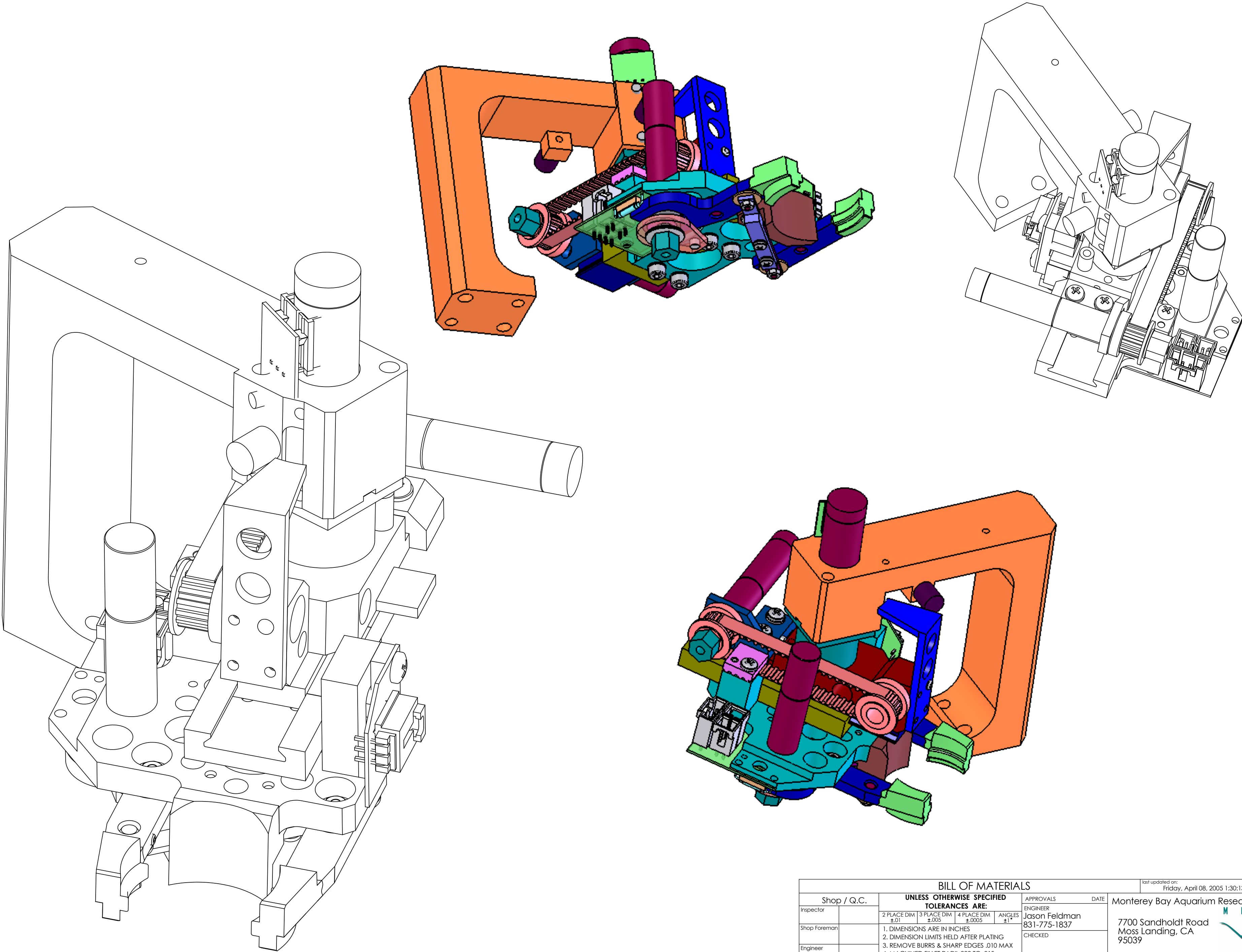


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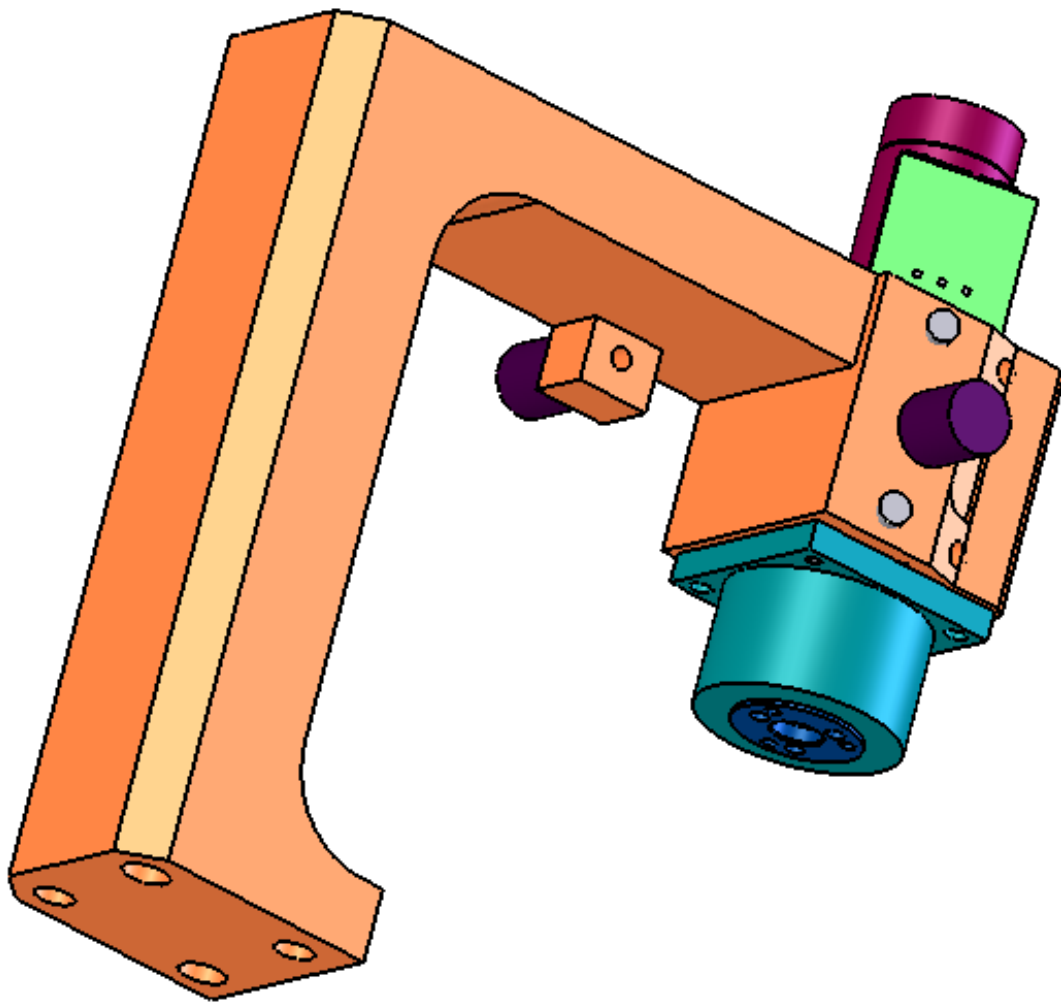
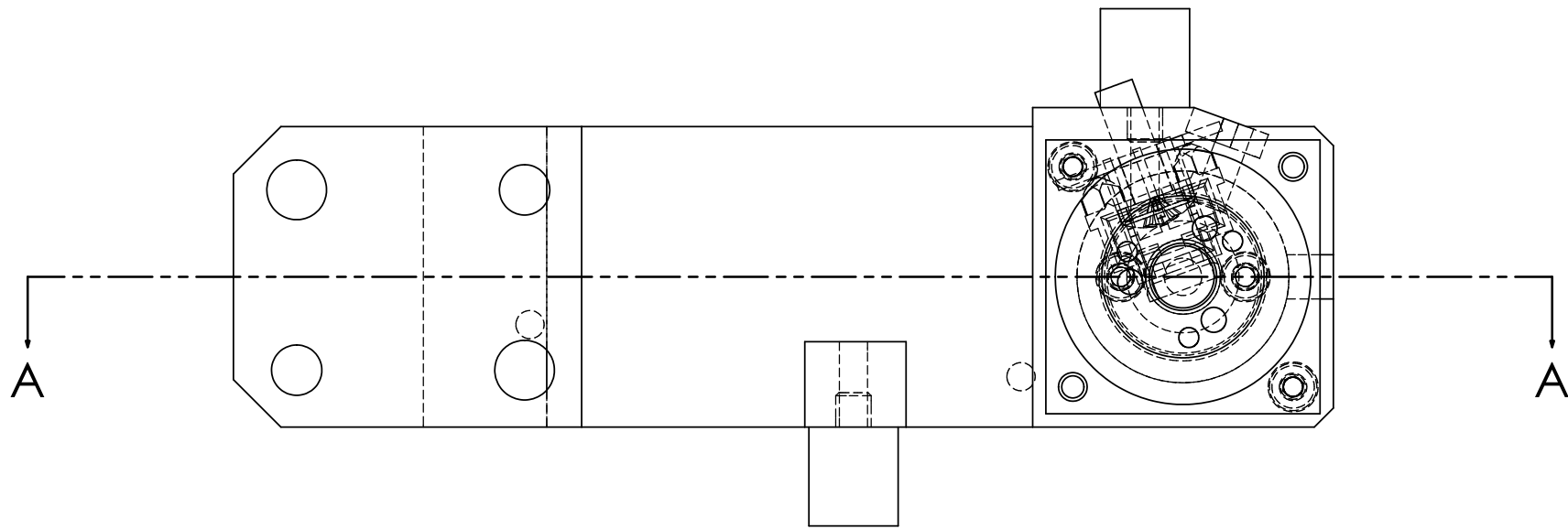
MANIPULATOR - assembly



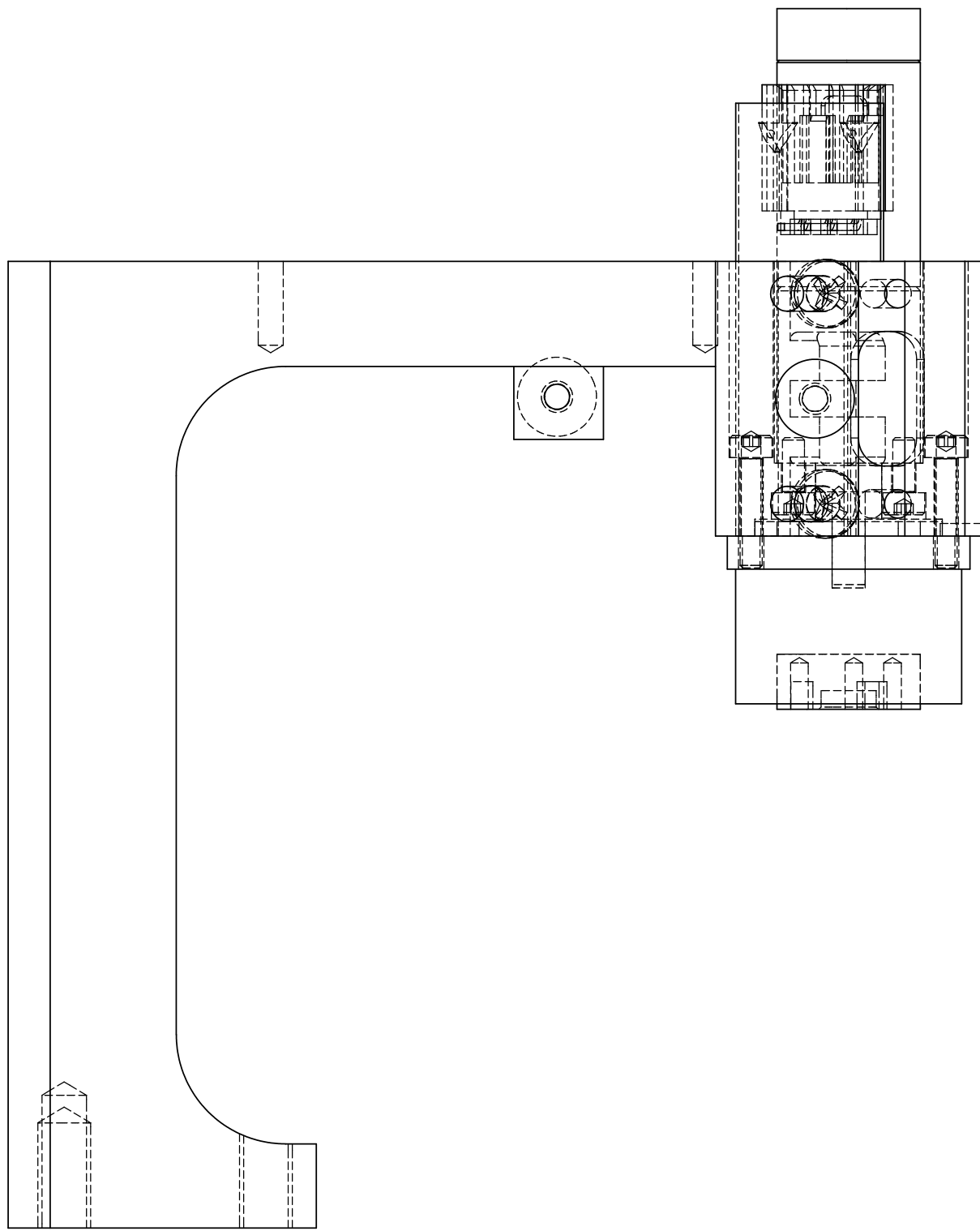
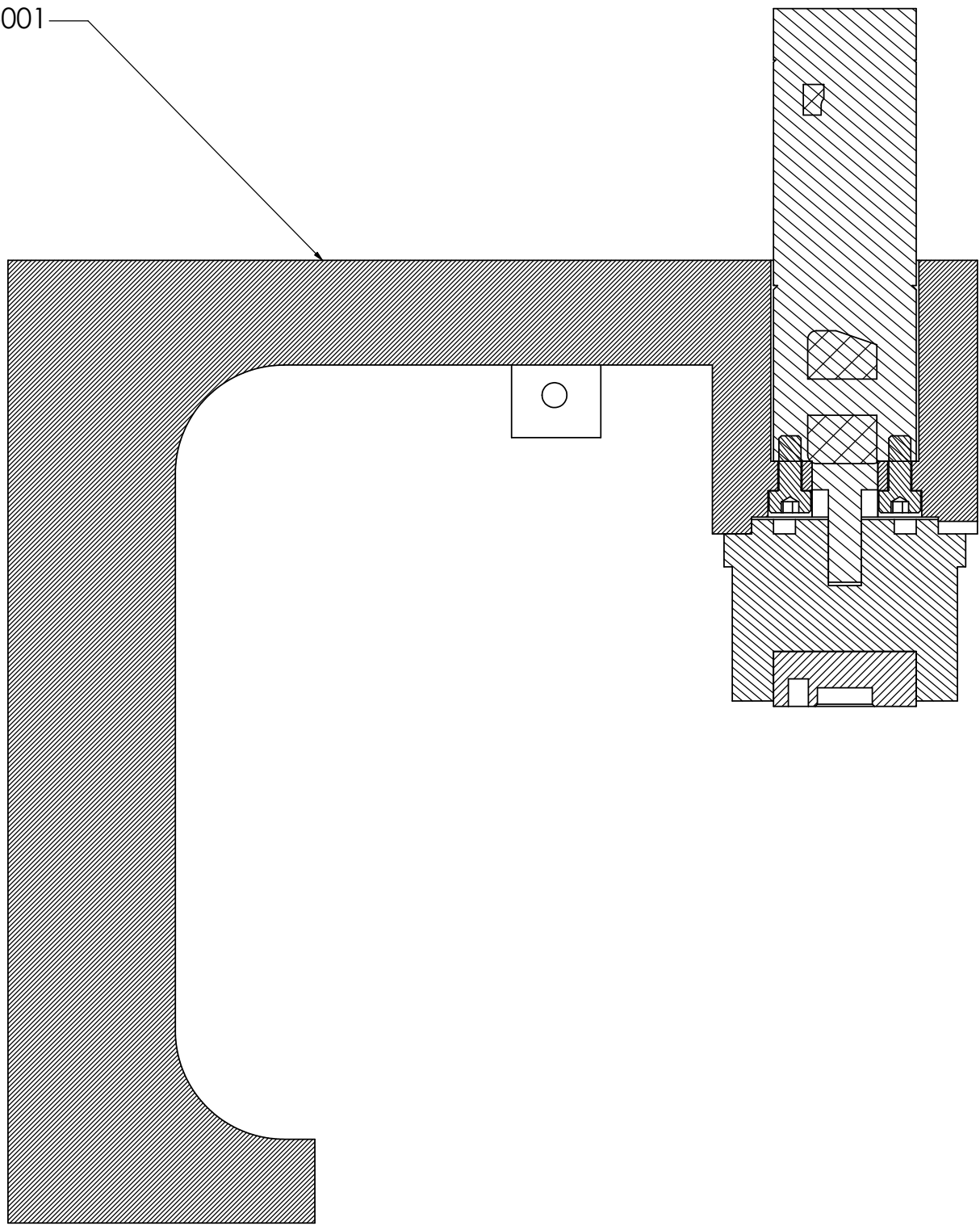
BILL OF MATERIALS					last updated on: Friday, April 08, 2005 1:30:13 PM					
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE: 2 PLACE DIM ±.01 3 PLACE DIM ±.005 4 PLACE DIM ±.0005 ANGLES ±1° 1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING 3. REMOVE BURRS & SHARP EDGES .010 MAX 4. MACHINED FILLET RADII .000 TO .015 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005 6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .001 PER INCH. MAX .003 INCHES FOR SINGLE SURFACE. 7. SURFACE FINISH TO BE 32 MICRON UNLESS OTHERWISE SPECIFIED			APPROVALS DATE		Monterey Bay Aquarium Research Institute 7700 Sandholdt Road Moss Landing, CA 95039			
Inspector					ENGINEER Jason Feldman 831-775-1837					
Shop Foreman					CHECKED					
Engineer					PROJECT NUMBER 701312.00				manipulator	
NEXT ASSY Description	NEXT ASSY Number				PROJECT ESP 2G				SIZE C	
DO NOT SCALE DRAWING					DWG. NO. 1002451				REV. C	
CAD FILE: X:\701312 ESP 2G\SolidWorks files\internal structure (1002209)					SHEET 1 OF 19					

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MANIPULATOR MOUNT - assembly



1002451-001

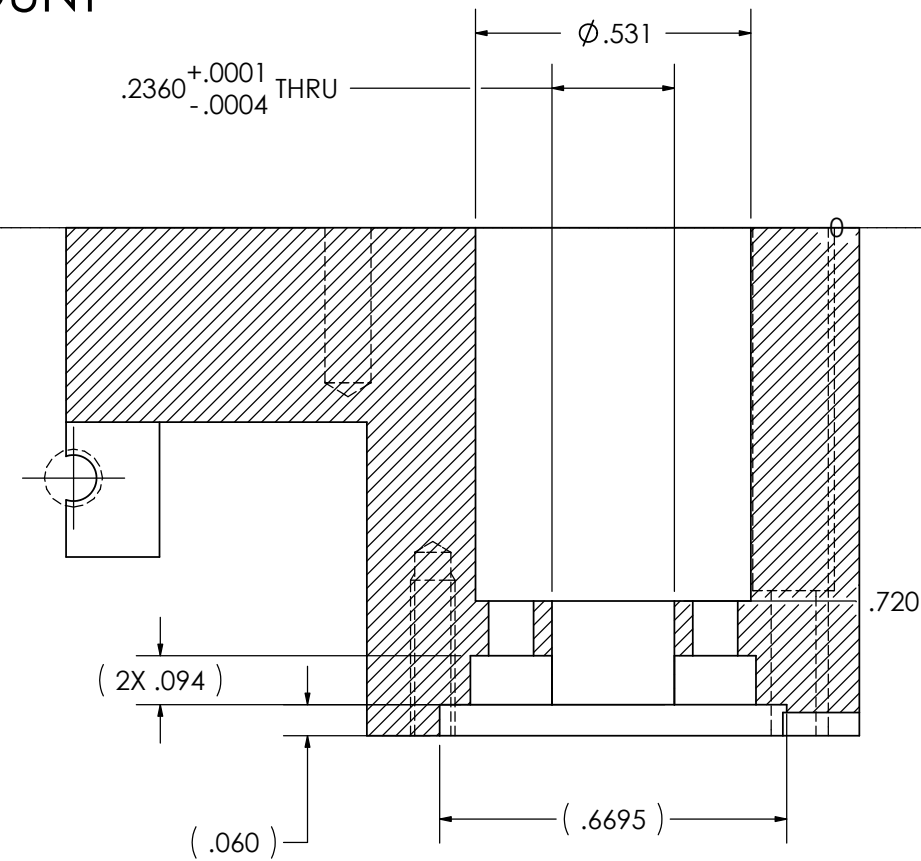
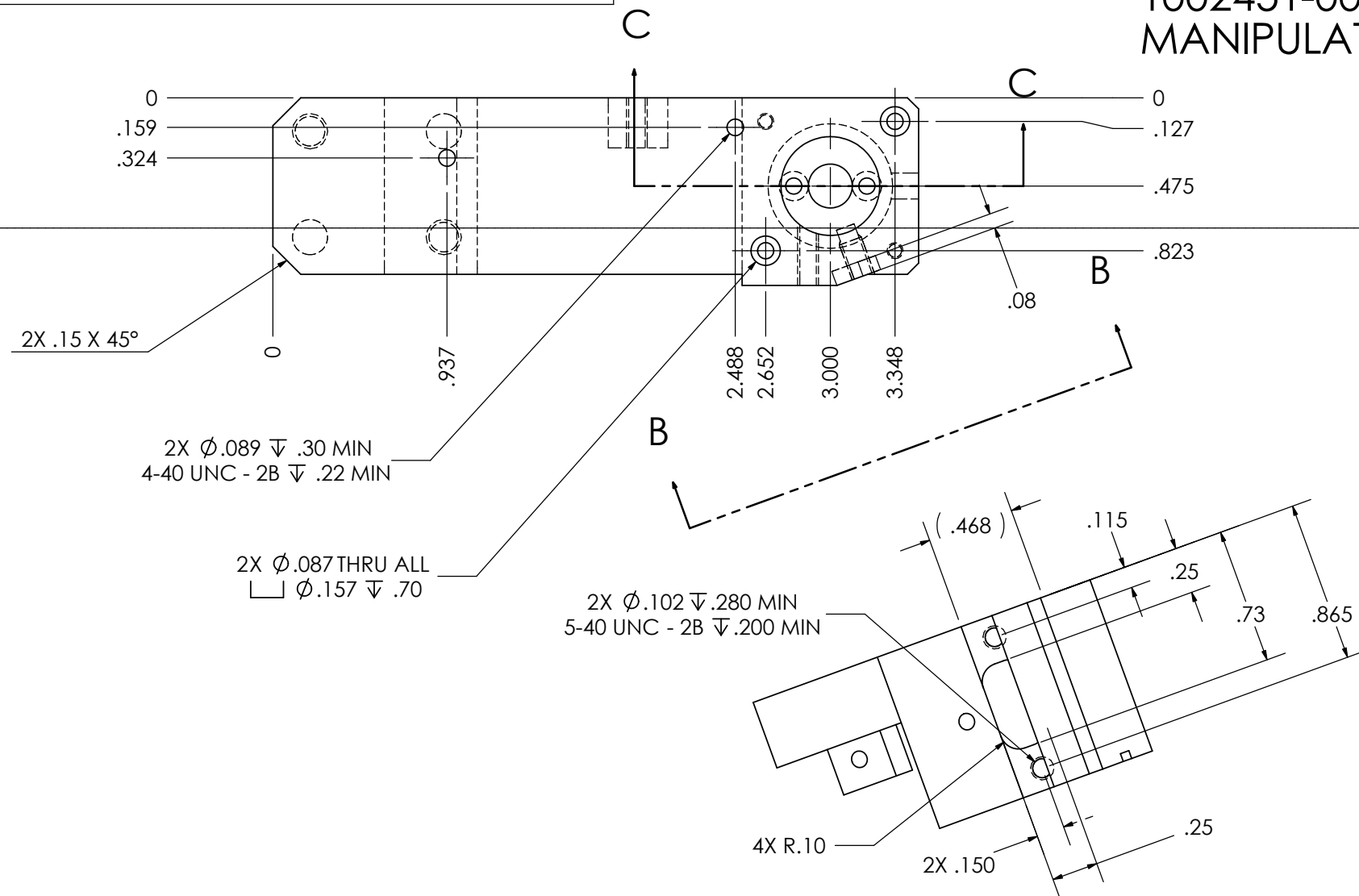


SECTION A-A

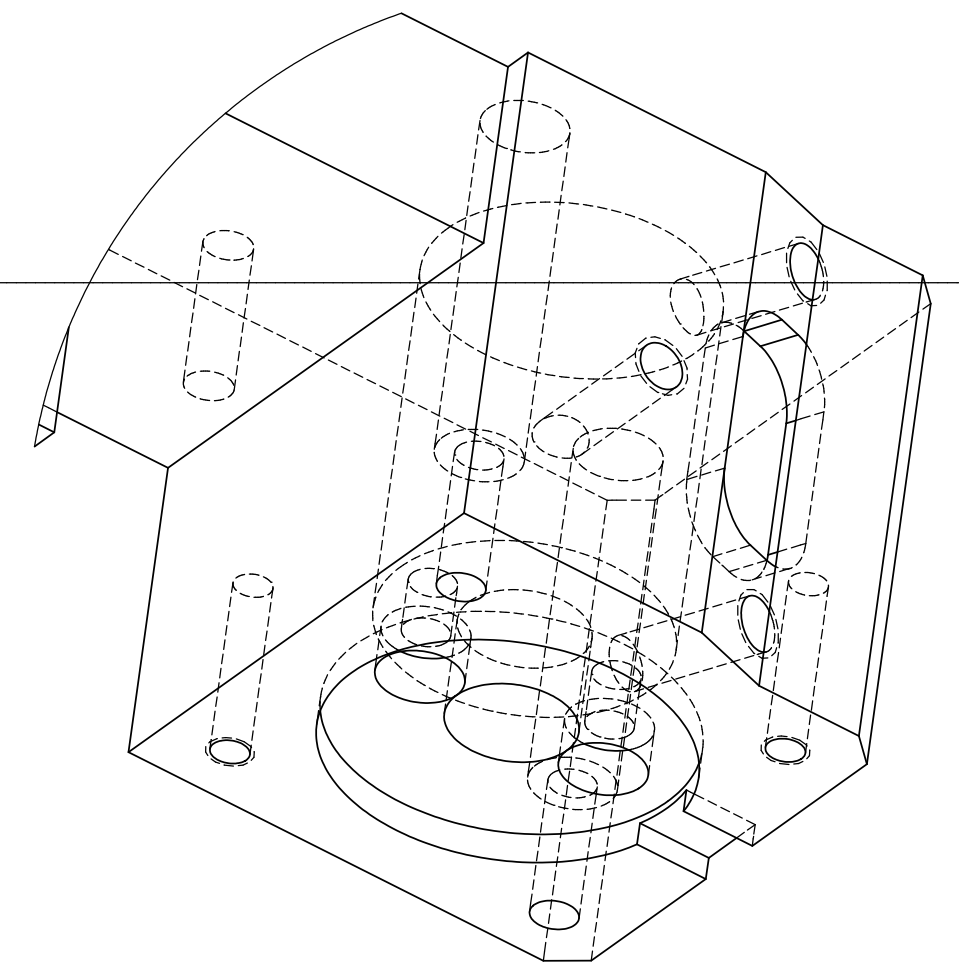
BILL OF MATERIALS					last updated on: Friday, April 08, 2005 1:30:13 PM					
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:			APPROVALS	DATE	Monterey Bay Aquarium Research Institute			
Inspector		2 PLACE DIM ±.01	3 PLACE DIM ±.005	4 PLACE DIM ±.0005	ANGLES ±1°	ENGINEER Jason Feldman 831-775-1837	7700 Sandholdt Road Moss Landing, CA 95039			
Shop Foreman		1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING 3. REMOVE BURRS & SHARP EDGES .010 MAX 4. MACHINED FILLET RADII .000 TO .015 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005 6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .001 PER INCH. MAX .003 INCHES FOR SINGLE SURFACE. 7. SURFACE FINISH TO BE 32 MICRON UNLESS OTHERWISE SPECIFIED					CHECKED			
Engineer							PROJECT NUMBER 701312.00		manipulator	
NEXT ASSY Description	NEXT ASSY Number						PROJECT ESP 2G		SIZE C	DWG. NO. 1002451
DO NOT SCALE DRAWING		CAD FILE: X:\701312 ESP 2G\SolidWorks files\internal structure (1002209)					SHEET 2 OF 19			

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1002451-001
MANIPULATOR MOUNT

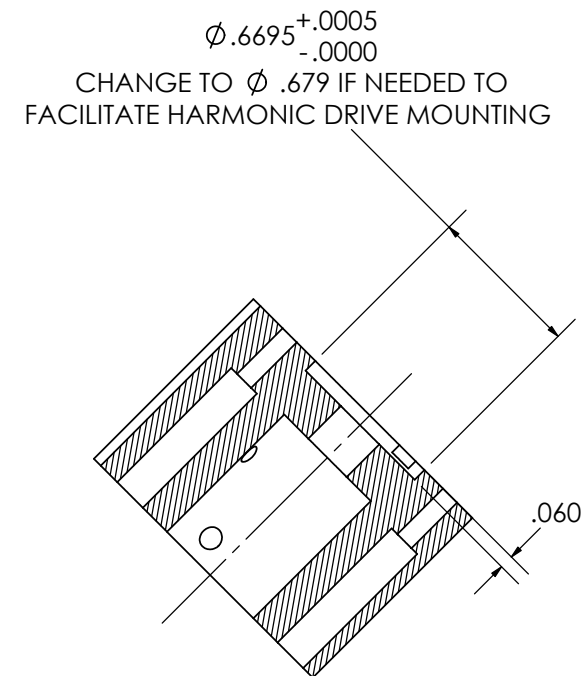
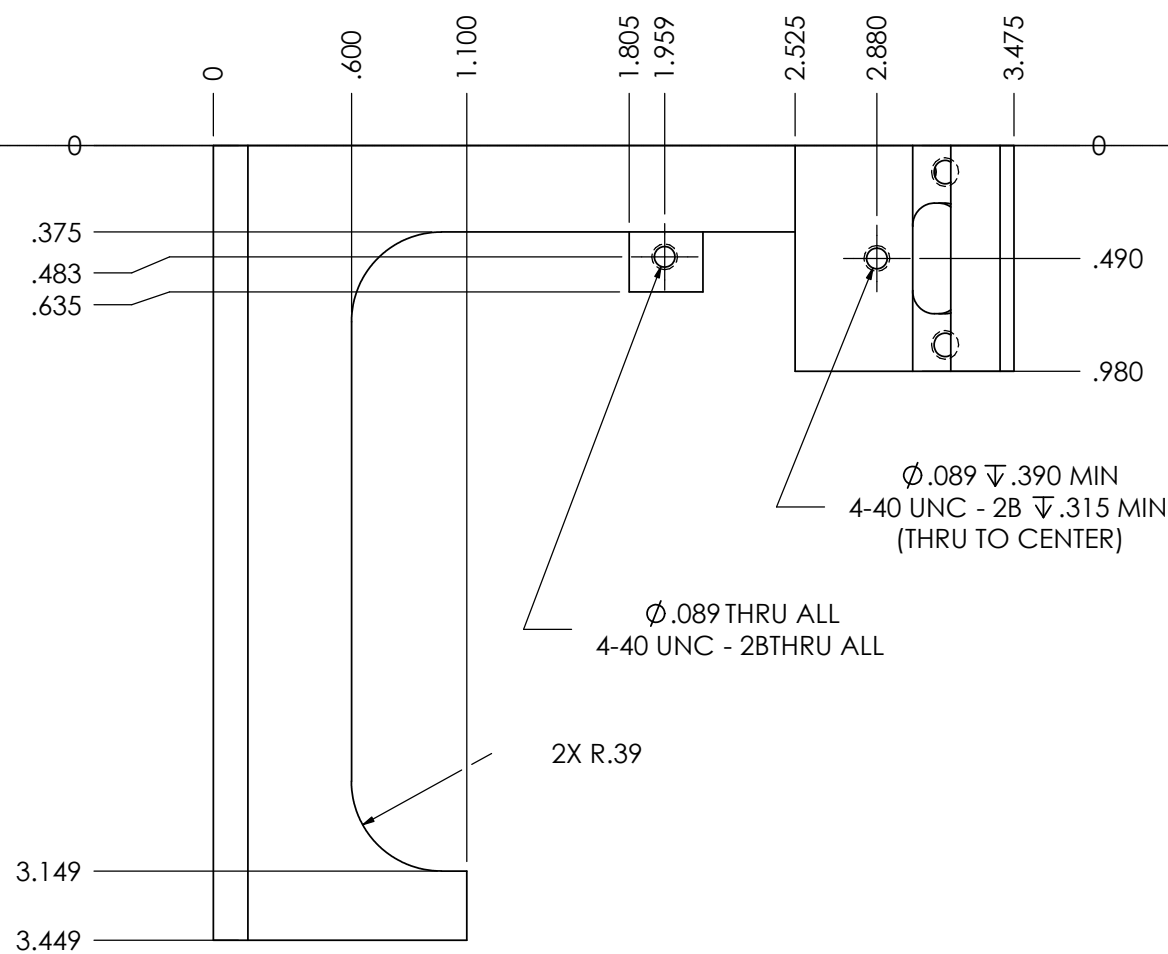


SECTION C-C
(partial)

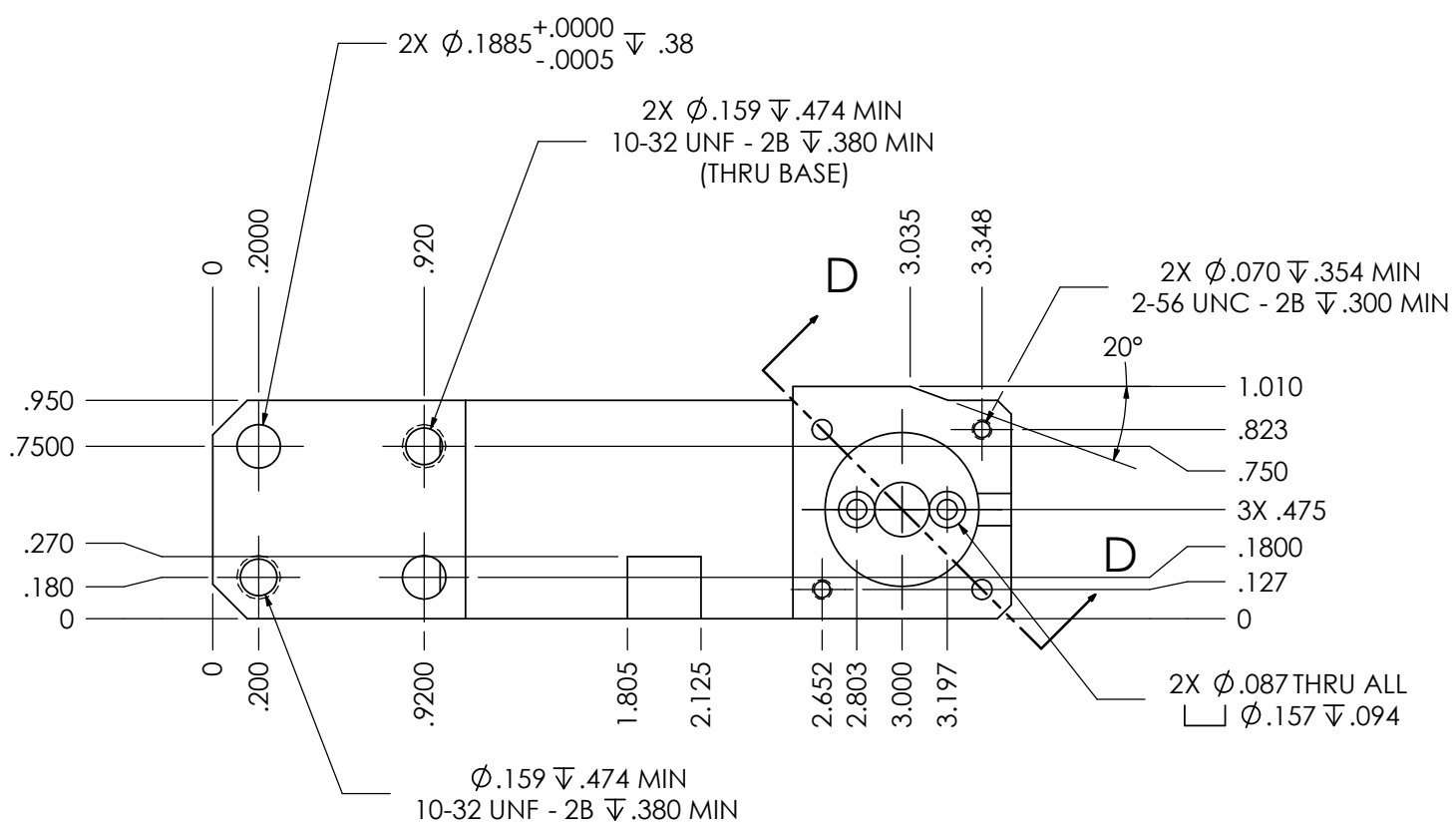
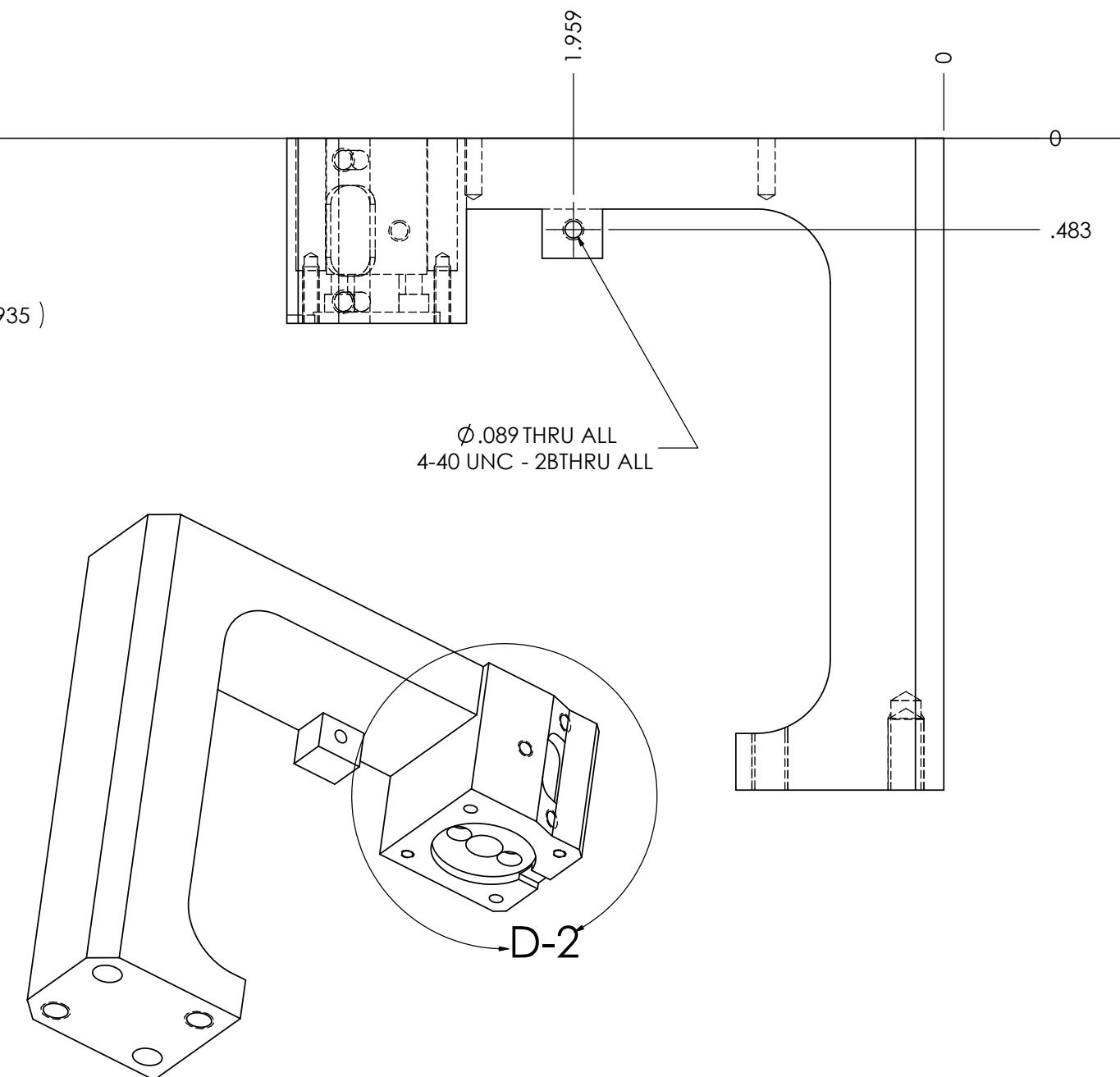
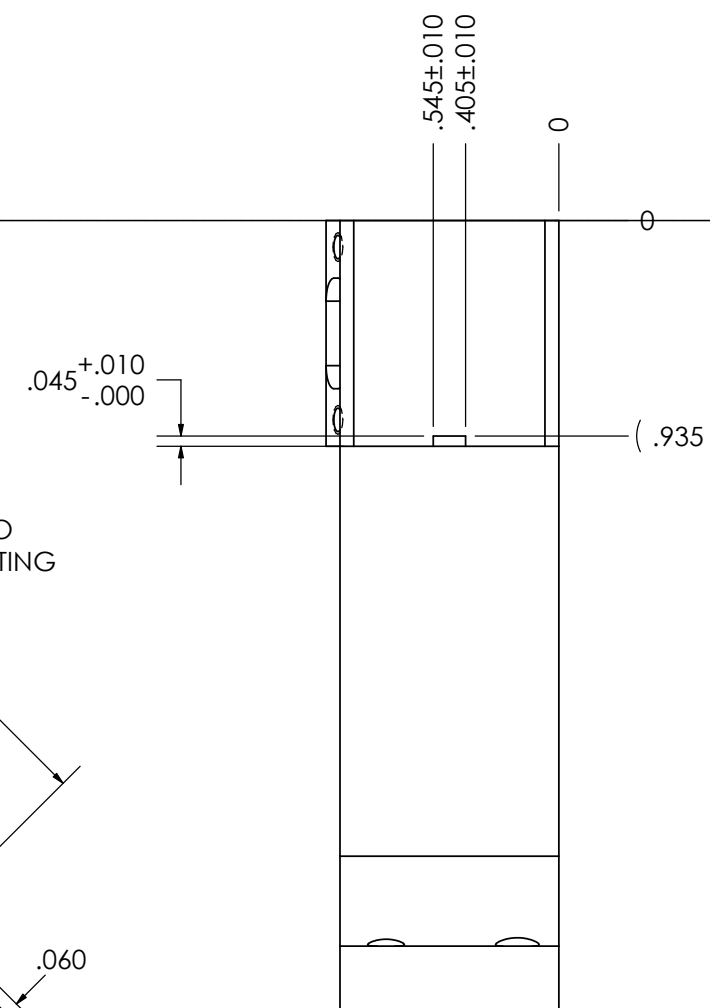
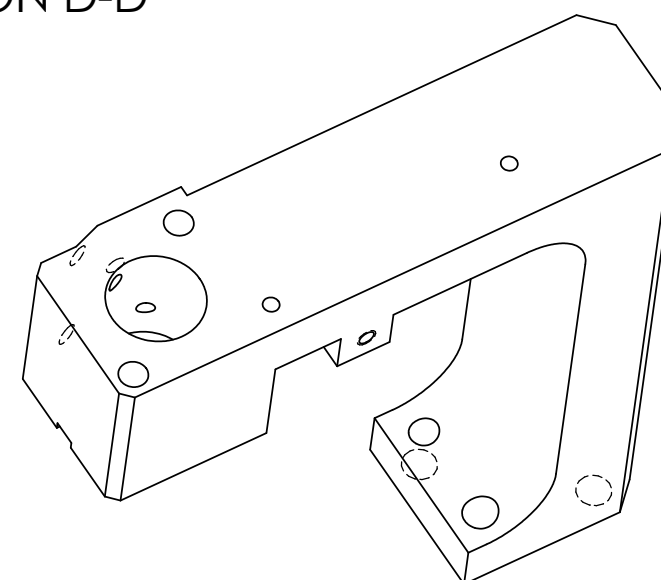


DETAIL D-2

SECTION B-B

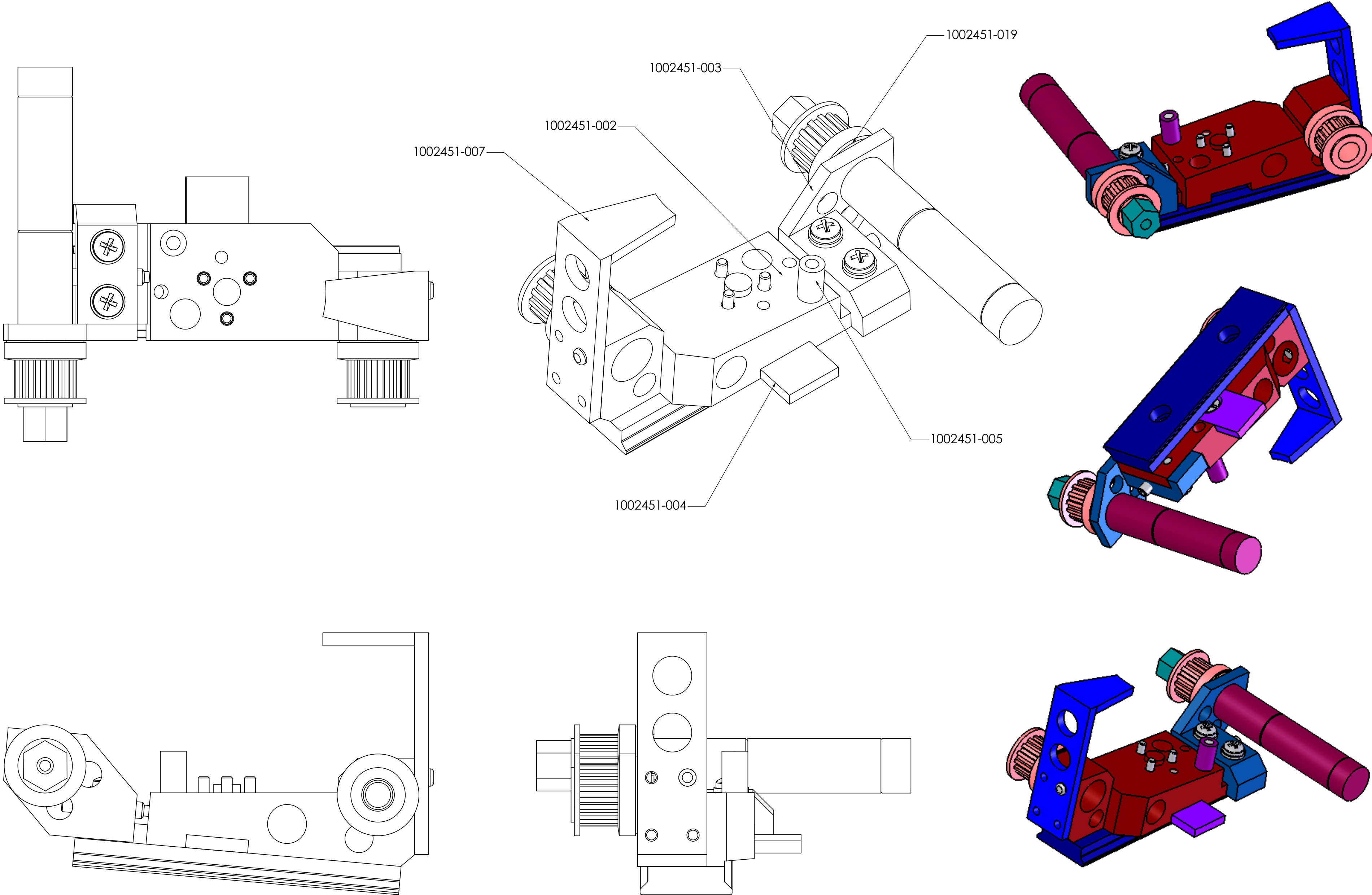


SECTION D-D



ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
1	1002451-001	manipulator mount	6061-T6 Aluminum	1
BILL OF MATERIALS			last updated on: Friday, April 08, 2005 1:30:13 PM	
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE: 2 PLACE DIM $\pm .01$ 3 PLACE DIM $\pm .005$ 4 PLACE DIM $\pm .0005$ ANGLES $\pm 1^\circ$ APPROVALS ENGINEER Jason Feldman 831-775-1837 CHECKED PROJECT NUMBER 701312.00 PROJECT ESP 2G CAD FILE: X:\701312 ESP 2G\SolidWorks files\internal structure (1002209) DATE Monterey Bay Aquarium Research Institute 7700 Sandholdt Road Mass Landing, CA 95039 		
Inspector				
Shop Foreman				
Engineer				
NEXT ASSY Description	NEXT ASSY Number			
DO NOT SCALE DRAWING				

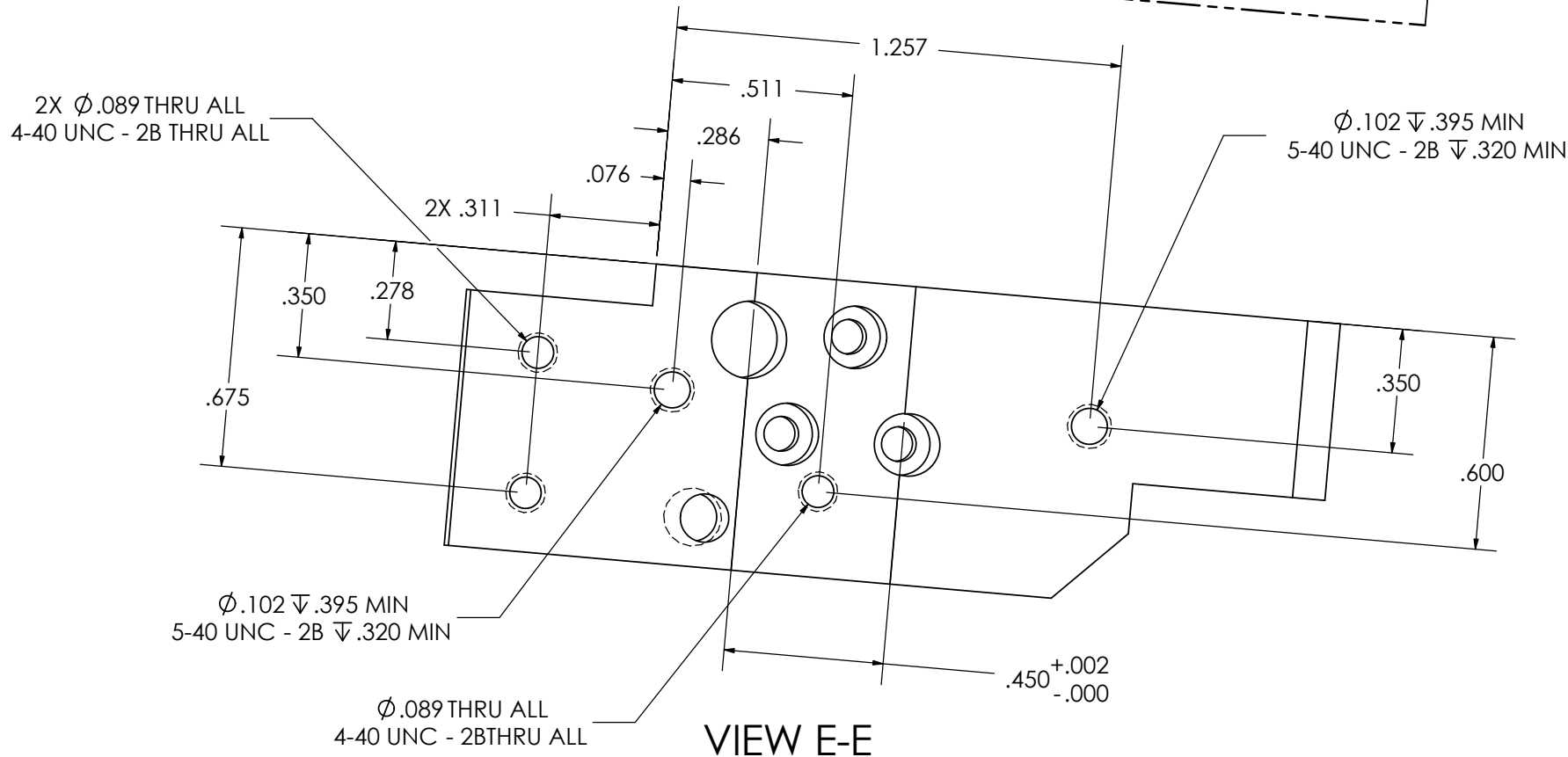
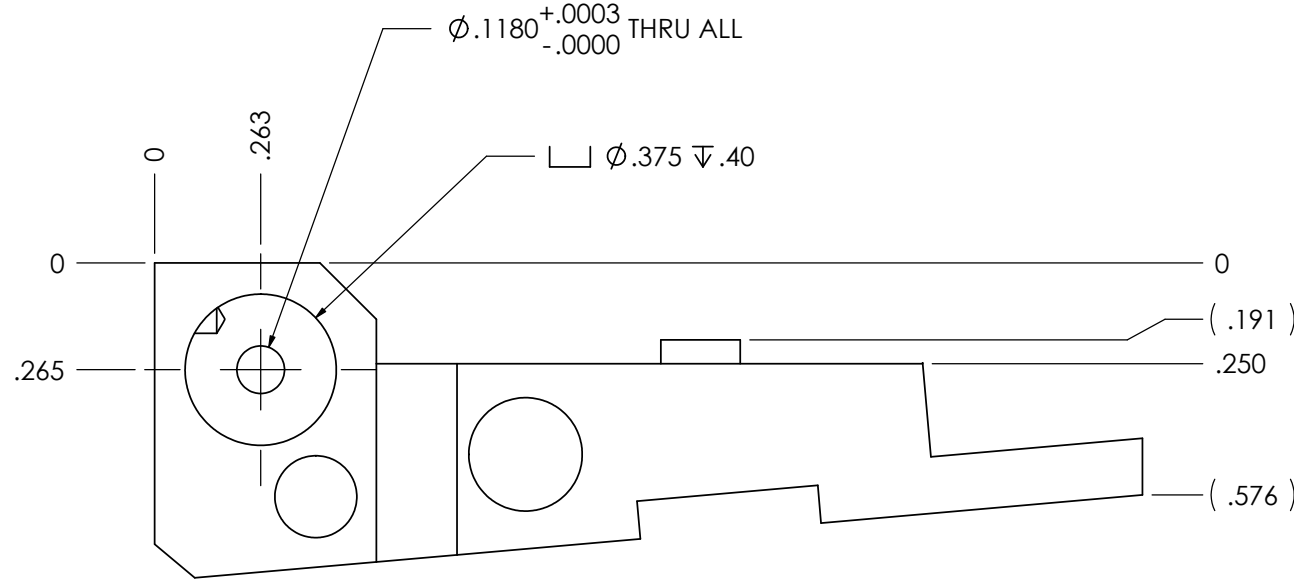
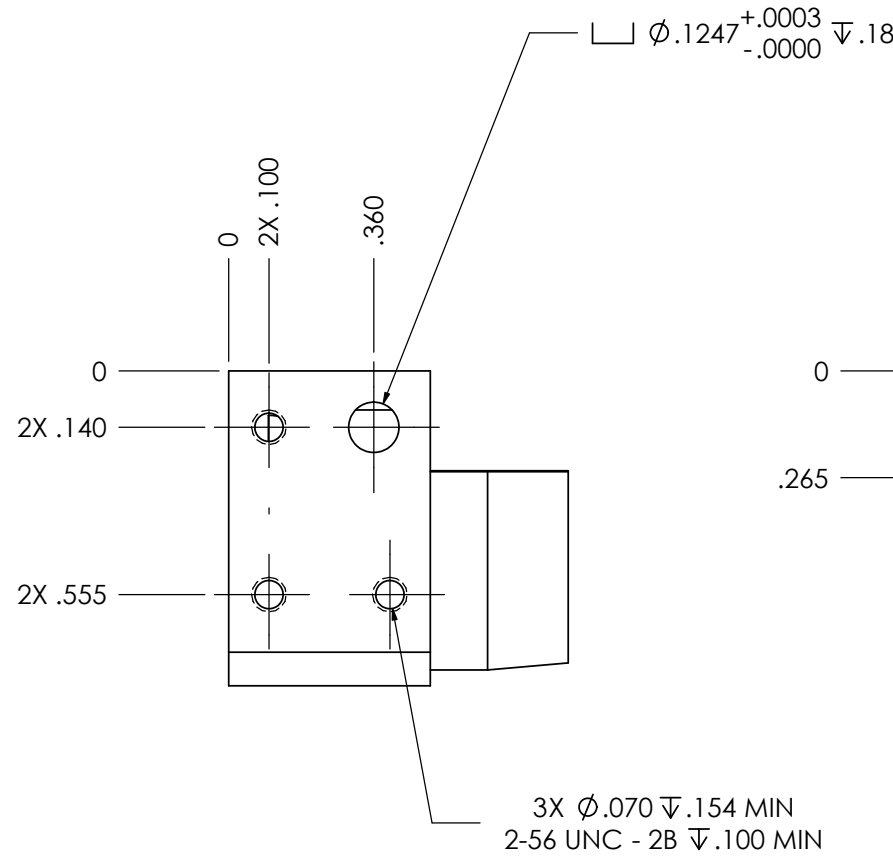
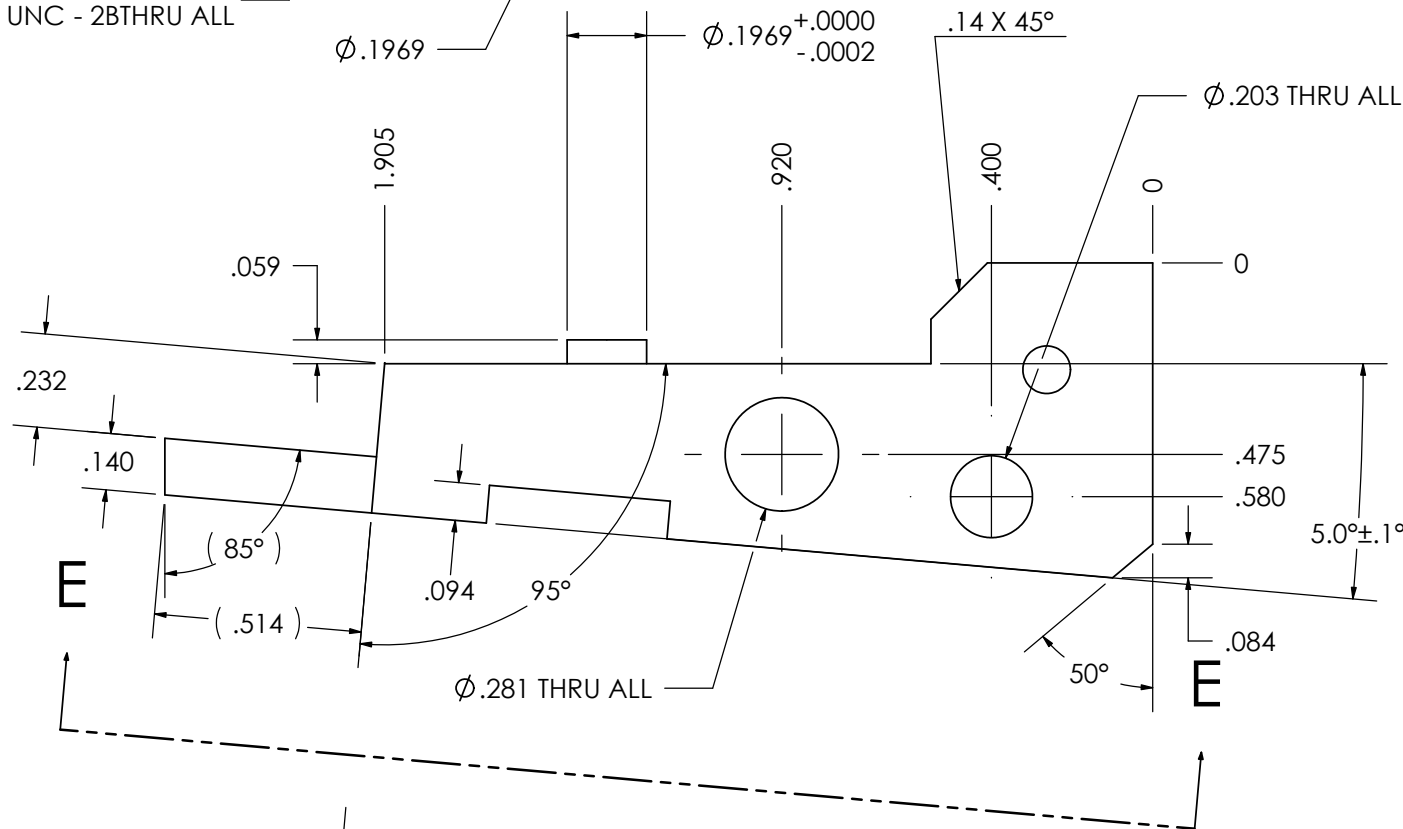
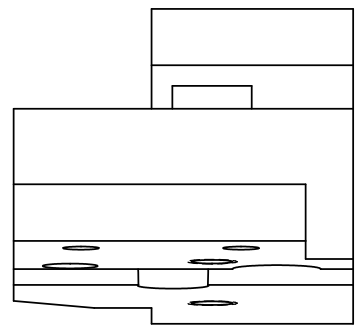
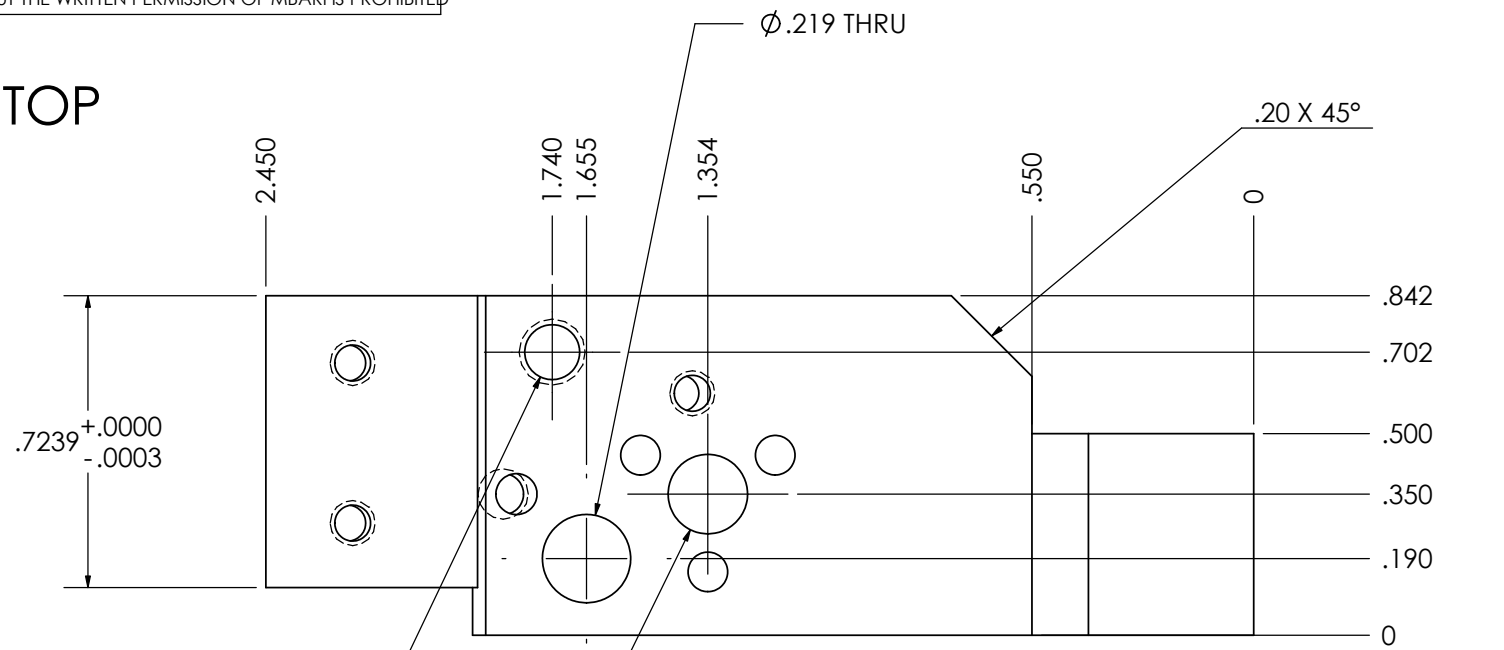
MANIPULATOR TOP - assembly



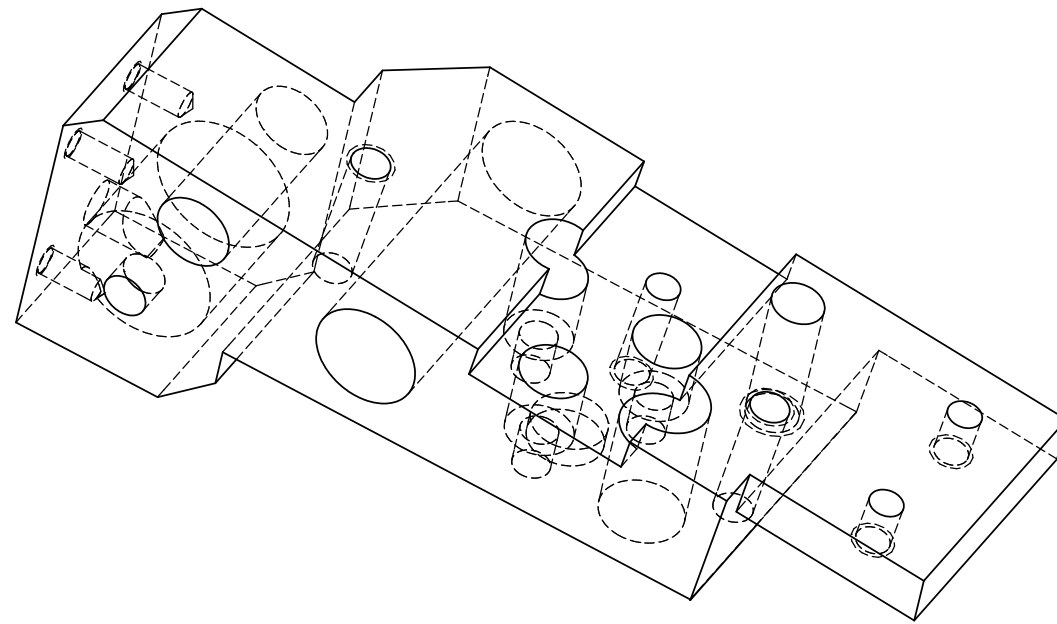
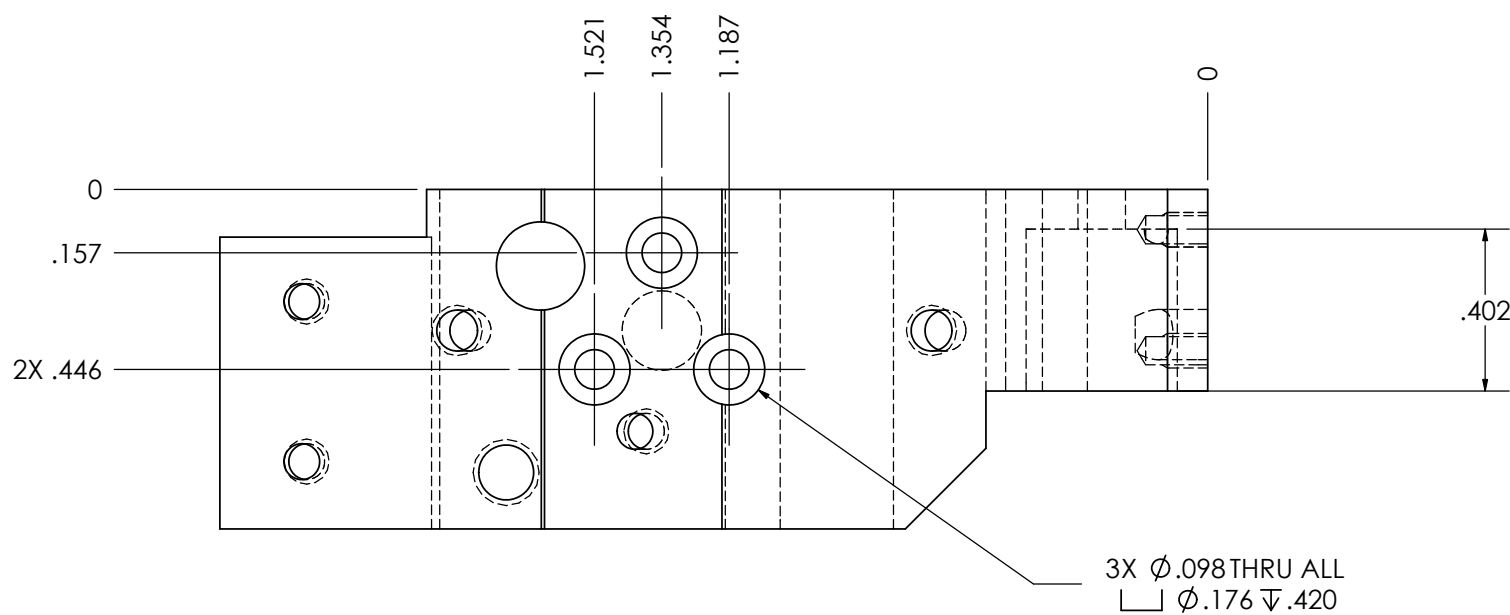
BILL OF MATERIALS						last updated on: Friday, April 08, 2005 1:30:13 PM					
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:				APPROVALS DATE		Monterey Bay Aquarium Research Institute			
Inspector		2 PLACE DIM ±.01	3 PLACE DIM ±.005	4 PLACE DIM ±.0005	ANGLES ±1°	ENGINEER Jason Feldman 831-775-1837	7700 Sandholdt Road Moss Landing, CA 95039				
Shop Foreman		1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING 3. REMOVE BURRS & SHARP EDGES .010 MAX 4. MACHINED FILLET RADII .000 TO .015 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005 6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .001 PER INCH. MAX .003 INCHES FOR SINGLE SURFACE. 7. SURFACE FINISH TO BE 32 MICRON UNLESS OTHERWISE SPECIFIED				CHECKED					
Engineer						PROJECT NUMBER 701312.00				manipulator	
NEXT ASSY Description	NEXT ASSY Number					PROJECT ESP 2G				SIZE C	DWG. NO. 1002451
DO NOT SCALE DRAWING		CAD FILE: X:\701312 ESP 2G\SolidWorks files\internal structure (1002209)						SHEET 4 OF 19			

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1002451-002 MANIPULATOR TOP



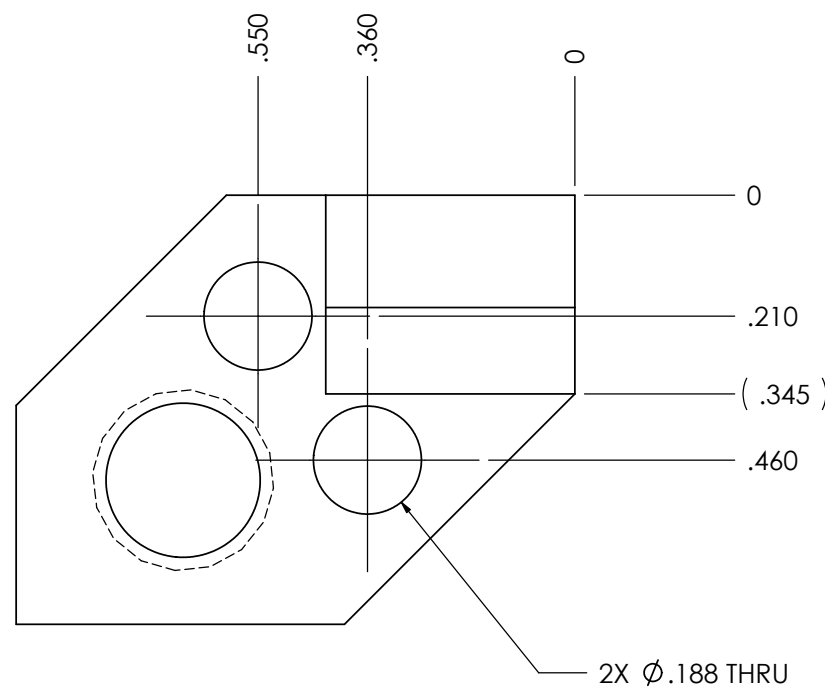
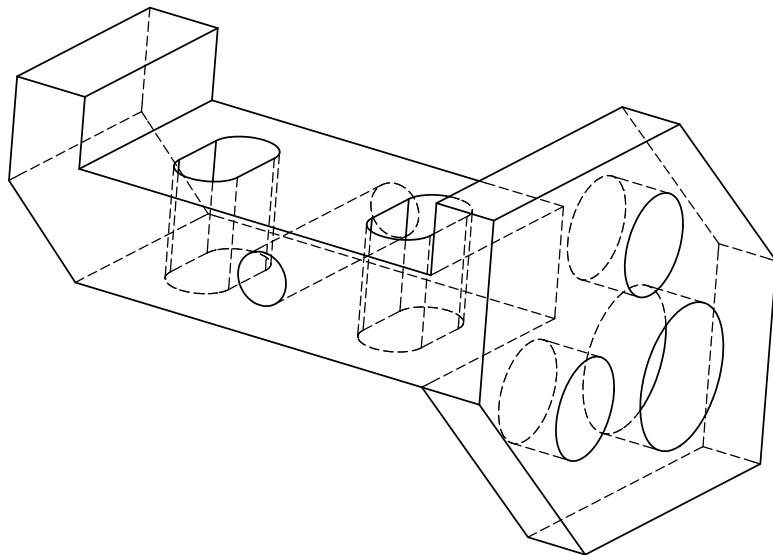
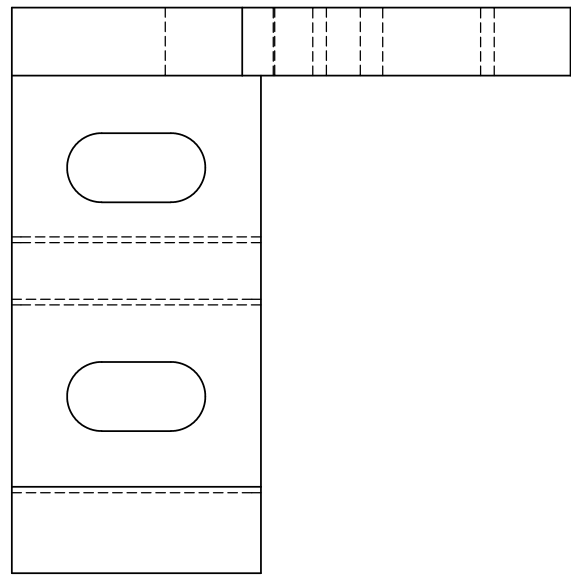
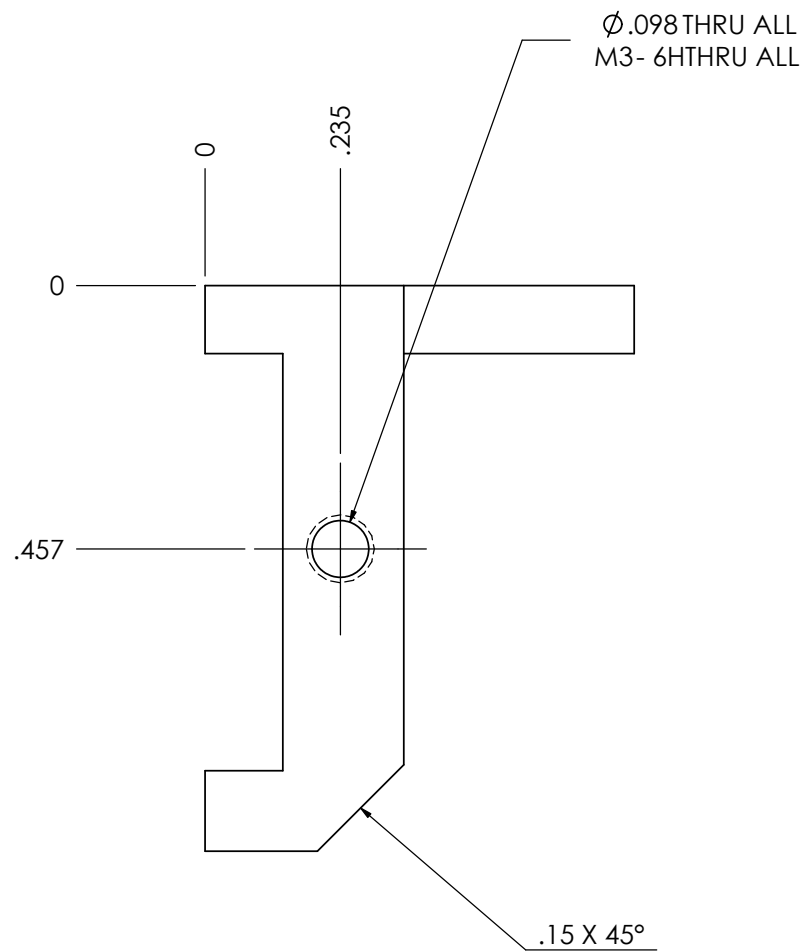
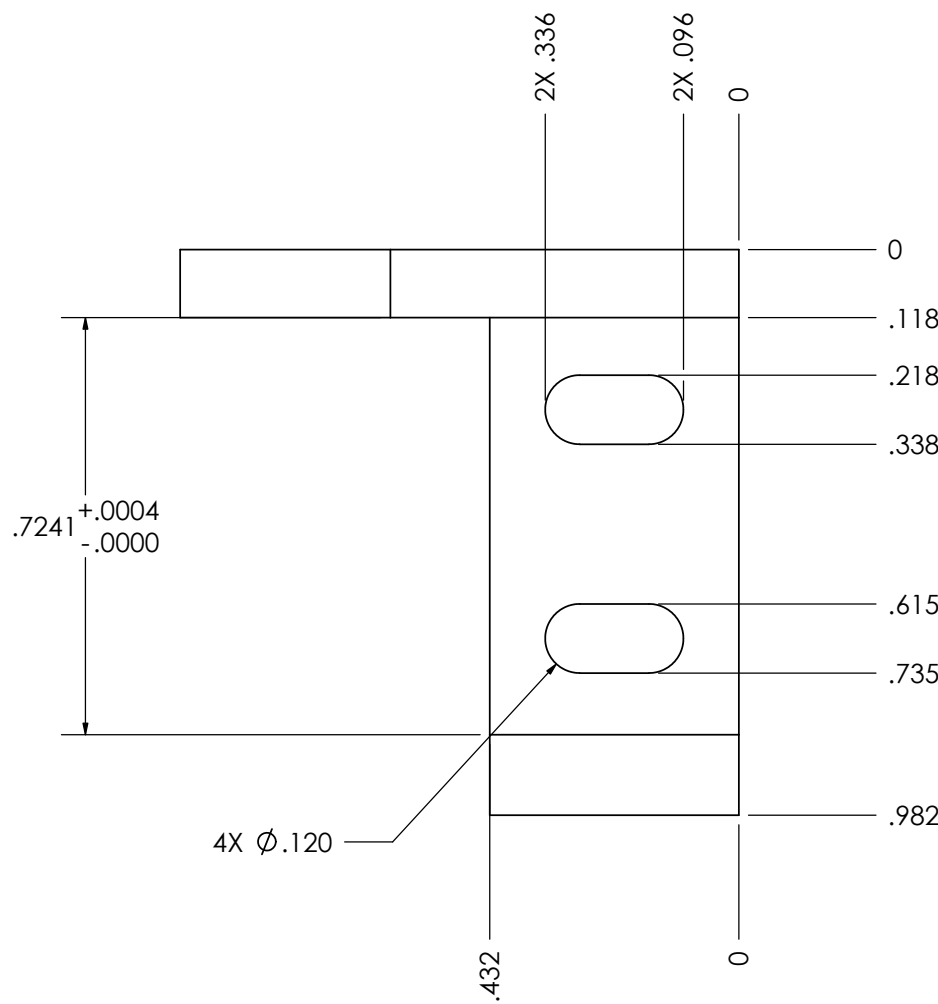
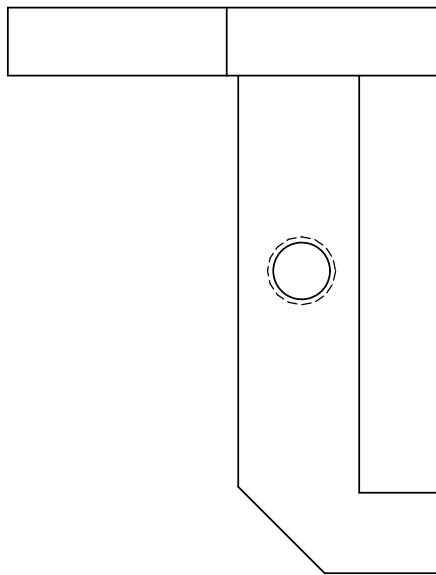
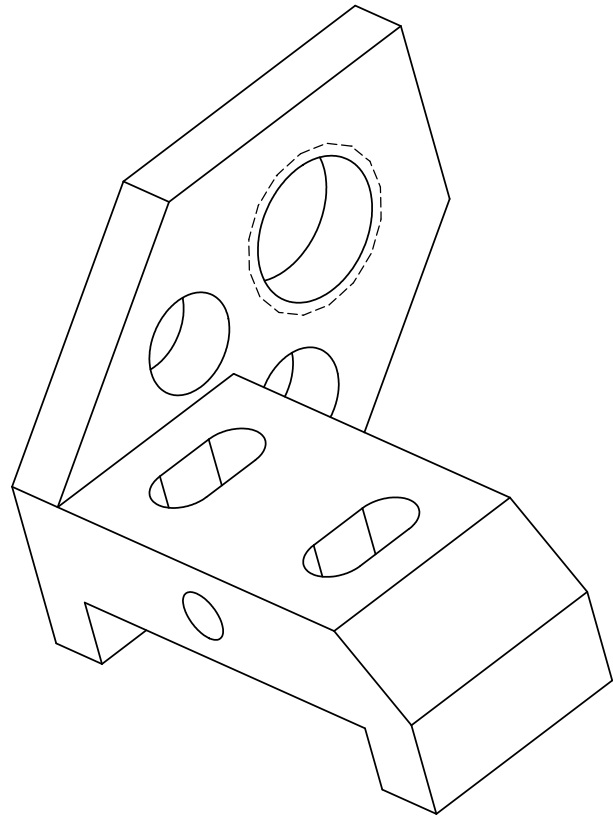
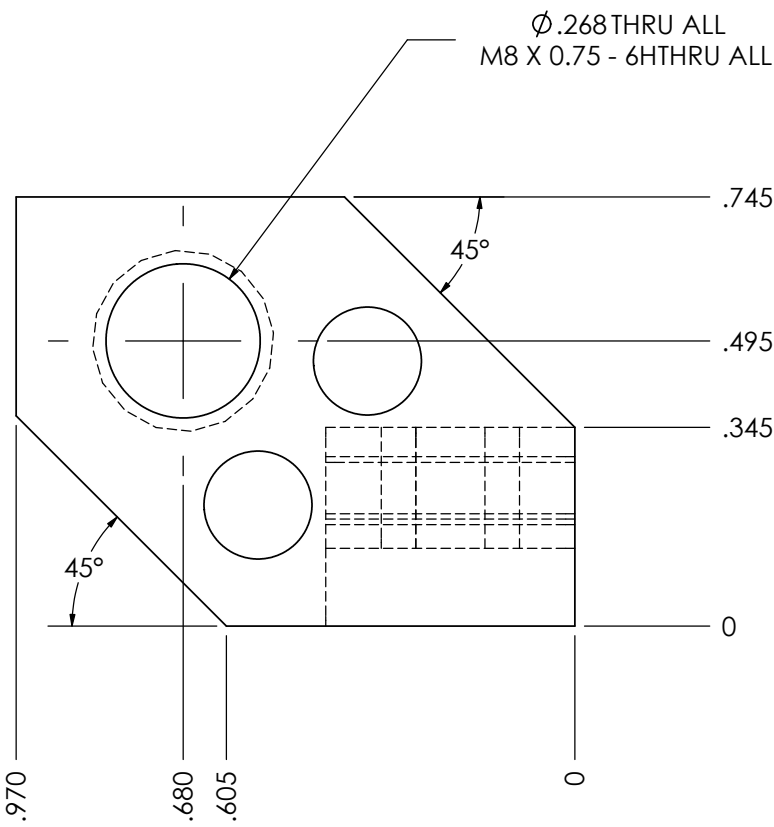
VIEW E-E



ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
2	1002451-002	manipulator top	7075-T6 or -T651 Aluminum	1
BILL OF MATERIALS			last updated on: Friday, April 08, 2005 1:30:13 PM	
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		APPROVALS DATE
Inspector		2 PLACE DIM ±.01	3 PLACE DIM ±.005	4 PLACE DIM ±.0005
Shop Foreman		ANGLES ±1°	ENGINEER Jason Feldman 831-775-1837	
Engineer		1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING 3. REMOVE BURRS & SHARP EDGES .010 MAX 4. MACHINED FILLET RADII .000 TO .015 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005		Monterey Bay Aquarium Research Institute  7700 Sandholdt Road Moss Landing, CA 95039
NEXT ASSY Description	NEXT ASSY Number	6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .001 PER INCH. MAX .003 INCHES FOR SINGLE SURFACE. 7. SURFACE FINISH TO BE 32 MICRON UNLESS OTHERWISE SPECIFIED		PROJECT NUMBER 701312.00
DO NOT SCALE DRAWING		PROJECT ESP 2G		SIZE C
		DWG. NO. 1002451		REV. C
CAD FILE: X:\701312 ESP 2G\SolidWorks files\internal structure (1002209)			SHEET 5 OF 19	

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1002451-003
MANIPULATOR BELT TENSIONER



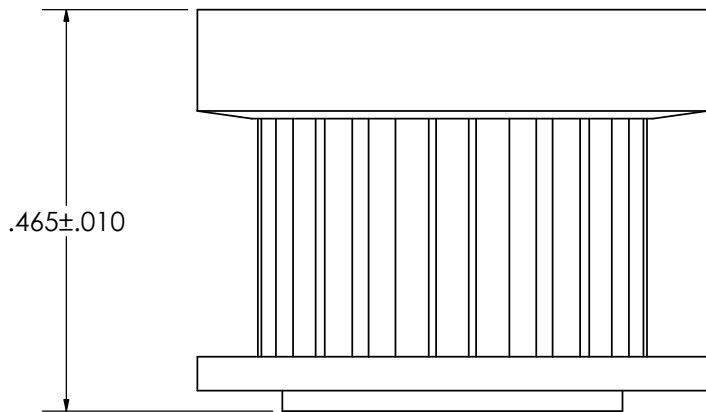
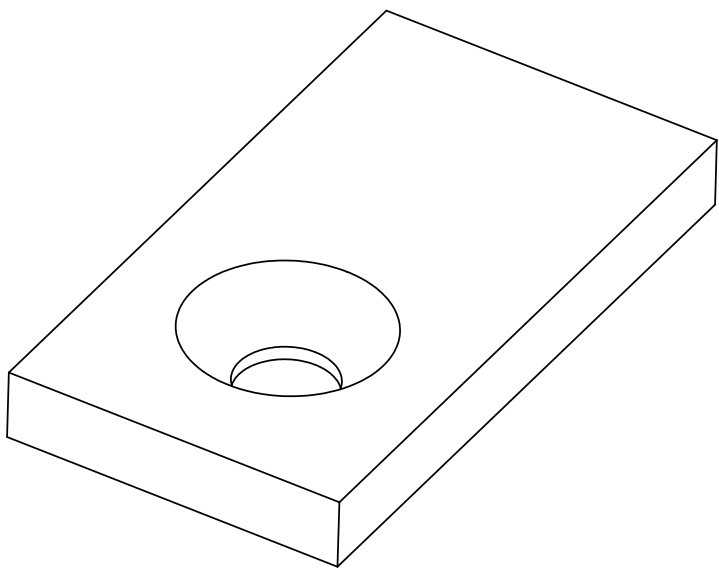
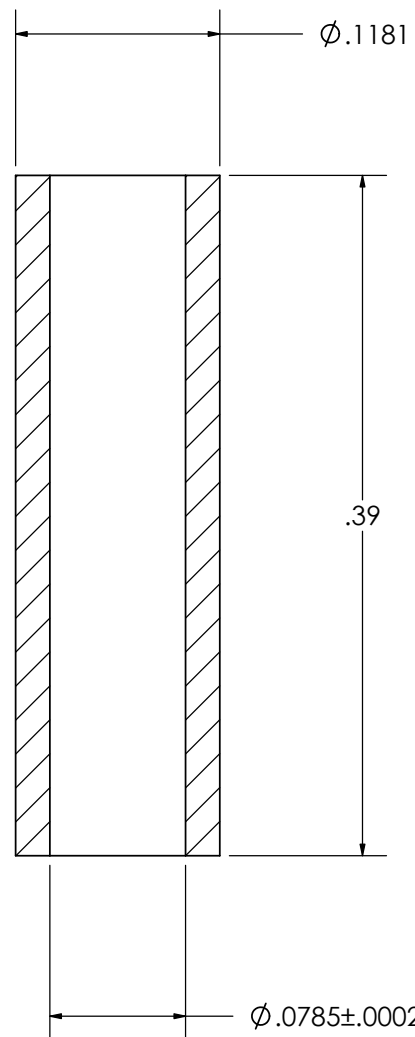
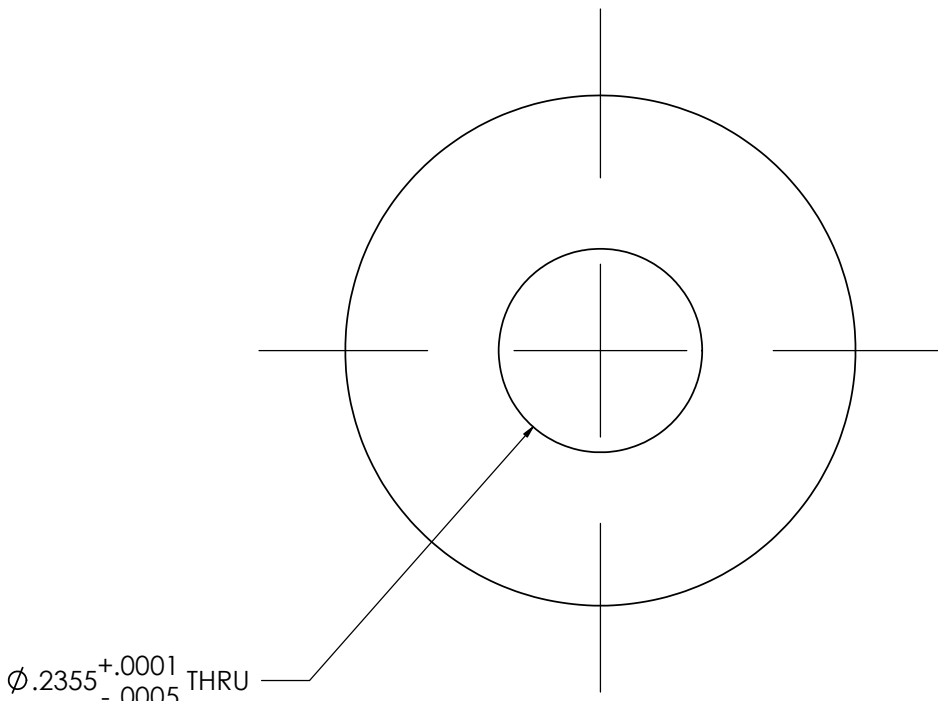
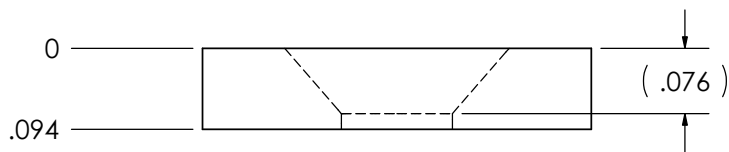
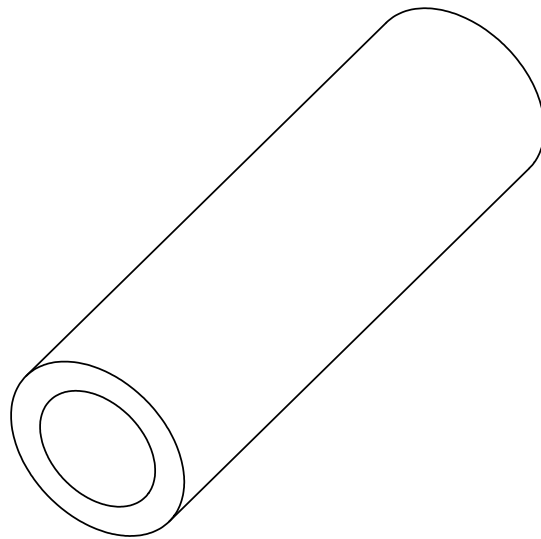
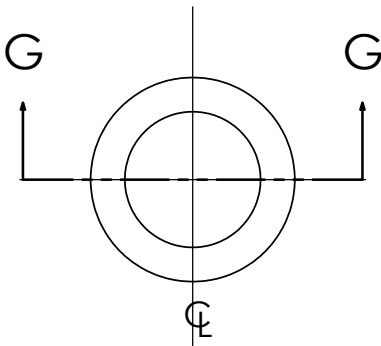
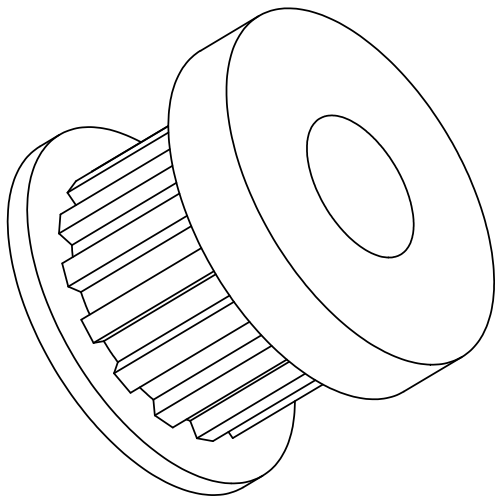
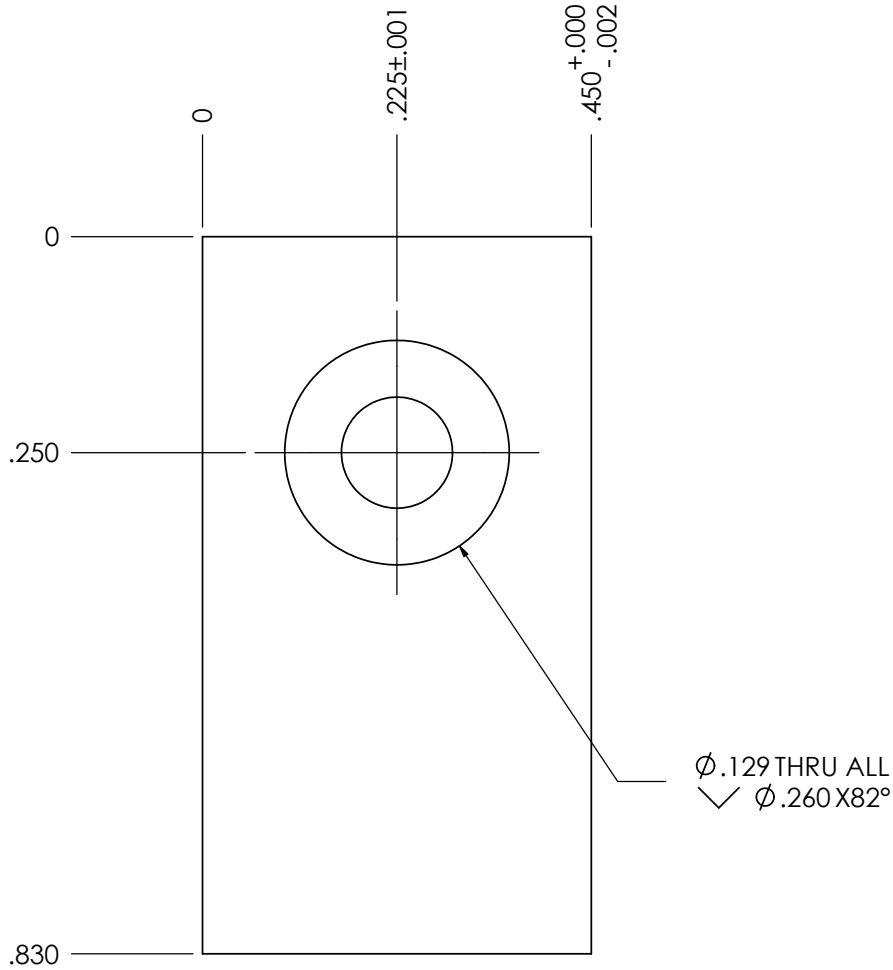
ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
3	1002451-003	manipulator belt tensioner	7075-T6 or -T651 Aluminum	1
BILL OF MATERIALS				
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		
Inspector		2 PLACE DIM $\pm .01$	3 PLACE DIM $\pm .005$	4 PLACE DIM $\pm .0005$
Shop Foreman		1. DIMENSIONS ARE IN INCHES	ANGLES $\pm 1^\circ$	
Engineer		2. DIMENSION LIMITS HELD AFTER PLATING		
NEXT ASSY Description	NEXT ASSY Number	3. REMOVE BURRS & SHARP EDGES .010 MAX		
		4. MACHINED FILLET RADII .000 TO .015		
		5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005		
		6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .001 PER INCH. MAX. .003 INCHES FOR SINGLE SURFACE.		
		7. SURFACE FINISH TO BE 32 MICRON UNLESS OTHERWISE SPECIFIED		
DO NOT SCALE DRAWING		APPROVALS DATE		
		ENGINEER Jason Feldman 831-775-1837		
		CHECKED		
		PROJECT NUMBER 701312.00		
		PROJECT ESP 2G		
		SIZE C DWG. NO. 1002451 REV. C		
		CAD FILE: X:\701312 ESP 2G\SolidWorks files\internal structure (1002209)		
		SHEET 6 OF 19		

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1002451-004
MANIPULATOR SLIDE HALL FLAG

Brecoflex T2.5X6-15
(modification)

1002451-006
MANIPULATOR BORE REDUCER

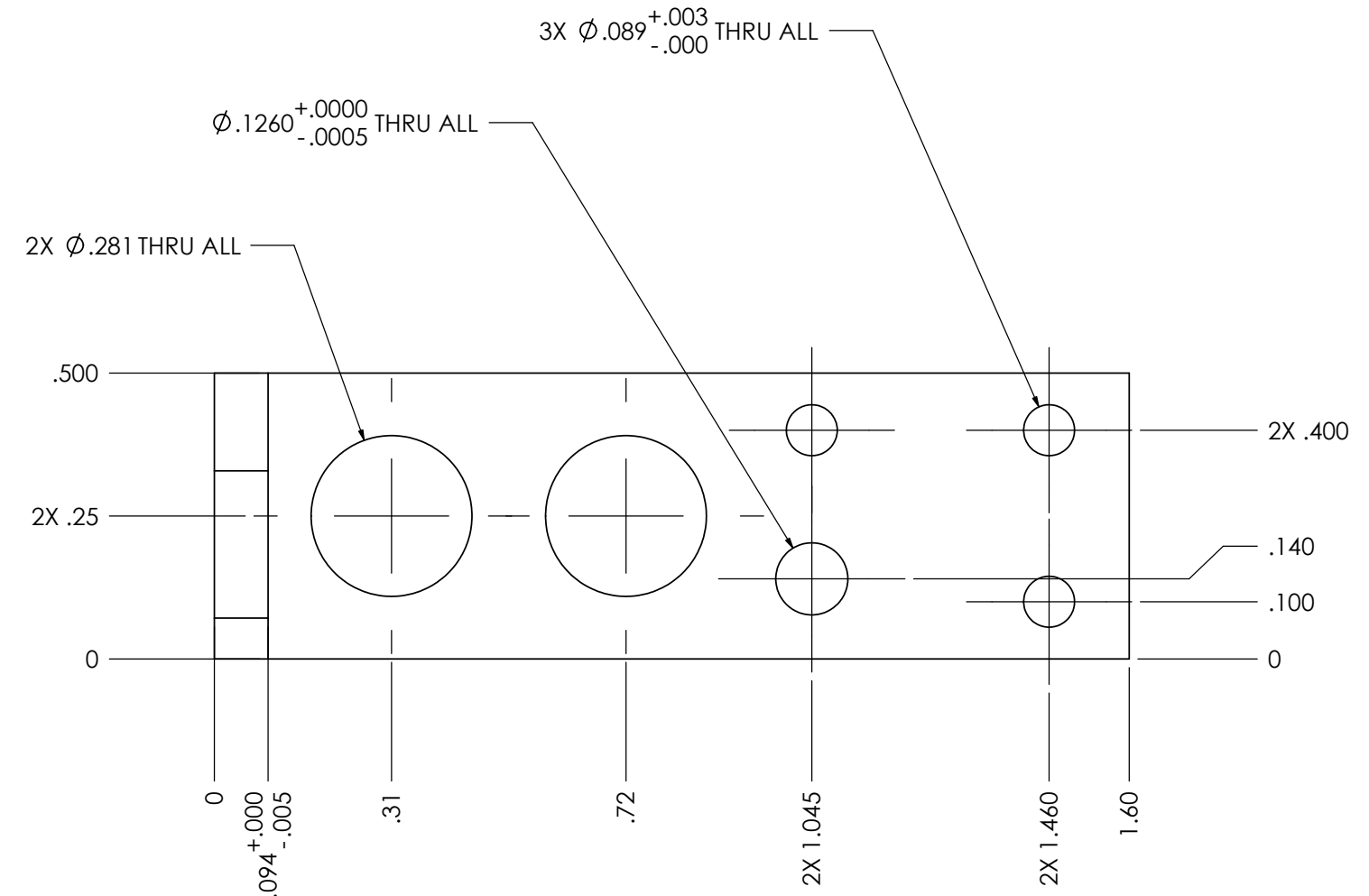
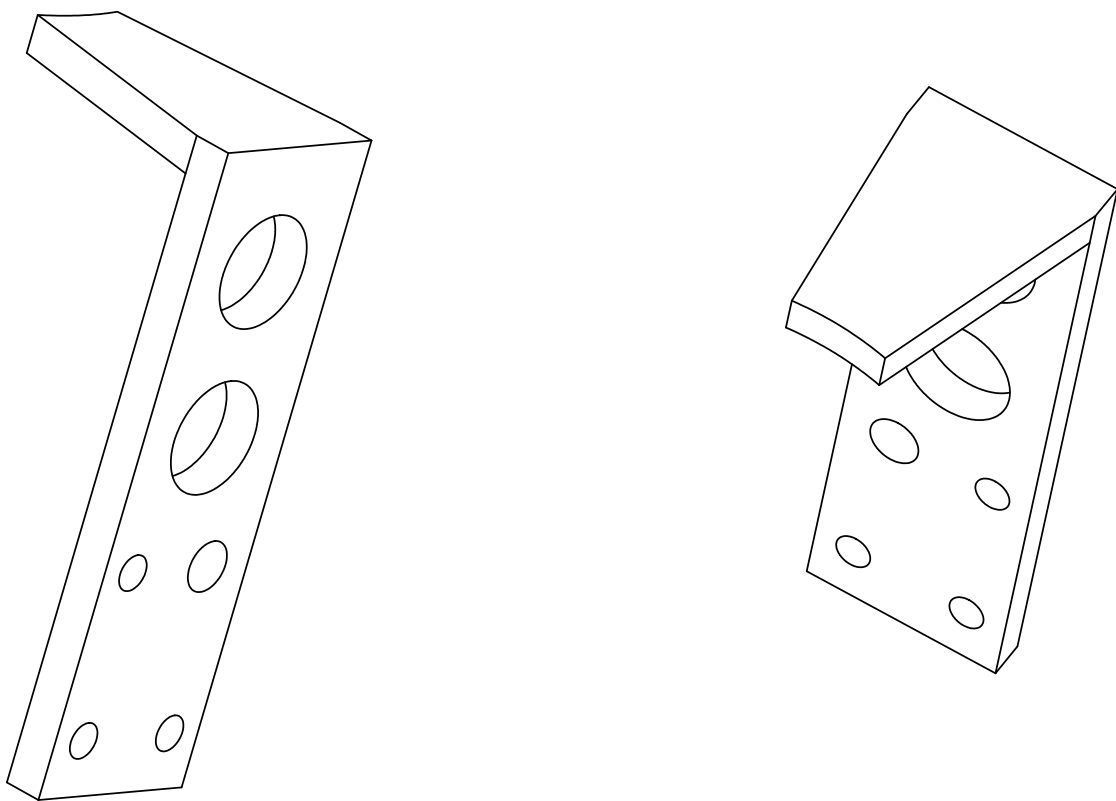


SECTION G-G

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
4	1002451-004	manipulator slide flag	430-F Stainless steel	1
6	1002451-006	manipulator bore reducer	Brass	3

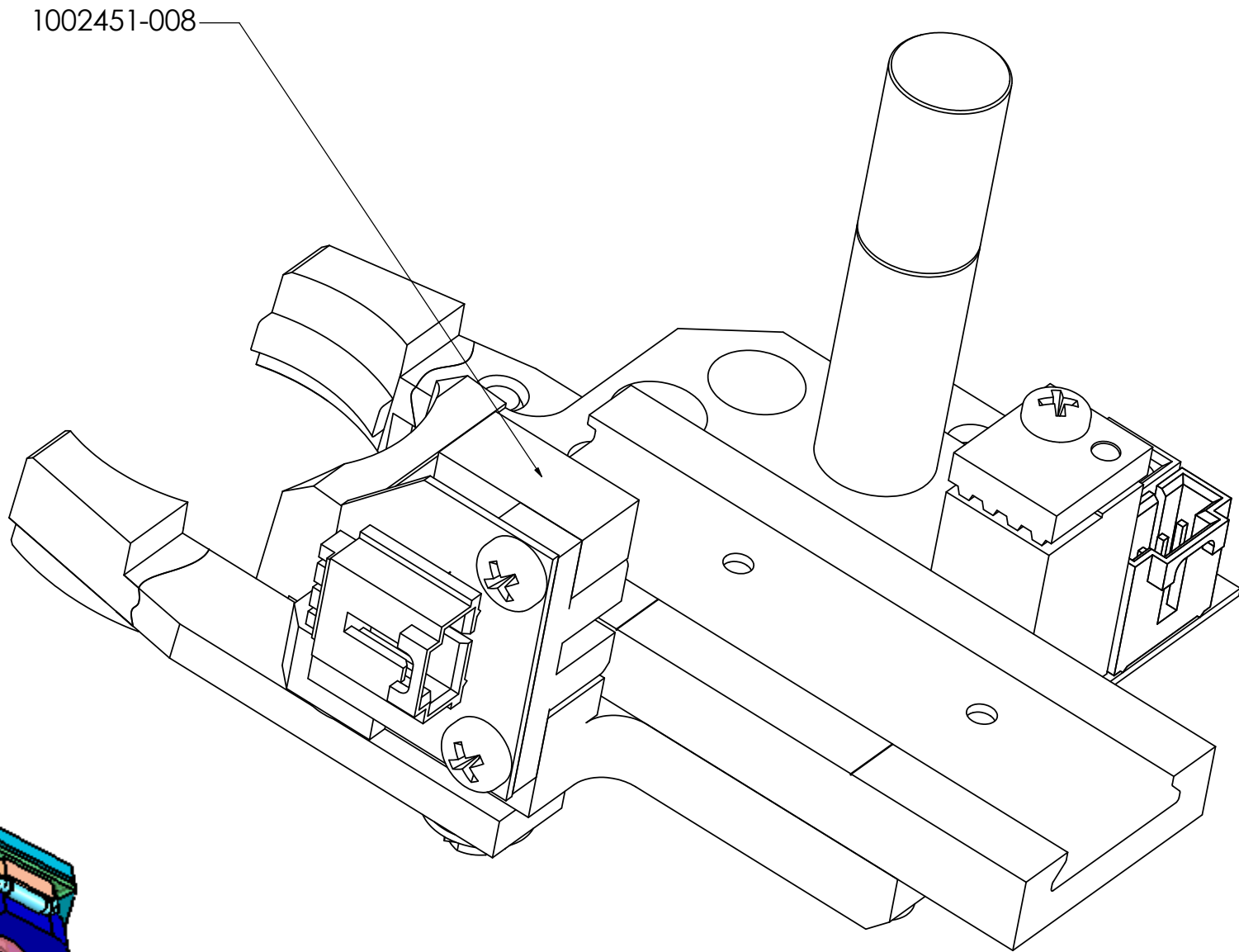
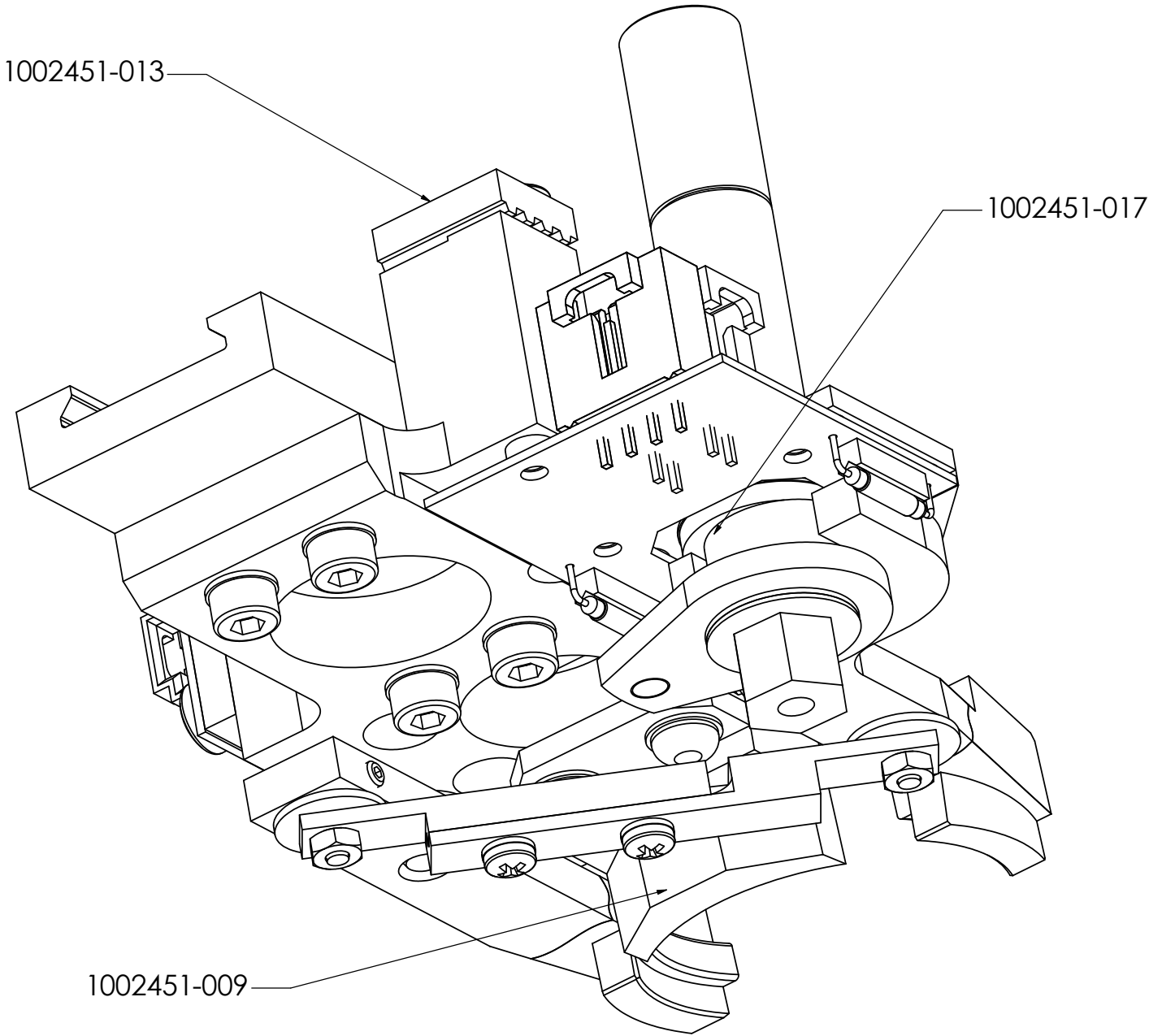
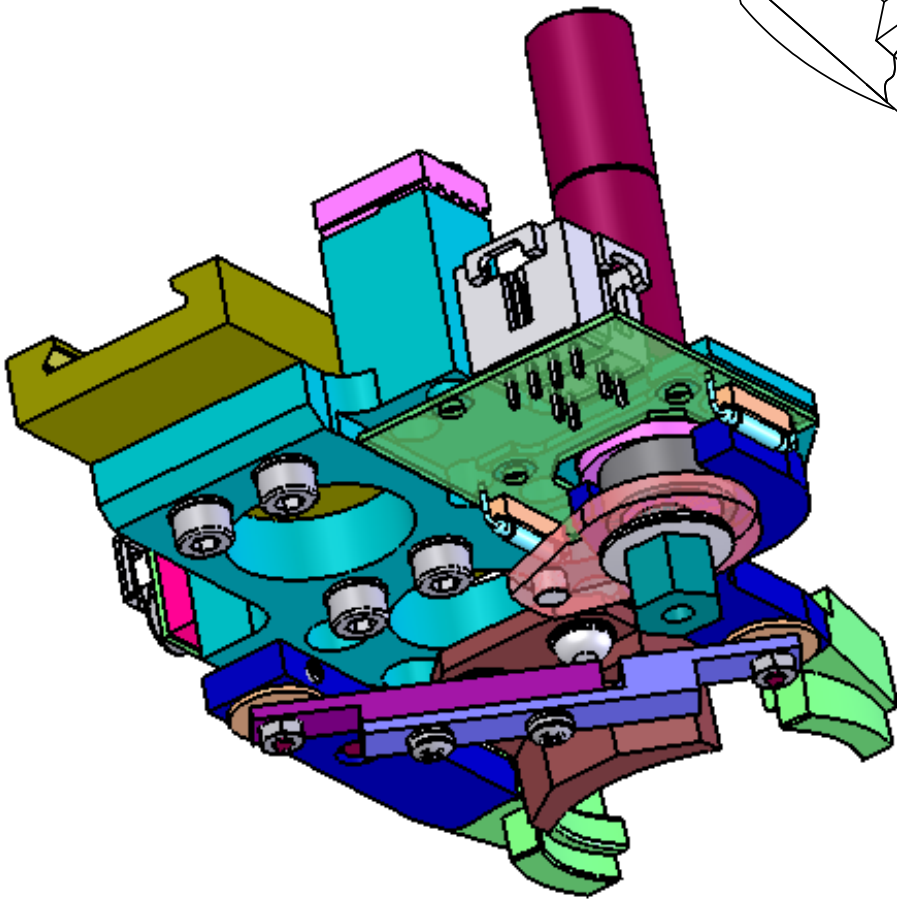
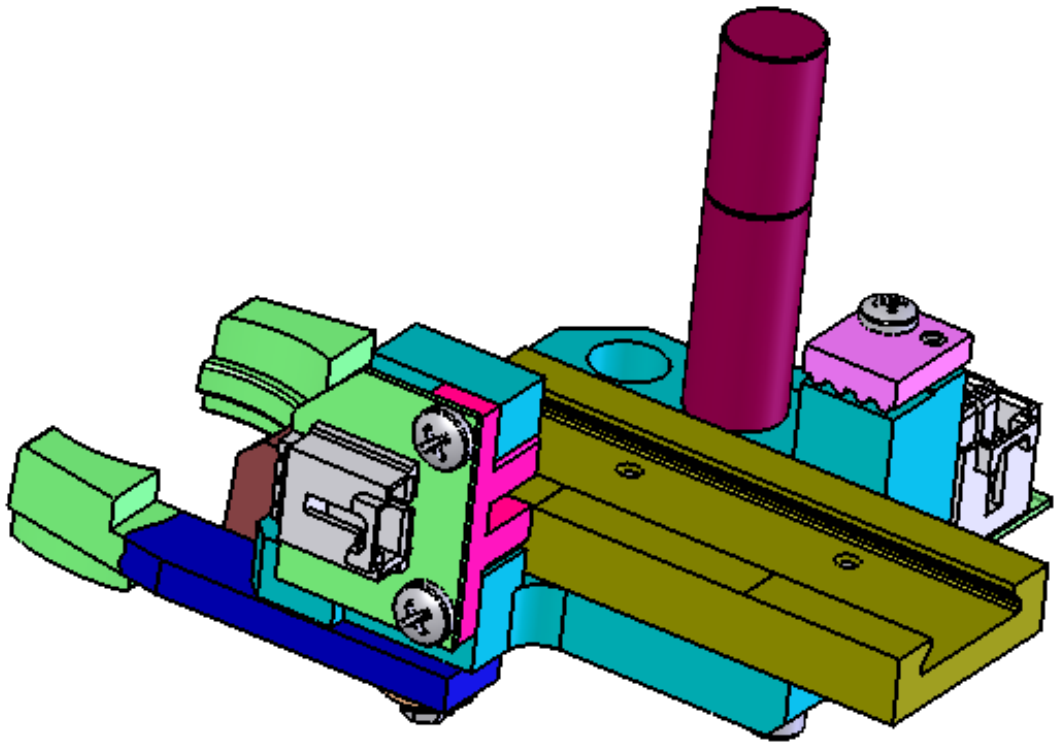
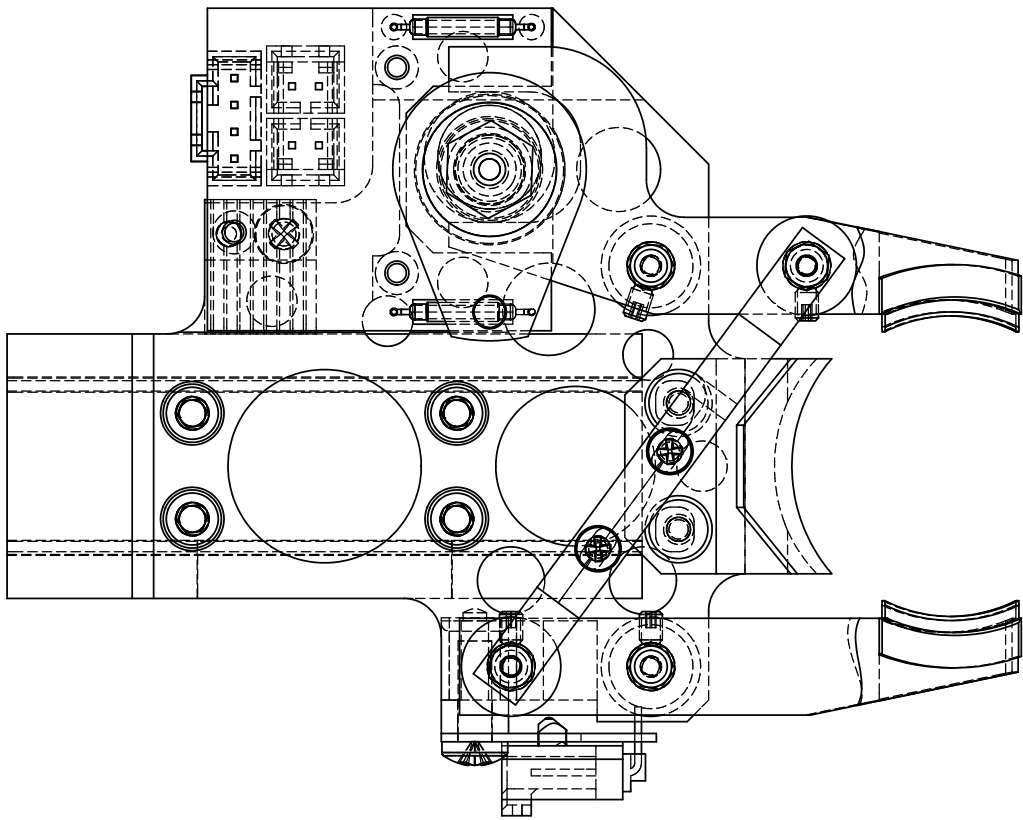
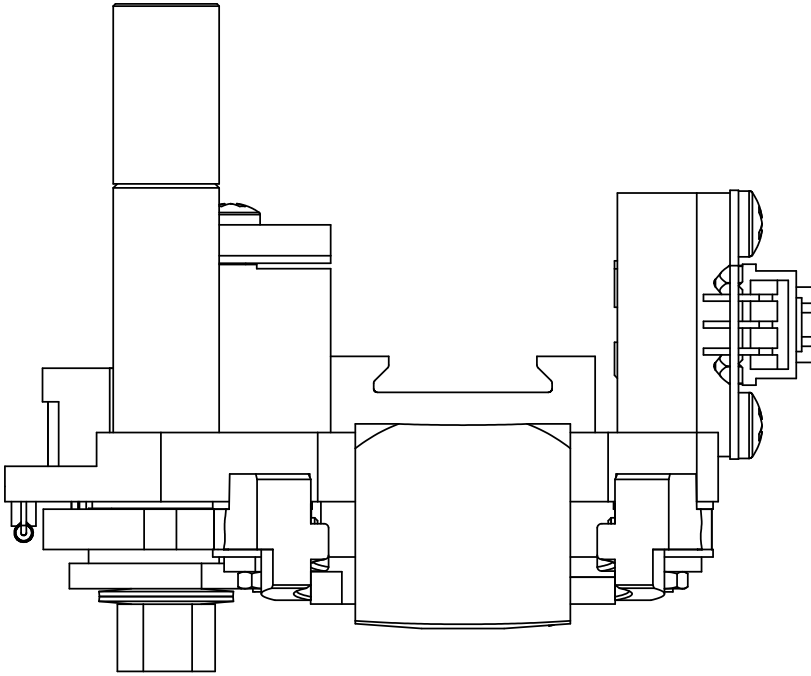
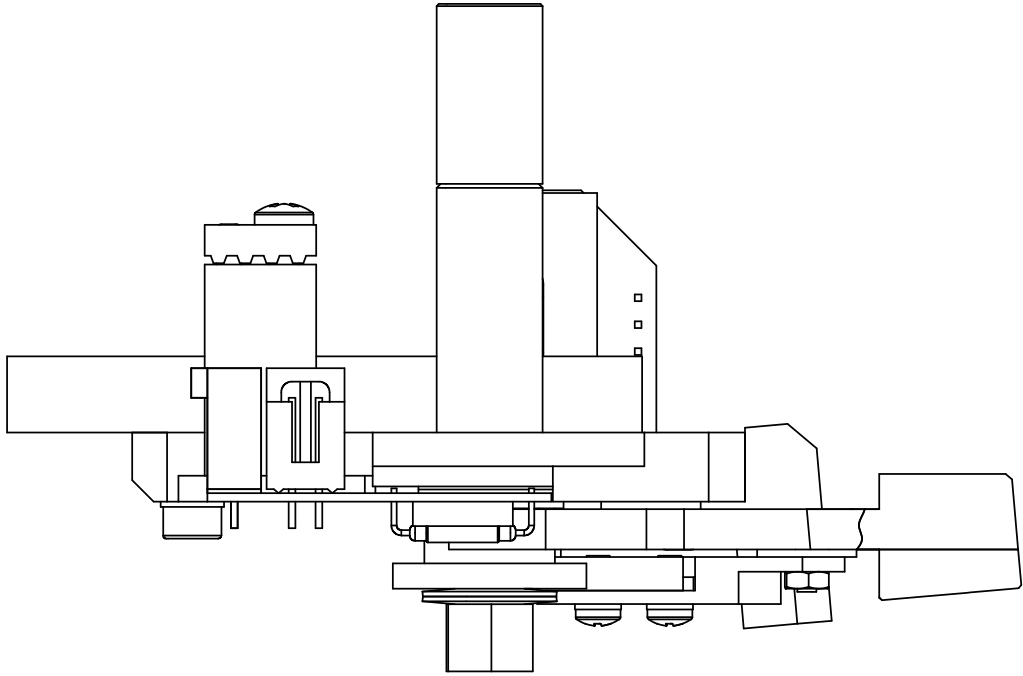
Shop / Q.C.			UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		APPROVALS		DATE		last updated on: Friday, April 08, 2005 1:30:13 PM	
Inspector			2 PLACE DIM ±.01	3 PLACE DIM ±.005	4 PLACE DIM ±.0005	ANGLES ±1°	ENGINEER		Monterey Bay Aquarium Research Institute	
Shop Foreman			1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING 3. REMOVE BURRS & SHARP EDGES .010 MAX 4. MACHINED FILLET RADII .000 TO .015 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005 6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .001 PER INCH. MAX. .003 INCHES FOR SINGLE SURFACE. 7. SURFACE FINISH TO BE 32 MICRON UNLESS OTHERWISE SPECIFIED				Jason Feldman		7700 Sandholdt Road	
Engineer							831-775-1837		Moss Landing, CA	
NEXT ASSY Description	NEXT ASSY Number						CHECKED		95039	
DO NOT SCALE DRAWING			PROJECT NUMBER		701312.00		manipulator		SIZE	
			PROJECT		ESP 2G		DWG. NO.		1002451	
							REV.		C	
			CAD FILE:		X:\701312 ESP 2G\SolidWorks files\internal structure (1002209)		SHEET 7 OF 19			

1002451-007
MANIPULATOR MAIN HALL FLAG



ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.	
7	1002451-007	manipulator main hall flag	430-F Stainless Steel	1	
BILL OF MATERIALS			last updated on: Friday, April 08, 2005 1:30:13 PM		
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:	APPROVALS	DATE	
Inspector		2 PLACE DIM $\pm .01$ 3 PLACE DIM $\pm .005$ 4 PLACE DIM $\pm .0005$ ANGLES $\pm .1^\circ$	ENGINEER Jason Feldman 831-775-1837	Monterey Bay Aquarium Research Institute  7700 Sandholdt Road Moss Landing, CA 95039	
Shop Foreman		1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING 3. REMOVE BURRS & SHARP EDGES .010 MAX 4. MACHINED FILLET RADII .000 TO .015	CHECKED		
Engineer		5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005	PROJECT NUMBER 701312.00		
NEXT ASSY Description	NEXT ASSY Number	6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .001 PER INCH, MAX .003 INCHES FOR SINGLE SURFACE.	PROJECT ESP 2G		
DO NOT SCALE DRAWING		7. SURFACE FINISH TO BE 32 MICRON UNLESS OTHERWISE SPECIFIED	SIZE C	DWG. NO. 1002451	REV. C
CAD FILE: X:\701312 ESP 2G\SolidWorks files\internal structure (1002209)			SHEET 8 OF 19		

MANIPULATOR BOTTOM - assembly



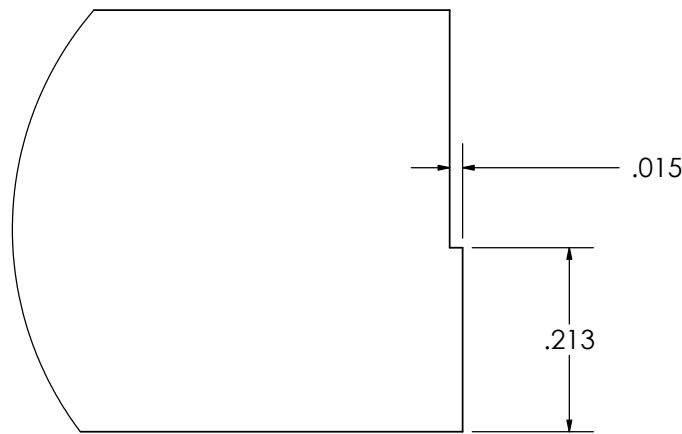
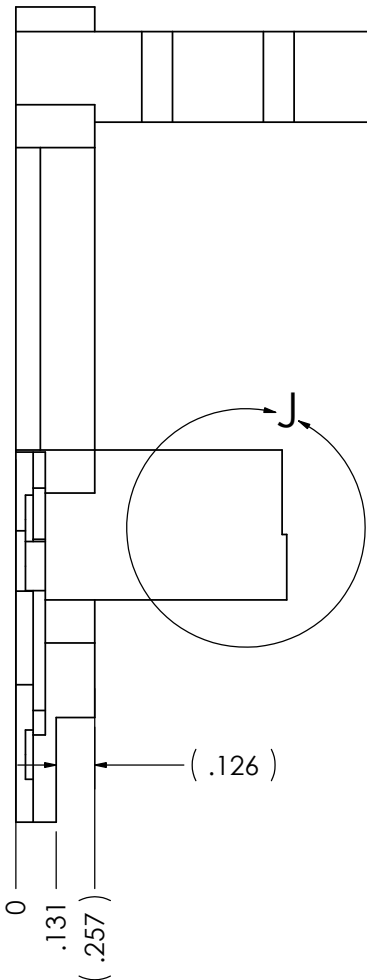
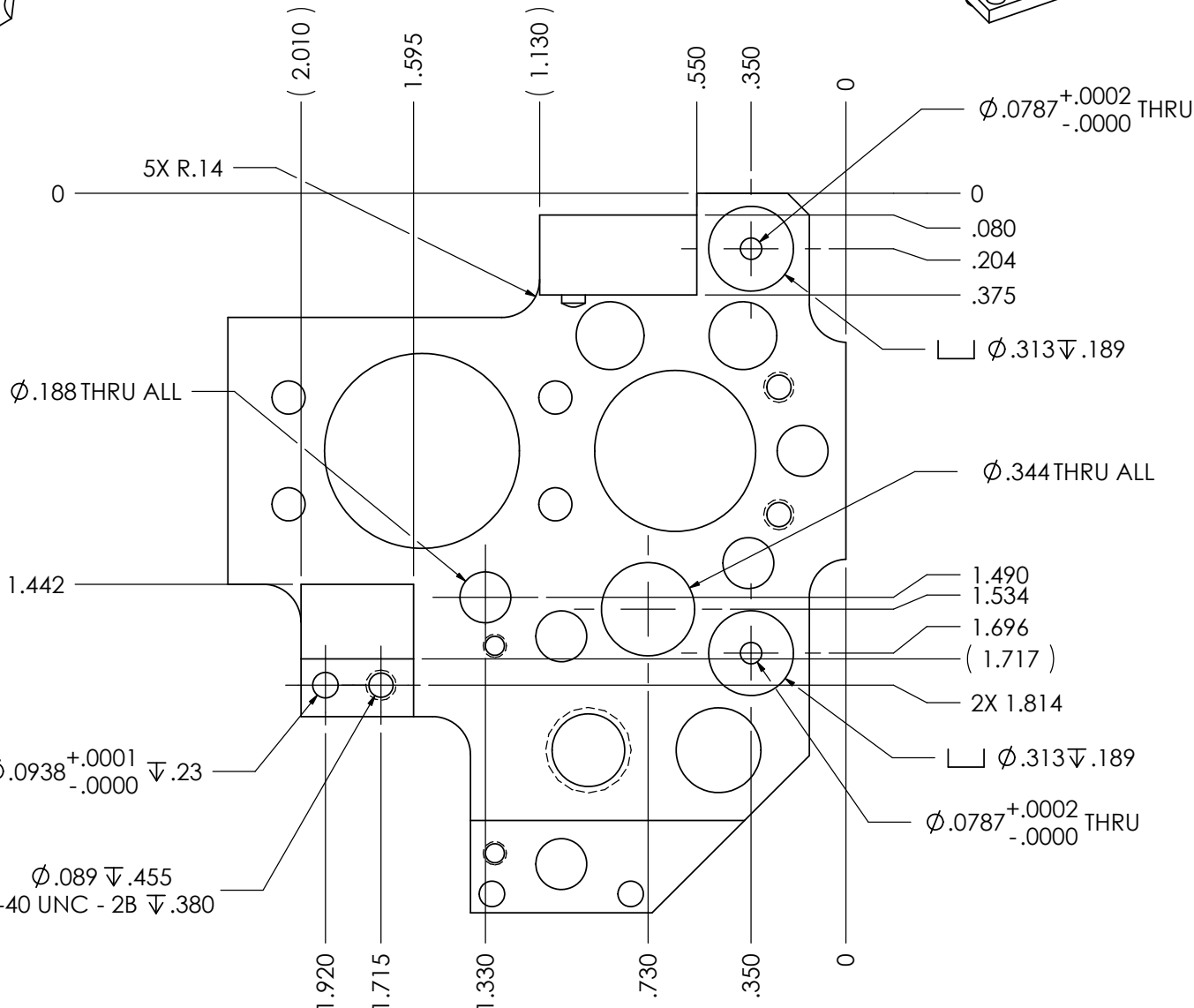
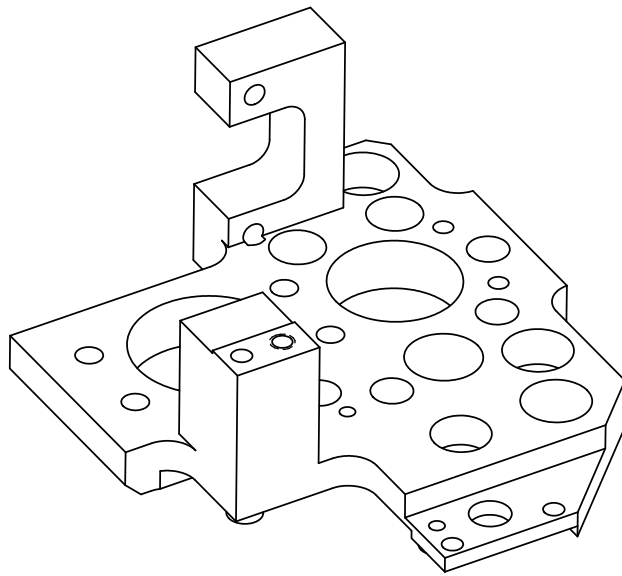
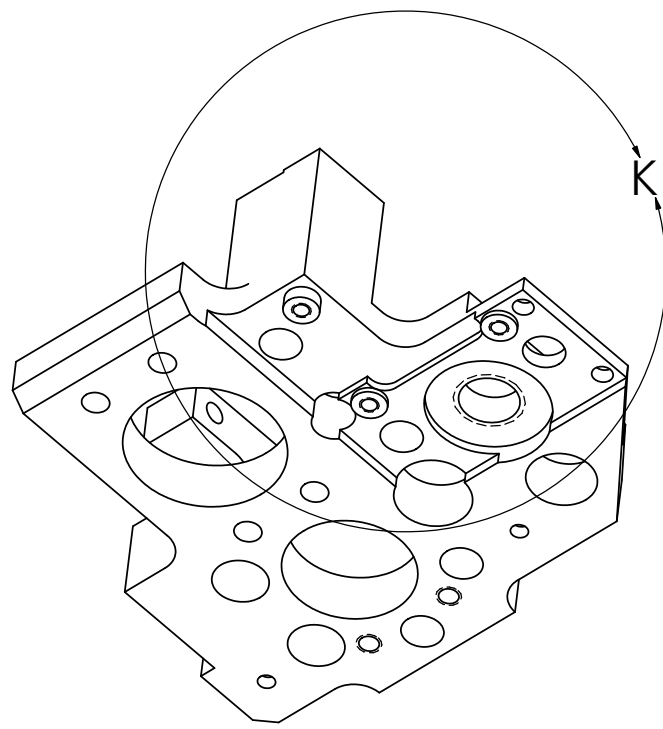
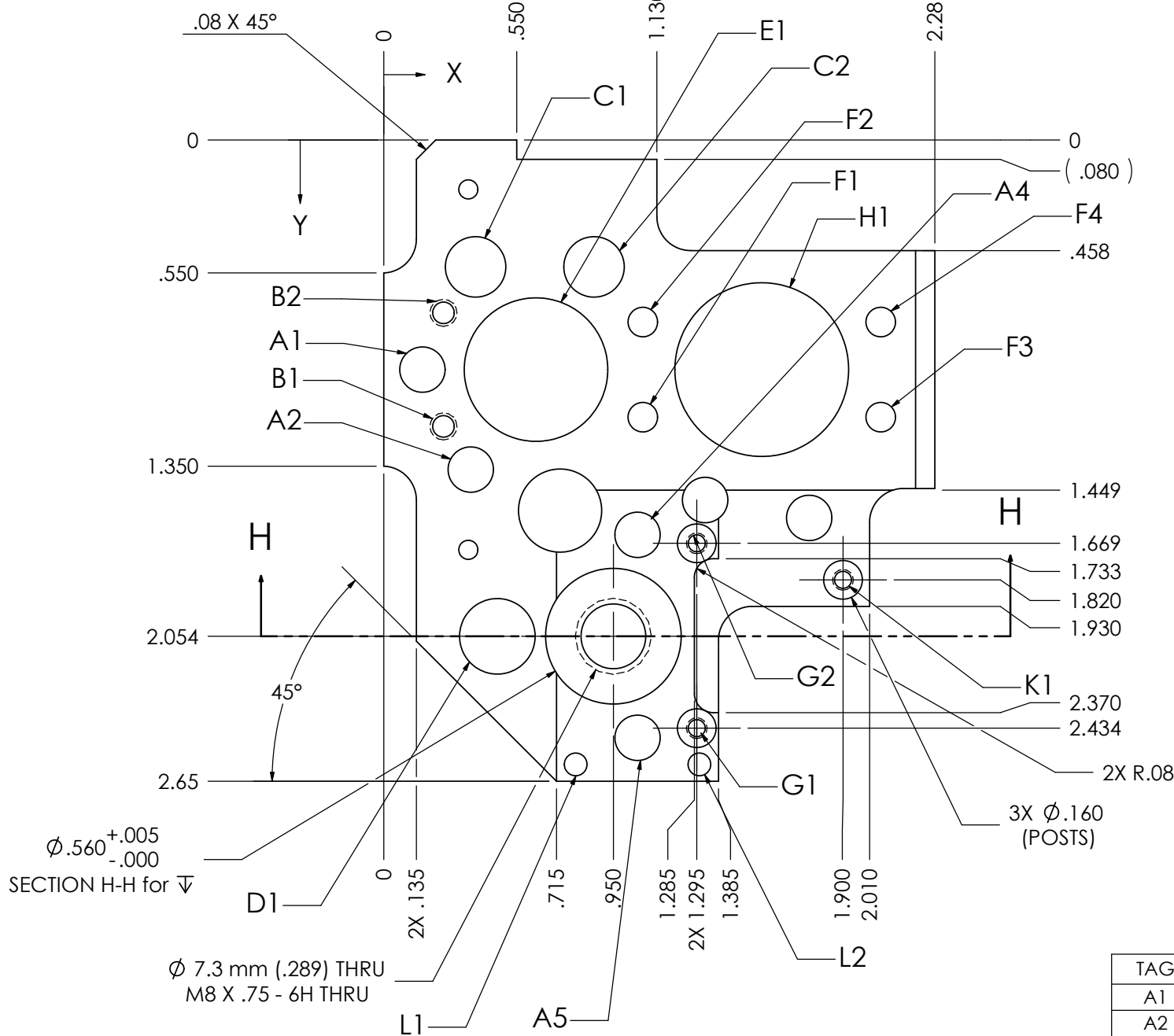
BILL OF MATERIALS					last updated on: Friday, April 08, 2005 1:30:13 PM	
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:			APPROVALS DATE	
Inspector		2 PLACE DIM ±.01	3 PLACE DIM ±.005	4 PLACE DIM ±.0005	ANGLES ±1°	ENGINEER Jason Feldman 831-775-1837
Shop Foreman		1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING 3. REMOVE BURRS & SHARP EDGES .010 MAX 4. MACHINED FILLET RADII .000 TO .015 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005 6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .001 PER INCH. MAX .003 INCHES FOR SINGLE SURFACE. 7. SURFACE FINISH TO BE 32 MICRON UNLESS OTHERWISE SPECIFIED				CHECKED
Engineer						PROJECT NUMBER 701312.00
NEXT ASSY Description	NEXT ASSY Number					PROJECT ESP 2G
DO NOT SCALE DRAWING						CAD FILE: X:\701312 ESP 2G\SolidWorks files\internal structure (1002209)
					Monterey Bay Aquarium Research Institute 7700 Sandholdt Road Moss Landing, CA 95039	
					manipulator	
					SIZE C	DWG. NO. 1002451
					REV. C	



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1002451-008
MANIPULATOR BOTTOM

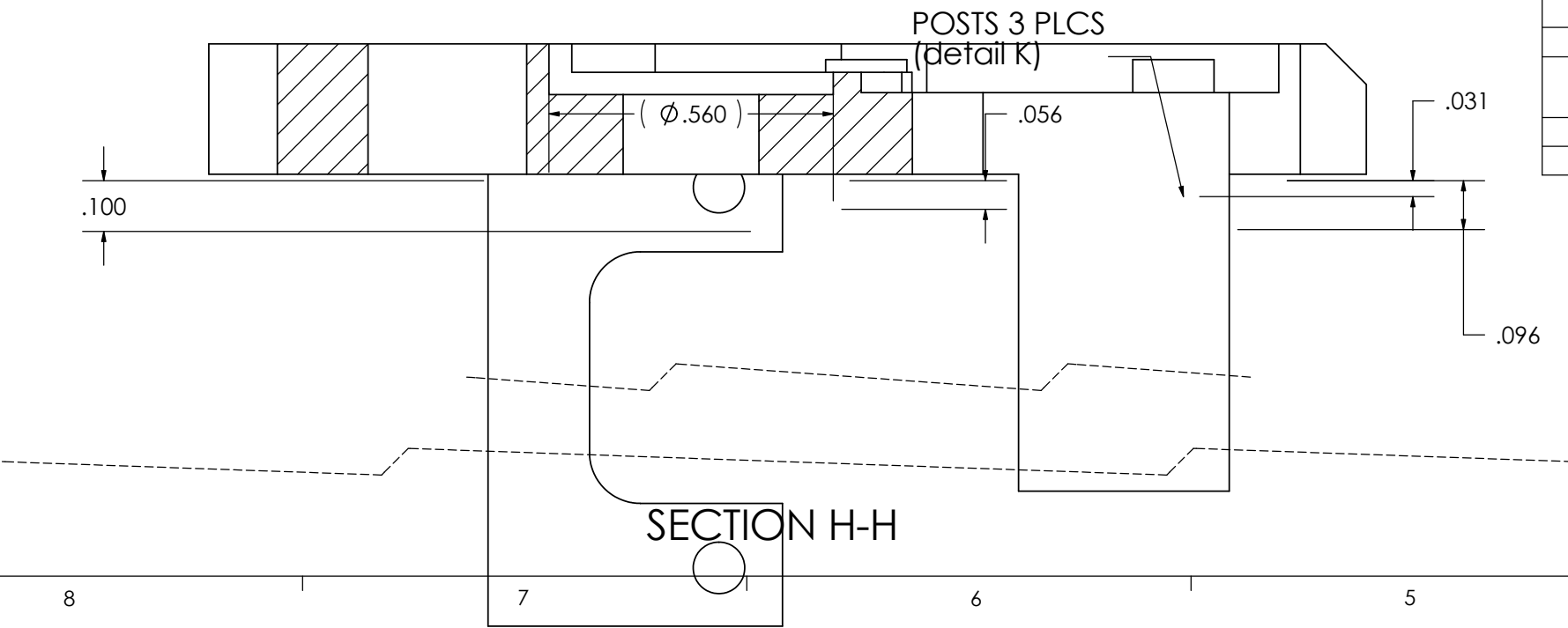
2X $\varnothing .102 \sqrt{.325 \text{ MIN}}$
5-40 UNC - 2B $\sqrt{.250 \text{ MIN}}$
(top hole is THRU)



TAG	X LOC	Y LOC	SIZE
A1	.160	.950	$\varnothing .188 \text{ THRU ALL}$
A2	.360	1.364	
A4	1.050	1.634	
A5	1.050	2.474	
B1	.247	1.185	$\varnothing .089 \text{ THRU ALL}$ 4-40 UNC - 2B THRU ALL
B2	.247	.715	
C1	.380	.525	$\varnothing .250 \text{ THRU ALL}$
C2	.870	.525	
D1	.470	2.054	$\varnothing .313 \text{ THRU ALL}$
E1	.630	.950	$\varnothing .594 \text{ THRU ALL}$
F1	1.072	1.147	$\varnothing .122 \text{ THRU ALL}$
F2	1.072	.753	
F3	2.056	1.147	
F4	2.056	.753	
G1	1.295	2.434	$\varnothing .070 \text{ THRU ALL}$ 2-56 UNC - 2B THRU ALL
G2	1.295	1.669	
H1	1.564	.950	$\varnothing .719 \text{ THRU ALL}$
K1	1.900	1.820	$\varnothing .070 \sqrt{.334}$ 2-56 UNC - 2B $\sqrt{.280}$
L1	.794	2.584	
L2	1.306	2.584	$\varnothing .094 \text{ THRU}$

DETAIL K

DETAIL J



ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
8	1002451-008	manipulator bottom	Aluminum 7075-T6	1

BILL OF MATERIALS				last updated on: Friday, April 08, 2005 1:30:13 PM	
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		APPROVALS DATE	
Inspector		2 PLACE DIM ±.01	3 PLACE DIM ±.005	4 PLACE DIM ±.0005	ANGLES ±1°
Shop Foreman		1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING 3. REMOVE BURRS & SHARP EDGES .010 MAX 4. MACHINED FILLET RADII .000 TO .015 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005 6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .001 PER INCH. MAX .003 INCHES FOR SINGLE SURFACE. 7. SURFACE FINISH TO BE 32 MICRON UNLESS OTHERWISE SPECIFIED			
Engineer		PROJECT NUMBER 701312.00			
NEXT ASSY Description	NEXT ASSY Number				
		PROJECT ESP 2G		manipulator	
DO NOT SCALE DRAWING		C		SIZE DWG. NO. 1002451	REV. C
		CAD FILE: X:\701312 ESP 2G\SolidWorks files\internal structure (1002209) SHEET 10 OF 19			

Monterey Bay Aquarium Research Institute
7700 Sandholdt Road
Moss Landing, CA 95039



manipulator

SIZE C DWG. NO. 1002451 REV. C

1002451-009
MANIPULATOR PUCK RETAINER

16

L

L

R.06 TYPICAL

2X .200

.082

.248

.248

.082

2X .143

VIEW L-L

$\varnothing 1.225^{+.005}_{-.000}$

2X 39°

0

(.247)

CL

.400

M

(.553)

.800

CL

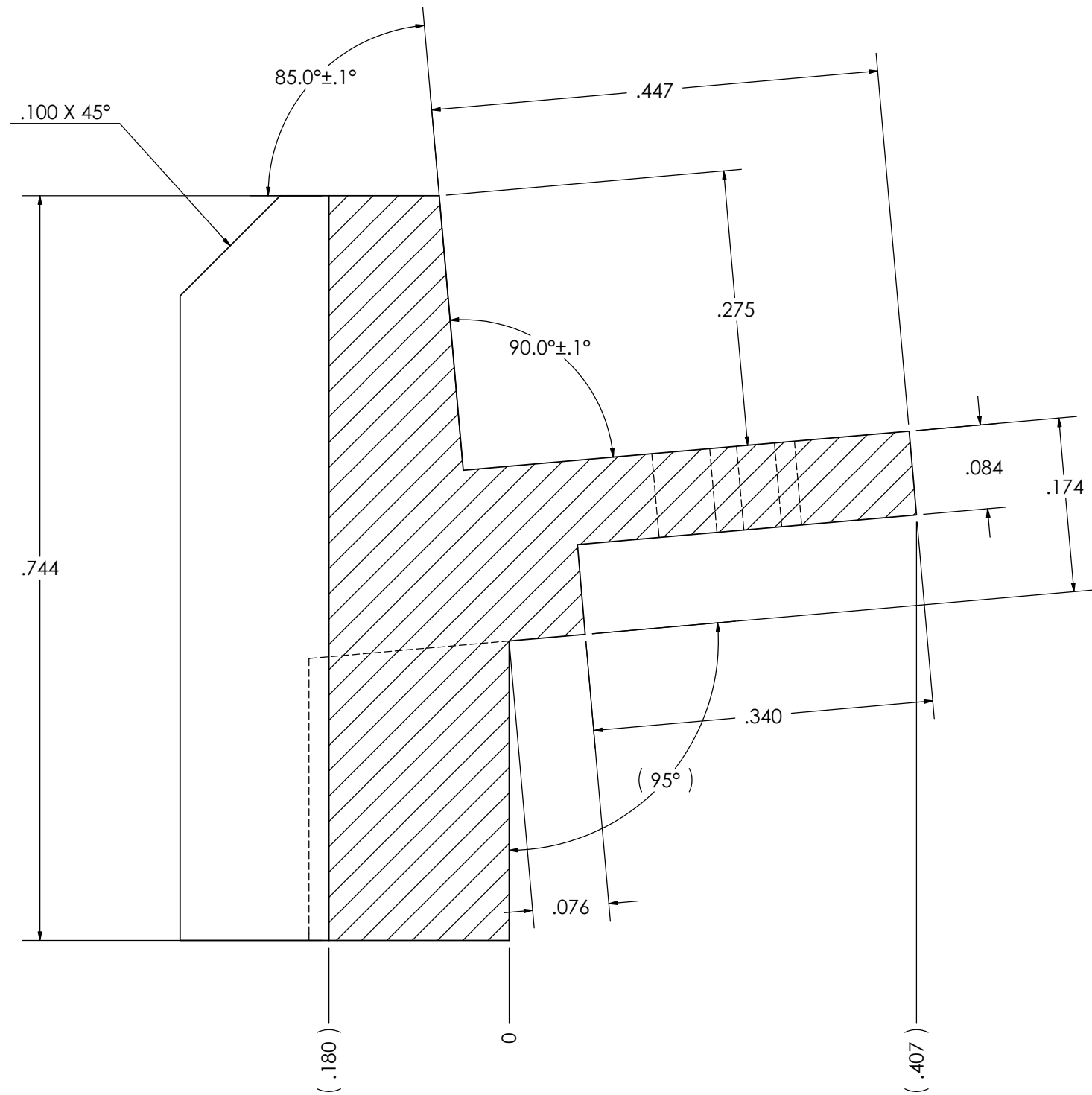
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(.329)

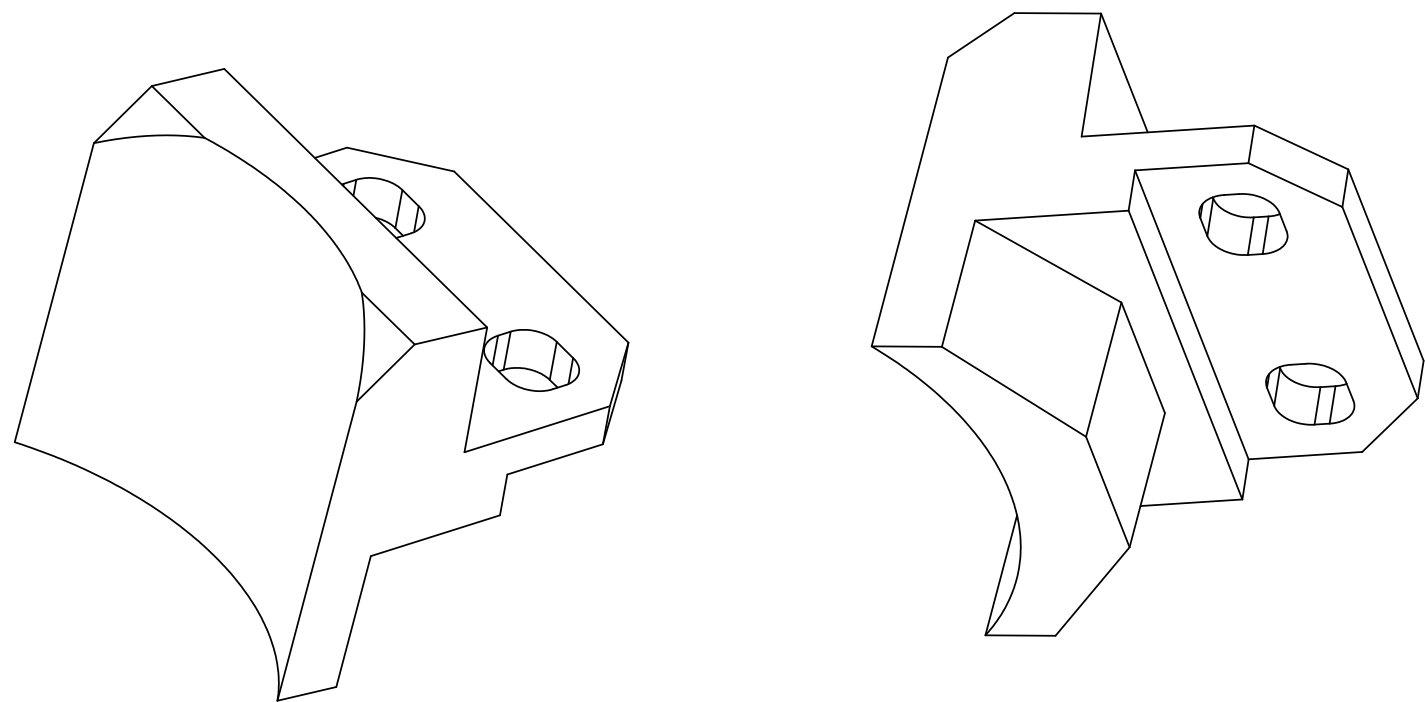
.200

0

(.415)



SECTION M-M



ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
9	1002451-009	manipulator puck retainer	Delrin AF (Teflon filled)	2

BILL OF MATERIALS					last updated on: Friday, April 08, 2005 1:30:13 PM	
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:			APPROVALS DATE	
Inspector		2 PLACE DIM ±.01	3 PLACE DIM ±.005	4 PLACE DIM ±.0005	ANGLES ±1°	ENGINEER Jason Feldman 831-775-1837
Shop Foreman		1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING 3. REMOVE BURRS & SHARP EDGES .010 MAX 4. MACHINED FILLET RADII .000 TO .015 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005 6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .001 PER INCH. MAX .003 INCHES FOR SINGLE SURFACE. 7. SURFACE FINISH TO BE 32 MICRON UNLESS OTHERWISE SPECIFIED				CHECKED
Engineer						PROJECT NUMBER 701312.00
NEXT ASSY Description	NEXT ASSY Number					PROJECT ESP 2G
DO NOT SCALE DRAWING		SIZE C		DWG. NO. 1002451		REV. C
CAD FILE: X:\701312 ESP 2G\SolidWorks files\internal structure (1002209)				SHEET 11 OF 19		

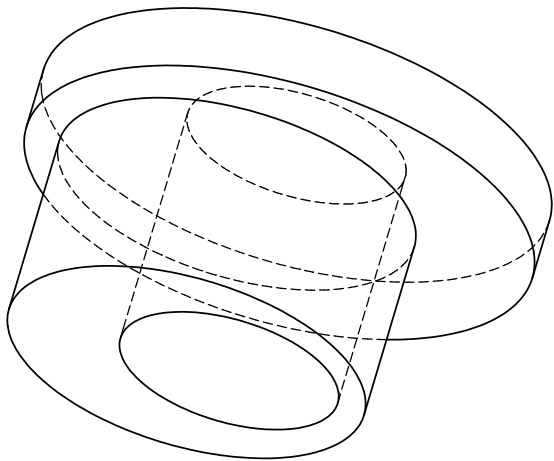
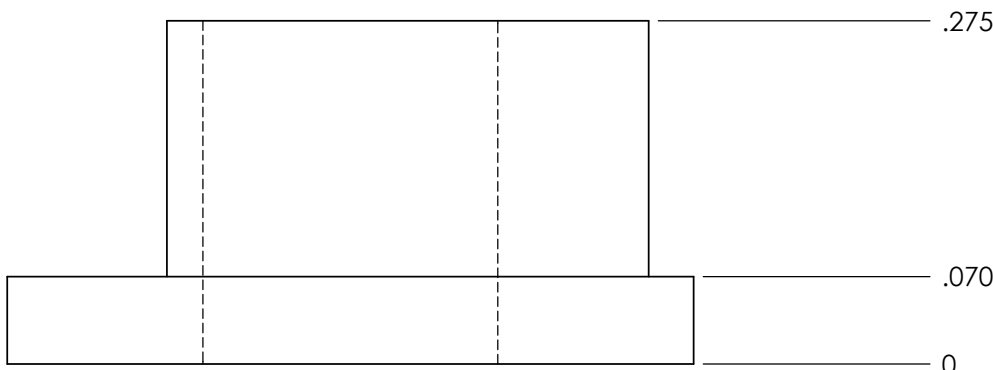
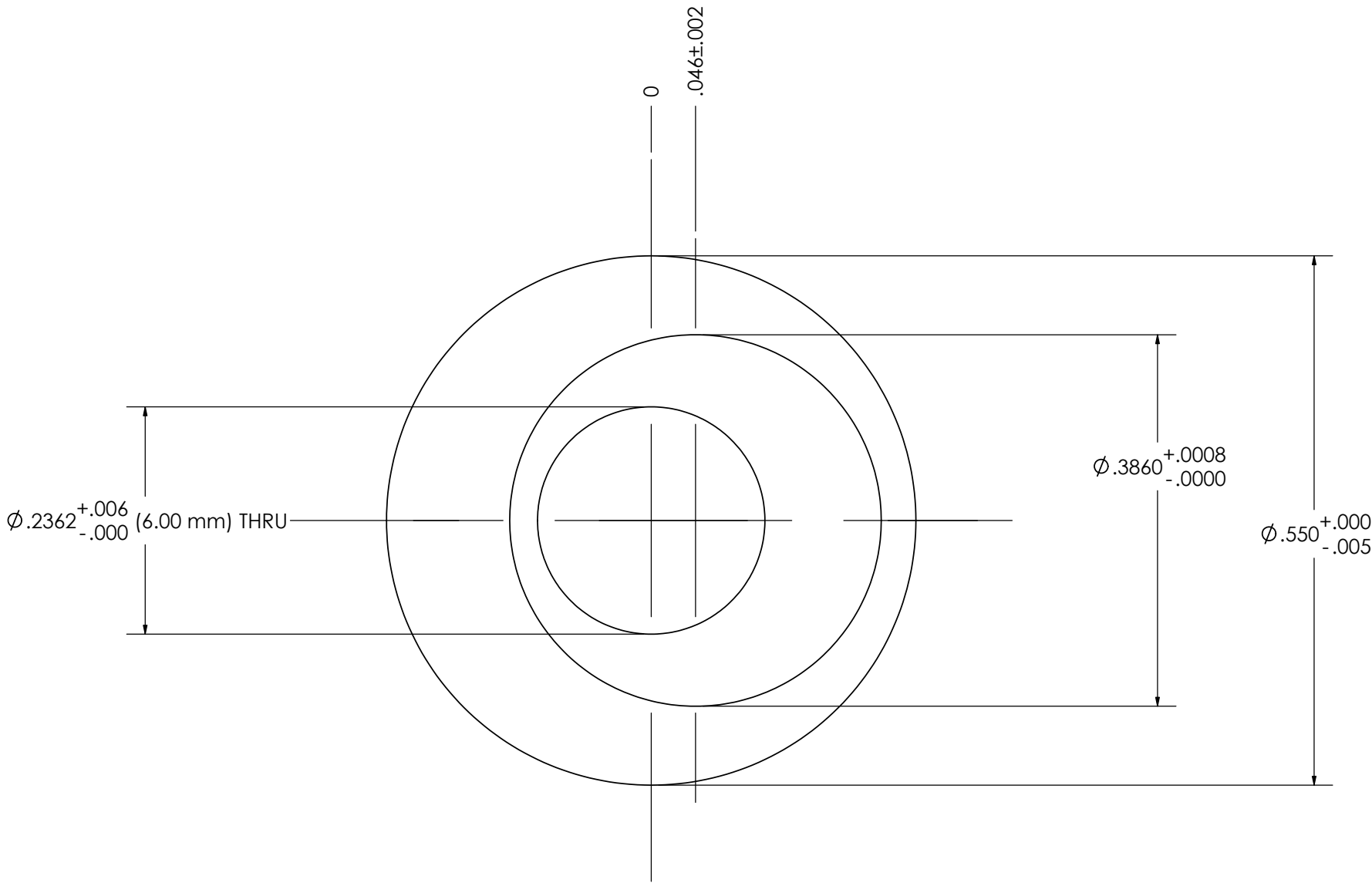
Monterey Bay Aquarium Research Institute

7700 Sandholdt Road
Moss Landing, CA
95039

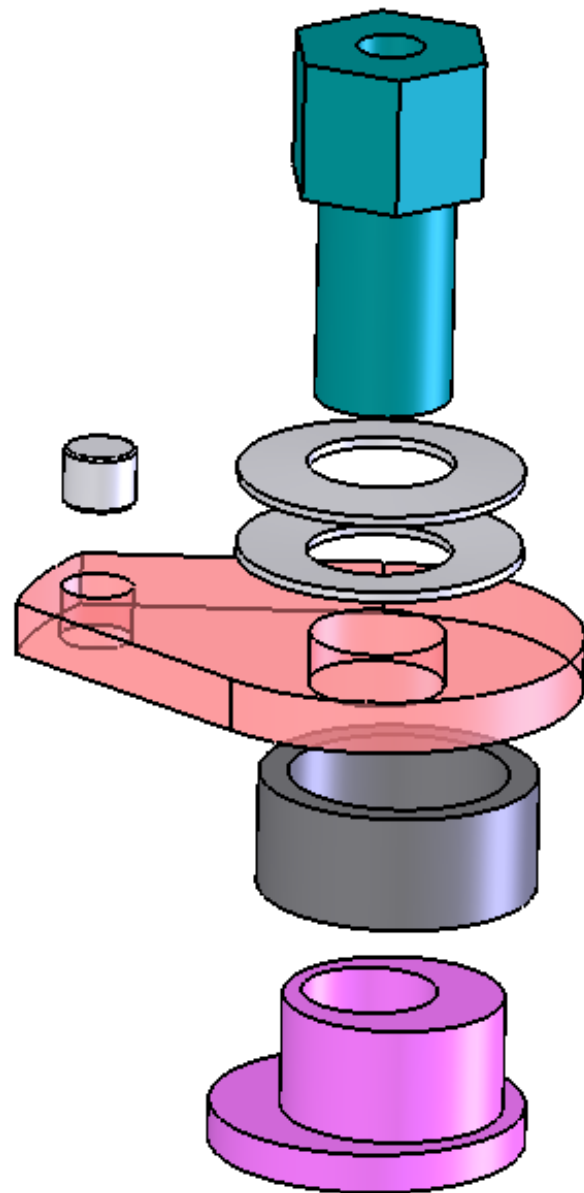
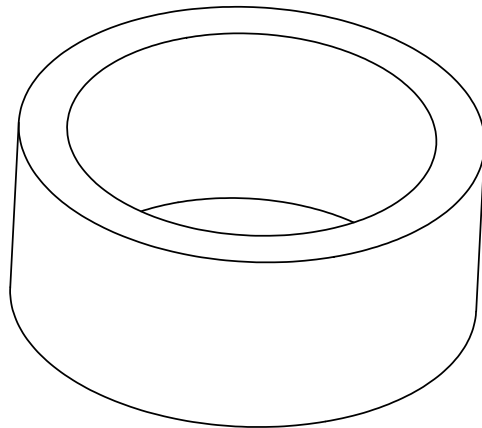
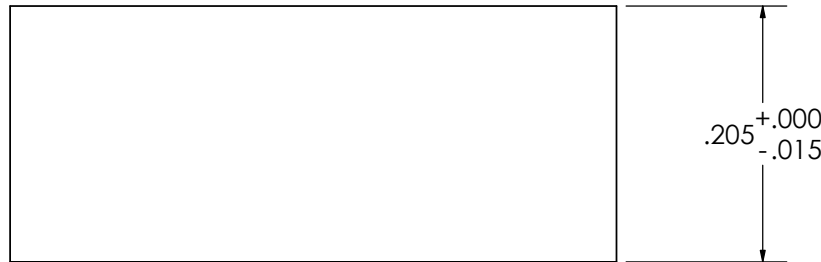
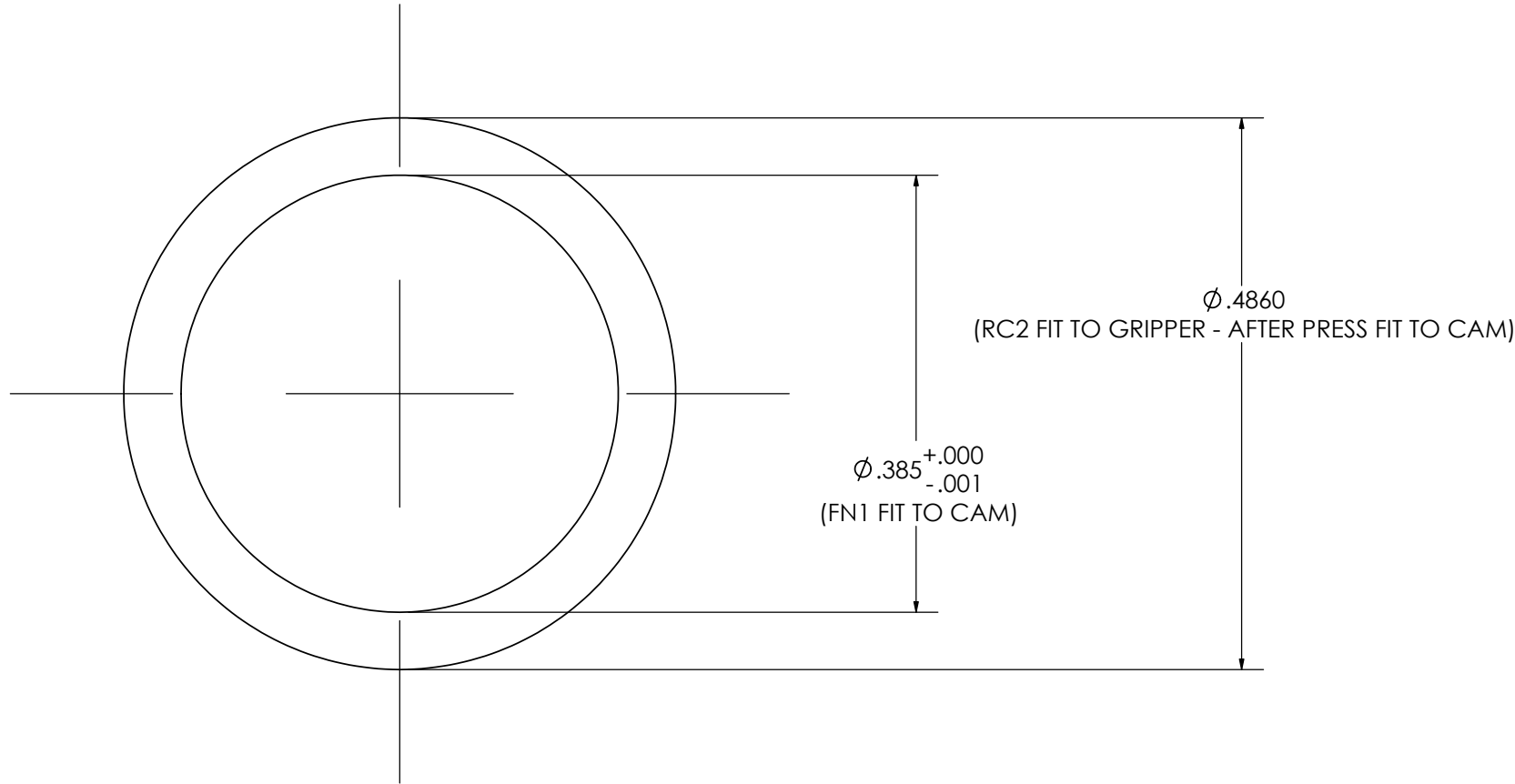


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1002451-010
MANIPULATOR CAM



1002451-021
CAM TIRE

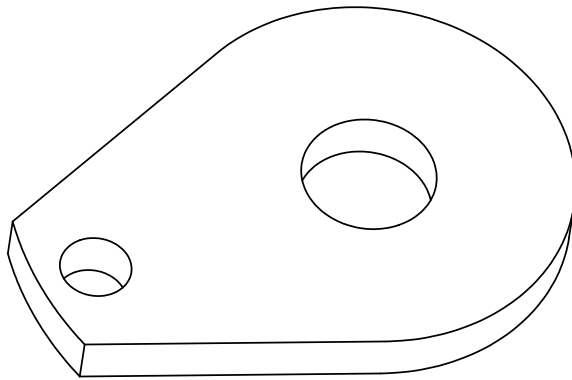
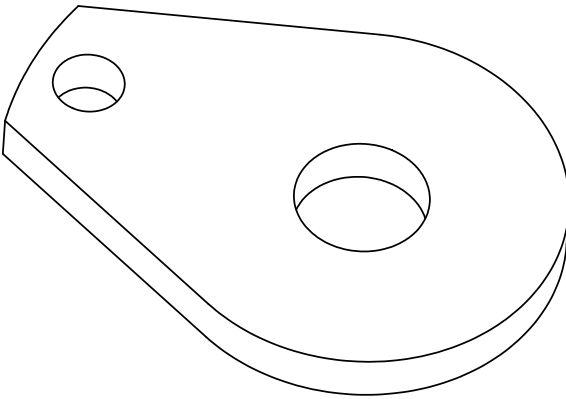
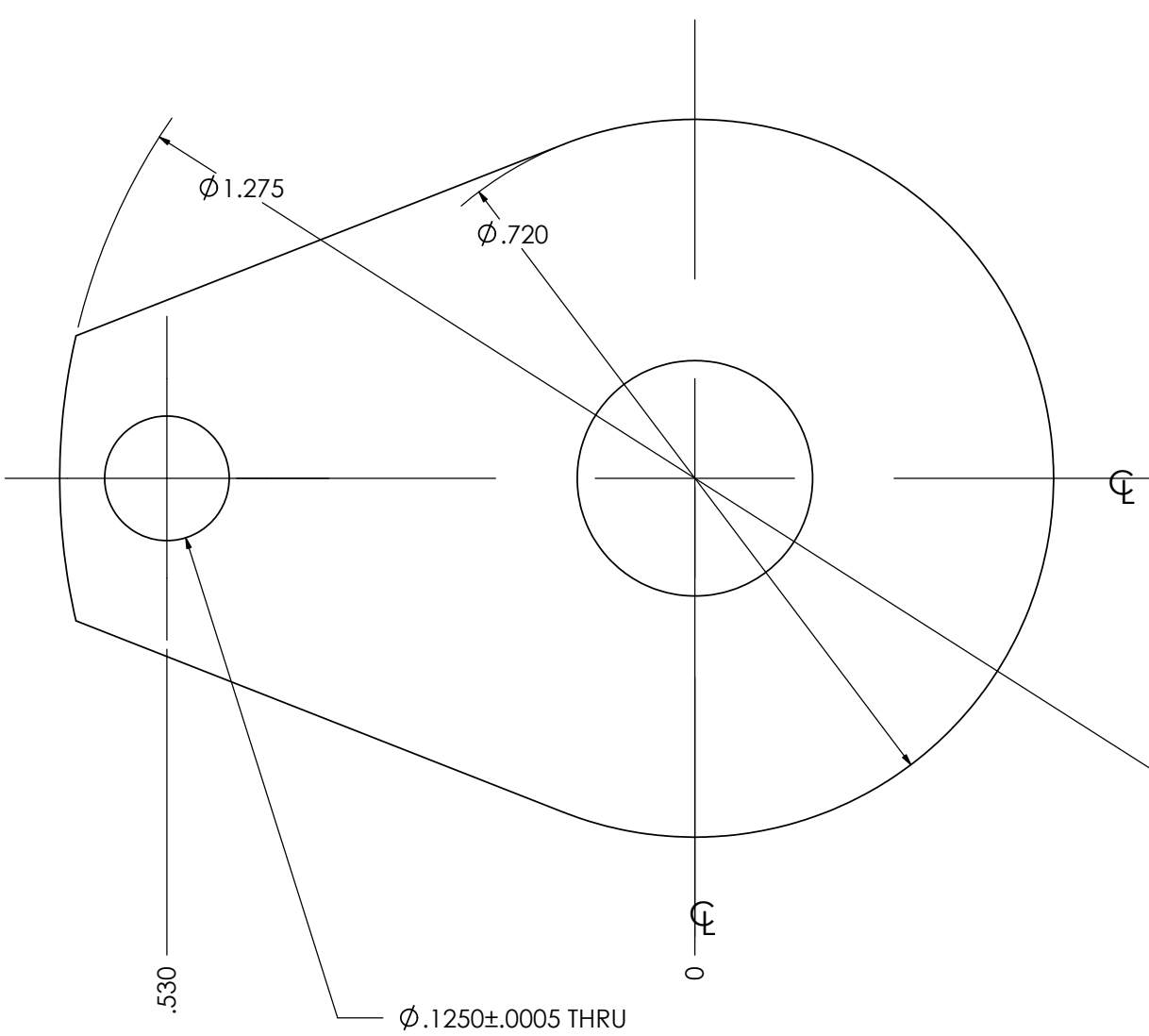
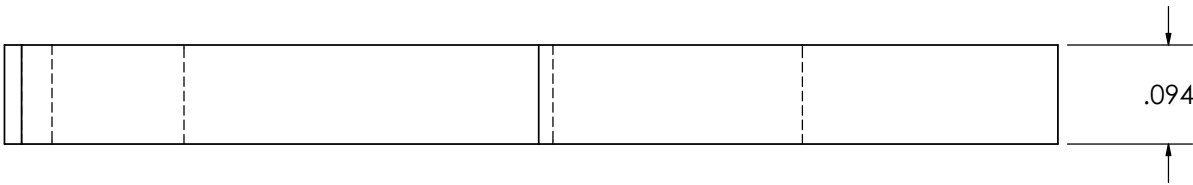
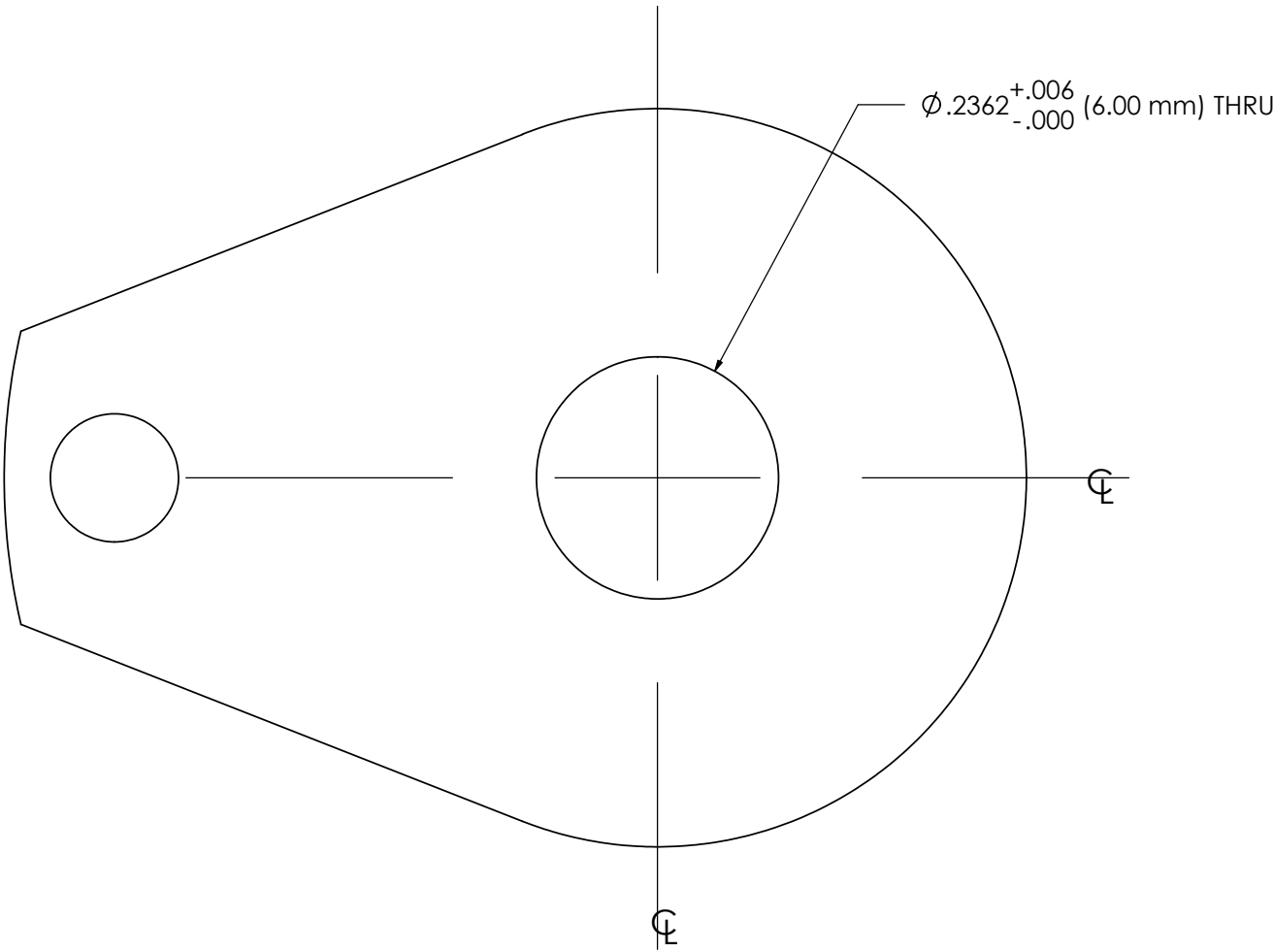


ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
10	1002451-010	manipulator CAM	Stainless Steel	1
21	1002451-021	CAM TIRE	Vespel SP-21	1

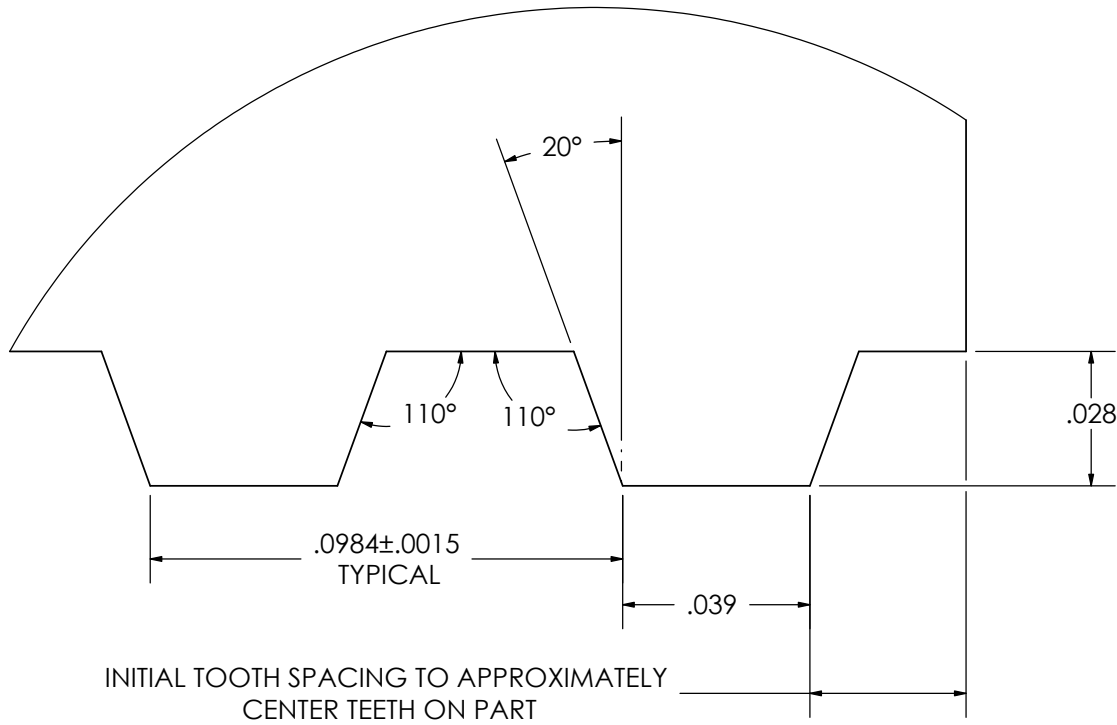
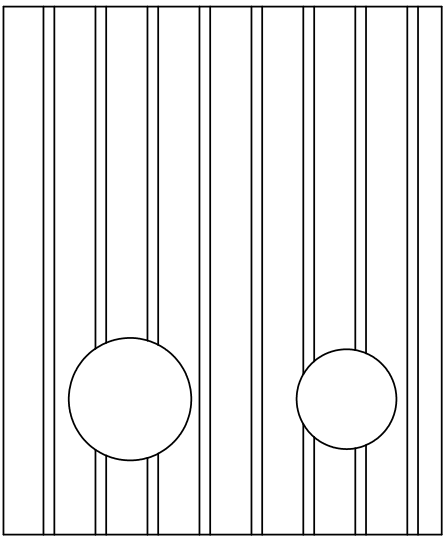
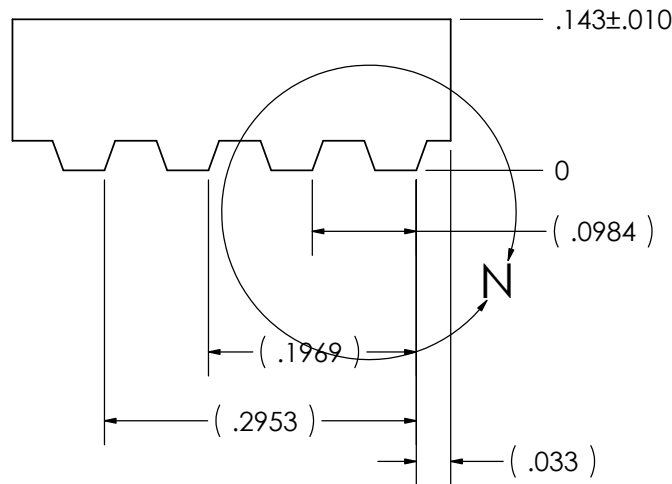
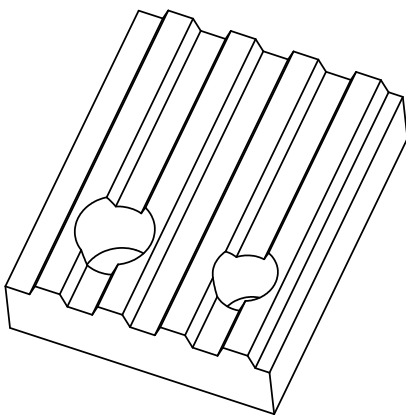
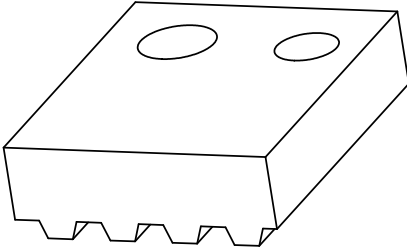
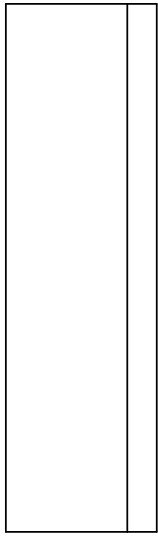
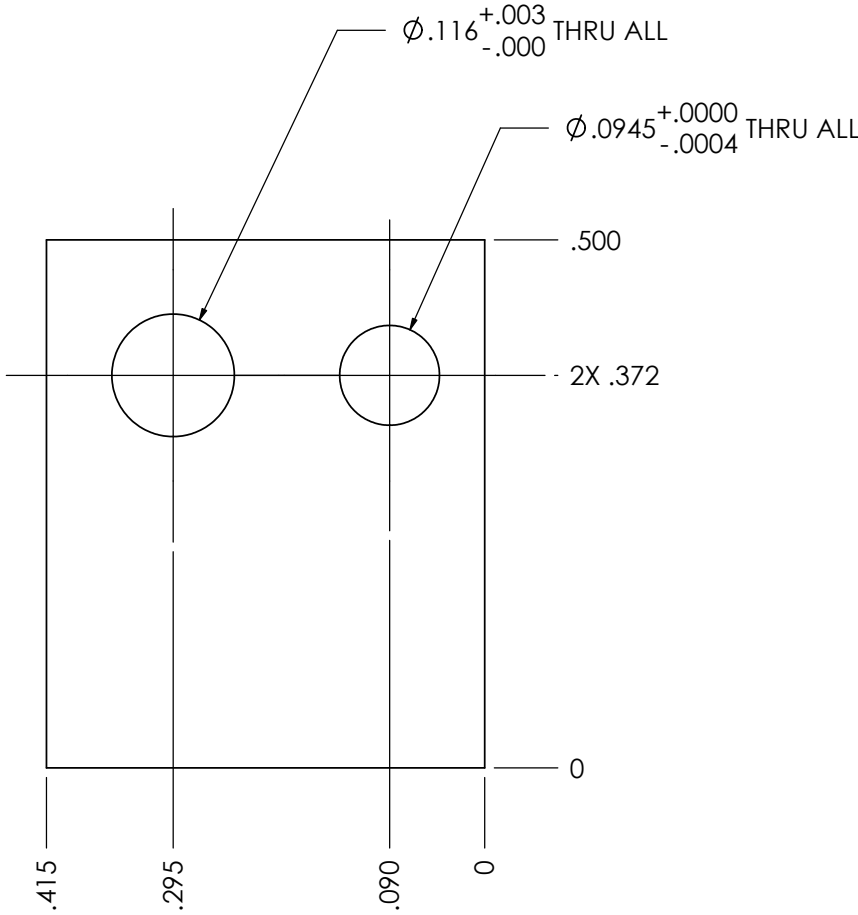
BILL OF MATERIALS				last updated on: Friday, April 08, 2005 1:30:13 PM	
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		APPROVALS	DATE
Inspector		2 PLACE DIM ±.01	3 PLACE DIM ±.005	ENGINEER Jason Feldman 831-775-1837	Monterey Bay Aquarium Research Institute 7700 Sandholdt Road Moss Landing, CA 95039 
Shop Foreman		4 PLACE DIM ±.0005	ANGLES ±1°	CHECKED	
Engineer		1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING 3. REMOVE BURRS & SHARP EDGES .010 MAX 4. MACHINED FILLET RADII .000 TO .015 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005			
NEXT ASSY Description	NEXT ASSY Number	6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .001 PER INCH. MAX .003 INCHES FOR SINGLE SURFACE. 7. SURFACE FINISH TO BE 32 MICRON UNLESS OTHERWISE SPECIFIED			
DO NOT SCALE DRAWING				PROJECT NUMBER 701312.00	manipulator
				PROJECT ESP 2G	SIZE C
					DWG. NO. 1002451
					REV. C
				CAD FILE: X:\701312 ESP 2G\SolidWorks files\internal structure (1002209) SHEET 12 OF 19	

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1002451-012
MANIPULATOR REED WHEEL



1002451-013
MANIPULATOR BELT CLAMP



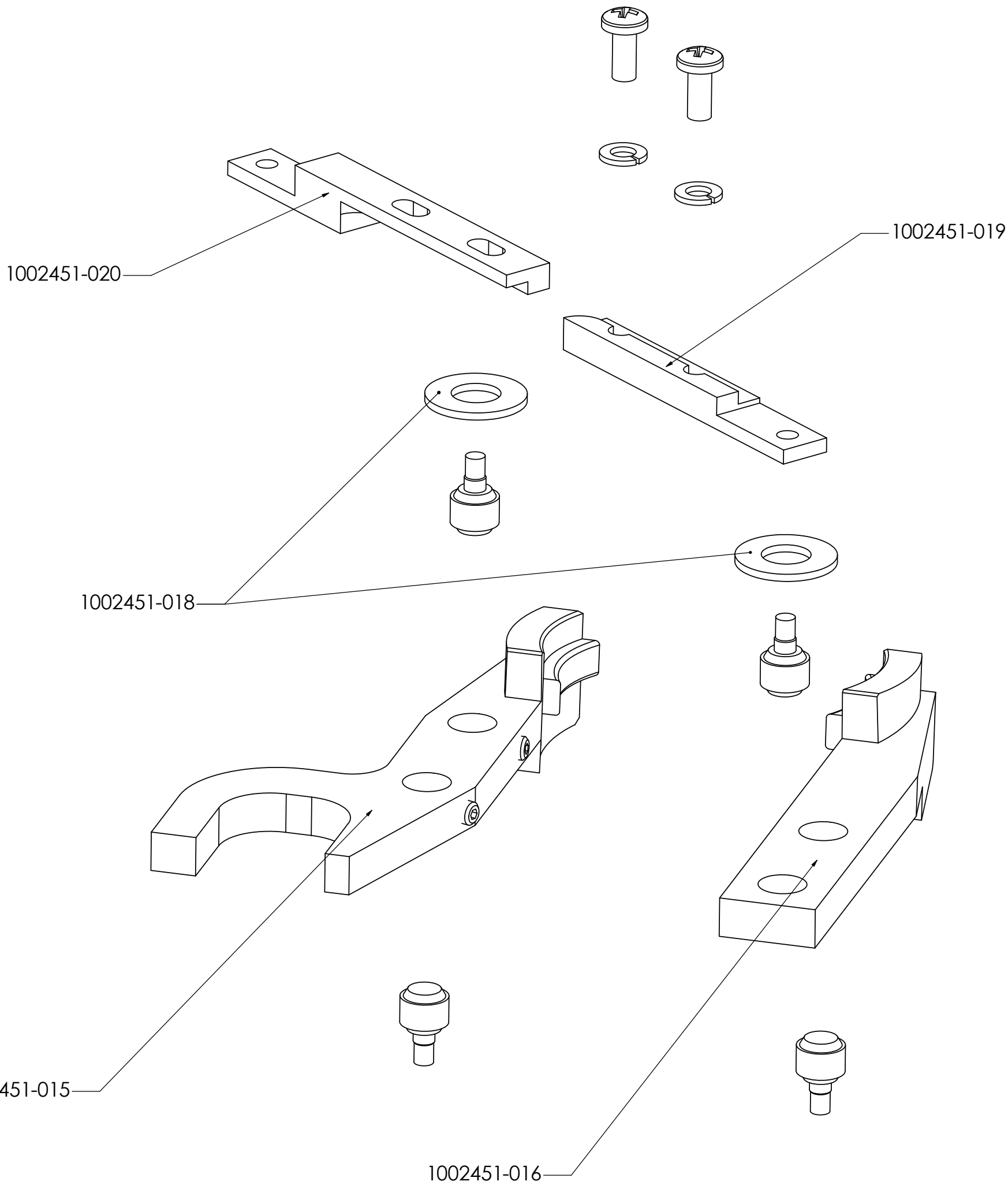
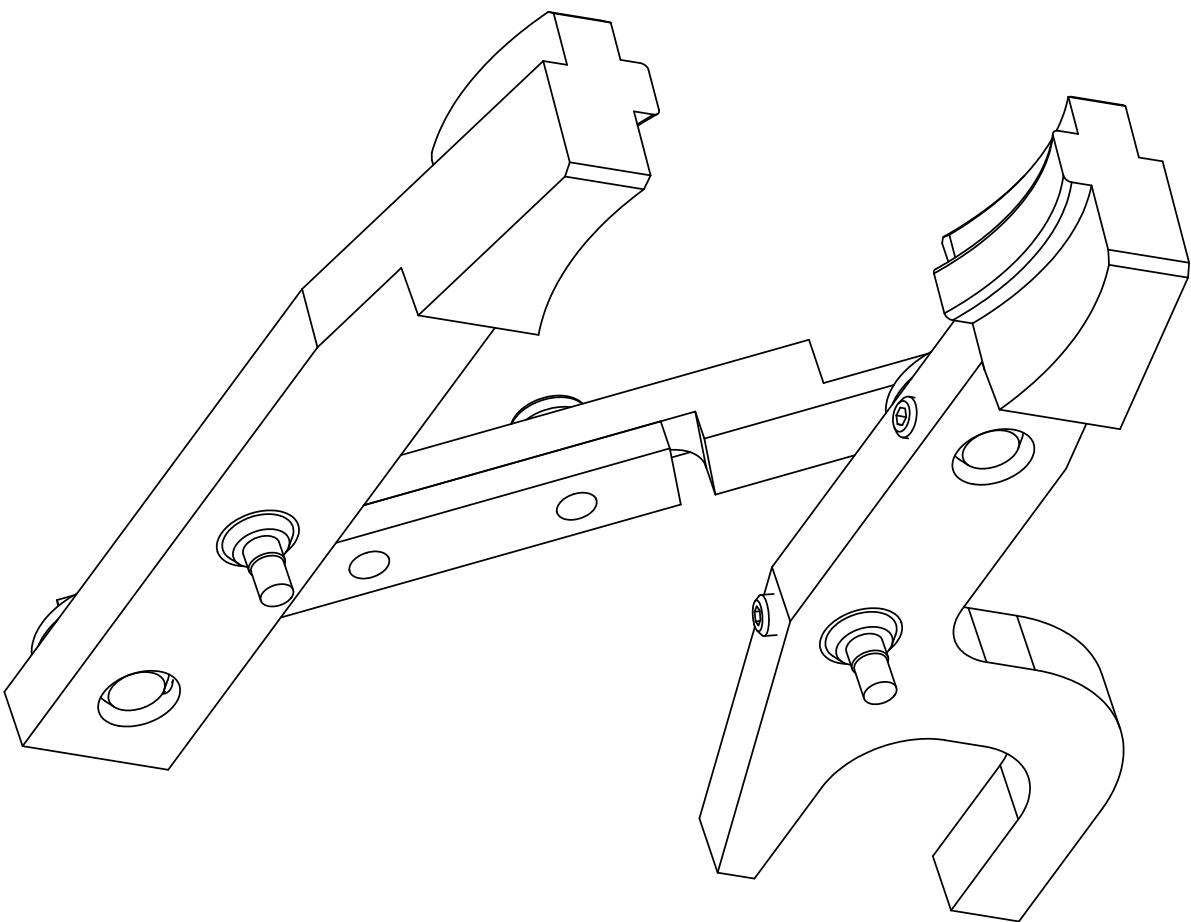
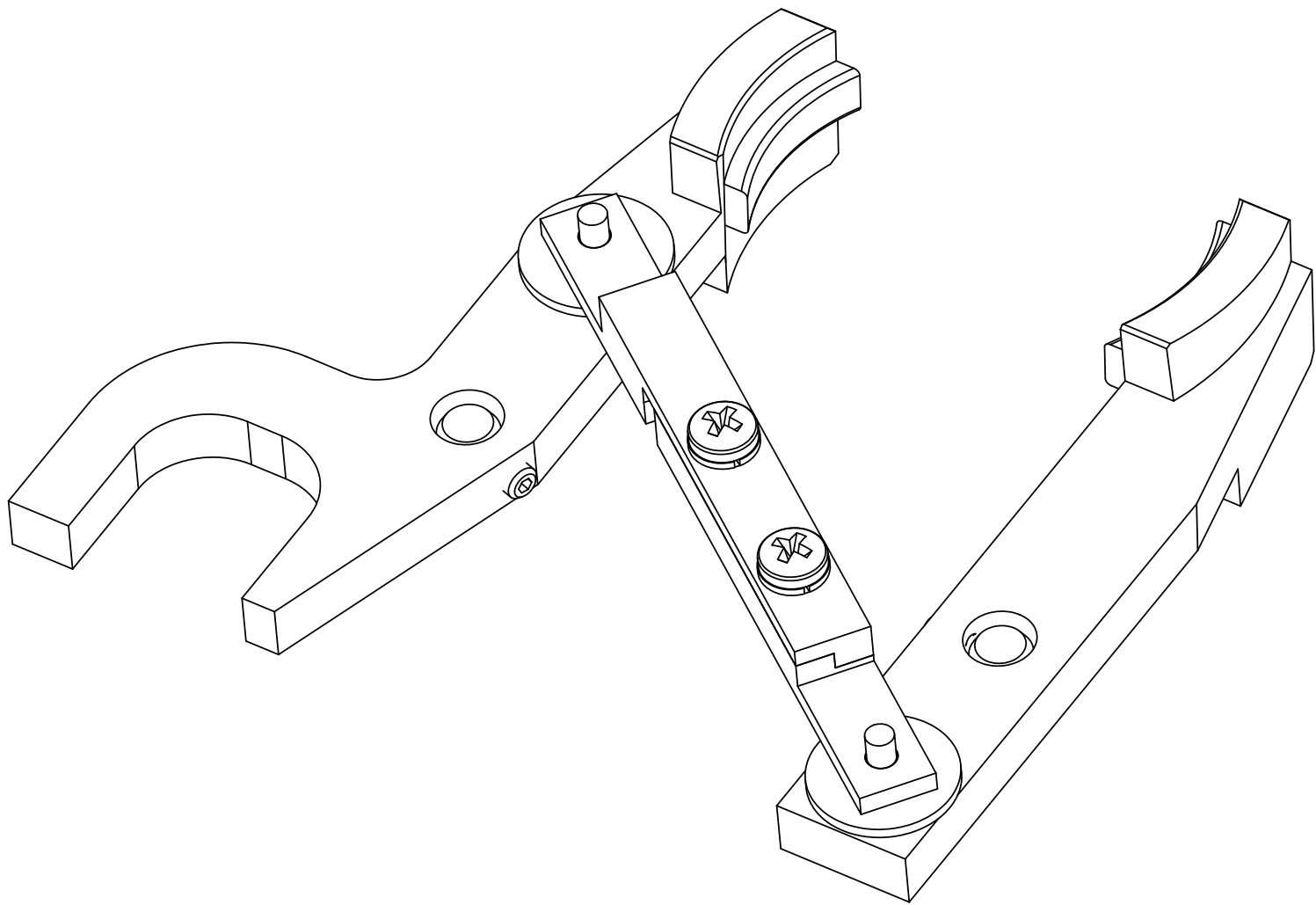
DETAIL N

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
12	1002451-012	manipulator reed wheel	7075-T6 or -T651 Aluminum	1
13	1002451-013	manipulator belt clamp	Brass	2

BILL OF MATERIALS				last updated on: Friday, April 08, 2005 1:30:13 PM	
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		APPROVALS DATE	
Inspector		2 PLACE DIM ±.01	3 PLACE DIM ±.005	ENGINEER Jason Feldman 831-775-1837	
Shop Foreman		4 PLACE DIM ±.0005	ANGLES ±1°	CHECKED	
Engineer		1. DIMENSIONS ARE IN INCHES		PROJECT NUMBER 701312.00	
NEXT ASSY Description		2. DIMENSION LIMITS HELD AFTER PLATING		PROJECT ESP 2G	
NEXT ASSY Number		3. REMOVE BURRS & SHARP EDGES .010 MAX		SIZE C	
		4. MACHINED FILLET RADII .000 TO .015		DWG. NO. 1002451	
		5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005		REV. C	
		6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .001 PER INCH. MAX. .003 INCHES FOR SINGLE SURFACE.		CAD FILE: X:\701312 ESP 2G\SolidWorks files\internal structure (1002209)	
		7. SURFACE FINISH TO BE 32 MICRON UNLESS OTHERWISE SPECIFIED		SHEET 13 OF 19	

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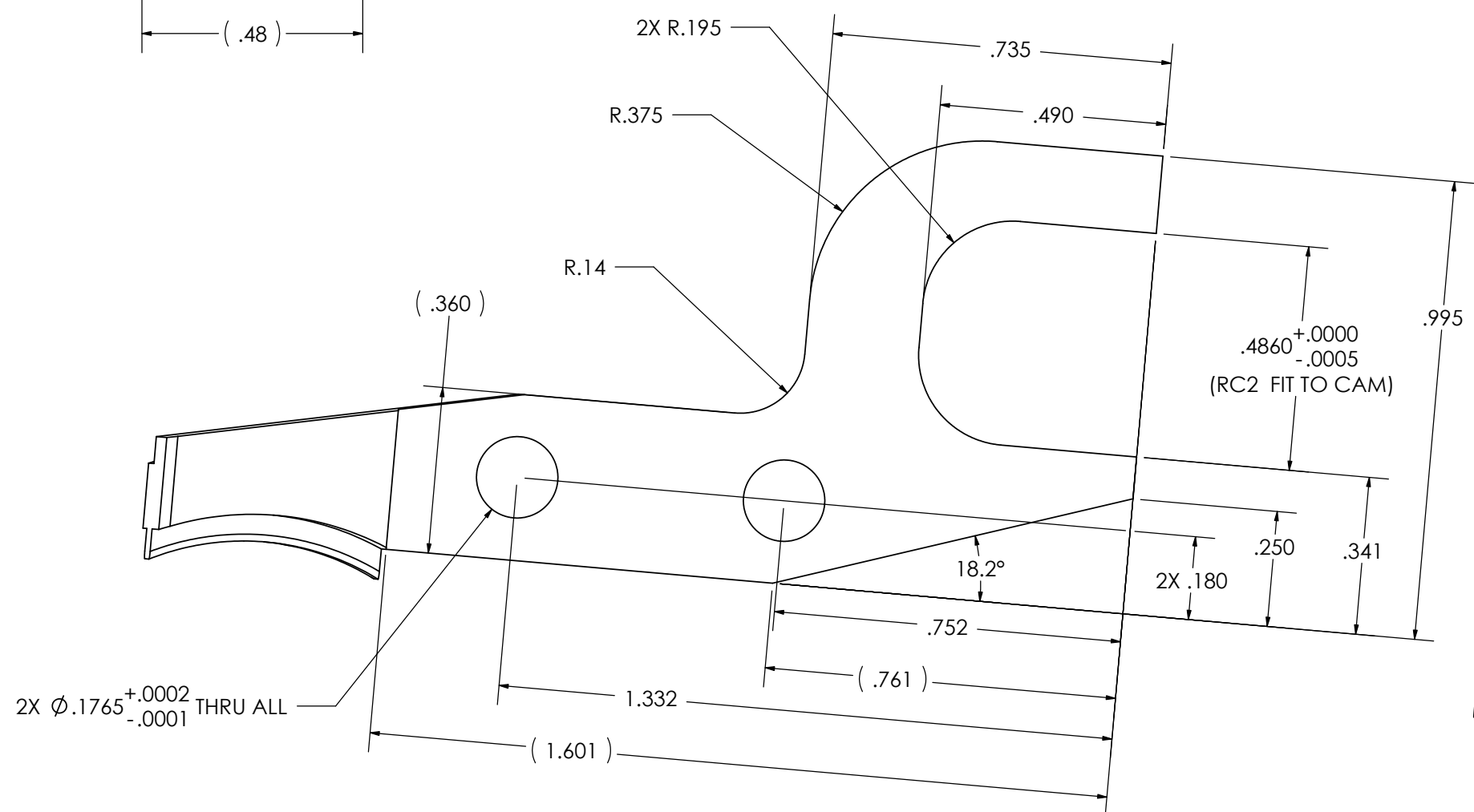
MANIPULATOR GRIPPER - assembly



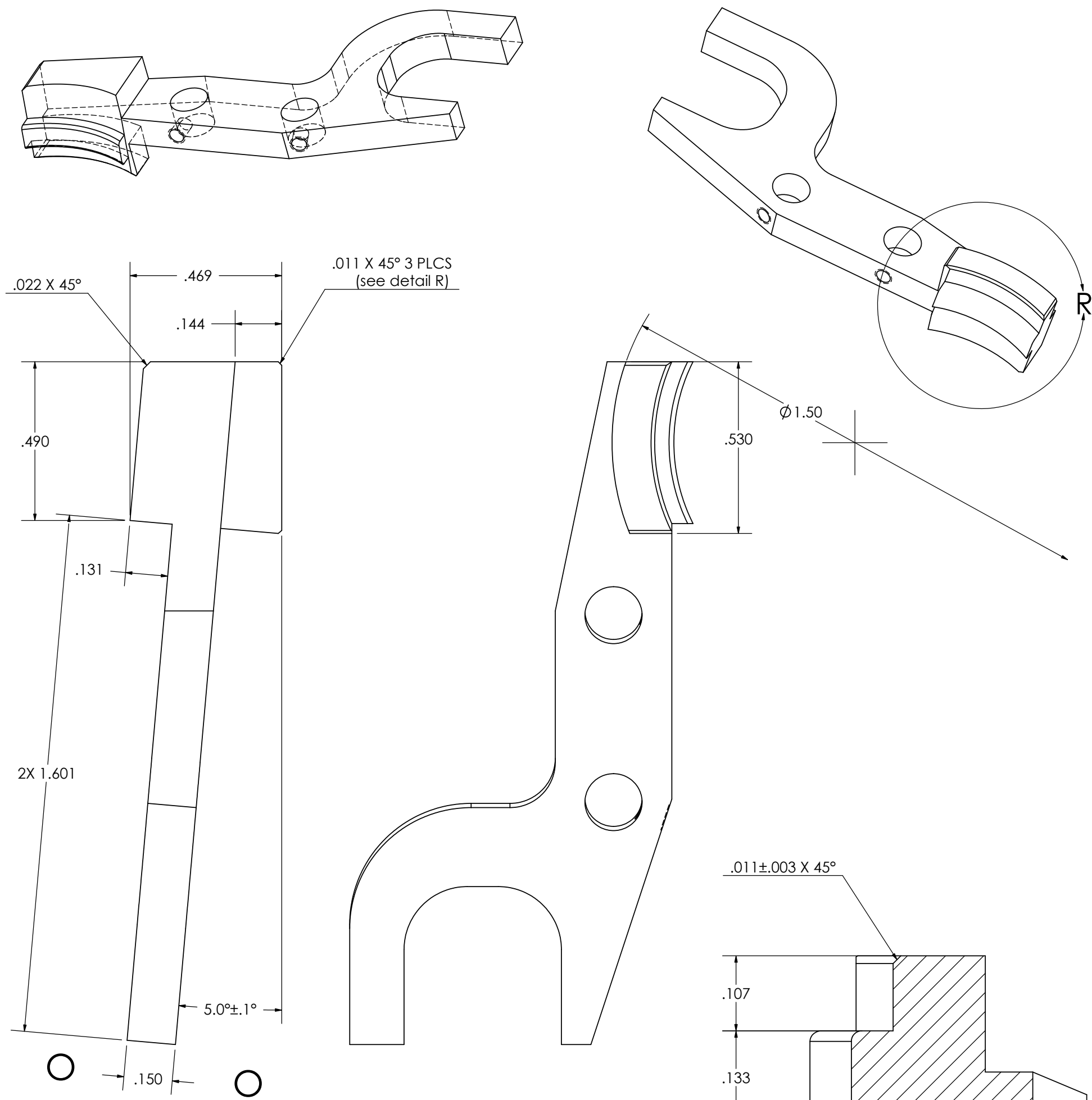
BILL OF MATERIALS					last updated on: Friday, April 08, 2005 1:30:13 PM			
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:			APPROVALS	DATE	Monterey Bay Aquarium Research Institute	
Inspector		2 PLACE DIM ±.01	3 PLACE DIM ±.005	4 PLACE DIM ±.0005	ENGINEER Jason Feldman 831-775-1837		7700 Sandholdt Road Moss Landing, CA 95039	M B A R I
Shop Foreman		1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING 3. REMOVE BURRS & SHARP EDGES .010 MAX 4. MACHINED FILLET RADII .000 TO .015 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005			CHECKED			
Engineer					PROJECT NUMBER 701312.00	manipulator		
NEXT ASSY Description	NEXT ASSY Number	6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .001 PER INCH. MAX .003 INCHES FOR SINGLE SURFACE. 7. SURFACE FINISH TO BE 32 MICRON UNLESS OTHERWISE SPECIFIED			PROJECT ESP 2G	SIZE C	DWG. NO. 1002451	REV. C
DO NOT SCALE DRAWING					CAD FILE: X:\701312 ESP 2G\SolidWorks files\internal structure (1002209)	SHEET 14 OF 19		



41002451-015
GRIPPER WITH CAM



VIEW P-P



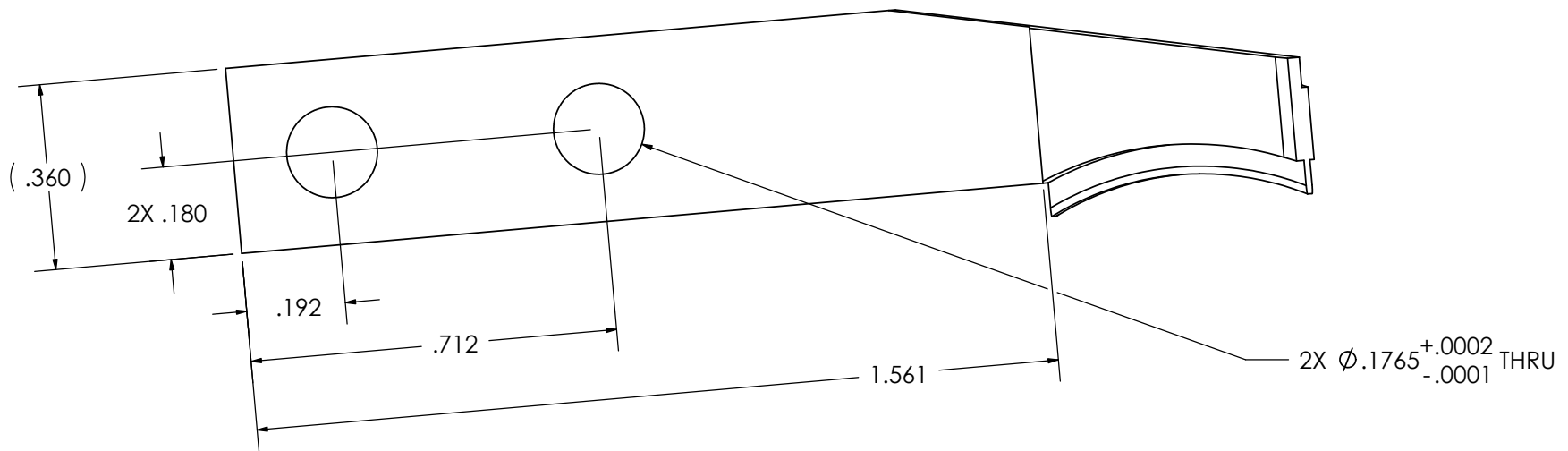
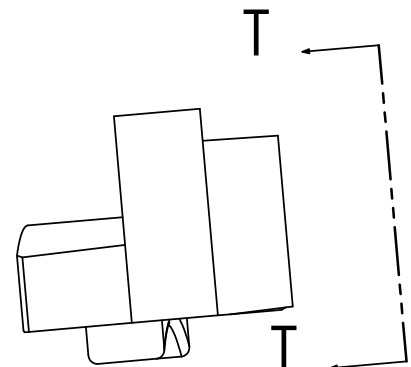
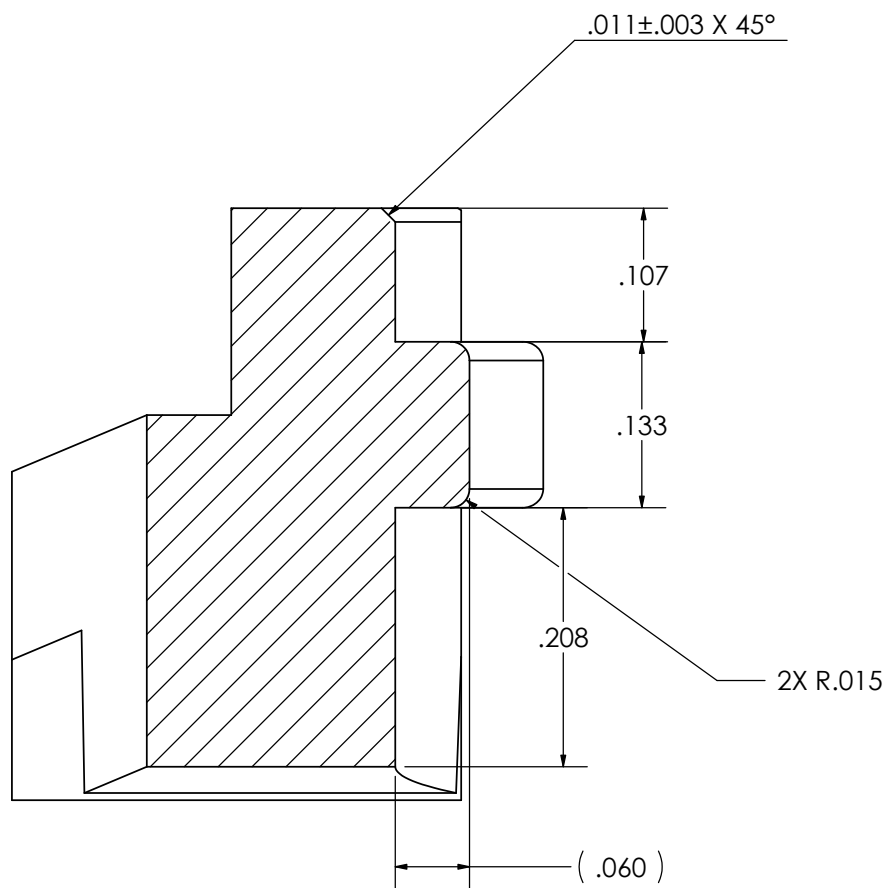
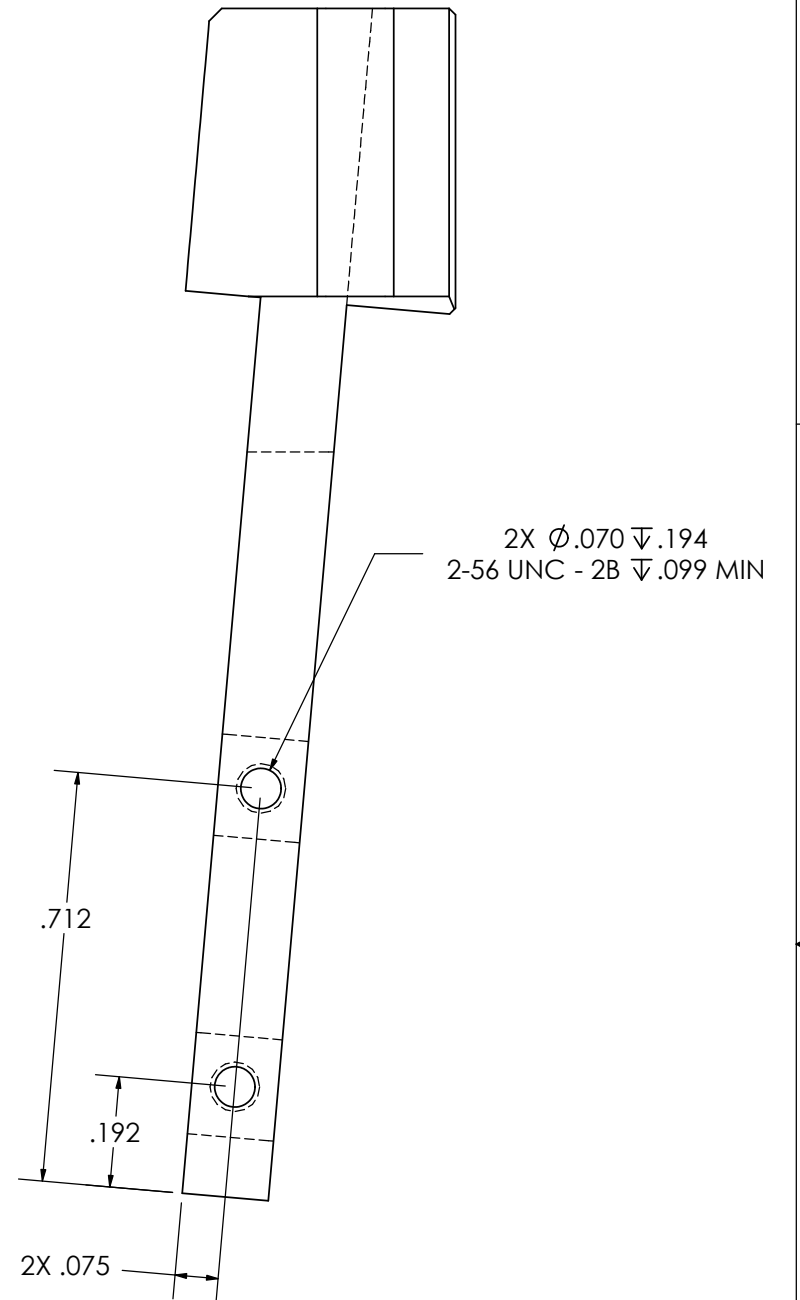
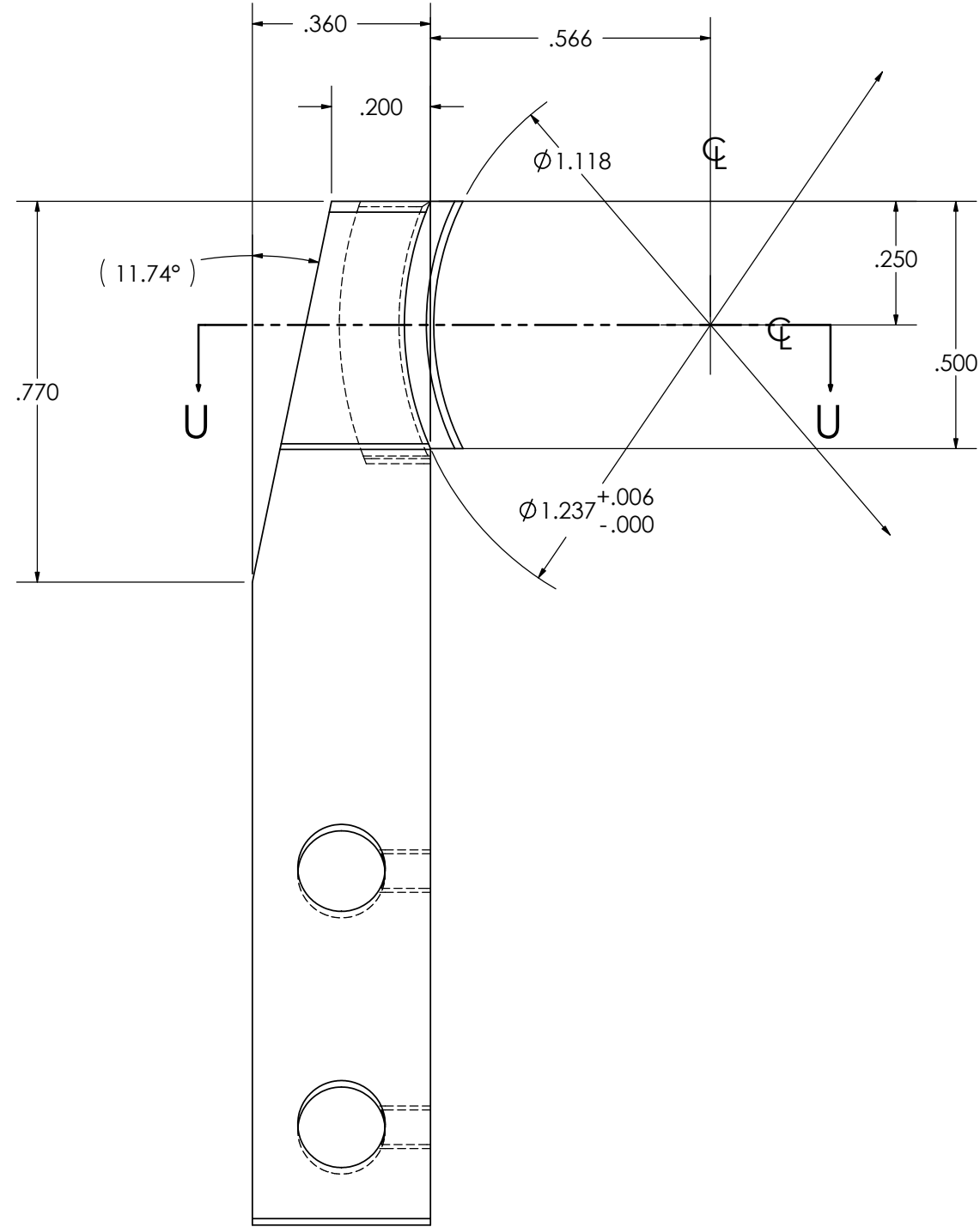
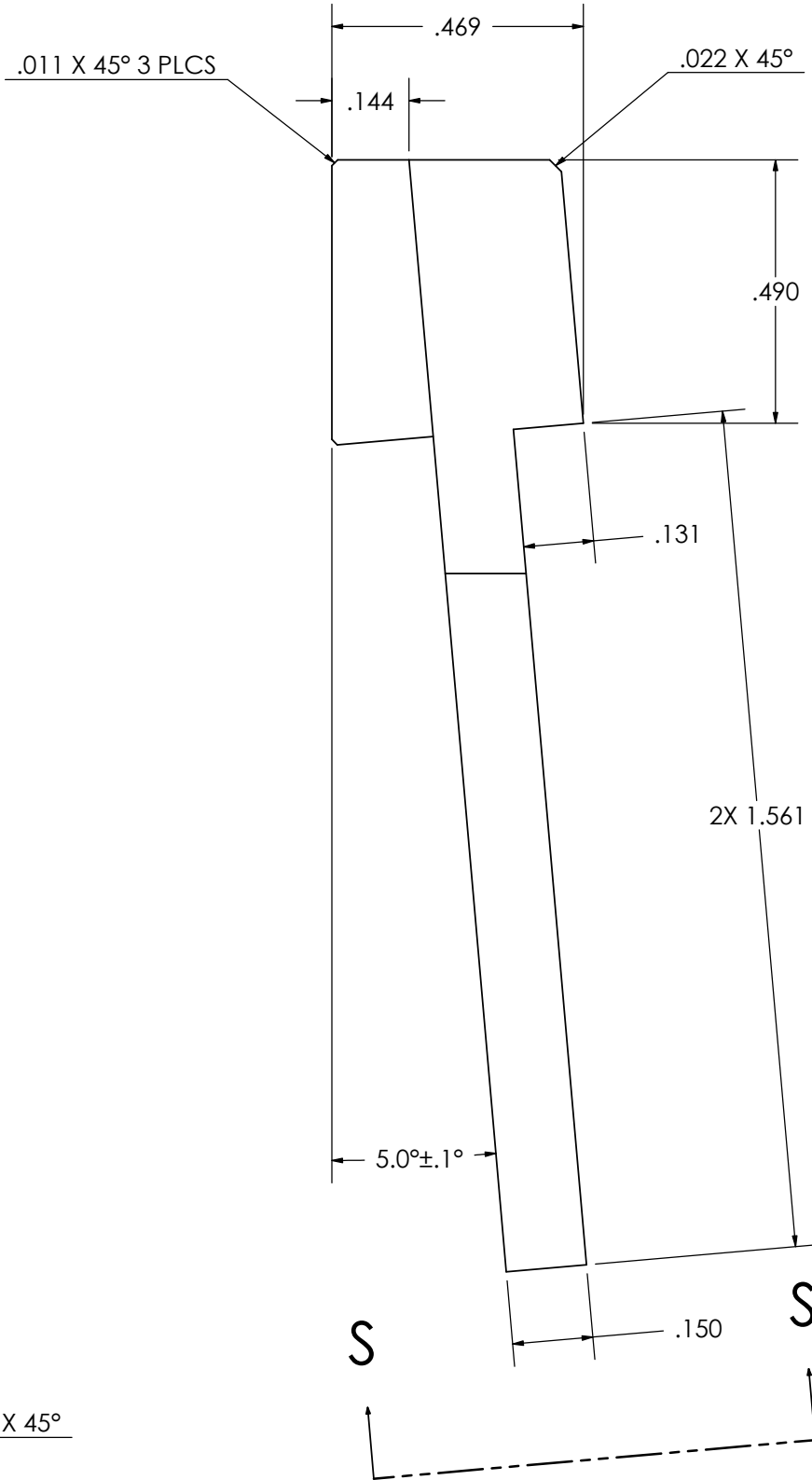
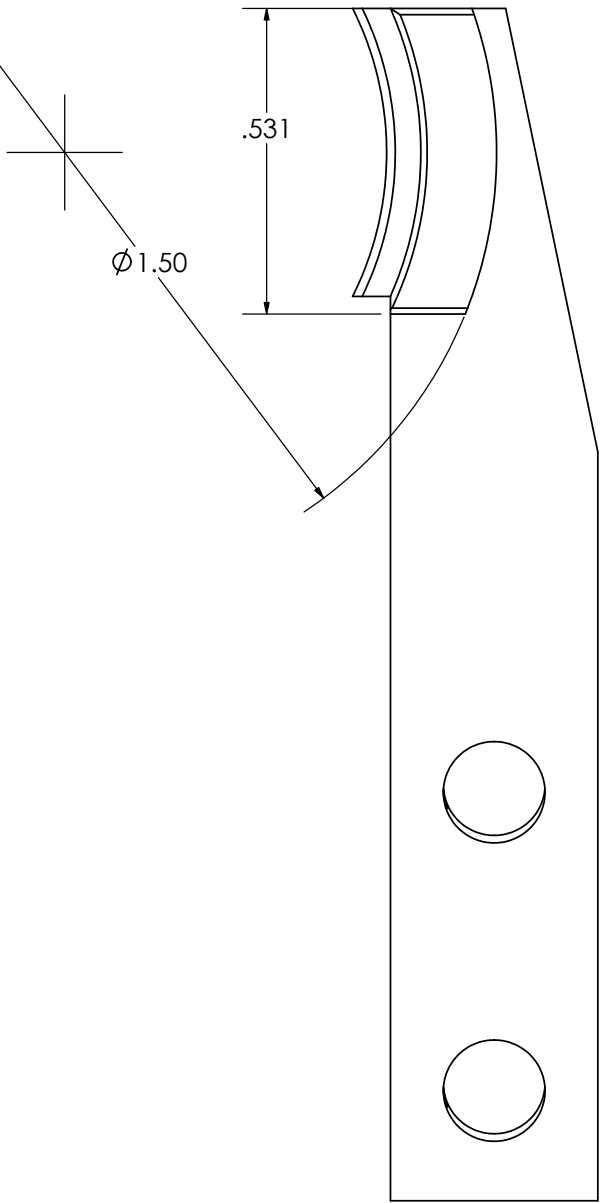
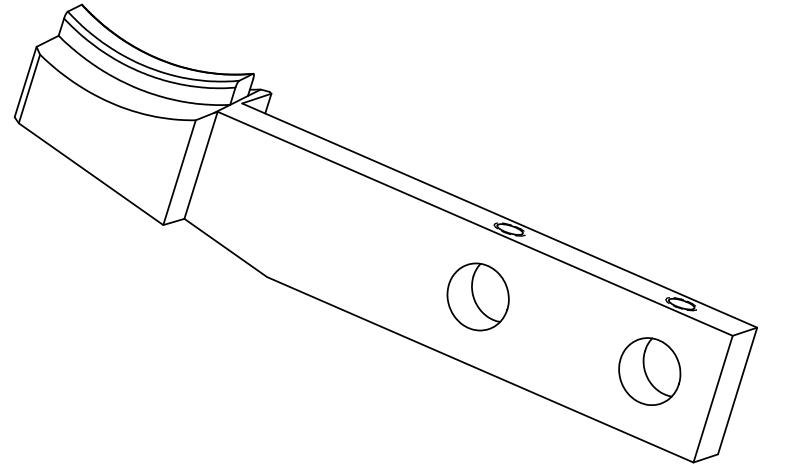
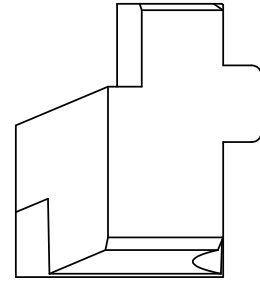
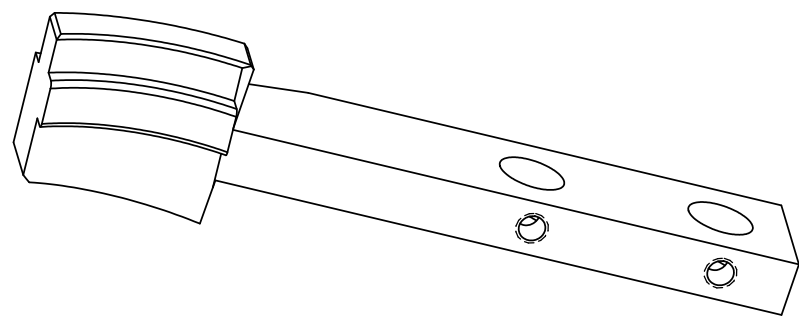
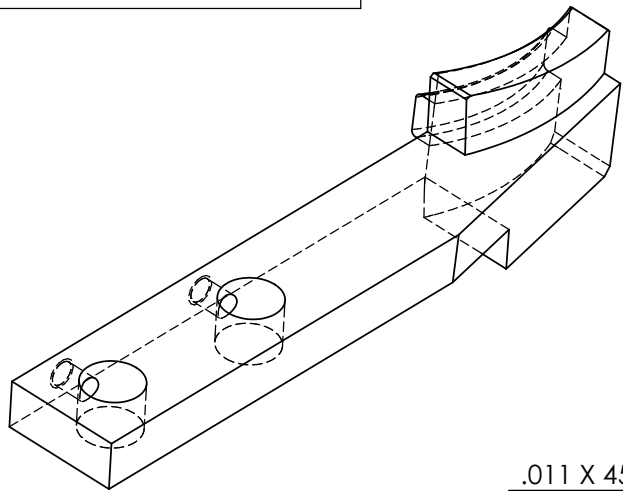
DETAIL R

SECTION Q-Q

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL		QTY.
15	1002451-015	Gripper - actuated	Aluminum 7075 T-6		2
BILL OF MATERIALS			last updated on: Friday, April 08, 2005 1:30:13 PM		
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:	APPROVALS	DATE	
Inspector		2 PLACE DIM $\pm .01$ 3 PLACE DIM $\pm .005$ 4 PLACE DIM $\pm .0005$ ANGLES $\pm 1'$	ENGINEER	Monterey Bay Aquarium Research Institute 	
Shop Foreman		1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING 3. REMOVE BURRS & SHARP EDGES .010 MAX 4. MACHINED FILLET RADII .000 TO .015	Jason Feldman 831-755-1837	7700 Sandholdt Road Moss Landing, CA 95039	
Engineer		5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005	CHECKED		
NEXT ASSY Description	NEXT ASSY Number	6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .001 PER INCH, MAX .003 INCHES FOR SINGLE SURFACE.	PROJECT NUMBER	manipulator	
		7. SURFACE FINISH TO BE 32 MICRON UNLESS OTHERWISE SPECIFIED	701312.00	SIZE	DWG. NO.
DO NOT SCALE DRAWING			PROJECT	C	1002451
			CAD FILE:	X:\701312 ESP 2G\SolidWorks files\internal structure (1002209)	REV. C
			SHEET 15 OF 19		

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41002451-016
GRIPPER SIMPLE



SECTION U-U

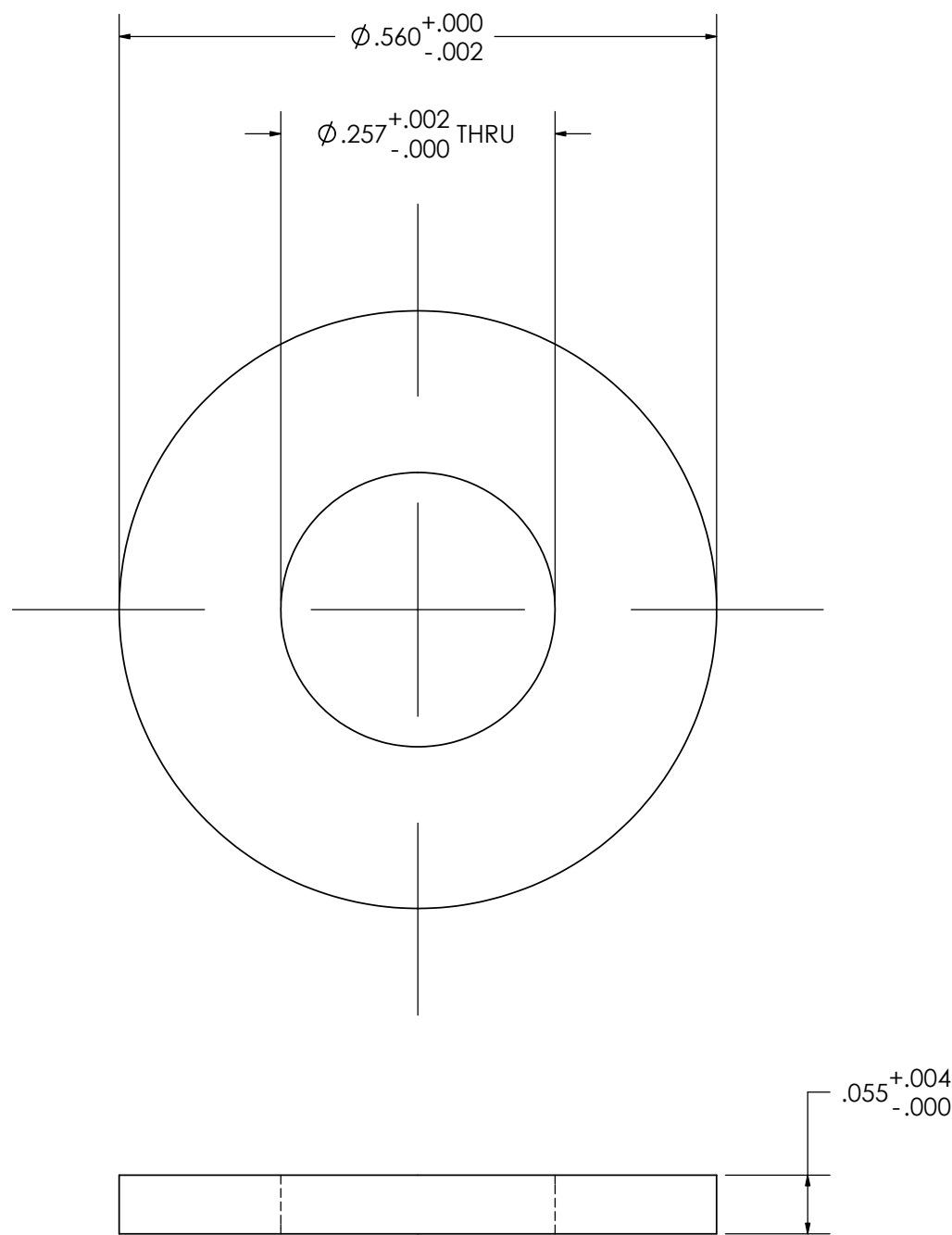
VIEW S-S

VIEW T-T

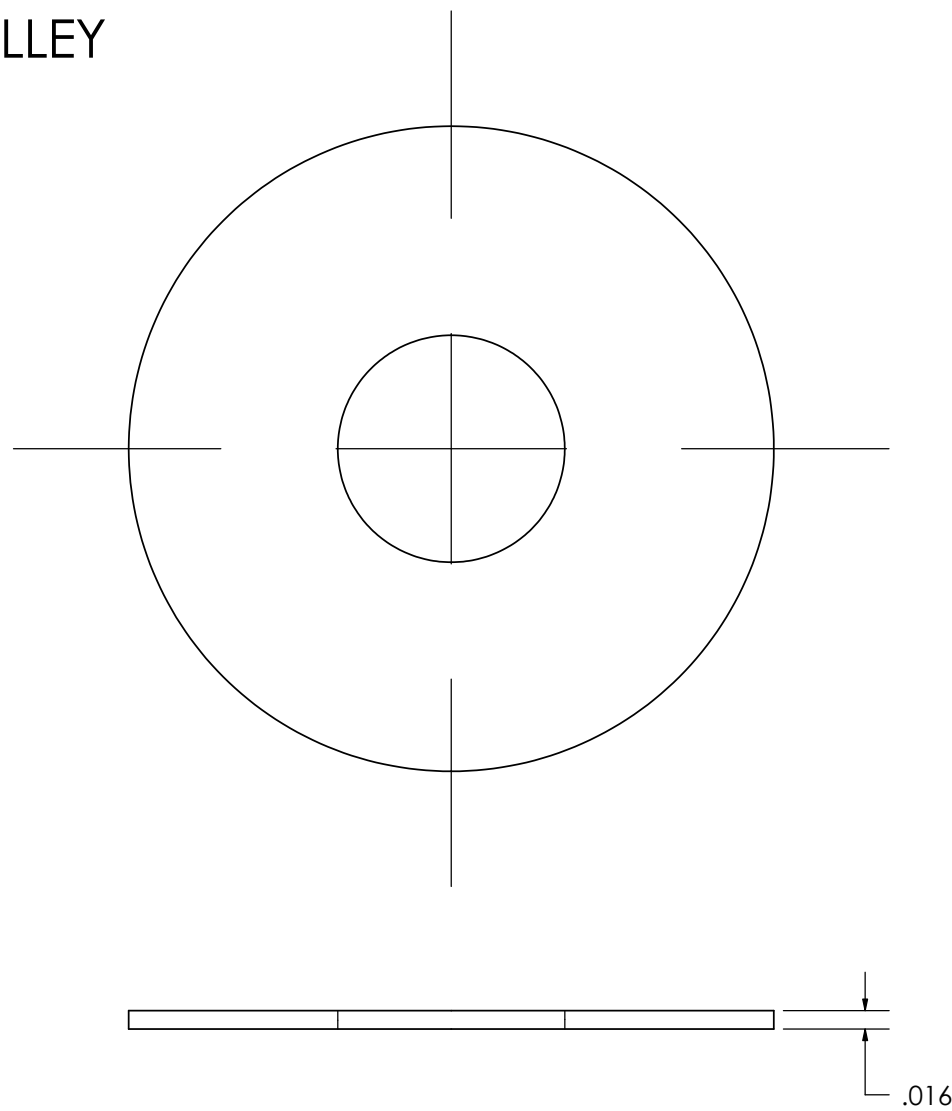
ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
16	1002451-016	Gripper - driven	Aluminum 7075 T-6	2
BILL OF MATERIALS				
Shop / Q.C.		APPROVALS		
Inspector		ENGINEER	Monterey Bay Aquarium Research Institute	
Shop Foreman		831-775-1837	7700 Sandholdt Road	
Engineer		CHECKED	Moss Landing, CA	
NEXT ASSY Description	NEXT ASSY Number	PROJECT NUMBER	SIZE	DWG. NO.
		701312.00	C	1002451
		PROJECT	ESP 2G	REV. C
DO NOT SCALE DRAWING		CAD FILE: X:\701312 ESP 2G\SolidWorks files\internal structure (1002209)		

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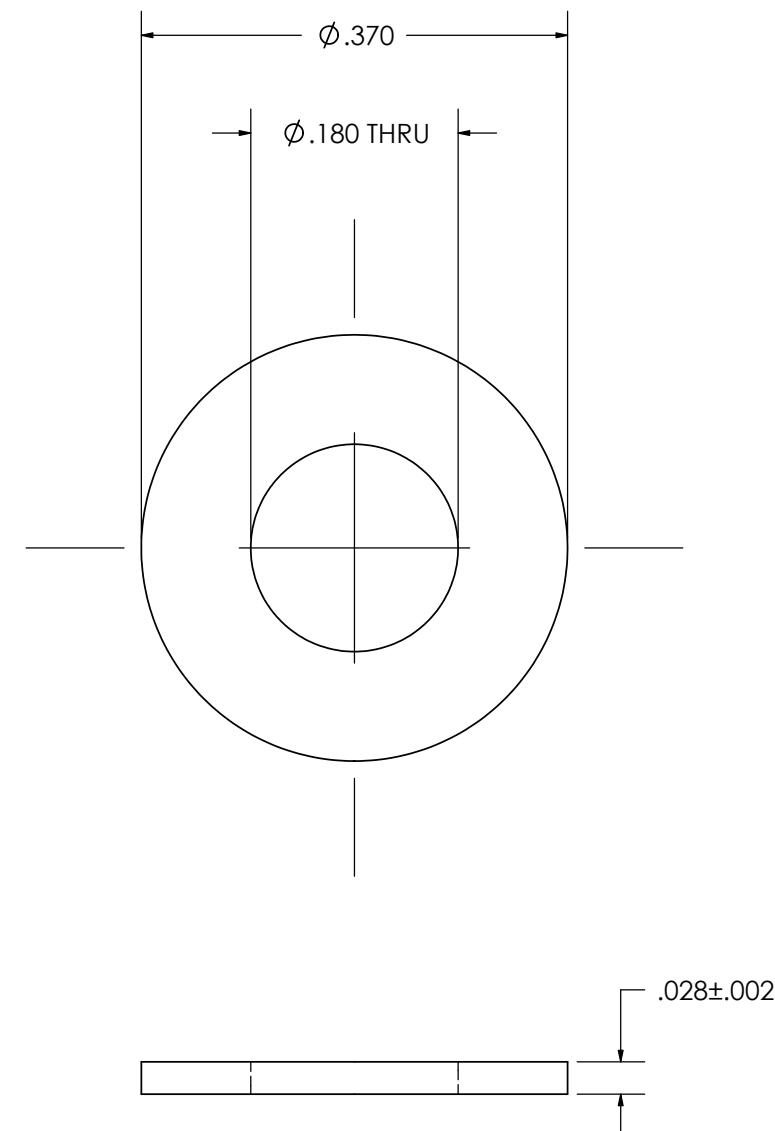
1002451-017
SPACER - CAM



1002451-005
SPACER - TIMING PULLEY



1002451-018
SPACER - GRIPPER



ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
17	1002451-017	Spacer - cam	Vespel SP-21	2
18	1002451-018	Spacer - gripper	Vespel S-21	4
19	1002451-005	Spacer - timing pulley	Vespel SP-21	3

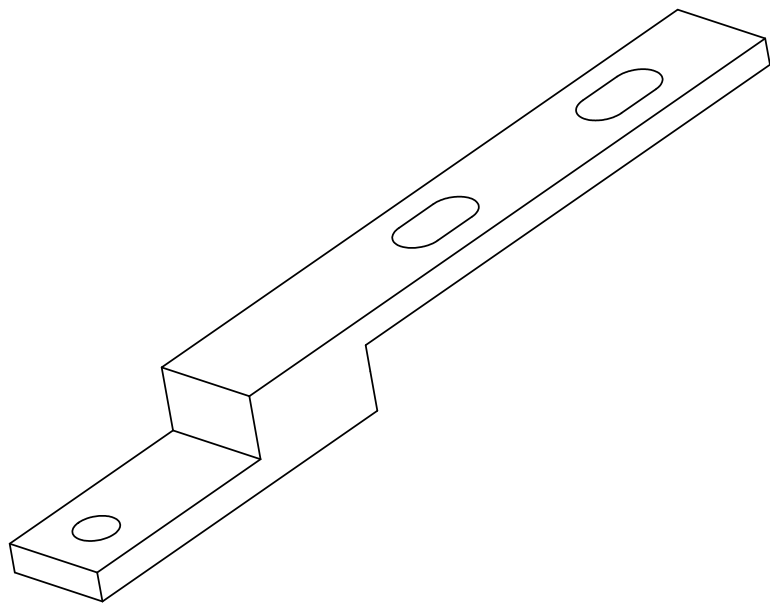
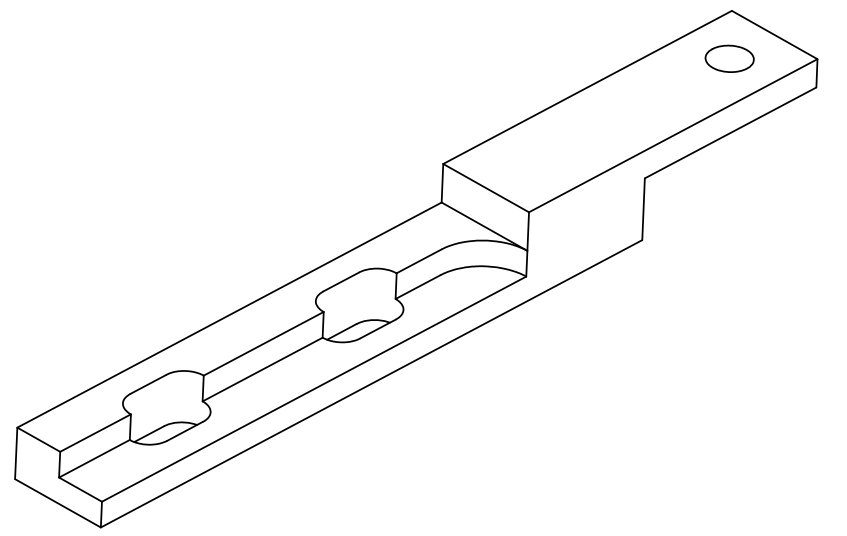
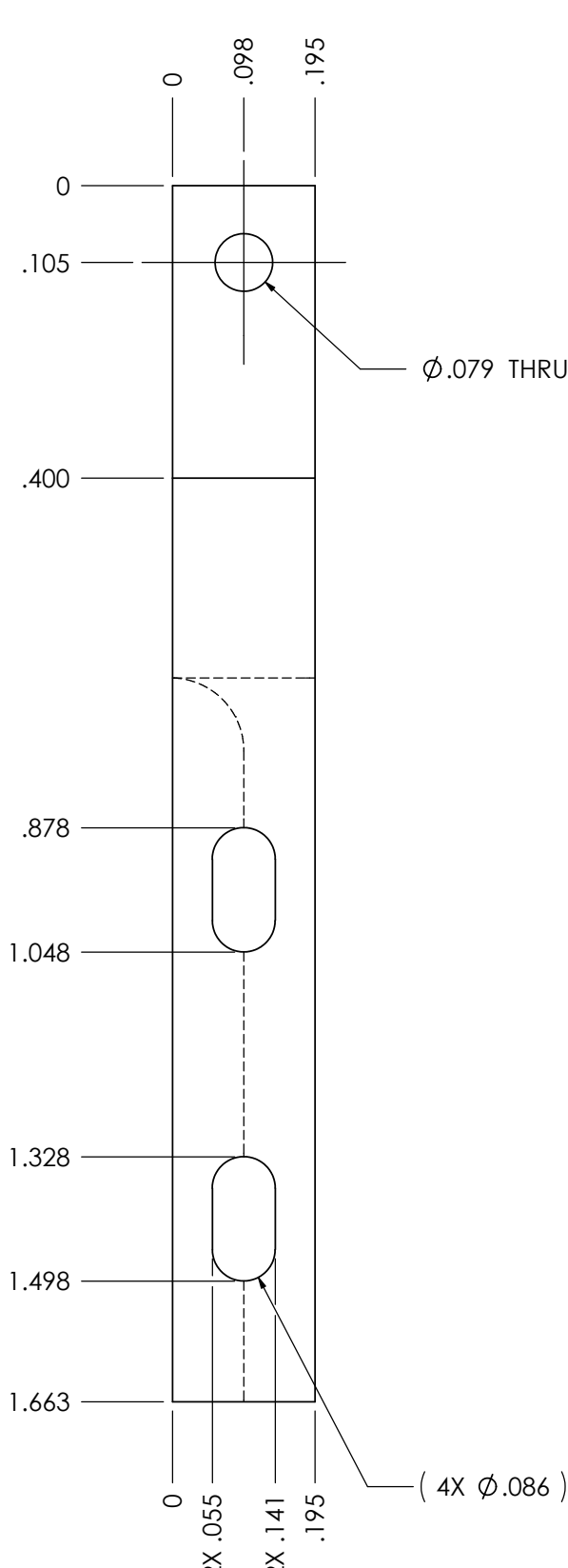
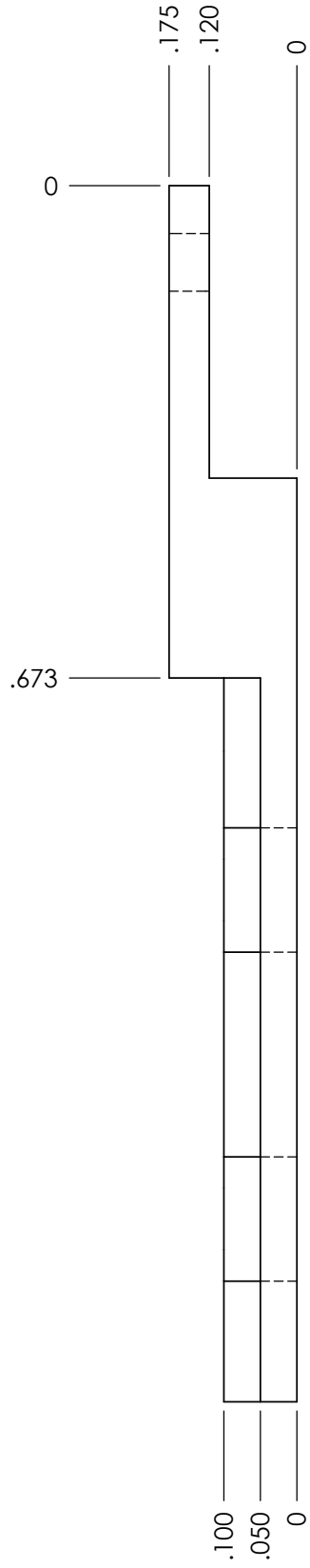
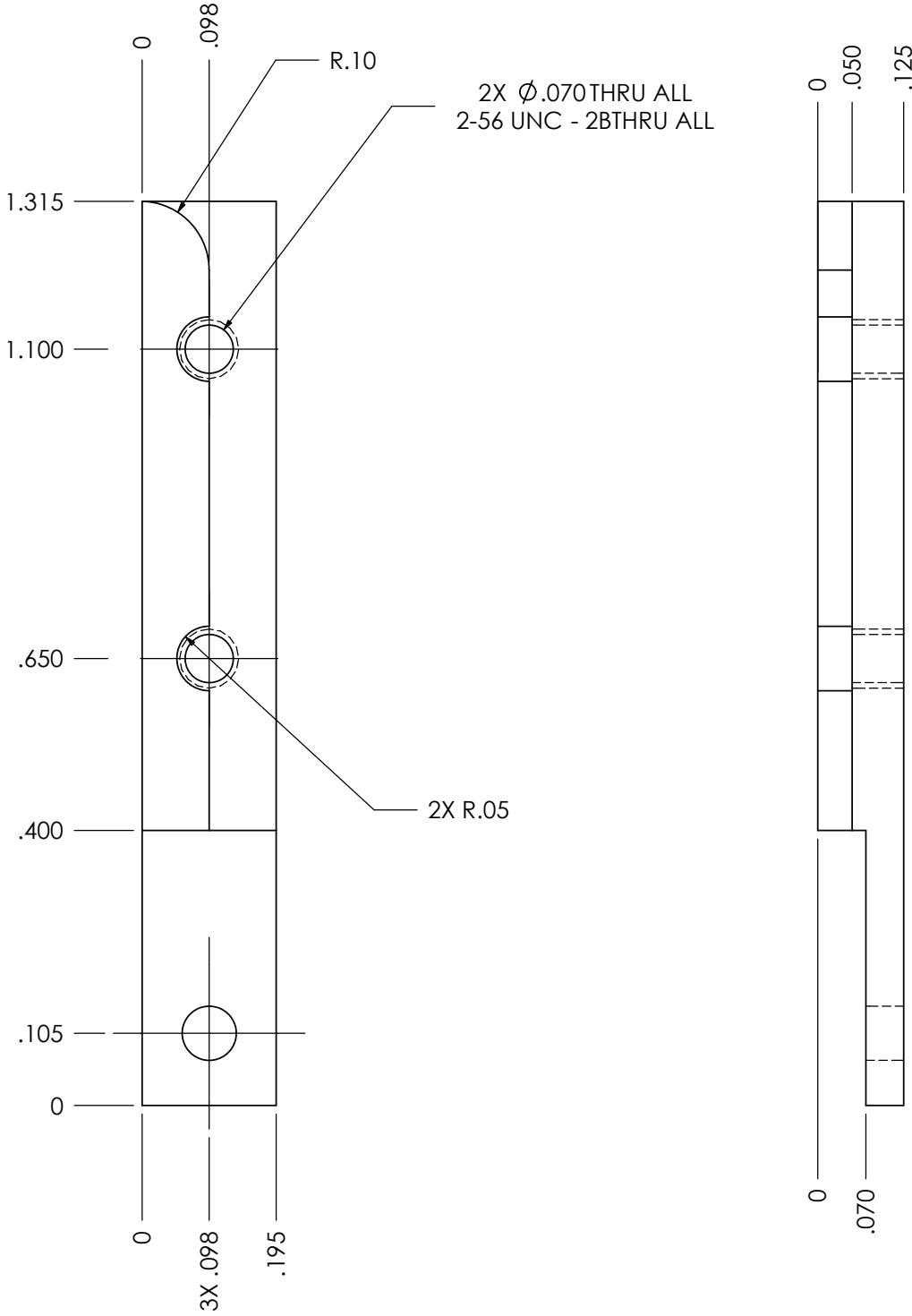
BILL OF MATERIALS				last updated on: Friday, April 08, 2005 1:30:13 PM	
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		APPROVALS DATE	
Inspector		2 PLACE DIM ±.01	3 PLACE DIM ±.005	4 PLACE DIM ±.0005	ANGLES ±1°
Shop Foreman		1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING 3. REMOVE BURRS & SHARP EDGES .010 MAX 4. MACHINED FILLET RADII .000 TO .015 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005			
Engineer		6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .001 PER INCH. MAX .003 INCHES FOR SINGLE SURFACE. 7. SURFACE FINISH TO BE 32 MICRON UNLESS OTHERWISE SPECIFIED			
NEXT ASSY Description	NEXT ASSY Number	PROJECT NUMBER 701312.00		manipulator	
		PROJECT ESP 2G		SIZE C	DWG. NO. 1002451
DO NOT SCALE DRAWING		CAD FILE: X:\701312 ESP 2G\SolidWorks files\internal structure (1002209)		REV. C	
				SHEET 17 OF 19	

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1002451-019
GRIPPER LINK TAPPED

1002451-020
GRIPPER LINK SLOTTED

DETAIL V



ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
19	1002451-019	gripper link (tapped)	Stainless Steel	2
20	1002451-020	gripper link (slot)	Stainless Steel	2

BILL OF MATERIALS						last updated on: Friday, April 08, 2005 1:30:13 PM		
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:			APPROVALS	DATE	Monterey Bay Aquarium Research Institute	
Inspector		2 PLACE DIM ±.01	3 PLACE DIM ±.005	4 PLACE DIM ±.0005	ANGLES ±1°	ENGINEER Jason Feldman 831-775-1837	7700 Sandholdt Road Moss Landing, CA 95039	
Shop Foreman		1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING 3. REMOVE BURRS & SHARP EDGES .010 MAX 4. MACHINED FILLET RADII .000 TO .015 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005 6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .001 PER INCH. MAX .003 INCHES FOR SINGLE SURFACE. 7. SURFACE FINISH TO BE 32 MICRON UNLESS OTHERWISE SPECIFIED				CHECKED		
Engineer								
NEXT ASSY Description	NEXT ASSY Number							
DO NOT SCALE DRAWING		PROJECT NUMBER 900312.00			manipulator			
		PROJECT ESP 2G			SIZE C	DWG. NO. 1002451	REV. C	
CAD FILE: X:\701312 ESP 2G\SolidWorks files\internal structure (1002209)						SHEET 18 OF 19		

NOTES FOR MAGNAPLATE HCR PROCESSING
SURFACE GROWTH TO BE .0005" to .0010"
(TOTAL COATING THICKNESS .0010" to .0020")

NO MAGNAPLATE HCR IN BLUE AREAS

MAGNAPLATE HCR GREEN AREAS ONLY

FRINGE AREA NON-CRITICAL
(OK for plating to extend slightly
into non-plated area)

MBARI part number: 1002451-015

MBARI part number: 1002451-016

BILL OF MATERIALS				last updated on: Friday, April 08, 2005 1:30:13 PM	
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		APPROVALS DATE	
Inspector		2 PLACE DIM ±.01	3 PLACE DIM ±.005	ENGINEER Jason Feldman 831-775-1837	Monterey Bay Aquarium Research Institute 7700 Sandholdt Road Moss Landing, CA 95039
Shop Foreman		4 PLACE DIM ±.0005	ANGLES ±1°		
Engineer		1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING 3. REMOVE BURRS & SHARP EDGES .010 MAX 4. MACHINED FILLET RADII .000 TO .015 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005		CHECKED	manipulator
NEXT ASSY Description	NEXT ASSY Number	6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .001 PER INCH. MAX .003 INCHES FOR SINGLE SURFACE. 7. SURFACE FINISH TO BE 32 MICRON UNLESS OTHERWISE SPECIFIED		PROJECT NUMBER 701312.00	
DO NOT SCALE DRAWING		PROJECT ESP 2G		SIZE C	DWG. NO. 1002451
		CAD FILE: X:\701312 ESP 2G\SolidWorks files\internal structure (1002209)		REV. C	
				SHEET 19 OF 19	

