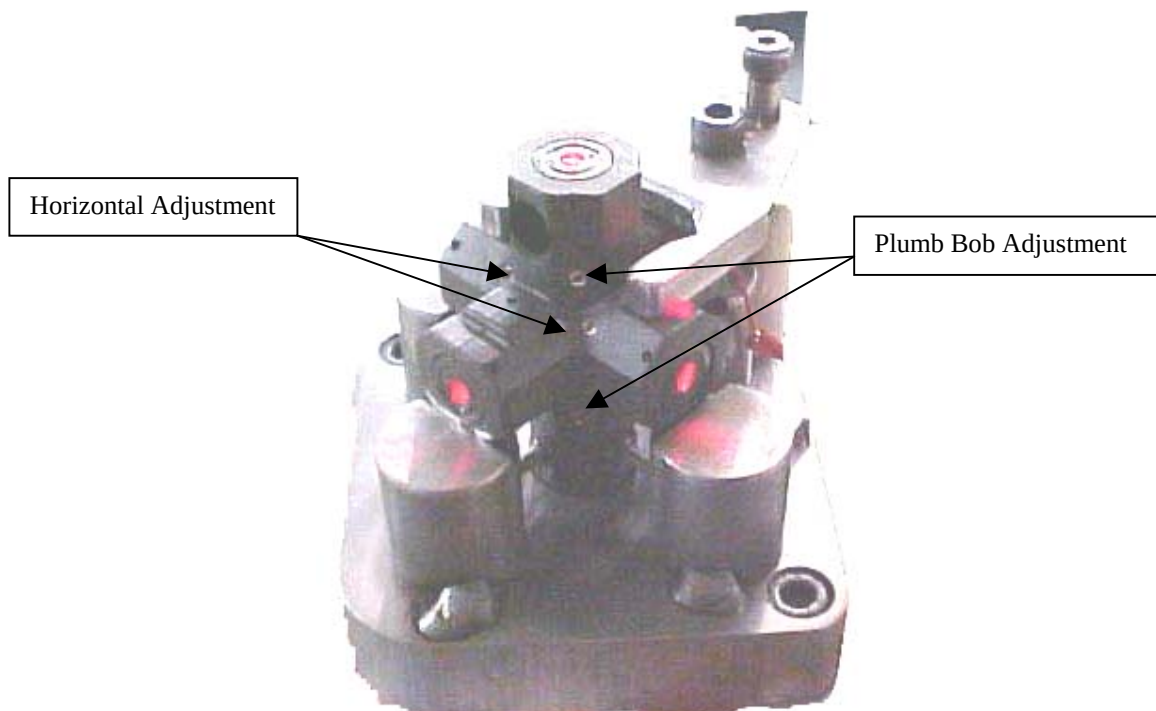
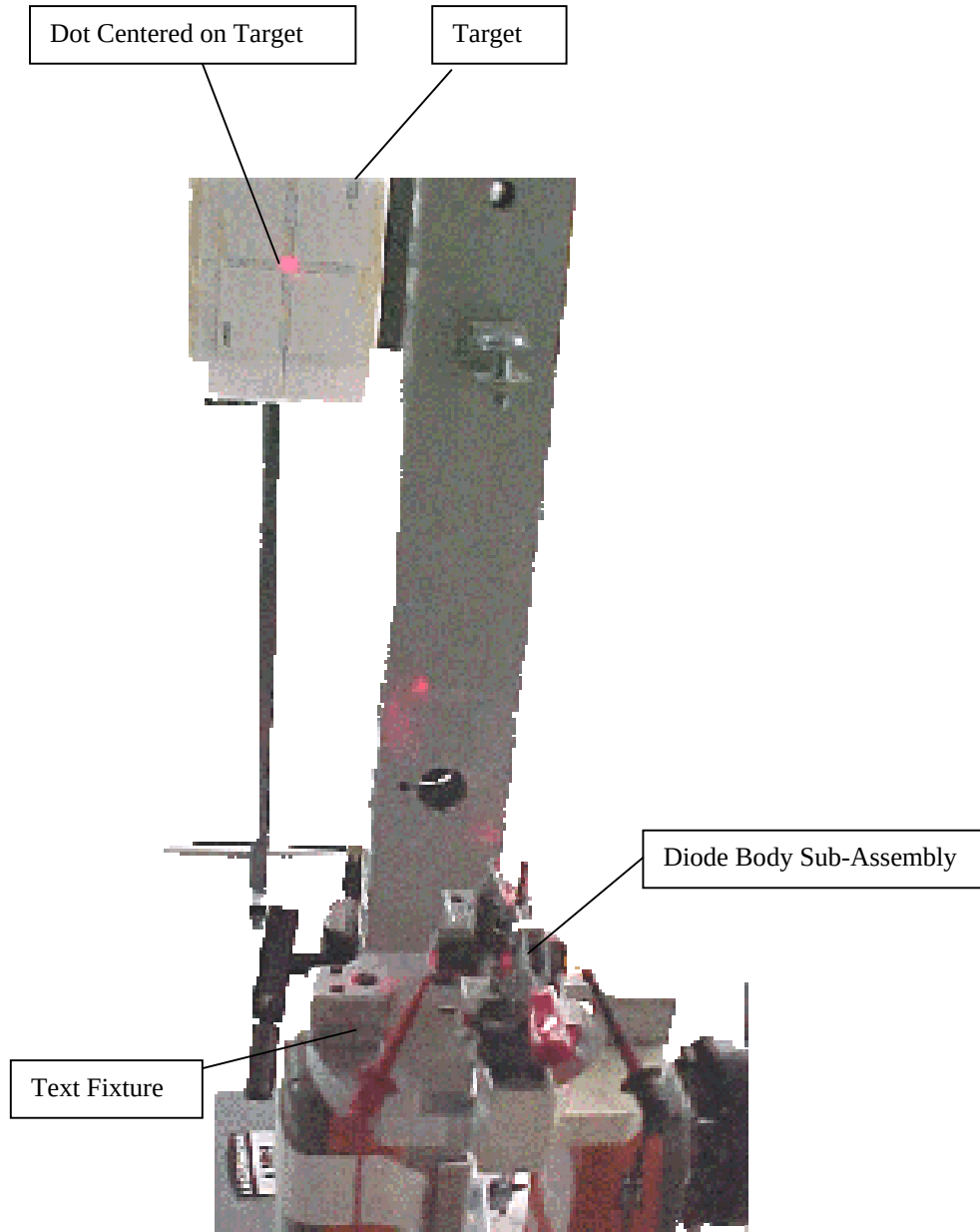


Figure T



XI. Full Main Diode Sub-Assembly

- 1) Place 58-6411 Lower Circuit Board Sub-Assembly on 58-6182 Main Diode Body.
- 2) Solder 57-4109 Black 28AWG 1 inch wire to the 58-6411 Lower Circuit Board Sub-Assembly (Figure U)
- 3) Solder the 57-4108 Red 28AWG 1inch wire to 58-6411 Lower Circuit Board Sub-Assembly.
- 4) Connect to power supply checking for power to the Diodes. If not Repeat steps A-C.
- 5) Add (2) 58-6178 Counterweights – one at front and one at right
- 6) Add 58-6189 Damper and (4) 58-6189 M2 X .4 X 4MM lg soc HD cap screws

Figure U

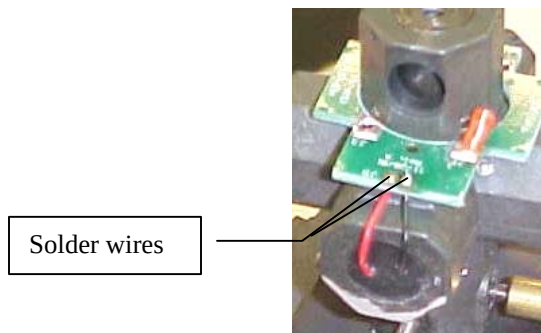
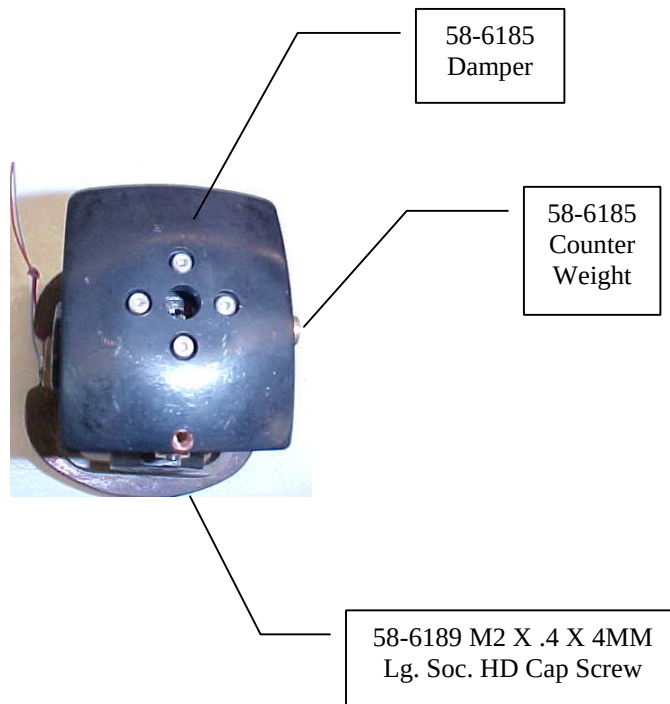


Figure V



XII. Pre-Balance

- 1) Check that 58-6189 M2 X .4 X 4MM lg soc HD cap screws are tight on the 58-6185 Damper (Figure S).
- 2) Place 58-6304 Full Main Diode Assembly into fixture (Figure X).
- 3) Hook power supply to female connector.
- 4) Check Y-axis for small amounts of movement noting movement of Gimbal by slightly moving body back and forth.
- 5) Shoot the front laser dot on target.
- 6) Tighten Yoke screws.
- 7) Set balance on X axis by tightening/loosing the back 58-6164 Gimbal Pin bringing dot to reference point on target (Bring screw out to raise the diode; screw in to lower the diode)
- 8) Wedge a screwdriver between Gimbal and diode adjusting the yoke screw.
- 9) Remove wedge from between Gimbal and diode.
- 10) Recheck dot on target at reference point
- 11) Turn assembly to side checking Y axis at reference point on target.
- 12) Recheck for dot movement on target by wedging a screwdriver between Gimbal/diode and releasing (If dot does not return to the point of reference you may need to adjust damper).

Figure W

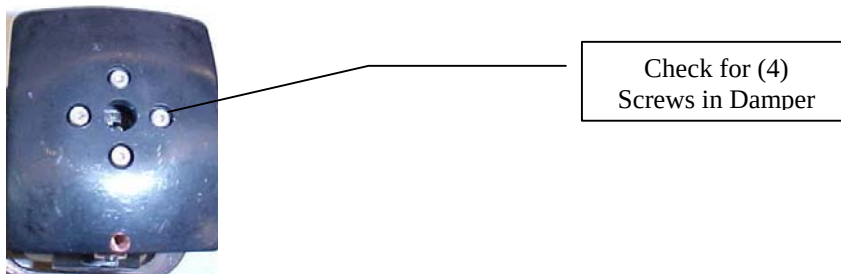
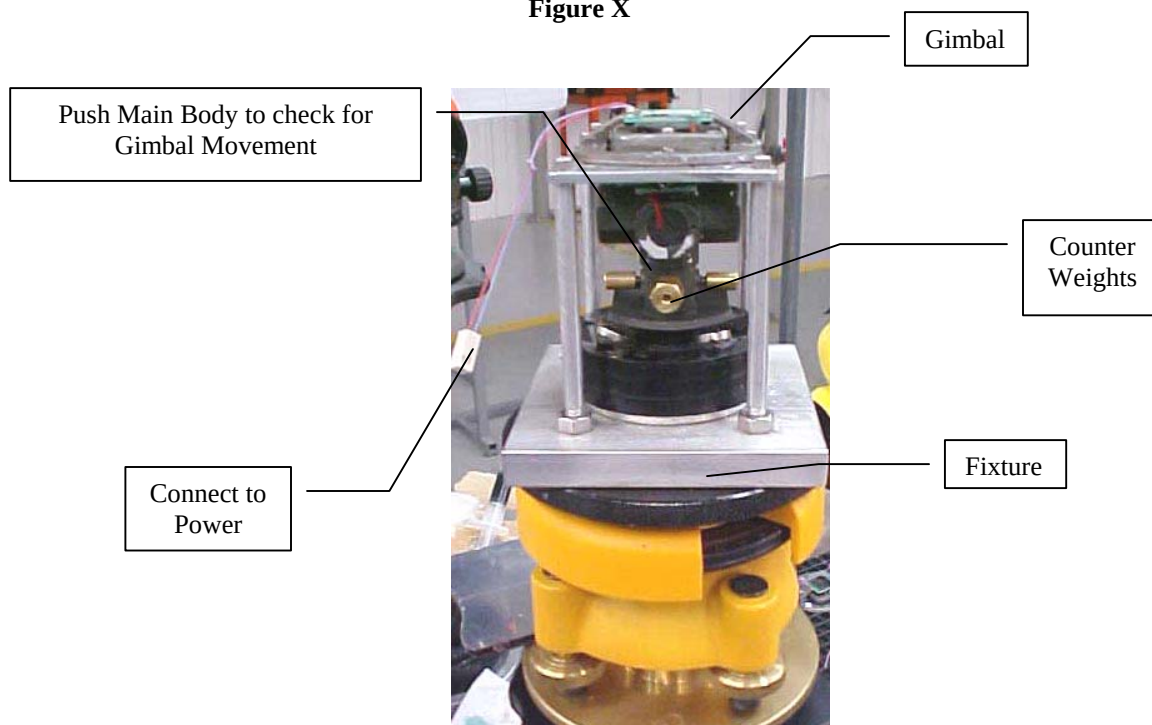


Figure X



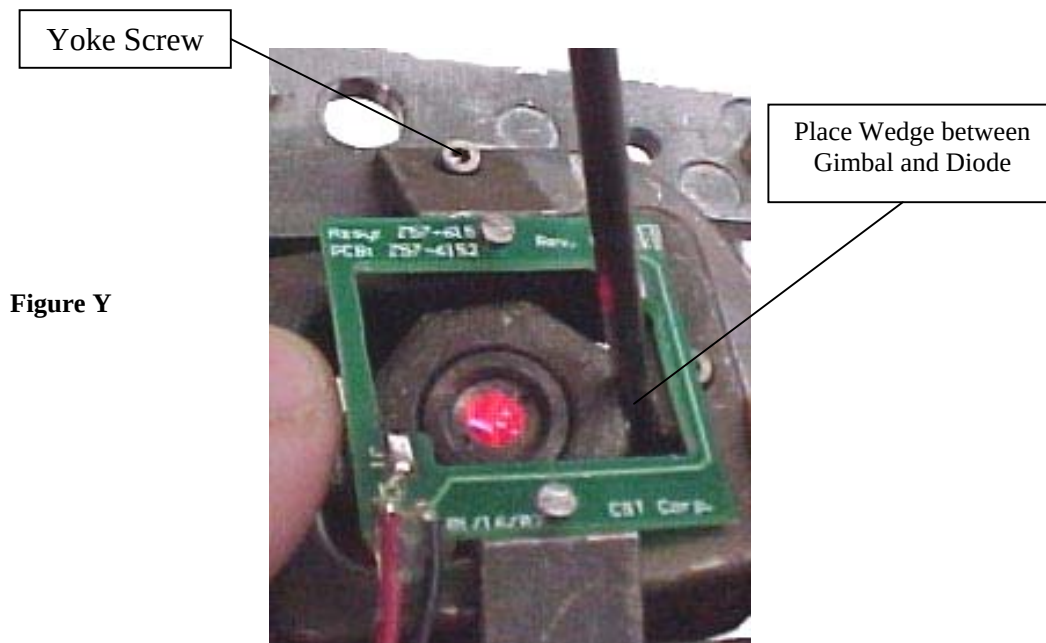


Figure Y

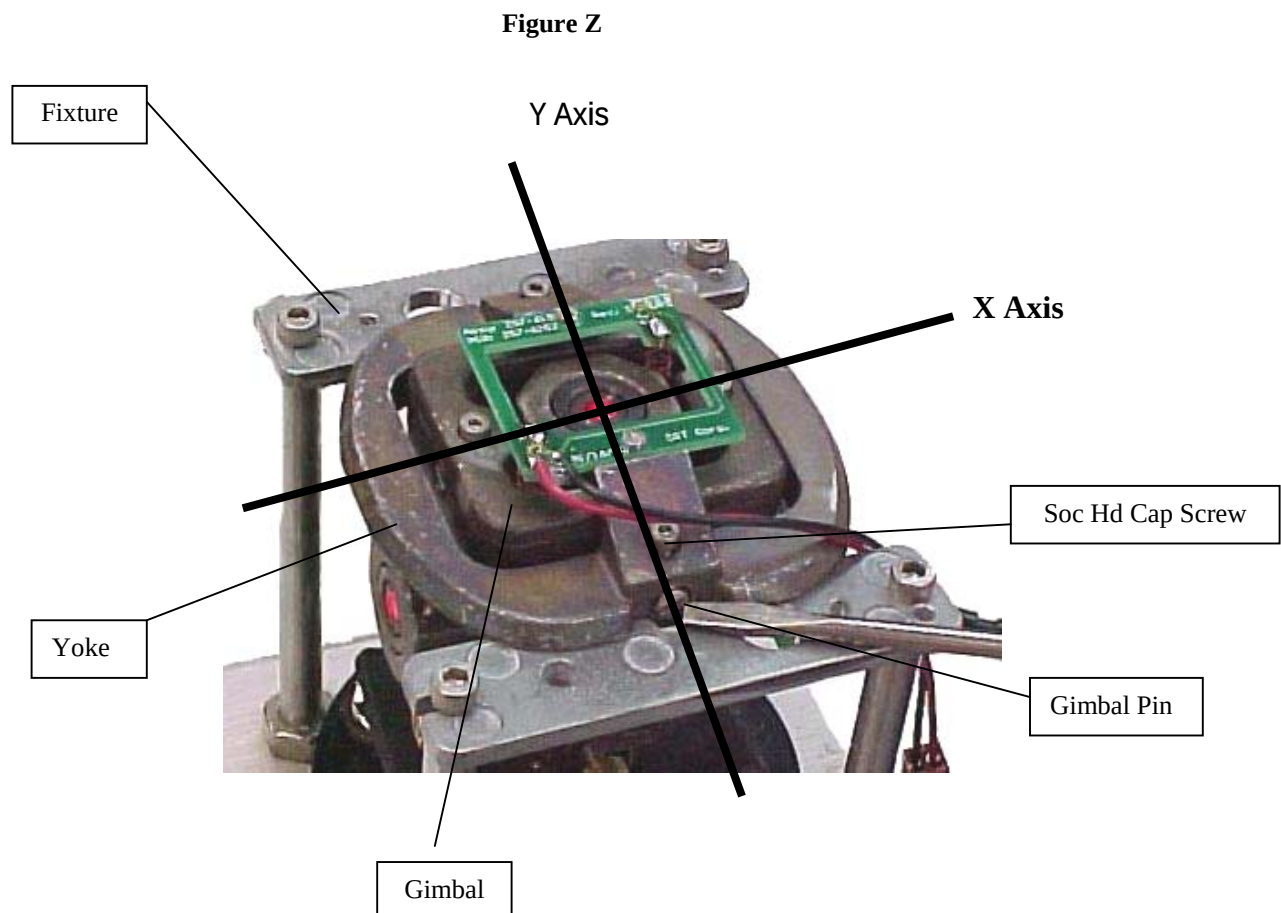
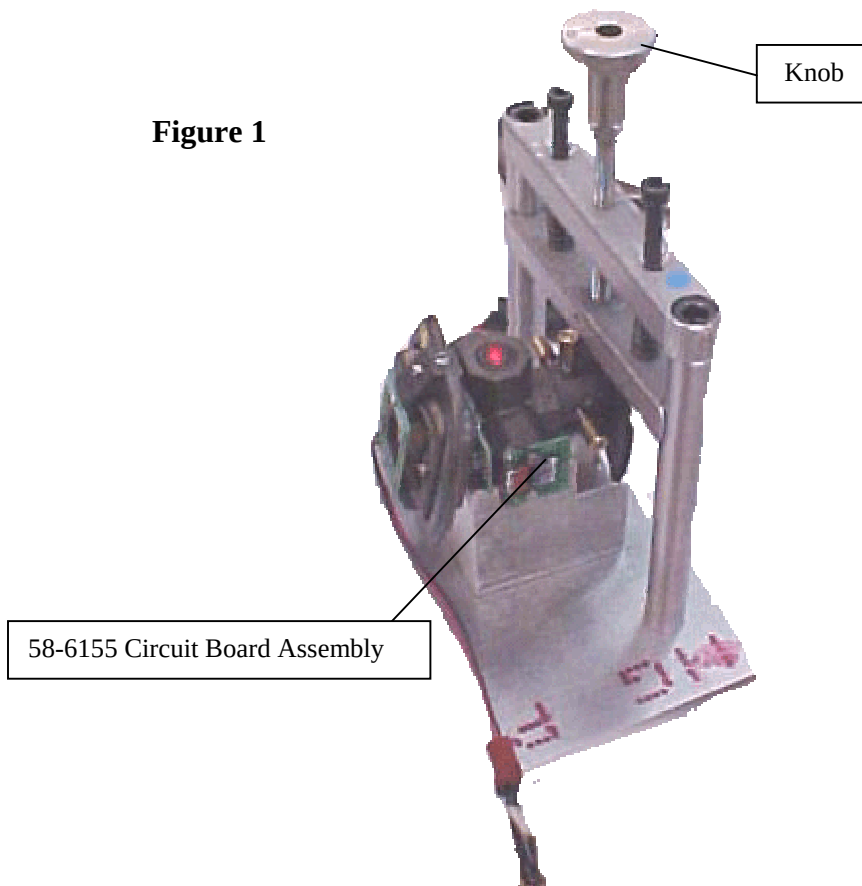


Figure Z

XIII. Adjusting Damper

- 1) Place assembly with side of damper that needs adjusted facing down in Damper Fixture.
- 2) Tighten assembly in place using the knob on top of fixture.
- 3) Loosen (4) Cap Screws in the damper.
- 4) Retighten fixture knob.
- 5) Retighten (4) Damper Screws.
- 6) Remove Assembly from fixture .
- 7) If necessary to adjust the damper recheck balance.
- 8) All weights should be adjusted equally from the body.
- 9) If necessary, back weight may be adjusted to bring balance into the reference point.

Figure 1

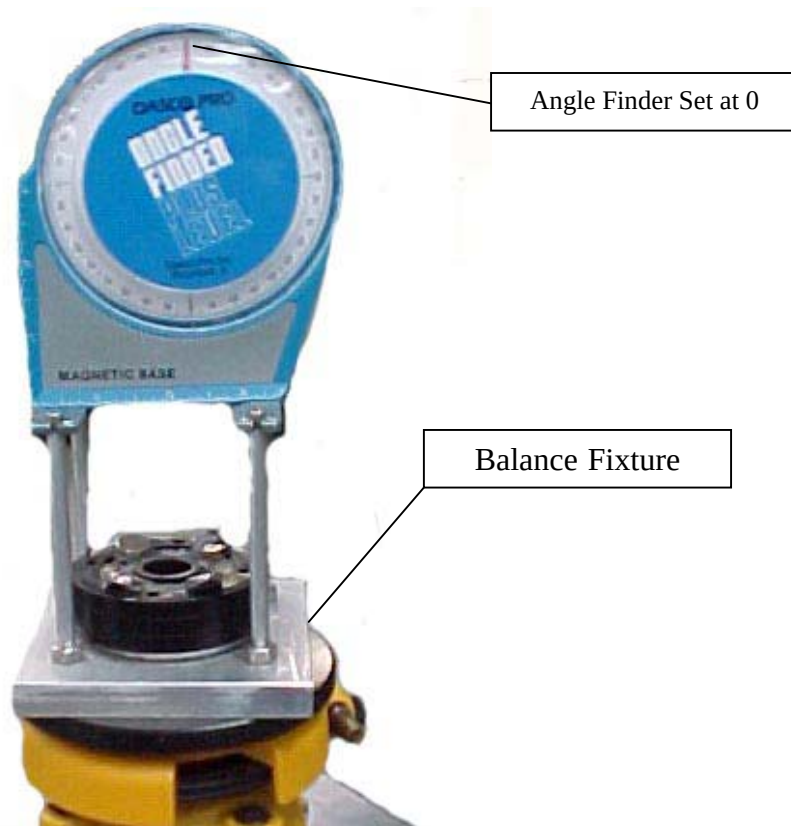


XIV. Balance

NOTE: BEFORE USING THE ANGLE FINDER SET FIXTURE TO ZERO AND MAKE SURE THE DAMPER SCREWS ARE TIGHT.

- 1) Place assembly on fixture
- 2) Connect to power supply
- 3) Check play on Y Axis by gently gliding the Gimbal back and forth
- 4) Tighten yoke screws
- 5) Check short shot on all (3) dots, making sure there is Gimbal movement.
- 6) Shoot laser to target
- 7) Check for bearing stabilization by inserting a wedge between the bearings and Gimbal
- 8) Remove wedge and check for free movement of the Gimbal
- 9) Retighten Gimbal screws
- 10) Check Gimbal movement by slightly swinging assembly back and forth
- 11) Check balance by shooting dot to target
- 12) Adjust Counter Weight (screw Counter Weight out to lower dot; screw Counter Weight in to raise dot)
- 13) Check each laser by repeating steps E through L
- 14) Check tilt by loosening knob and tilting test fixture forwards
- 15) The dot on (3) each laser should hit in same spot on target (Dot may hit halfway on top or bottom of target)
- 16) Recheck tilt on each laser by tilting fixture in opposite direction
- 17) Adjust the fixture back to zero position, level as set with the Angle Finder, recheck dots on the target

Figure 2

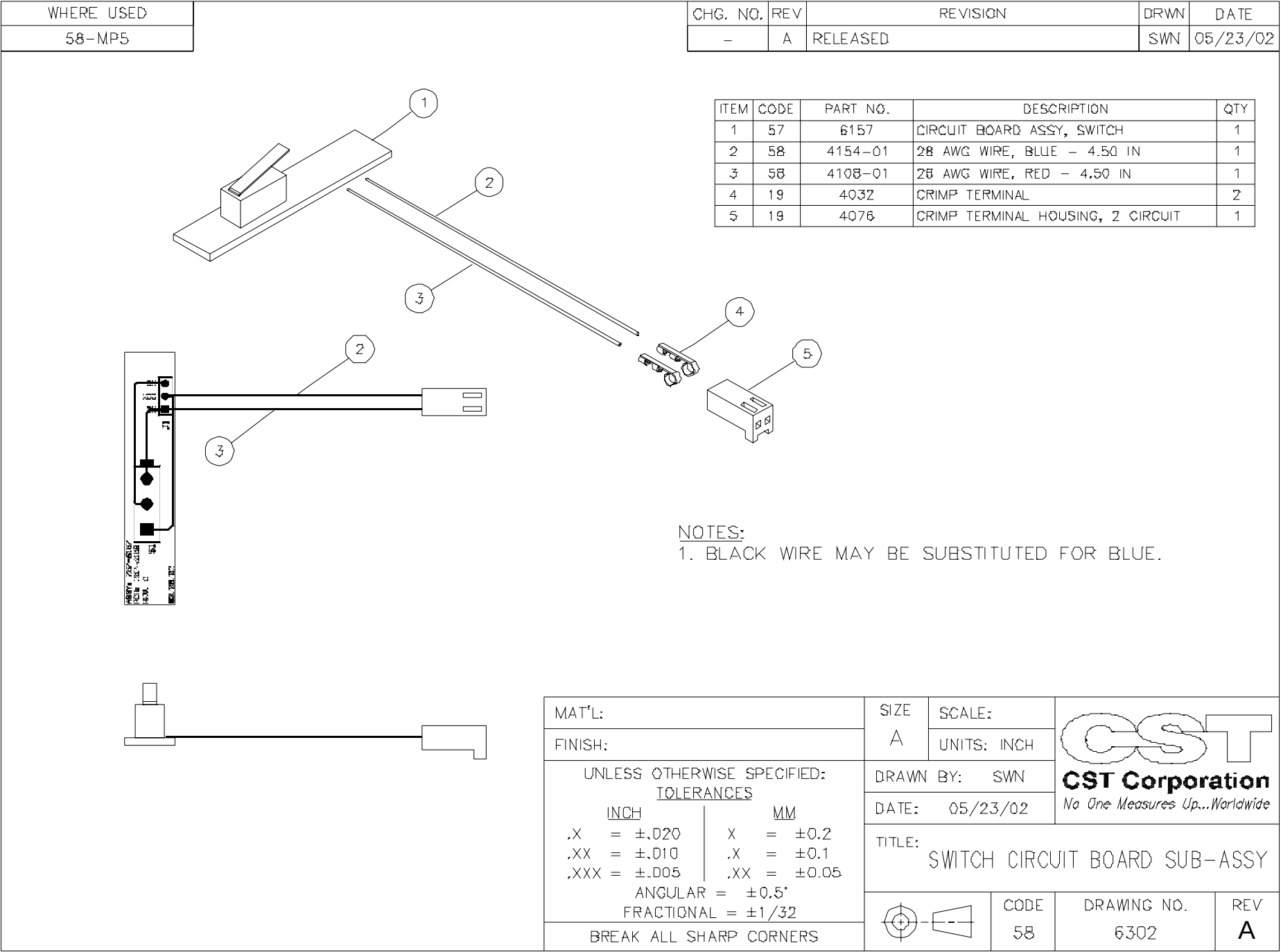


XV. Inspection

1. A. Instrument does not blink when Sensor Spring touches Sensor Board – Replace Main Board (58-6159).
 B. Sensor Spring (58-6405) corroded – Replace.
2. Instrument blinks when Sensor Spring does not touch Sensor Board – Replace Main Board (58-6159).
3. Instrument turns on before switch is fully unlocked:
 - A. Check strength of Compression Spring (57-5252) between the two switch parts (58-6165/58-6166).
 - B. Bend front half of metal arm on Switchboard (58-6157) upward at a 30° angle.
4. Tilt function failure - Instrument must be updated with sensor spring and sensor board to replace the optional sensor.
5. A. Pendulum does not move freely – Check for loose components causing interference between damper and magnets.
 B. Magnet loose from Magnet Bracket – Reattach Magnet using a new Adhesive (58-6420).
 C. Magnet bracket loose – Replace housing half.

XVI. Parts List

Part #	Description	Located
58-6413	Left Housing Sub Assembly	Page 5 Figure A
58-6414	Right Housing Sub Assembly	Page 6 Figure B
58-6415	Front Window Assembly	Page 7 Figure D
58-6305	Bottom Square Glass Sub Assembly	Page 7 Figure D
58-6147	Battery Door	
58-6159	Circuit Board Assembly, Main	Page 8 Figure E
58-6302	Switch Circuit Board Sub Assembly	
58-6300	Yoke Sub Assembly	
58-6301	Circuit Board Back Sub Assembly	Page 11 Figure L
58-6163	650NM Laser Diode Module	
57-5851	Connector Wire	Page 10 Figure J
58-6411	Lower Circuit Board Sub Assembly	
58-6299	Circuit Board Upper Sub Assembly	Page 10 Figure J
58-6181	Gimbal	Page 10 Figure K
58-6180	Yoke	Page 10 Figure J
58-6293	Bumper Foot	
58-6291	Foam Rubber Strip	
58-3758	#2 X ¾" LG Torx Pan Head Screw	
58-6148	M1.6 X .36 X 3MM Lg Ph Pan HD Screw	
58-6189	M2 X .4 X 4MM Lg Soc Hd Cap Screw	
58-6164	Gimbal Pin	Page 10 Figure J
58-6198	Bearing	
58-6170	Battery Contact, Single Button	Page 6 Figure B
58-6171	Battery Contact, Double Button	Page 6 Figure B
58-6287	Battery Clip, Single "AAA"	Page 5 Figure A
58-6174	Battery Contact Single Button W/Spring	Page 5 Figure A
58-6175	Battery Contact Double Button W Spring	Page 5 Figure A
58-6307	Battery Contact W/O Spring, Sub Assembly	Page 5 Figure A
58-6425	Battery Contact W Spring, Sub Assembly	
58-6295	M4 X .7 X 6MM Lg Slotted Cheese Hd Machine Screw	
58-6426	Bumper Assembly	Page 7 Figure C



NOTES:

1. BLACK WIRE MAY BE SUBSTITUTED FOR BLUE.

MAT'L:

FINISH:

UNLESS OTHERWISE SPECIFIED:
TOLERANCES

INCH

MM

.X = ±.020

X = ±0.2

.XX = ±.010

.X = ±0.1

.XXX = ±.005

.XX = ±0.05

ANGULAR = ±0.5°

FRACTIONAL = ±1/32

BREAK ALL SHARP CORNERS

SIZE

A

SCALE:

UNITS: INCH

DRAWN BY: SWN

DATE: 05/23/02

TITLE:

SWITCH CIRCUIT BOARD SUB-ASSY

CODE

58

DRAWING NO.

6302

REV

A

CST

CST Corporation

No One Measures Up...Worldwide

SM-MP5

24