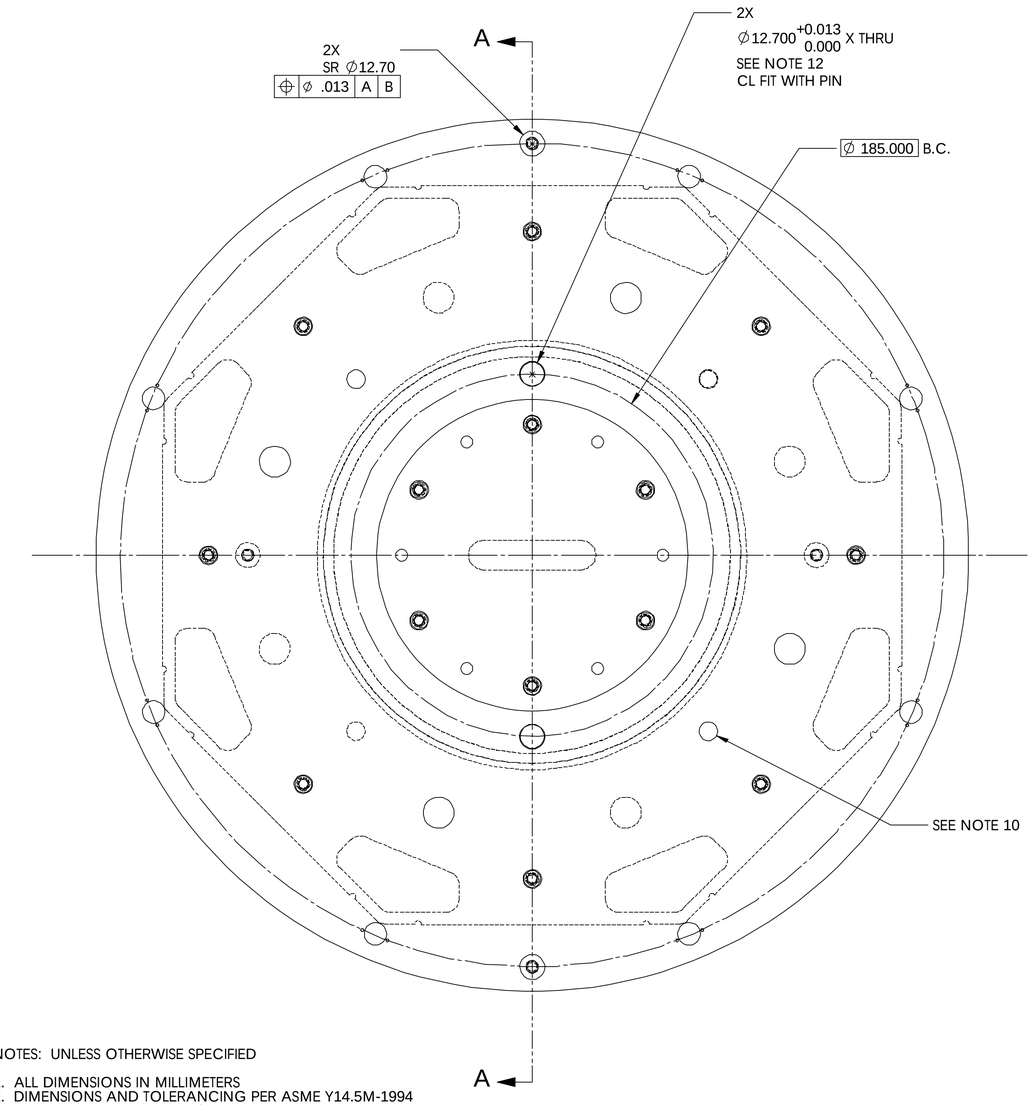
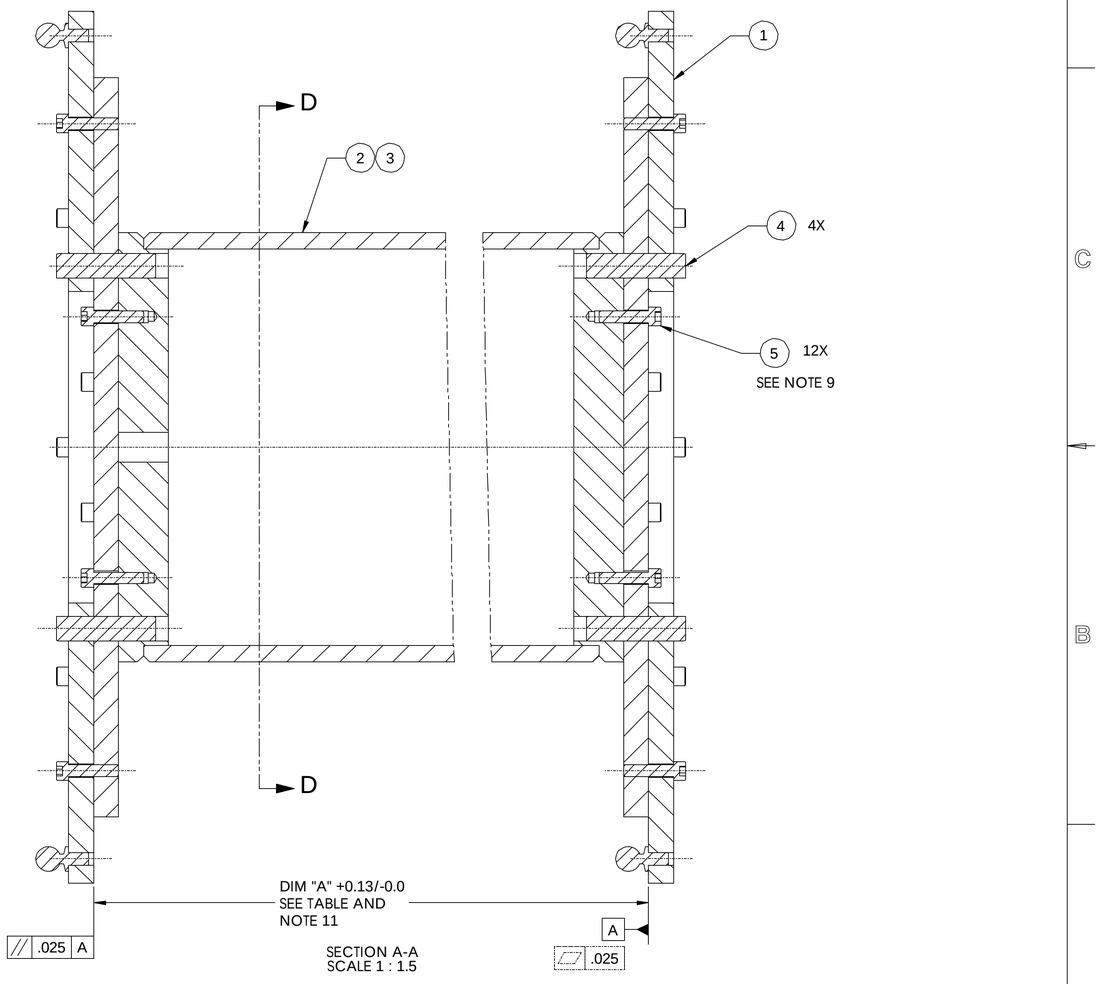
DWG. NO. 21F688 4 | SIZE | REV. - | SH. 1

ITEM	PART NO.	REQD	REQD	DESCRIPTION	MATERIAL
5		12	12	M6 X 1.0 SOCKET HD CAP X 25.4	
4		4	4	12.7 DIA. GAGE PIN	
3	21F689-3		1	CENTRAL SECTION SPACING TUBE	
2	21F689-1	1		END SECTION SPACING TUBE	
1	21F690	2	2	PRE-ALIGNMENT ASSEMBLY	
DASH NO.		-1	-3		





SECTION A-A
SCALE 1 : 1.5

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS
9. TORQUE SOCKET HEAD CAP SCREWS TO 24.3 in-Lbs (2.0 ft-Lbs.) MAX
10. REMOVE TWO 9.52 DOWEL PINS FROM TOP SIDE ONLY
11. DIMENSIONS ARE REFERENCE, ARE BASED ON INDIVIDUAL PART TOLERANCES
12. ANGULARLY ORIENT, MATCH DRILL AND PIN ITEM(S) 1 TO EACH OTHER; BOLT ASSEMBLY TOGETHER USING ITEM(S) 5
13. CMM INSPECTION OR EQUIVALENT REQUIRED; INSPECTION REPORTS PROVIDED TO HYTEC FOR REVIEW AND APPROVAL. INSPECTION TEMPERATURE MUST BE INDICATED

PART NO.	DIM "A"	ASSEMBLY
-1	292.000	END SECTION
-3	840.000	CENTRAL SECTION

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED
TOLERANCES: X.X ± 0.5 FRAC. ± 1/64; X.XX ± 0.25 ANGLES ± 30'; X.XXX ± 0.013 FINISH 1.6
DO NOT SCALE PRINT
THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS
ACCT NO. | NO. REQD | DATE ISSD
DEL TO | DATE REQD
SURFACE TREATMENT
IDEN METHOD TAG
PROJECT NUMBER ATL-IP-ED-XXXX
PROJECT NAME US ATLAS SILICON SUBSYSTEM
DWG BY W. K. MILLER DATE 4/16/2002
CHK BY BILL WILDS DATE 4/16/2002
APR BY E. ANDERSSEN DATE 4/16/2002
SER NO

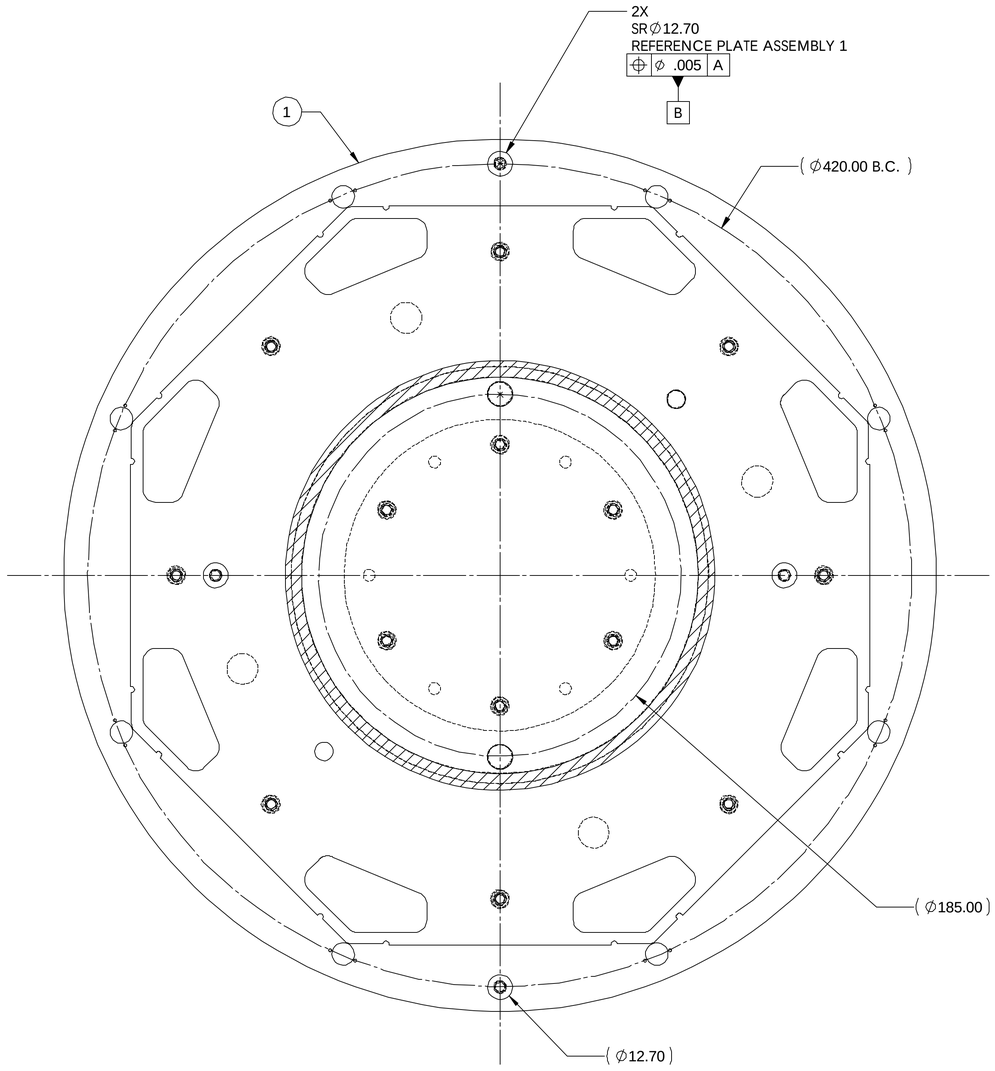
ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

ATLAS PIXEL DETECTOR
SPACEFRAME BONDING FIXTURE
SUB-ASSEMBLY ALIGNMENT

MICROFILMED: | DWG. TYPE ASSEM | SHOWN ON N/A | SCALE: 1:1.5 | DO NOT SCALE PRINTS
PATENT CLEAR: | DESIGN ACCT. NO. P1AP-11 | CATEGORY CIDE AP6250 | SHEET 1 OF 2
DWG. NO. 21F688 4 | SIZE | REV. -

DWG. NO.	SIZE	REV.	SH.
21F688 4		-	2

ITEM	PART NO.	REQD	DESCRIPTION	MATERIAL



SECTION D-D
SCALE 1 : 1.5

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS
9. TORQUE SOCKET HEAD CAP SCREWS TO 24.3 in-Lbs (2.0 ft-Lbs.) MAX
10. REMOVE TWO 9.52 DOWEL PINS FROM TOP SIDE ONLY
11. DIMENSIONS ARE REFERENCE, ARE BASED ON INDIVIDUAL PART TOLERANCES
12. ANGULARLY ORIENT, MATCH DRILL AND PIN ITEM(S) 1 TO EACH OTHER; BOLT ASSEMBLY TOGETHER USING ITEM(S) 5
13. CMM INSPECTION OR EQUIVALENT REQUIRED; INSPECTION REPORTS PROVIDED TO HYTEC FOR REVIEW AND APPROVAL. INSPECTION TEMPERATURE MUST BE INDICATED

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 FRAC. ± 1/64
X.XX ± 0.25 ANGLES ± 30'
X.XXX ± 0.013 FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.		NO. REQD	
DEL TO			
SURFACE TREATMENT			
IDEN METHOD	TAG		
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E. ANDERSSEN	DATE	4/16/2002

SER NO.
DATE ISSD
DATE REQD
(IF ATLAS SILICON SUBSYSTEM (SSID))

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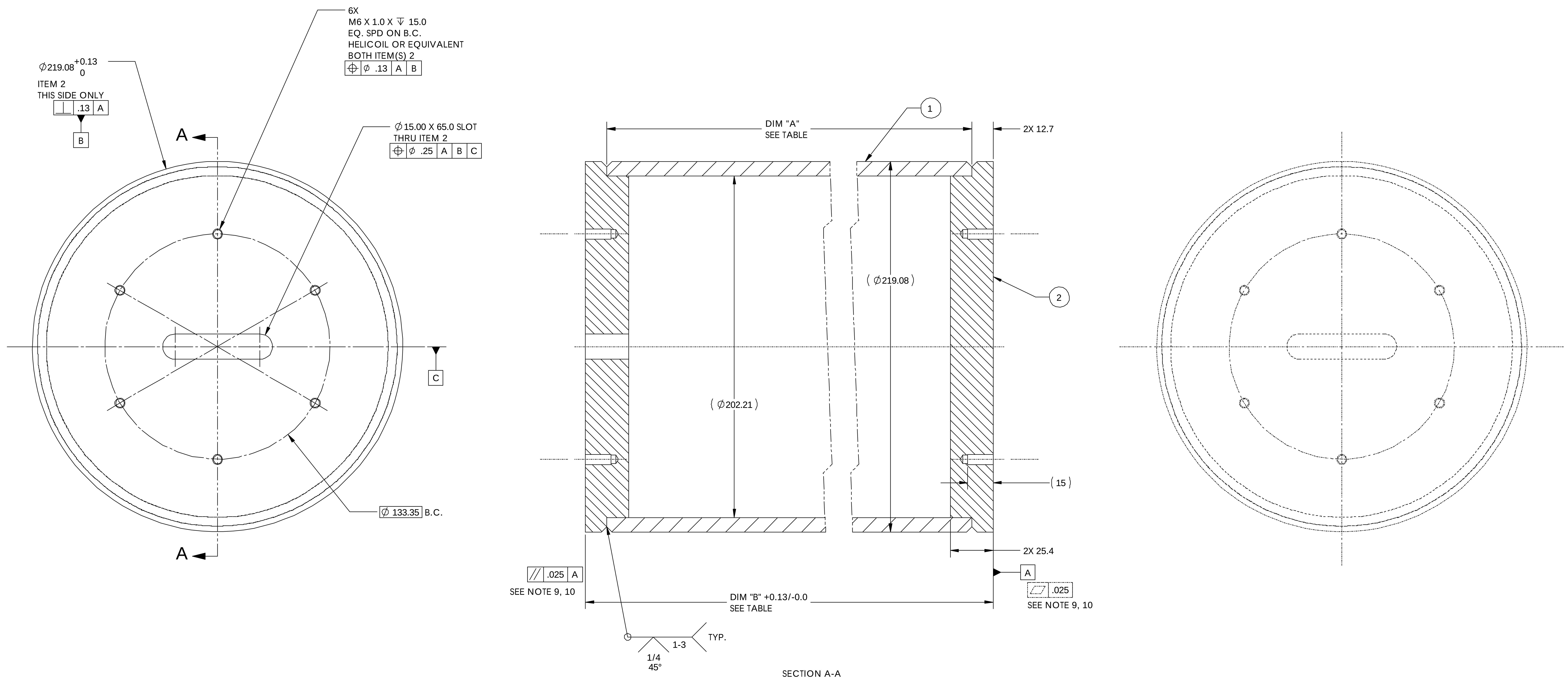
UNIVERSITY OF CALIFORNIA - BERKELEY ≠

ATLAS PIXEL DETECTOR
SPACEFRAME BONDING FIXTURE
SUB-ASSEMBLY ALIGNMENT

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	ASSEM	N/A	1:1.5	
			SHEET 2 OF 2	

PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CIDE	DWG. NO.	SIZE	REV.
	P1AP-11	AP6250	21F688 4		-

ITEM	PART NO.	REQD	DESCRIPTION	MATERIAL
2		2	TUBE SPACER END PLATE	6061-T6 ALUM
1		1	8.0" DIA. SCH 40 ALUM PIPE (.33 WALL) OR EQUIV.	6061-T6 ALUM



NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS
9. STRESS RELIEVE PART @ 350 F FOR 6 HOURS
10. CMM INSPECTION REQUIRED; INSPECTION REPORTS PROVIDED TO HYTEC FOR REVIEW AND APPROVAL. INSPECTION TEMPERATURE MUST BE INDICATED

PART NO	DIM "A"	DIM "B"	ASSEMBLY
-689-1	241.20	266.600	END SECTION
-689-3	789.20	814.600	CENTRAL SECTION

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES: X.X ± 0.5 | FRAC. ± 1/64 | X.XX ± 0.25 | ANGLES ± 30' | X.XXX ± 0.013 | FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

PROJECT NUMBER: ATL-IP-ED-XXXX
PROJECT NAME: US ATLAS SILICON SUBSYSTEM
DWG BY: W. K. MILLER — DATE 4/16/2002
CHK BY: BILL WILDS — DATE 4/16/2002
APR BY: E. ANDERSSEN — DATE 4/16/2002

ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

ATLAS PIXEL DETECTOR
SPACEFRAME BOND FIXTURE
CENTRAL AND END SECTION SPACING TUBES

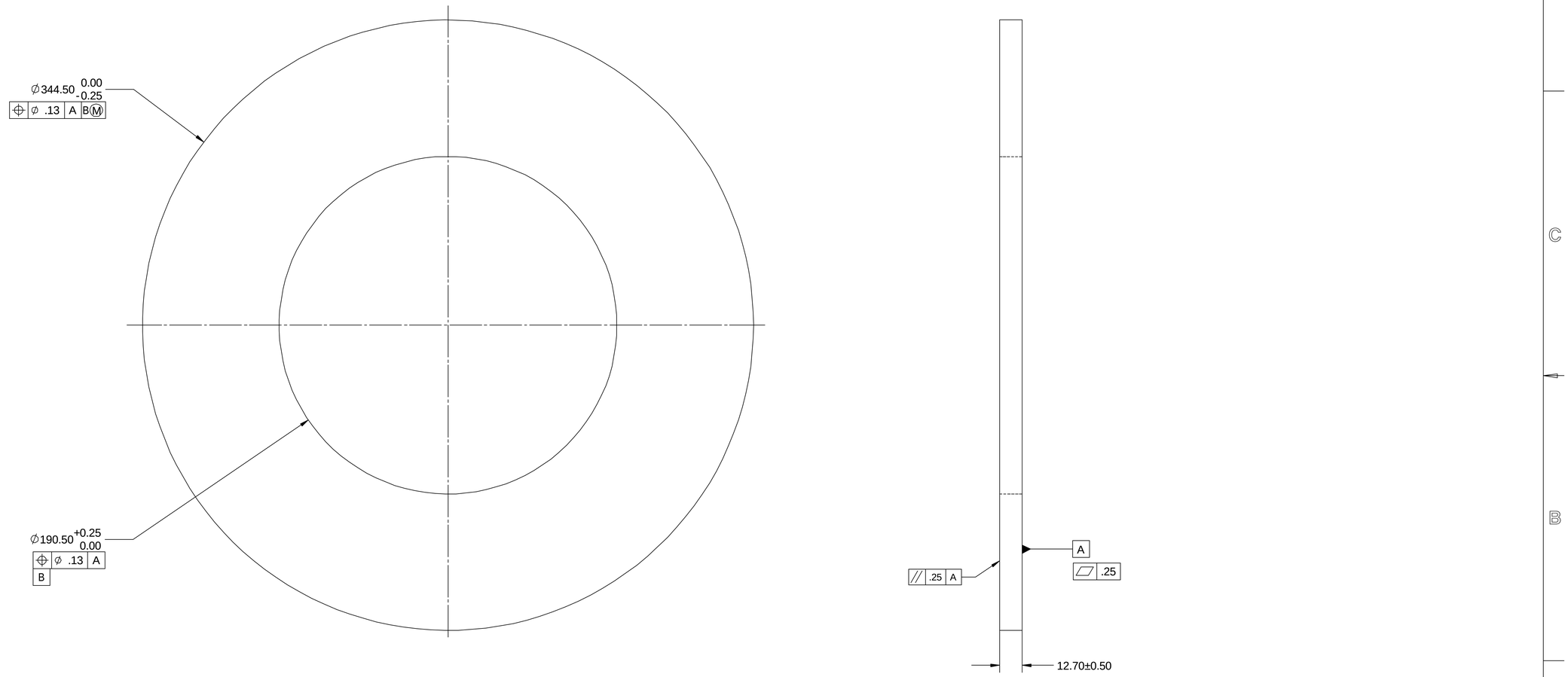
DWG. TYPE: ASSEM | SHOWN ON: 21F688 | SCALE: 1:1.25 | DO NOT SCALE PRINTS

SHEET 1 OF 1

DESIGN ACCT. NO.: P1AP-11 | CATEGORY CODE: AP6250 | DWG. NO.: 21F689 | SIZE: 4 | REV.: -

DWG. NO.	SIZE	REV.	SH.
21F7784		-	1

DESCRIPTION	MATERIAL	MAT. LOCATION



MATL: ALUMINUM

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 | FRAC. ± 1/64
X.XX ± 0.25 | ANGLES ± 30'
X.XXX ± 0.013 | FINISH 3.2

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO
DEL TO		DATE ISSD
SURFACE TREATMENT		DATE REQD
IDEN METHOD TAG		
PROJECT NUMBER	ATL-IP-ED-XXXX	
PROJECT NAME	US ATLAS SILICON SUBSYSTEM	
DWG BY	W. K. MILLER	DATE 4/16/2002
CHK BY	BILL WILDS	DATE 4/16/2002
APR BY	E ANDERSSEN	DATE 4/16/2002

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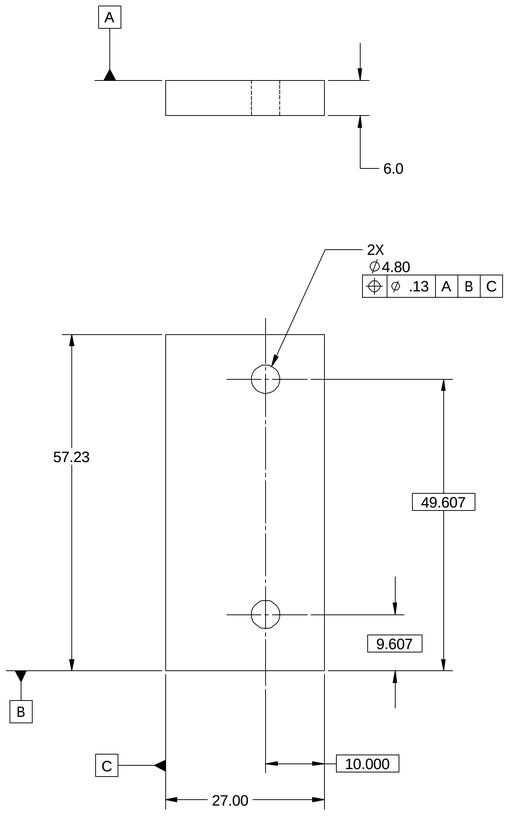
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY ±

ATLAS PIXEL DETECTOR
SPACEFRAME END STIFFENER
BOND FIXTURE CAUL PLATE

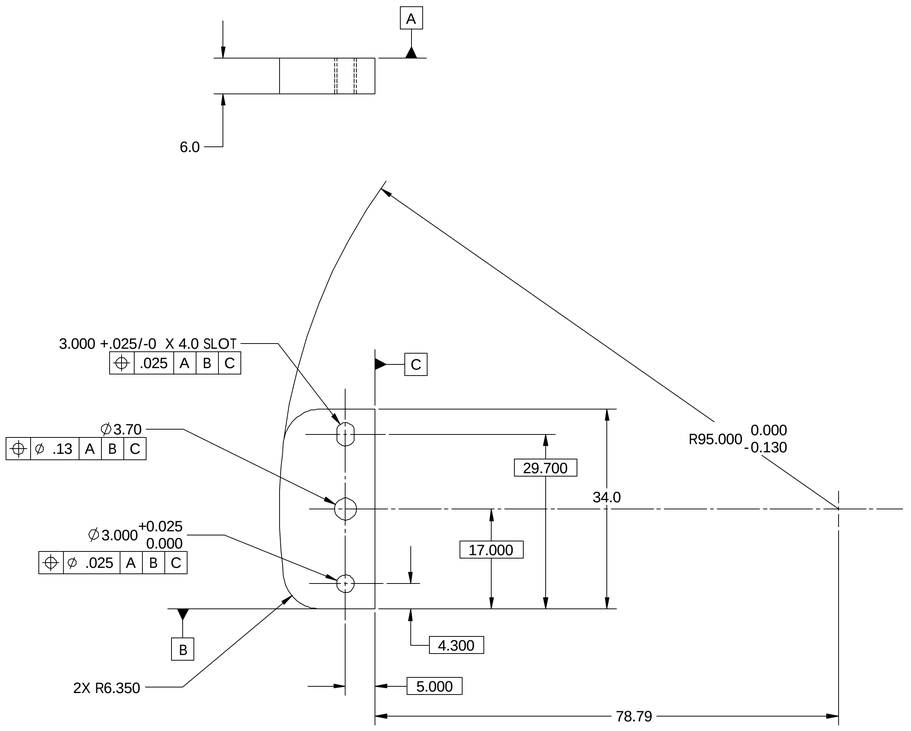
MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	21F775	1:1.25	
			SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CIDE	DWG. NO.	SIZE / REV.
	P1AP-11	AP6250	21F7784	-

DWG. NO.	SIZE	REV.	SH.
21F774	-	1	

DESCRIPTION	MATERIAL	MAT. LOCATION



STIFFENER VERTEX PLATE CLAMP
MATL: ALUMINUM



FACESHEET ALIGNMENT BLOCK
MATL: ALUMINUM

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES: X.X ± 0.5 | FRAC. ± 1/64 | X.XX ± 0.25 | ANGLES ± 30' | X.XXX ± 0.013 | FINISH 3.2

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	
DEL TO		DATE ISSD	
SURFACE TREATMENT		DATE REQD	
IDEN METHOD TAG			
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E ANDERSSEN	DATE	4/16/2002

TO HOLD SILICON MONITORS CODES

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BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY ±

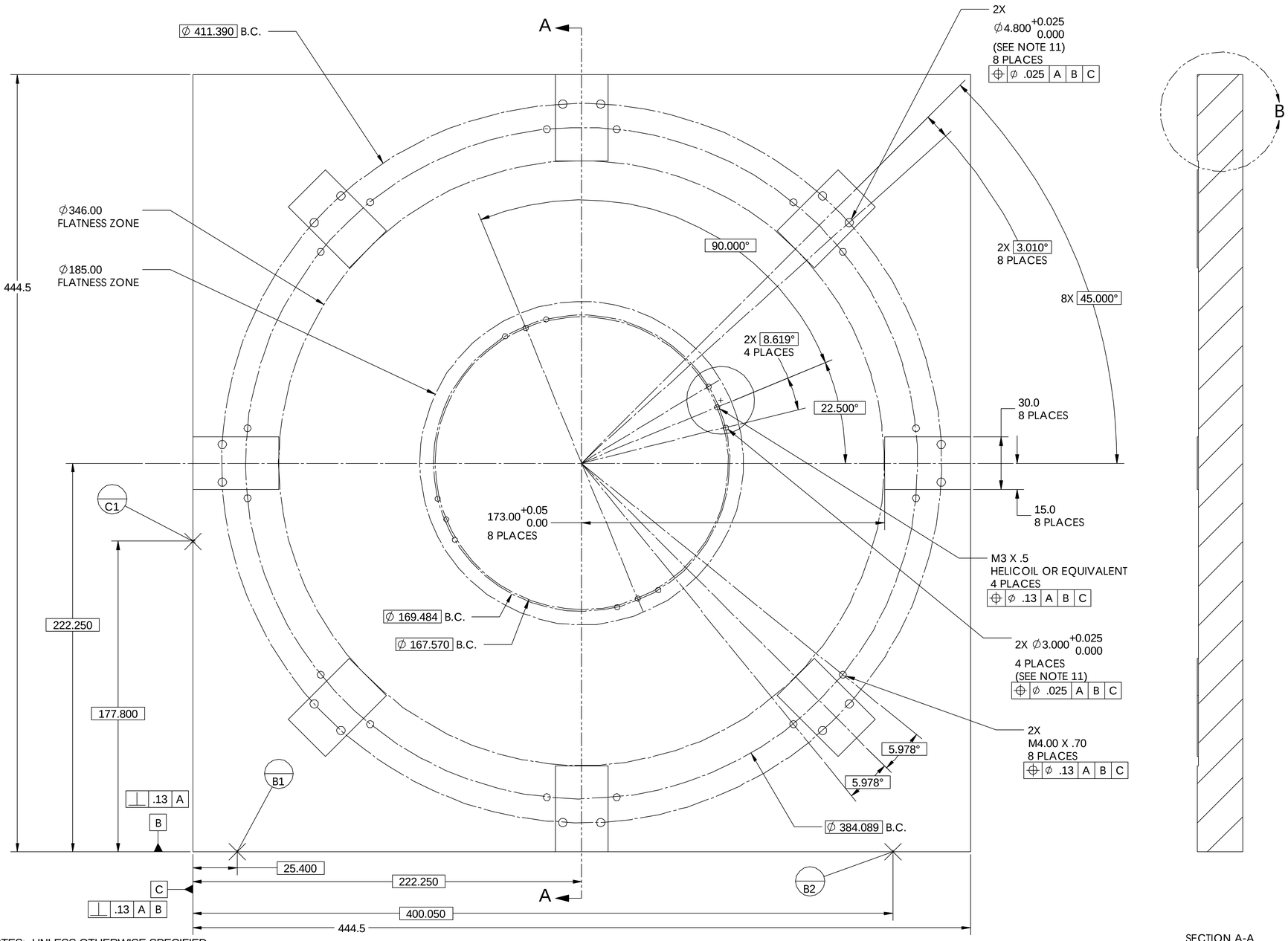
ATLAS PIXEL DETECTOR
SPACEFRAME END STIFFENER
BONDING FIXTURE CLAMPS

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	21F775	2:1	
			SHEET 1 OF 1	

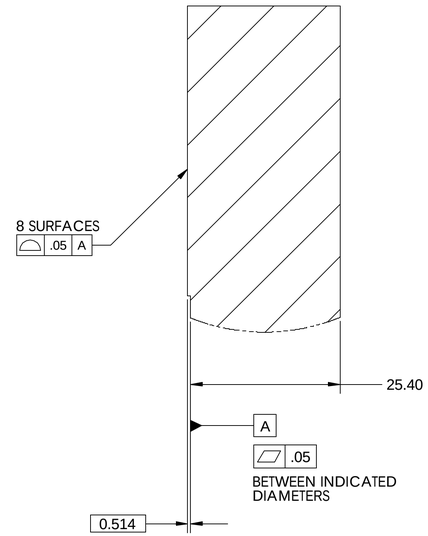
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CIDE	DWG. NO.	SIZE	REV.
	P1AP-11	AP6250	21F774		-

DWG. NO.	SIZE	REV.	SH.
21F776 4	-	-	1

DESCRIPTION	MATERIAL	MAT. LOCATION



SECTION A-A



DETAIL B
SCALE 2 : 1

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS
9. ROOM TEMPERATURE DURING MACHINING TO BE RECORDED AND PROVIDED TO HYTEC; TOP AND BOTTOM PLATES TO BE MACHINED AT THE SAME TEMPERATURE (WITHIN 5 DEGREES F)
10. INSPECTION REPORTS TO BE PROVIDED TO HYTEC
11. HOLES ARE THRU HOLES, OR 3X DIA. DEEP WITH A SMALLER PILOT HOLE THRU

MATL: ISOTROPIC GRAPHITE; CTE LESS THAN OR EQUAL TO 6uIN/IN/ ˚F OR EQUIVALENT (SEE NOTE 9, 10)

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES: X.X ± 0.5 FRAC. ± 1/64; X.XX ± 0.25 ANGLES ± 30'; X.XXX ± 0.013 FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2

CHAMFER ENDS OF ALL SCREW THREADS 30°

CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS

BREAK EDGES .016 MAX. ON MACHINED WORK

REMOVE BURRS, WELD SPLATTER & LOOSE SCALE IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

SER NO.			
ACCT NO.	NO. REQD	DATE ISSD	
DEL TO		DATE REQD	
SURFACE TREATMENT			
IDEN METHOD	TAG		
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APP BY	E ANDERSSEN	DATE	4/16/2002

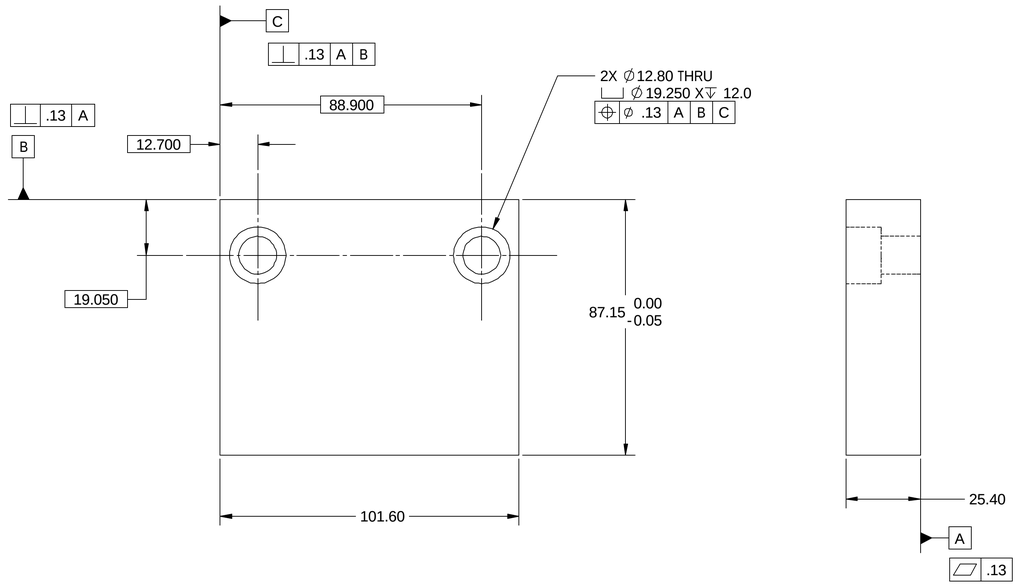
ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

ATLAS PIXEL DETECTOR
SPACEFRAME END STIFFENER
BOND FIXTURE PLATE

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	21F775	1:1.25	
			SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE / REV.
	P1AP-11	AP6250	21F776 4	-

DWG. NO.	SIZE	REV.	SH.
21F763 4		-	1

DESCRIPTION	MATERIAL	MAT. LOCATION



MATL: 4340 ALLOY STEEL (SEE NOTE 9)

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS
9. 4340 MATERIAL TO BE CARBORIZED AND OIL QUENCHED TO ACHIEVE Rc50 (HB 475) MINUMUM HARDNESS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES

X.X ± 0.5	FRAC. ± 1/64
X.XX ± 0.25	ANGLES ± 30'
X.XXX± 0.013	FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2

CHAMFER ENDS OF ALL SCREW THREADS 30°

CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS

BREAK EDGES .016 MAX. ON MACHINED WORK

REMOVE BURRS, WELD SPLATTER & LOOSE SCALE

IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	
DEL TO		DATE ISSD	
SURFACE TREATMENT		DATE REQD	
IDEN METHOD TAG			
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E ANDERSSEN	DATE	4/16/2002

ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

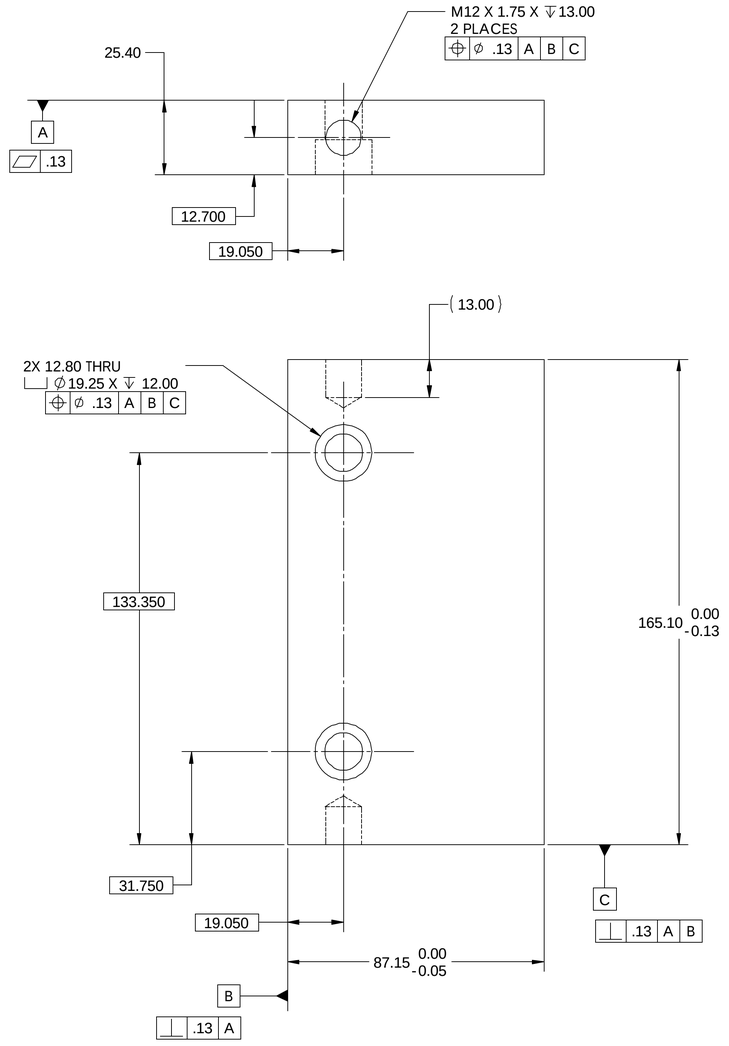
ATLAS PIXEL DETECTOR
ENDCONE VERTEX PLATE
MOLD END PLATE

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	21F759	1:1	SHEET 1 OF 1

PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CIDE	DWG. NO.	SIZE	REV.
	P1AP-11	AP6250	21F763 4		-

DWG. NO.	SIZE	REV.	SH.
21F762 4		-	1

DESCRIPTION	MATERIAL	MAT. LOCATION



MATL: 4340 ALLOY STEEL (SEE NOTE 9)

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS
9. 4340 MATERIAL TO BE CARBORIZED AND OIL QUENCHED TO ACHIEVE Rc50 (HB 475) MINUMUM HARDNESS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES: X.X ± 0.5 | FRAC. ± 1/64 | X.XX ± 0.25 | ANGLES ± 30' | X.XXX ± 0.013 | FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	
DEL TO		DATE ISSD	
SURFACE TREATMENT		DATE REQD	
IDEN METHOD	TAG		
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E ANDERSSEN	DATE	4/16/2002

US ATLAS SILICON SUBSYSTEM (SASS)

ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY ±

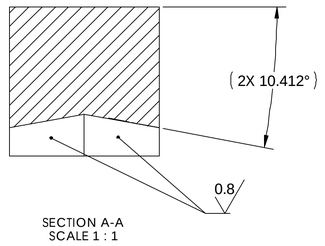
ATLAS PIXEL DETECTOR
ENDCONE VERTEX PLATE
MOLD SIDE PLATE

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	21F759	1:1	SHEET 1 OF 1

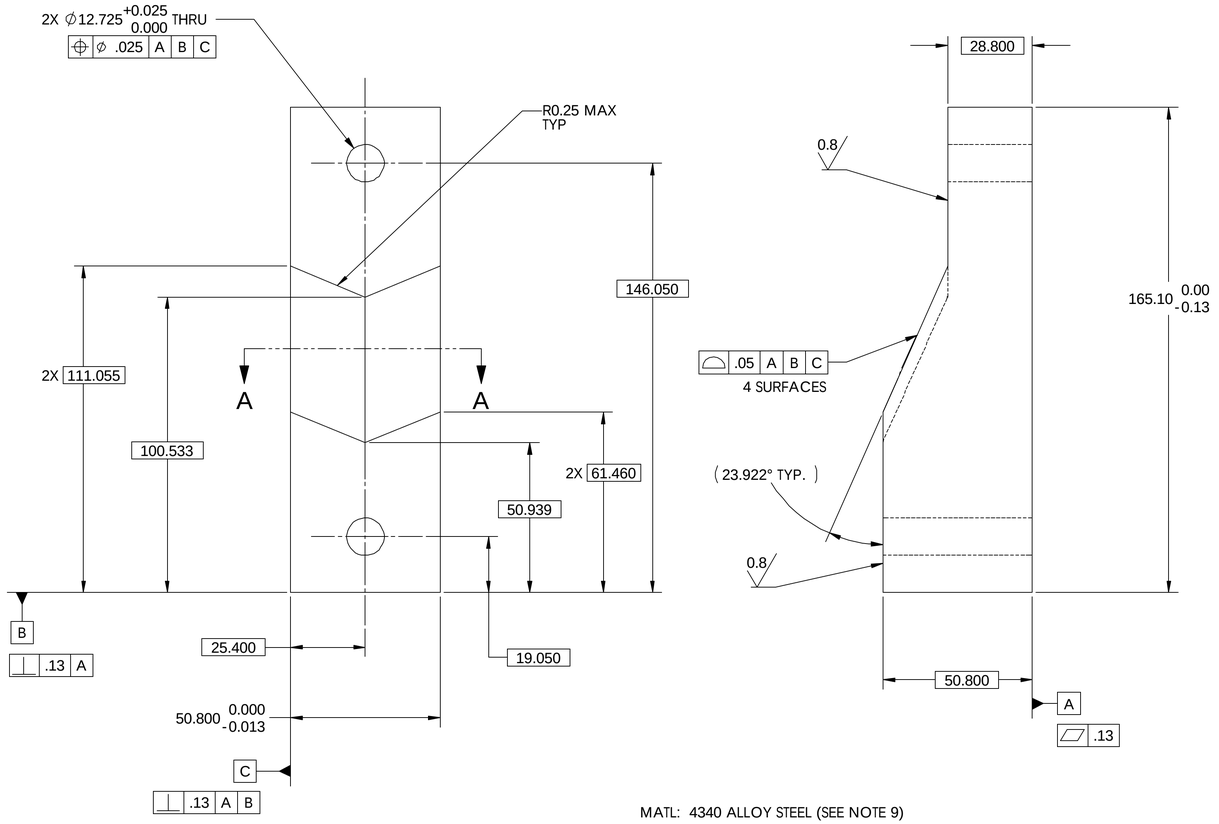
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE	REV.
	P1AP-11	AP6250	21F762 4		-

DWG. NO.	SIZE	REV.	SH.
21F761 4	-	1	

DESCRIPTION	MATERIAL	MAT. LOCATION



SECTION A-A
SCALE 1 : 1



MATL: 4340 ALLOY STEEL (SEE NOTE 9)

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS
9. 4340 MATERIAL TO BE CARBORIZED AND OIL QUENCHED TO ACHIEVE Rc50 (HB 475) MINUMUM HARDNESS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED
TOLERANCES: X.X ± 0.5 FRAC. ± 1/64; X.XX ± 0.25 ANGLES ± 30'; X.XXX ± 0.013 FINISH 1.6
DO NOT SCALE PRINT
THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS
ACCT NO. | NO. REQD | DATE ISSD
DEL TO | DATE REQD
SURFACE TREATMENT
IDEN METHOD | TAG
PROJECT NUMBER: ATL-IP-ED-XXXX
PROJECT NAME: US ATLAS SILICON SUBSYSTEM
DWG BY: W. K. MILLER — DATE: 4/16/2002
CHK BY: BILL WILDS — DATE: 4/16/2002
APR BY: E ANDERSSEN — DATE: 4/16/2002
SER NO. | DATE ISSD | DATE REQD

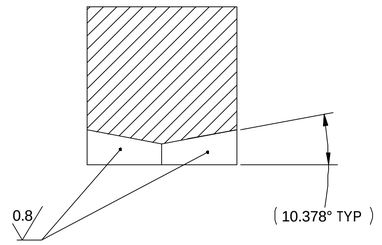
ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

ATLAS PIXEL DETECTOR
ENDCONE VERTEX PLATE
MOLD PRESS PLATE

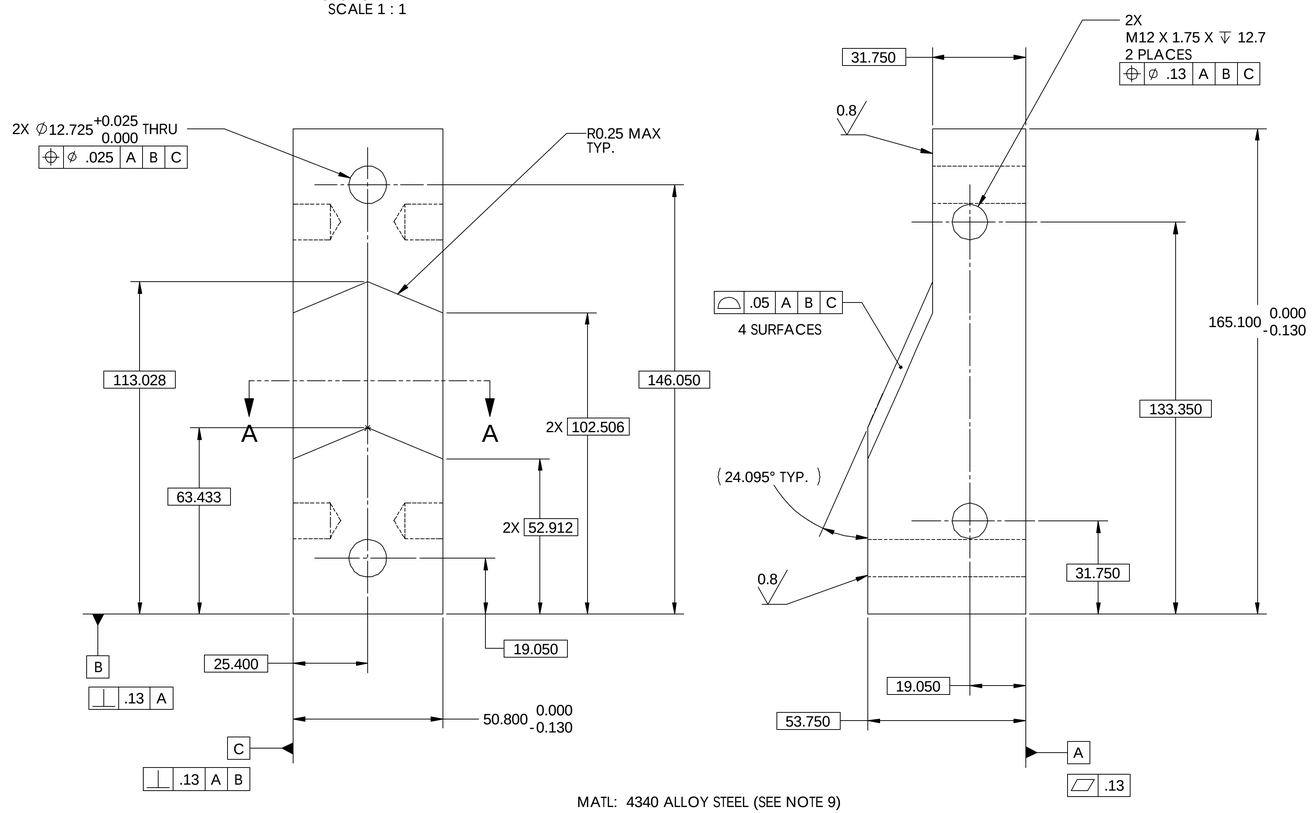
MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	21F759	1:1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	SHEET 1 OF 1	
	P1AP-11	AP6250	DWG. NO. 21F761 4	SIZE - REV.

DWG. NO.	SIZE	REV.	SH.
21F760 4	-	1	

DESCRIPTION	MATERIAL	MAT. LOCATION



SECTION A-A
SCALE 1 : 1



MATL: 4340 ALLOY STEEL (SEE NOTE 9)

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS
9. 4340 MATERIAL TO BE CARBORIZED AND OIL QUENCHED TO ACHIEVE Rc50 (HB 475) MINUMUM HARDNESS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES: X.X ± 0.5 FRAC. ± 1/64; X.XX ± 0.25 ANGLES ± 30'; X.XXX ± 0.013 FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	
DEL TO		DATE ISSD	
SURFACE TREATMENT		DATE REQD	
IDEN METHOD TAG		TO HOLD SILICON REMOVED CODES	
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E ANDERSSEN	DATE	4/16/2002

ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY ±

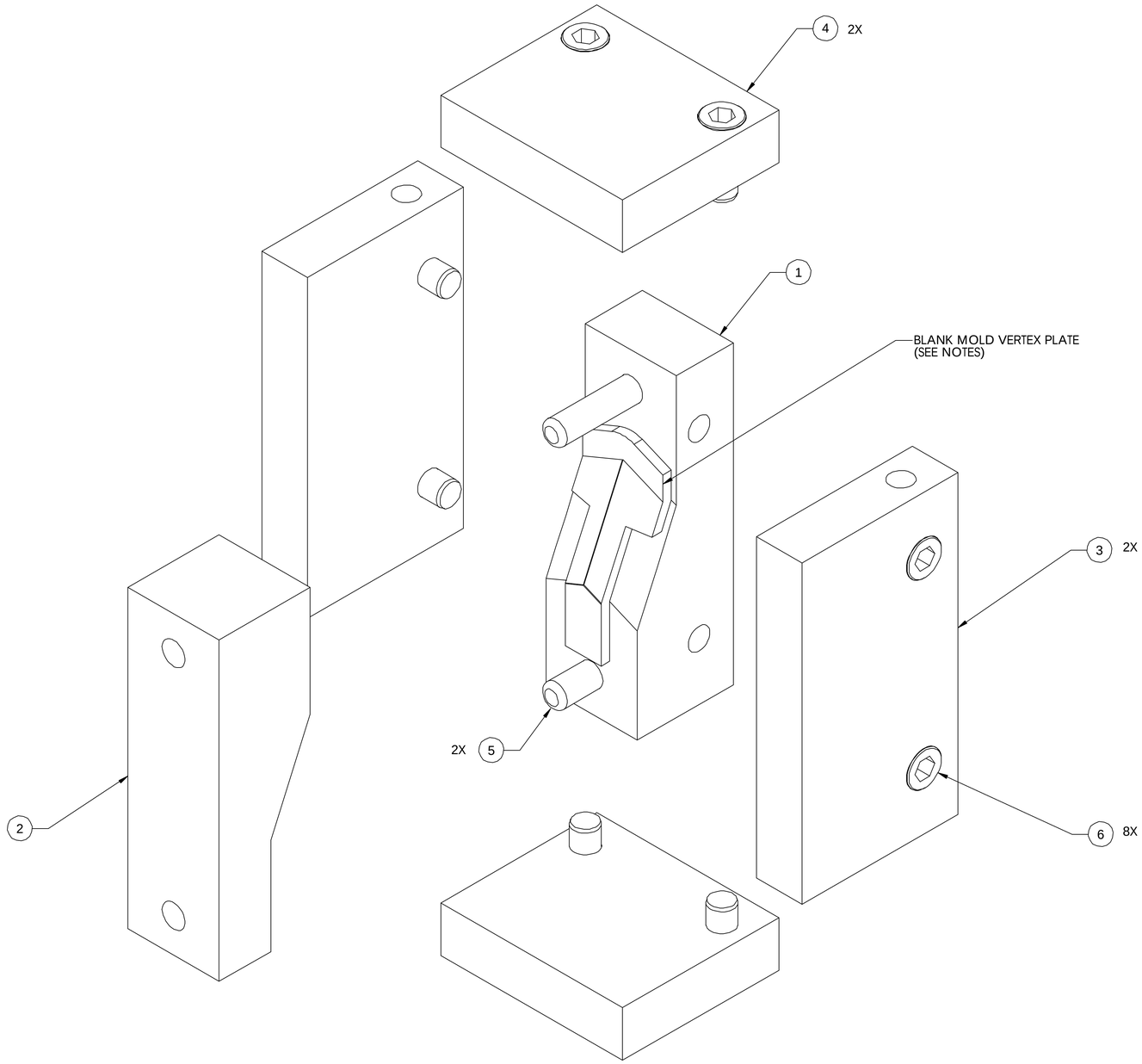
ATLAS PIXEL DETECTOR
ENDCONE VERTEX PLATE
MOLD BASEPLATE

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	21F759	1:1	SHEET 1 OF 1

PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE	REV.
	P1AP-11	AP6250	21F760 4		-

DWG. NO.	SIZE	REV.	SH.
21F7594	▭	1	

ITEM	PART NO.	REQD	DESCRIPTION	MATERIAL
6		8	M12 X 1.75 SOCKET HD CAP SCREW X 25.0	STEEL
5		2	12.7 DIA. DOWEL PIN X 63.5 mm LONG	STEEL
4	21F763	2	ENDCONE VERTEX PLATE - MOLD END PLATE	
3	21F762	2	ENDCONE VERTEX PLATE - MOLD SIDE PLATE	
2	21F761	1	ENDCONE VERTEX PLATE - MOLD PRESS PLATE	
1	21F760	1	ENDCONE VERTEX PLATE - MOLD BASEPLATE	



NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. MOLD USED TO FABRICATE "A" AND "C" SIDE ENDCONE VERTEX OUTER AND INNER PLATES 21F725, 21F727, 21F728, 21F729, 21F730, 21F736, 21F737
3. MATERIAL IS CALLED OUT ON INDIVIDUAL PART DRAWINGS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 FRAC. ± 1/64
X.XX ± 0.25 ANGLES ± 30'
X.XXX± 0.013 FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

SER NO.			
ACCT NO.	NO. REQD	DATE ISSD	
DEL TO		DATE REQD	
SURFACE TREATMENT			
IDEN METHOD	TAG		
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E. ANDERSSEN	DATE	4/16/2002

IN ATLAS SILICON SUBSYSTEM (ASSY)

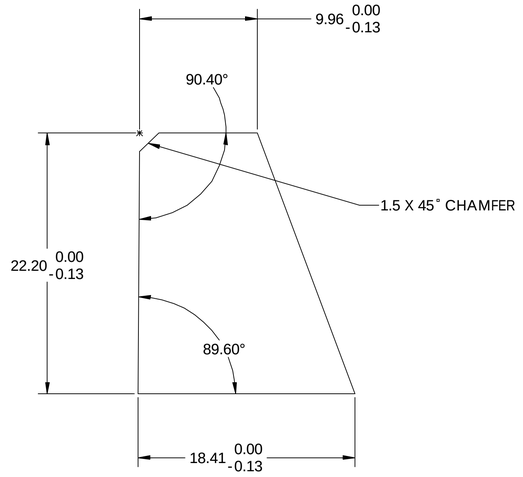
ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

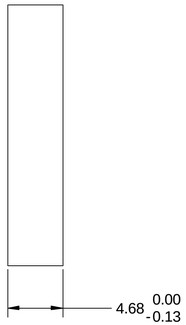
ATLAS PIXEL DETECTOR
ENDCONE VERTEX PLATE
MOLD FIXTURE

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 1:1	DO NOT SCALE PRINTS
	ASSEM	N/A	SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE / REV.
	P1AP-11	AP6250	21F7594	▭

DWG. NO.	SIZE	REV.	SH.
21F756 4		-	1

DESCRIPTION	MATERIAL	MAT. LOCATION





TEMPORARY BOND INSERT #1
MATL: ALUMINUM

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 FRAC. ± 1/64
X.XX ± 0.25 ANGLES ± 30'
X.XXX ± 0.013 FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO	
DEL TO		DATE ISSD	
SURFACE TREATMENT		DATE REQD	
IDEN METHOD TAG			
PROJECT NUMBER	ATL-IP-ED-XXXX	(IF ATLAS SILICON SUBSYSTEM USED)	
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE 4/16/2002	
CHK BY	BILL WILDS	DATE 4/16/2002	
APR BY	E ANDERSSEN	DATE 4/16/2002	

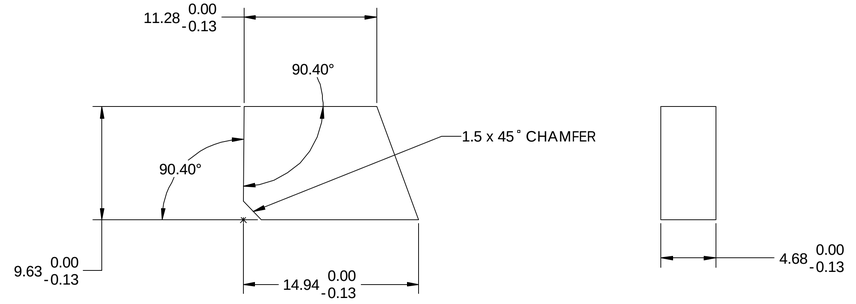
ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY ≠

ATLAS PIXEL DETECTOR
ENDCONE PANEL
BOND FIXTURE TEMPORARY INSERTS

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	21F750	4:1	
			SHEET 1 OF 2	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CIDE	DWG. NO.	SIZE / REV.
	P1AP-11	AP6250	21F756 4	-

DWG. NO.	SIZE	REV.	SH.
Sheet2		-	2

DESCRIPTION	MATERIAL	MAT. LOCATION



TEMPORARY BOND INSERT #2
MATL: ALUMINUM

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 FRAC. ± 1/64
X.XX ± 0.25 ANGLES ± 30'
X.XXX ± 0.013 FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO. | NO. REQD | DATE ISSD
DEL TO | DATE REQD
SURFACE TREATMENT
IDEN METHOD | TAG
PROJECT NUMBER ATL-IP-ED-XXXX (IF ATLAS SILICON SUBSYSTEM (SSID))
PROJECT NAME US ATLAS SILICONE SUBSYSTEM
DWG BY W. K. MILLER | DATE 4/16/2002
CHK BY BILL WILDS | DATE 4/16/2002
APR BY E ANDERSSEN | DATE 4/16/2002

SER NO.

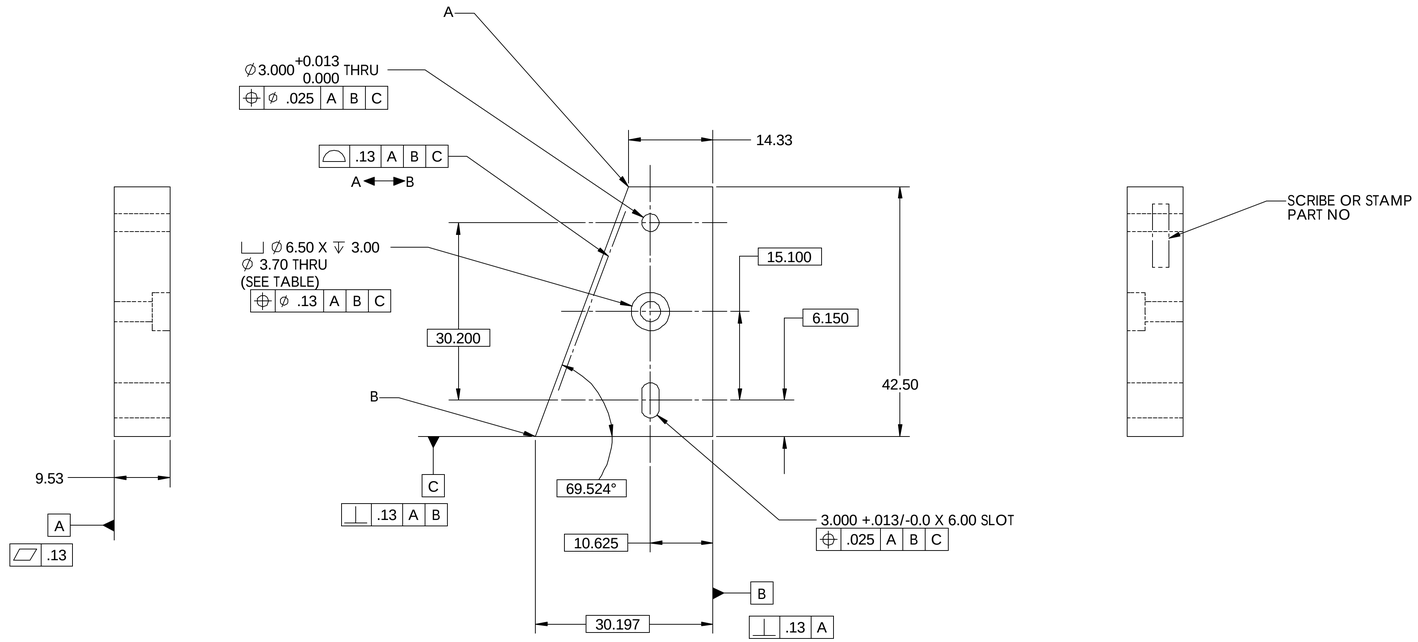
ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY ≠

ATLAS PIXEL DETECTOR
ENDCONE PANEL
BOND FIXTURE TEMPORARY INSERTS

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	21F750	4:1	
			SHEET 2 OF 2	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CIDE	DWG. NO.	SIZE / REV.
	P1AP-11	AP6250	21F756 4 1	-

DWG. NO.	SIZE	REV.	SH.
21F755 4		-	1

DESCRIPTION	MATERIAL	MAT. LOCATION



MATL: 6061-T6 ALUM

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS

PART NO.	DESCRIPTION
-1	NEAR SIDE
-2	FAR SIDE

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES: X.X ± 0.5 | FRAC. ± 1/64 | X.XX ± 0.25 | ANGLES ± 30' | X.XXX ± 0.013 | FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2

CHAMFER ENDS OF ALL SCREW THREADS 30°

CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS

BREAK EDGES .016 MAX. ON MACHINED WORK

REMOVE BURRS, WELD SPLATTER & LOOSE SCALE

IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD
DEL TO	
SURFACE TREATMENT	
IDEN METHOD	TAG
PROJECT NUMBER	ATL-IP-ED-XXXX
PROJECT NAME	US ATLAS SILICON SUBSYSTEM
DWG BY	W. K. MILLER — DATE 4/16/2002
CHK BY	BILL WILDS — DATE 4/16/2002
APR BY	E ANDERSSEN — DATE 4/16/2002

SER NO.	
DATE ISSD	
DATE REQD	

US ATLAS SILICON SUBSYSTEM (USASS)

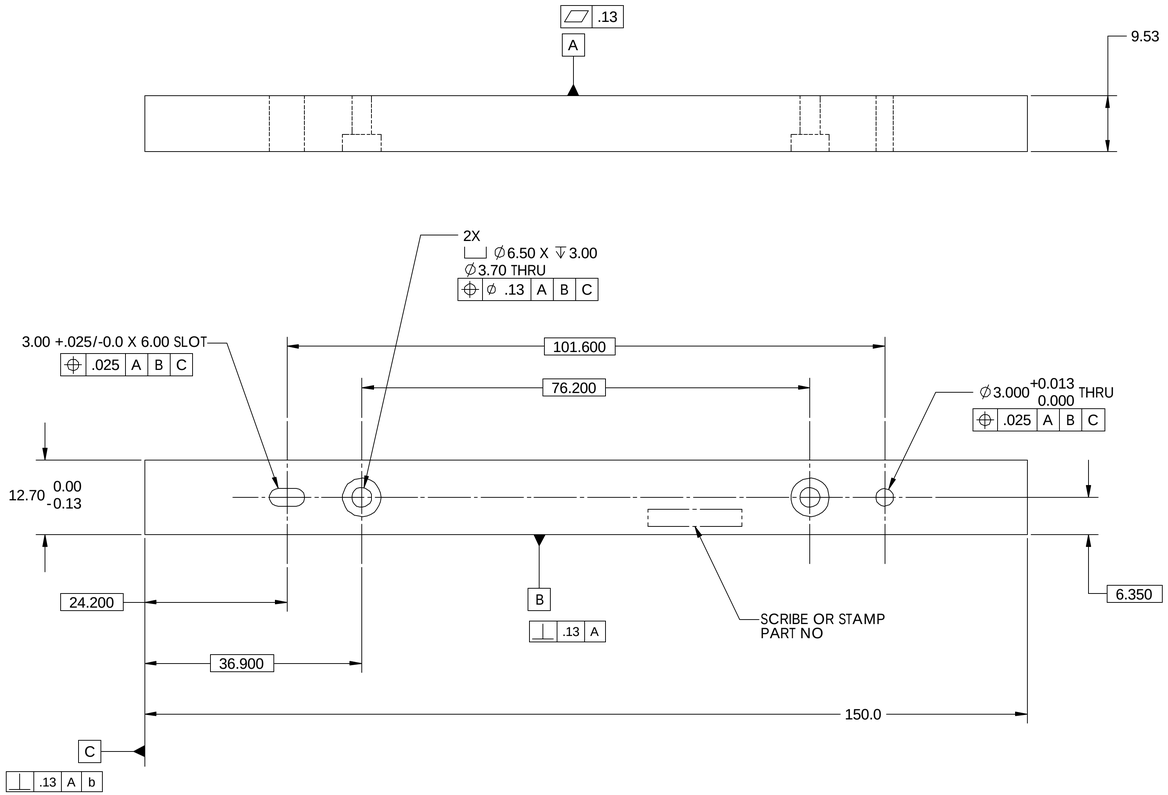
ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

ATLAS PIXEL DETECTOR
ENDCONE PANEL
BOND FIXTURE CAVITY BAR

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 2:1	DO NOT SCALE PRINTS
	PART	21F750	SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CIDE	DWG. NO.	SIZE / REV.
	P1AP-11	AP6250	21F755 4	-

DWG. NO.	SIZE	REV.	SH.
21F754 4	-		1

DESCRIPTION	MATERIAL	MAT. LOCATION



MATL: 6061-T6 ALUM

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 FRAC. ± 1/64
X.XX ± 0.25 ANGLES ± 30'
X.XXX ± 0.013 FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	
DEL TO		DATE ISSD	
SURFACE TREATMENT		DATE REQD	
IDEN METHOD	TAG		
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E ANDERSSEN	DATE	4/16/2002

(US ATLAS SILICON SUBSYSTEM LABEL)

ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

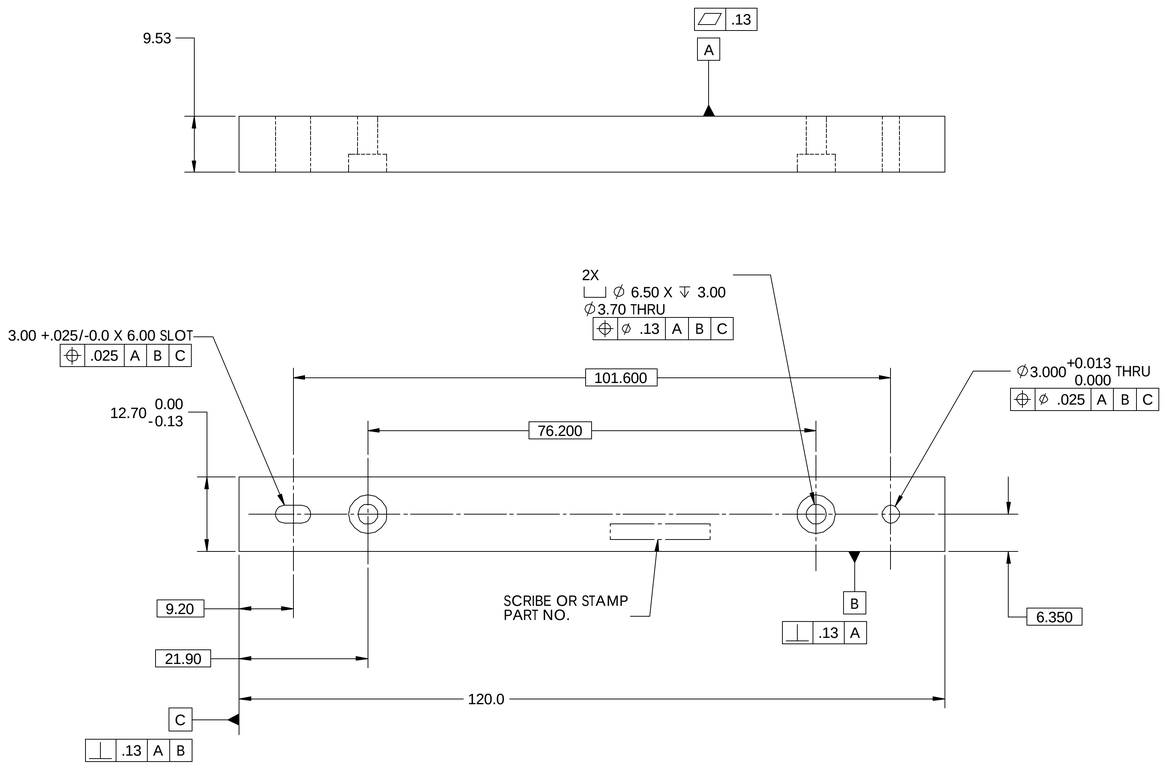
ATLAS PIXEL DETECTOR
ENDCONE PANEL
BONDING FIXTURE CAVITY PLATE

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	21F750	2:1	
			SHEET 1 OF 1	

PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE	REV.
	P1AP-11	AP6250	21F754 4	-	

DWG. NO.	SIZE	REV.	SH.
21F753 4	-	1	

DESCRIPTION	MATERIAL	MAT. LOCATION



MATL: 6061-T6 ALUM

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES: X.X ± 0.5 | FRAC. ± 1/64 | X.XX ± 0.25 | ANGLES ± 30' | X.XXX ± 0.013 | FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2

CHAMFER ENDS OF ALL SCREW THREADS 30°

CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS

BREAK EDGES .016 MAX. ON MACHINED WORK

REMOVE BURRS, WELD SPLATTER & LOOSE SCALE

IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	
DEL TO		DATE ISSD	
SURFACE TREATMENT		DATE REQD	
IDEN METHOD	TAG		
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E ANDERSSEN	DATE	4/16/2002

(A US ATLAS SILICON SUBSYSTEM CLASS)

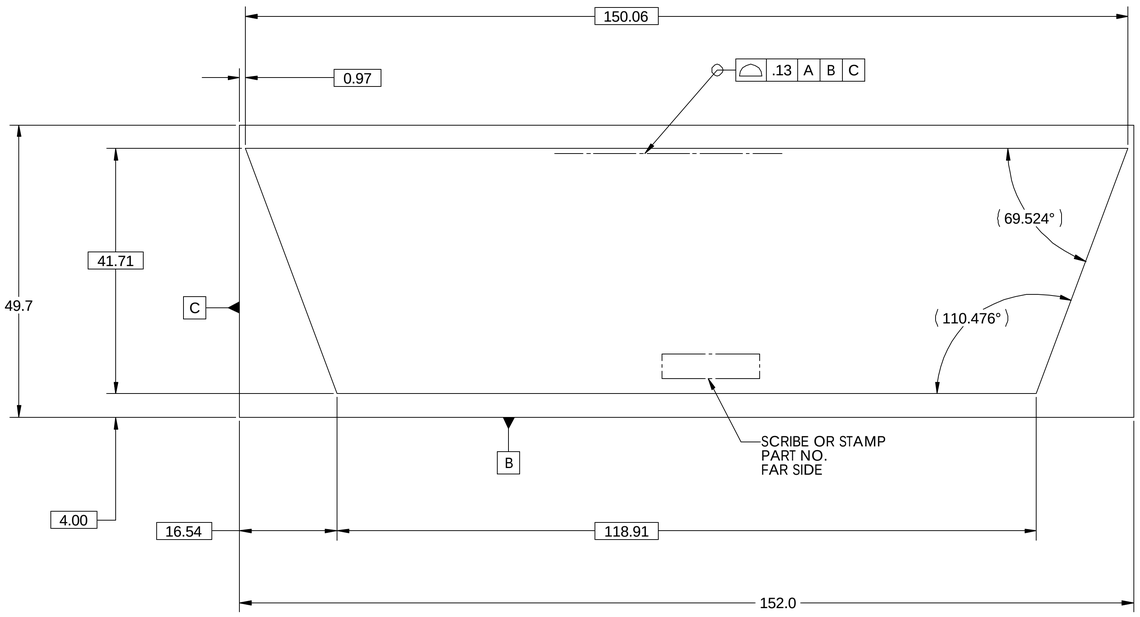
ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY ±

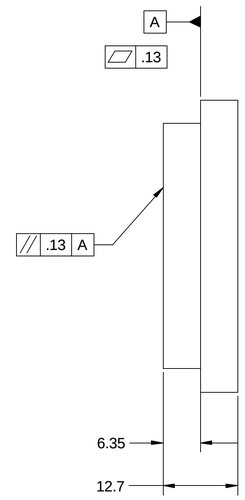
ATLAS PIXEL DETECTOR
ENDCONE PANEL
BONDING FIXTURE CAVITY PLATE

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 2:1	DO NOT SCALE PRINTS
	PART	21F750	SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE / REV.
	P1AP-11	AP6250	21F753 4	-

DWG. NO.	SIZE	REV.	SH.
21F752 4	-	-	1

DESCRIPTION	MATERIAL	MAT. LOCATION





MATL: 6061-T6 ALUM

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES: X.X ± 0.5 | FRAC. ± 1/64 | X.XX ± 0.25 | ANGLES ± 30' | X.XXX ± 0.013 | FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2

CHAMFER ENDS OF ALL SCREW THREADS 30°

CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS

BREAK EDGES .016 MAX. ON MACHINED WORK

REMOVE BURRS, WELD SPLATTER & LOOSE SCALE

IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	
DEL TO		DATE ISSD	
SURFACE TREATMENT		DATE REQD	
IDEN METHOD TAG		TO READ TAG FOR IDENTIFICATION	
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APP BY	E ANDERSSEN	DATE	4/16/2002

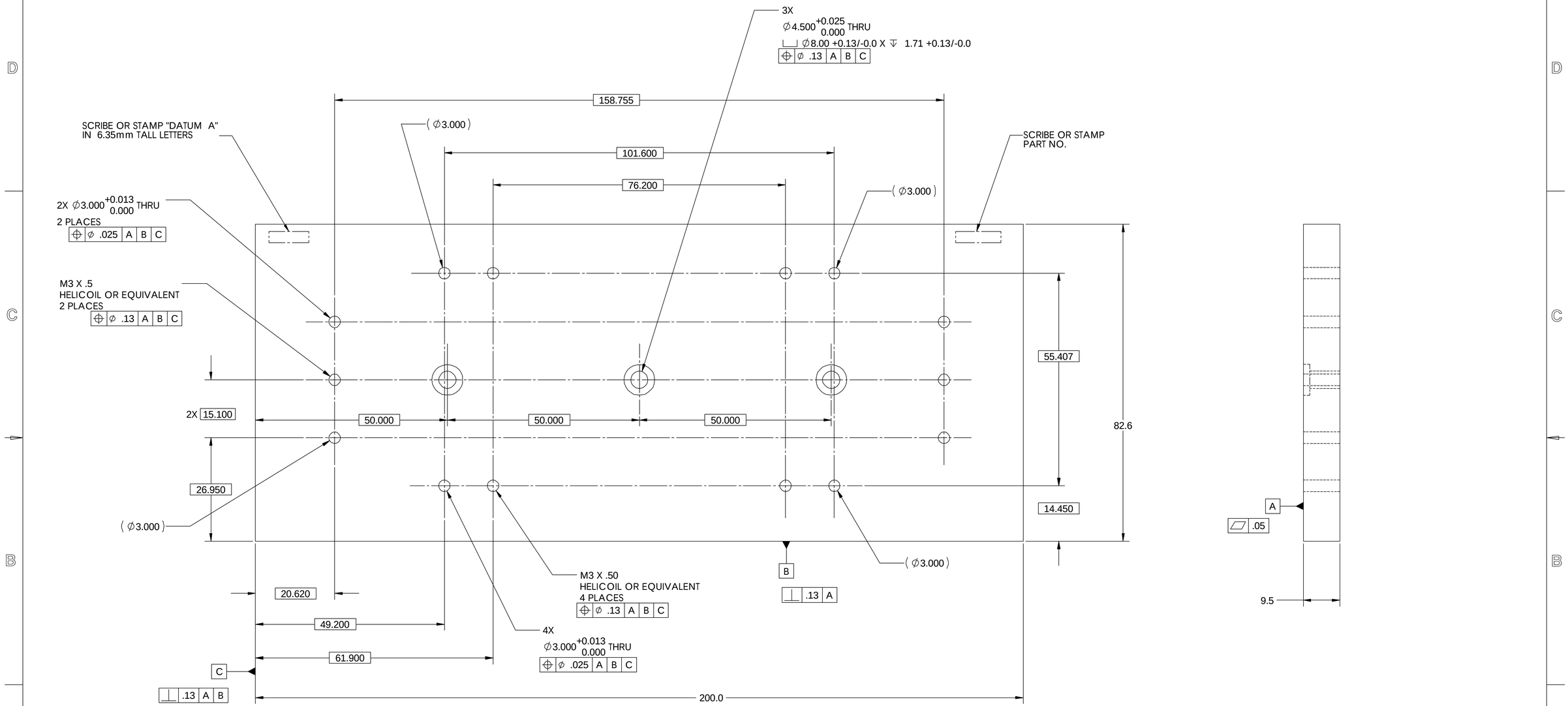
ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

ATLAS PIXEL DETECTOR
ENDCONE PANEL
BOND FIXTURE PRESSURE PLATE

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	21F750	2:1	SHEET 1 OF 1
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CIDE	DWG. NO.	SIZE / REV.
	P1AP-11	AP6250	21F752 4	-

DWG. NO.	SIZE	REV.	SH.
21F751 4	-	1	

DESCRIPTION	MATERIAL	MAT. LOCATION



MATL: 6061-T6 ALUM

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 FRAC. ± 1/64
X.XX ± 0.25 ANGLES ± 30'
X.XXX± 0.013 FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	
DEL TO		DATE ISSD	
SURFACE TREATMENT		DATE REQD	
IDEN METHOD TAG			
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E ANDERSSEN	DATE	4/16/2002

IN ATLAS SILICON SUBSYSTEM (ASS)

ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY ±

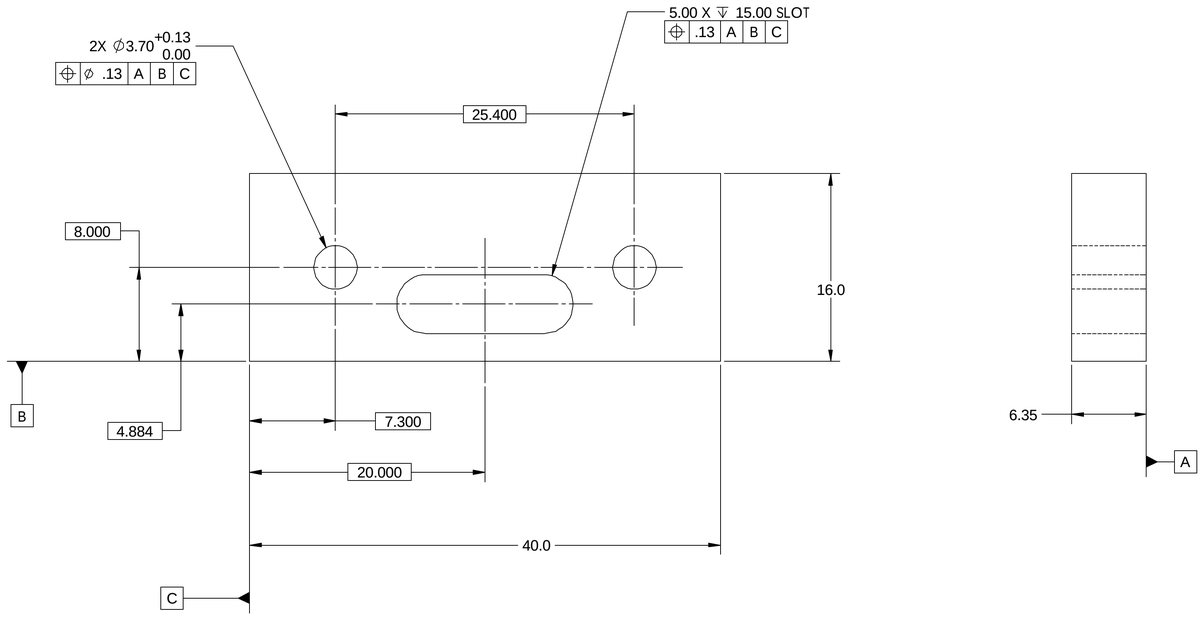
ATLAS PIXEL DETECTOR
ENDCONE PANEL
BOND FIXTURE BASEPLATE

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	21F750	2:1	SHEET 1 OF 1

PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE	REV.
	P1AP-11	AP6250	21F751 4		-

DWG. NO.	SIZE	REV.	SH.
21F749 4	-	-	1

DESCRIPTION	MATERIAL	MAT. LOCATION



MATL: ALUM

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 FRAC. ± 1/64
X.XX ± 0.25 ANGLES ± 30'
X.XXX ± 0.013 FINISH 3.2

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	
DEL TO		DATE ISSD	
SURFACE TREATMENT		DATE REQD	
IDEN METHOD	TAG		
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E ANDERSSEN	DATE	4/16/2002

US ATLAS SILICON SUBSYSTEM (USSS)

ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

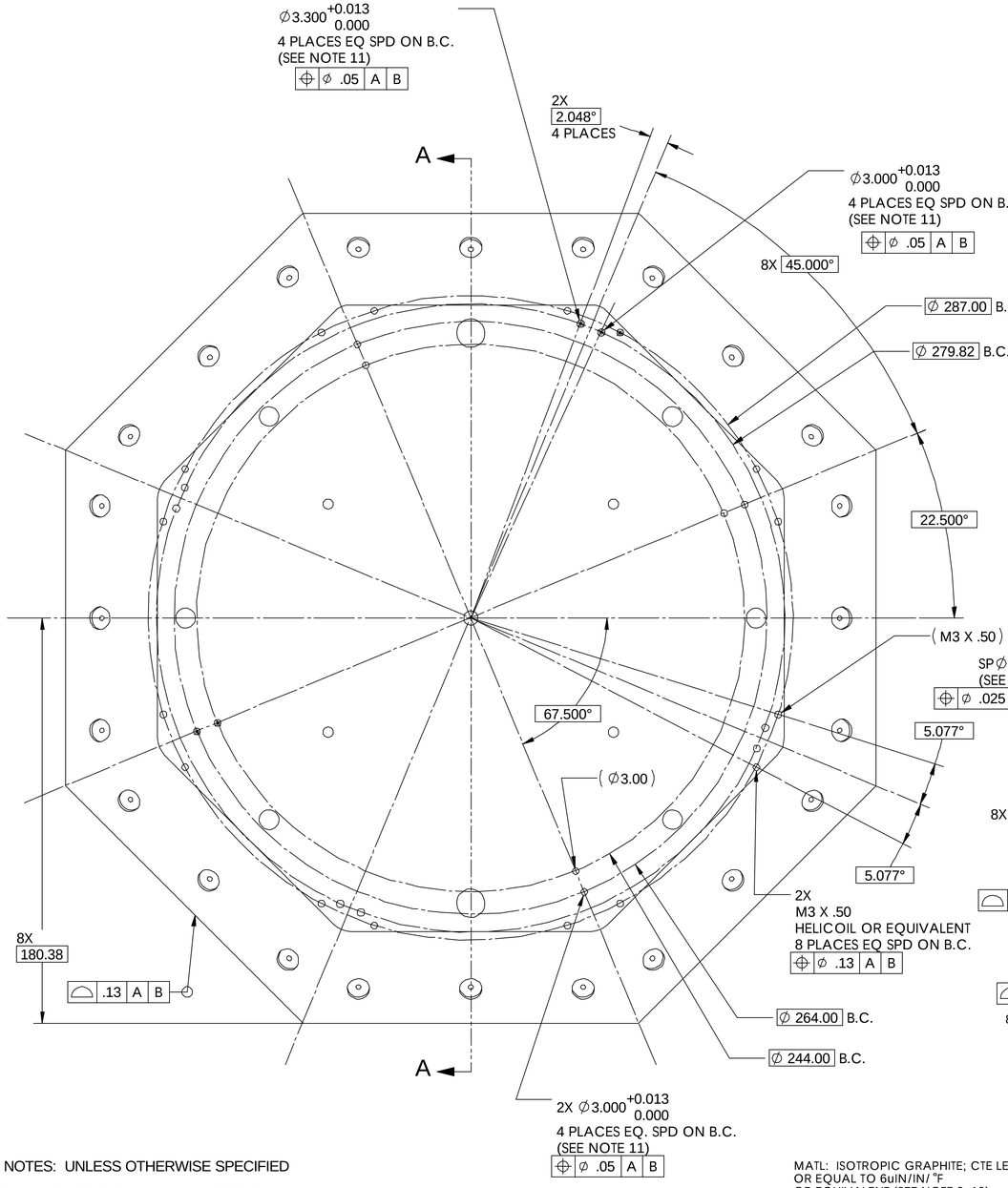
ATLAS PIXEL DETECTOR
ENDCONE BOND FIXTURE
INNER VERTEX PLATE CLAMP

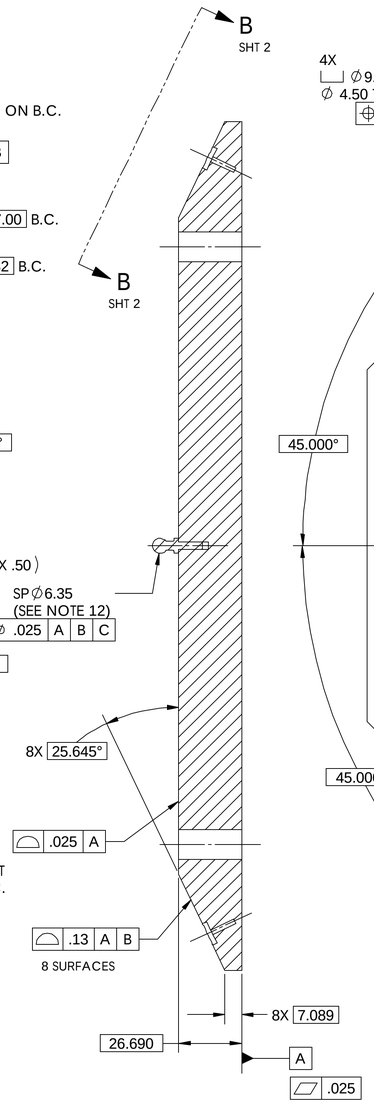
MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	21F746	4:1	
			SHEET 1 OF 1	

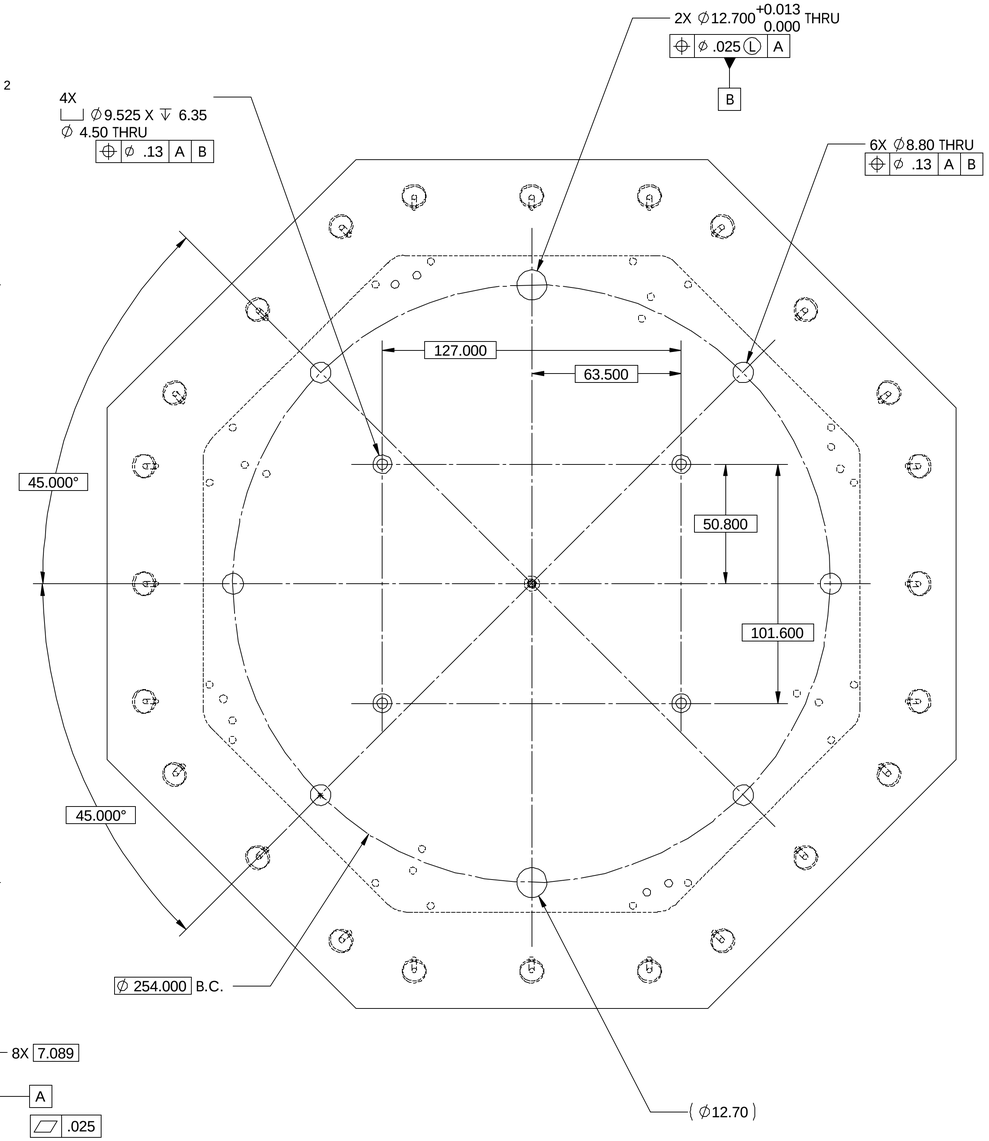
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CIDE	DWG. NO.	SIZE	REV.
	P1AP-11	AP6250	21F749 4	-	-

DWG. NO.	SIZE	REV.	SH.
21F748 4	-	-	1

DESCRIPTION	MATERIAL	MAT. LOCATION







NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS
9. ROOM TEMPERATURE DURING MACHINING TO BE RECORDED AND PROVIDED TO LAWRENCE BERKELEY LABORATORY; TOP AND BOTTOM PLATES TO BE MACHINED AT THE SAME TEMPERATURE (WITHIN 5 DEGREES F)
10. INSPECTION REPORTS TO BE PROVIDED TO LAWRENCE BERKELEY LABORATORY
11. HOLES ARE THRU HOLES, OR 3X DIA. DEEP WITH A SMALLER PILOT HOLE THRU
12. 6.35 DIA. TOOLING BALL PERMANENTLY INSTALLED

MATL: ISOTROPIC GRAPHITE; CTE LESS THAN OR EQUAL TO 6uIN/IN/ °F OR EQUIVALENT (SEE NOTE 9, 10)

SECTION A-A

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES: X.X ± 0.5 FRAC. ± 1/64; X.XX ± 0.25 ANGLES ± 30'; X.XXX ± 0.013 FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2

CHAMFER ENDS OF ALL SCREW THREADS 30°

CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS

BREAK EDGES .016 MAX. ON MACHINED WORK

REMOVE BURRS, WELD SPLATTER & LOOSE SCALE

IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD
DEL TO	
SURFACE TREATMENT	
IDEN METHOD TAG	
PROJECT NUMBER	ATL-IP-ED-XXXX
PROJECT NAME	US ATLAS SILICON SUBSYSTEM
DWG BY	W. K. MILLER — DATE 4/16/2002
CHK BY	BILL WILDS — DATE 4/16/2002
APR BY	E ANDERSSEN — DATE 4/16/2002

SER NO.

DATE ISSD

DATE REQD

US ATLAS SILICON SUBSYSTEM (USA15)

ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY

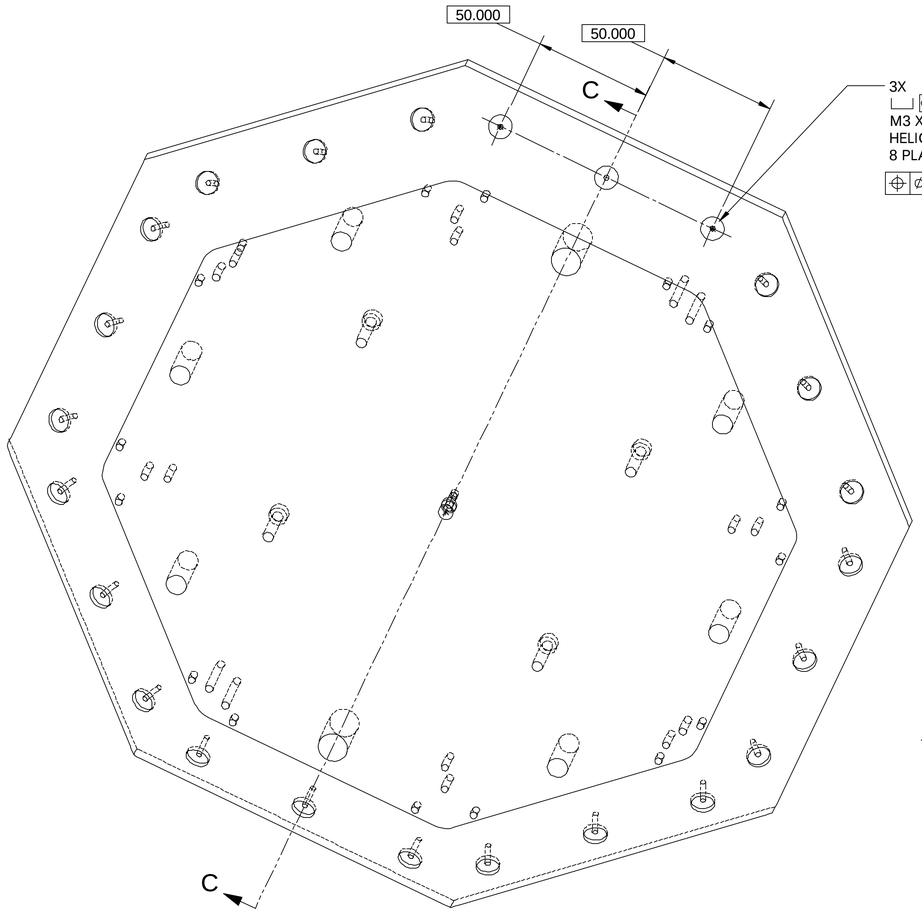
UNIVERSITY OF CALIFORNIA - BERKELEY ≠

ATLAS PIXEL DETECTOR ENDCONE BOND FIXTURE TOP GRAPHITE PLATE

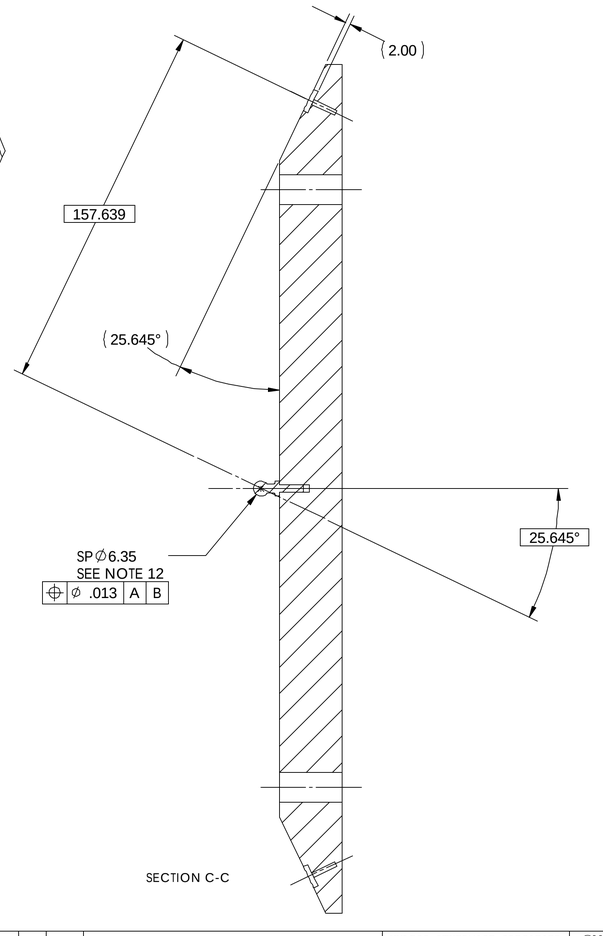
MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	21F746	1:1.25	
			SHEET 1 OF 2	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CIDE	DWG. NO.	SIZE / REV.
	P1AP-11	AP6250	21F748 4	-

DWG. NO.	SIZE	REV.	SH.
Sheet2		-	2

DESCRIPTION	MATERIAL	MAT. LOCATION



VIEW B-B
(SEE SHT 1)



SECTION C-C

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS
9. ROOM TEMPERATURE DURING MACHINING TO BE RECORDED AND PROVIDED TO HYTEC; TOP AND BOTTOM PLATES TO BE MACHINED AT THE SAME TEMPERATURE (WITHIN 5 DEGREES F)
10. INSPECTION REPORTS TO BE PROVIDED TO LAWRENCE BERKELEY LABORATORY
11. HOLES ARE THRU HOLES, OR 3X DIA. DEEP WITH A SMALLER PILOT HOLE THRU
12. 6.35 DIA. TOOLING BALL PERMANENTLY INSTALLED

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES: X.X ± 0.5 | FRAC. ± 1/64 | X.XX ± 0.25 | ANGLES ± 30' | X.XXX ± 0.013 | FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2

CHAMFER ENDS OF ALL SCREW THREADS 30°

CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS

BREAK EDGES .016 MAX. ON MACHINED WORK

REMOVE BURRS, WELD SPLATTER & LOOSE SCALE IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	
DEL TO		DATE ISSD	
SURFACE TREATMENT		DATE REQD	
IDEN METHOD	TAG		
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICONE SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E ANDERSSEN	DATE	4/16/2002

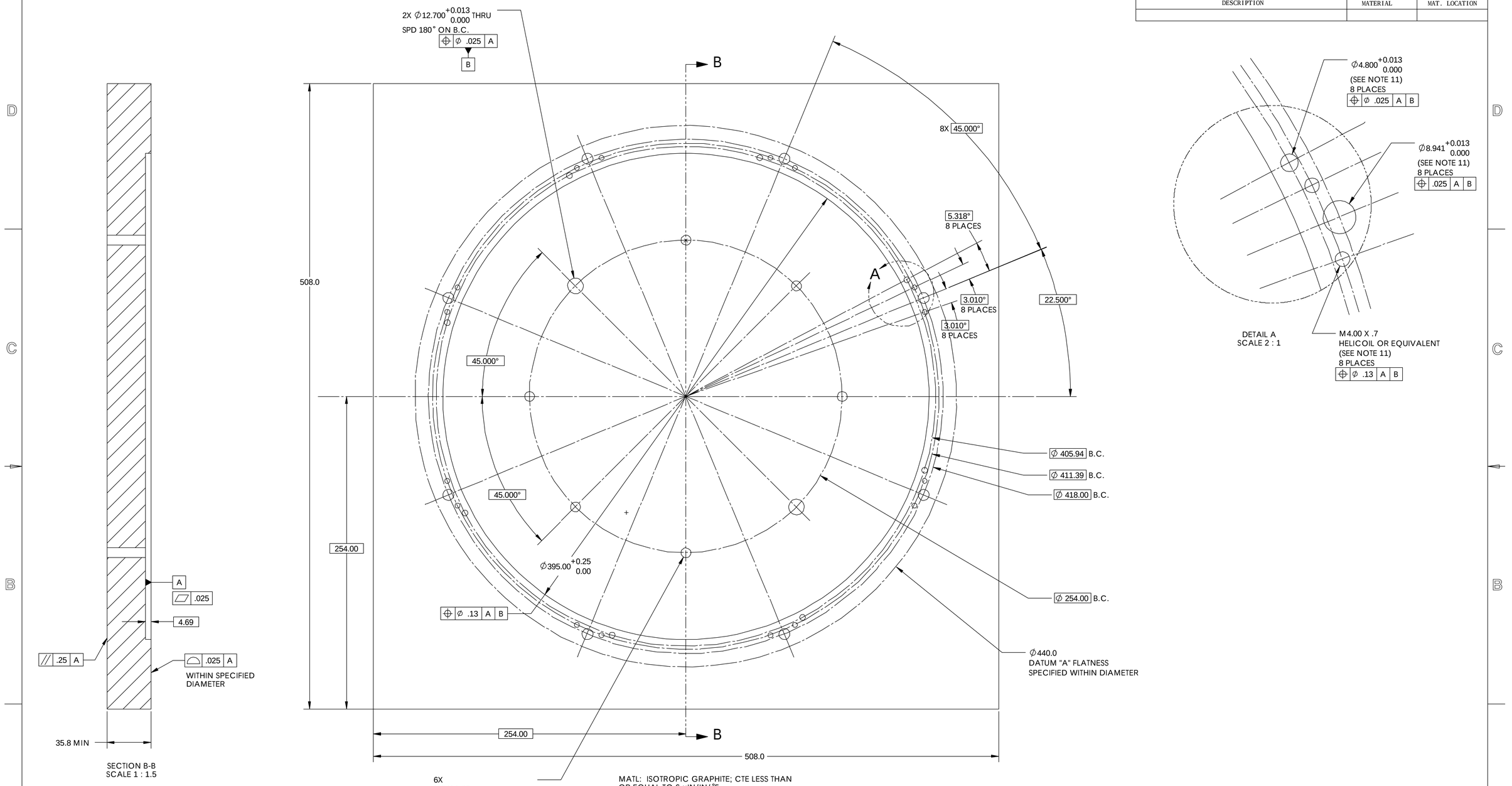
ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY ÷

ATLAS PIXEL DETECTOR
ENDCONE BOND FIXTURE
TOP GRAPHITE PLATE

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 1:1.25	DO NOT SCALE PRINTS
	PART	21F746	SHEET 2 OF 2	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE / REV.
	P1AP-11	AP6250	21F7484	-

DWG. NO.	SIZE	REV.	SH.
21F747 4	-		1

DESCRIPTION	MATERIAL	MAT. LOCATION



DETAIL A
SCALE 2 : 1

SECTION B-B
SCALE 1 : 1.5

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS
9. ROOM TEMPERATURE DURING MACHINING TO BE RECORDED AND PROVIDED TO LAWRENCE BERKELEY LABORATORY; TOP AND BOTTOM PLATES TO BE MACHINED AT THE SAME TEMPERATURE (WITHIN 5 DEGREES F)
10. INSPECTION REPORTS TO BE PROVIDED TO LAWRENCE BERKELEY LABORATORY
11. HOLES ARE THRU HOLES, OR 3X DIA. DEEP WITH A SMALLER PILOT HOLE THRU

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 | FRAC. ± 1/64
X.XX ± 0.25 | ANGLES ± 30'
X.XXX ± 0.013 | FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.
DEL TO		DATE ISSD
SURFACE TREATMENT		DATE REQD
IDEN METHOD TAG		
PROJECT NUMBER	ATL-IP-ED-XXXX	(US ATLAS SILICON SUBSYSTEM CODE)
PROJECT NAME	US ATLAS SILICON SUBSYSTEM	
DWG BY	W. K. MILLER	DATE 4/16/2002
CHK BY	BILL WILDS	DATE 4/16/2002
APR BY	E ANDERSSEN	DATE 4/16/2002

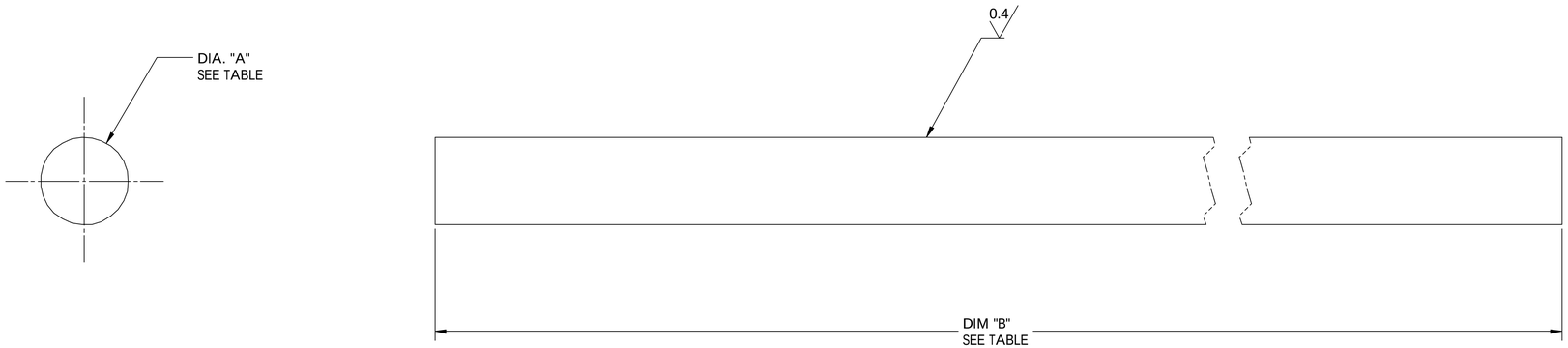
ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

ATLAS PIXEL DETECTOR
ENDCONE BOND FIXTURE
BOTTOM GRAPHITE PLATE

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	21F746	1:1.5	SHEET 1 OF 1
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CIDE	DWG. NO.	SIZE / REV.
	P1AP-11	AP6250	21F747 4	-

DWG. NO.	SIZE	REV.	SH.
21F715 4		-	1

DESCRIPTION	MATERIAL	MAT. LOCATION



MATL: STEEL GROUND ROUNDSTOCK

PART NO.	DIM "A"	"A" TOL	DIM "B"	PART/PURPOSE
21F715-1	8.965	+/-0.025	305.00	JOINT INSERT MANDREL
21F715-3	6.35	+/-0.025	305.00	MOLD ALIGNMENT ROD
21F715-5	7.72	+/-0.025	305.00	JOINING PIN MANDREL
21F715-7	10.11	+/-0.025	857.00	STIFFENING TUBE MANDREL
21F715-9	6.35	+/-0.025	857.00	MOLD ALIGNMENT ROD

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 FRAC. ± 1/64
X.XX ± 0.25 ANGLES ± 30'
X.XXX ± 0.013 FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.		NO. REQD	
DEL TO			
SURFACE TREATMENT			
IDEN METHOD	TAG		
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E ANDERSSEN	DATE	4/16/2002

SER NO.
DATE ISSD
DATE REQD
US ATLAS SILICON SUBSYSTEM (USA)

ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

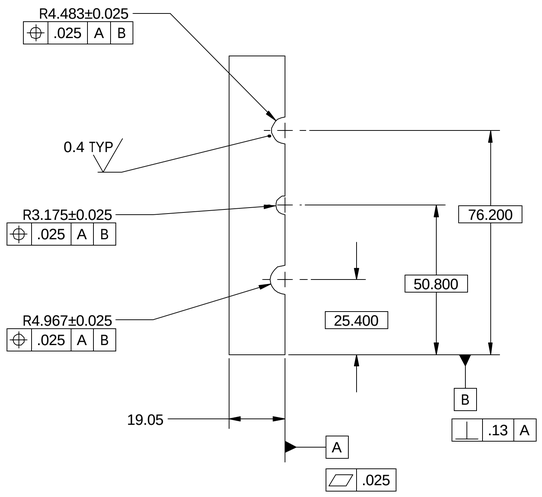
ATLAS PIXEL DETECTOR
SPACEFRAME
VERTEX STIFFENER TUBE MOLD MANDREL

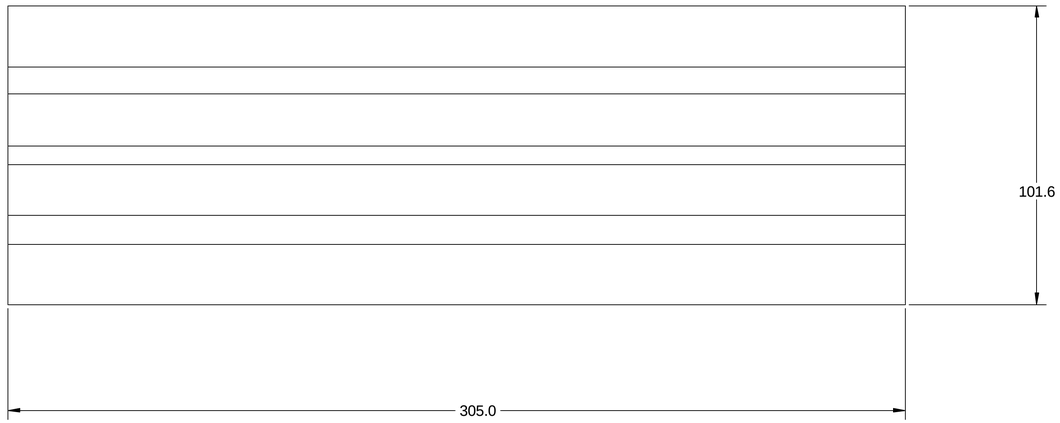
MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	N/A	4:1	
			SHEET 1 OF 1	

PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE	REV.
	P1AP-11	AP6250	21F715 4		-

DWG. NO.	SIZE	REV.	SH.
21F714		-	1

DESCRIPTION	MATERIAL	MAT. LOCATION





MATL: STEEL GROUND FLATSTOCK

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 FRAC. ± 1/64
X.XX ± 0.25 ANGLES ± 30'
X.XXX ± 0.013 FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	
DEL TO		DATE ISSD	
SURFACE TREATMENT		DATE REQD	
IDEN METHOD	TAG		
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E ANDERSSEN	DATE	4/16/2002

US ATLAS SILICON SUBSYSTEM (SCT)

ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

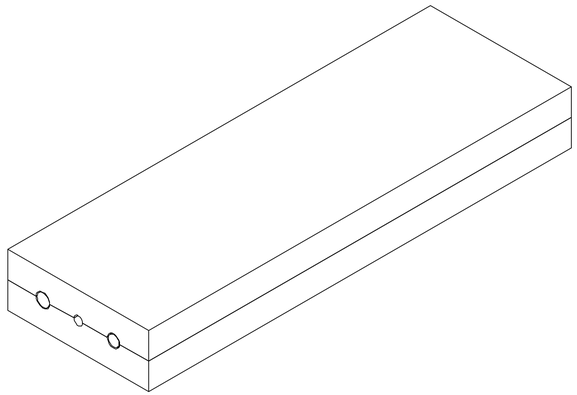
ATLAS PIXEL DETECTOR
SPACEFRAME
VERTEX TUBE MOLD CAVITY

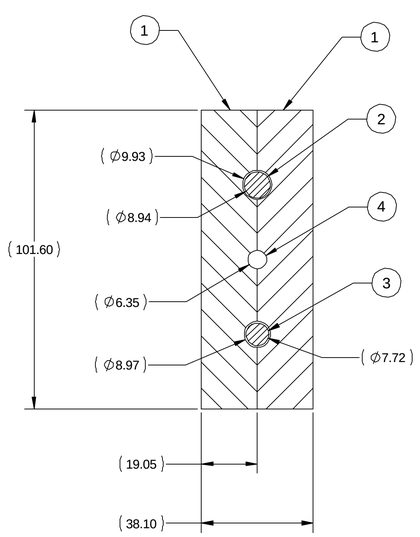
MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	21F713	1:1	SHEET 1 OF 1

PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE	REV.
	P1AP-11	AP6250	21F714 4		-

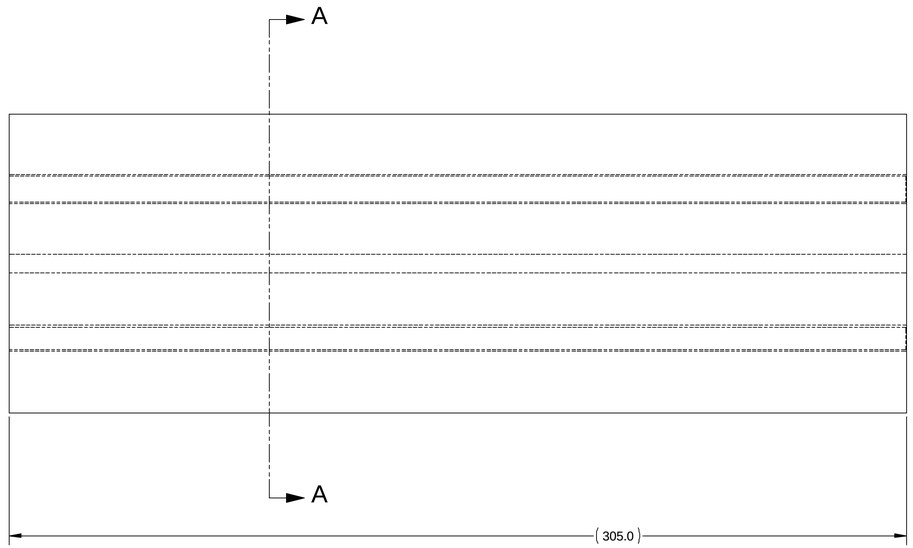
DWG. NO.	SIZE	REV.	SH.
21F713 4		-	1

ITEM	PART NO.	REQD	DESCRIPTION	MATERIAL
4	21F713-3	1	MOLD ALIGNMENT ROD	STEEL
3	21F713-5	1	VERTEX JOINING PIN MANDREL	STEEL
2	21715-1	1	VERTEX JOINT INSERT MANDREL	STEEL
1	21F713	2	VERTEX TUBE INSERT MOLD CAVITY	STEEL





SECTION A-A
SCALE 1 : 1



NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS IN MILLIMETERS
2. MOLD USED TO FORM VERTEX JOINT INSERT AND VERTEX JOINING PIN (PARTS 21F677 AND 21F658)
3. SEE PART DRAWINGS FOR MATERIAL SPECIFICATIONS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 FRAC. ± 1/64
X.XX ± 0.25 ANGLES ± 30'
X.XXX ± 0.013 FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	
DEL TO		DATE ISSD	
SURFACE TREATMENT		DATE REQD	
IDEN METHOD	TAG		
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E. ANDERSSEN	DATE	4/16/2002

(IF ATLAS SILICON SUBSYSTEM USED)

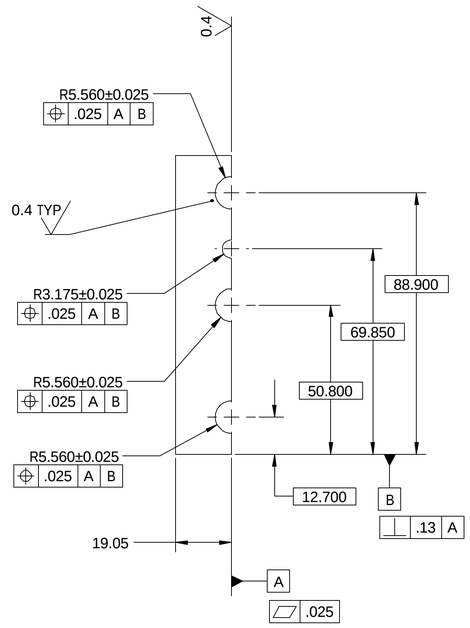
ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY ±

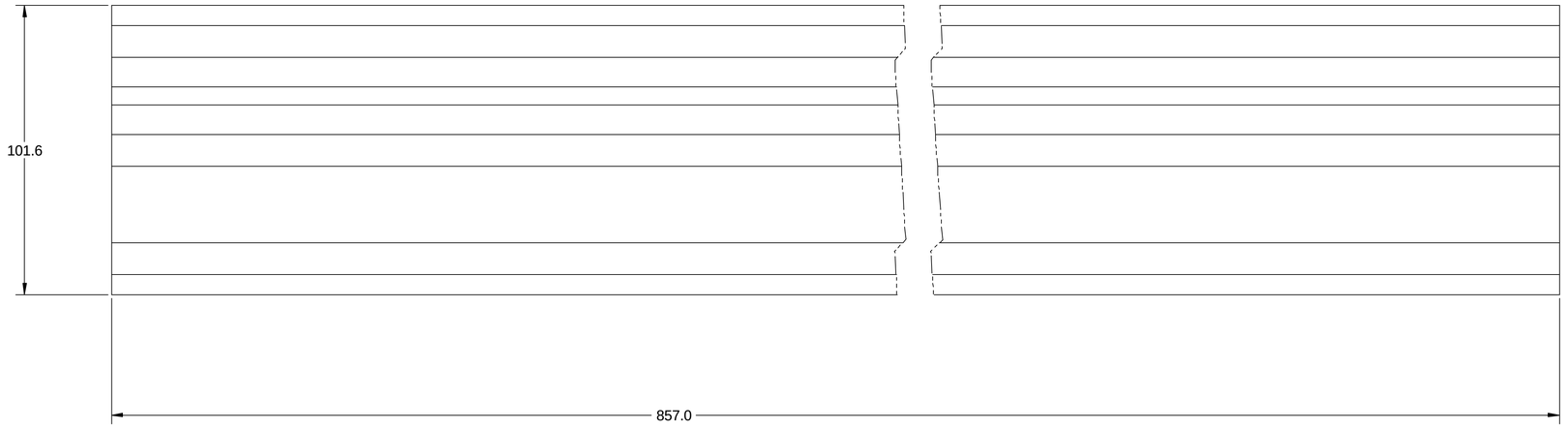
ATLAS PIXEL DETECTOR
SPACEFRAME
VERTEX TUBE MOLD ASSEMBLY

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 1:1	DO NOT SCALE PRINTS
	ASSEM	N/A	SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO. 21F713 4	SIZE	REV. -
	P1AP-11	AP6250		

DWG. NO.	SIZE	REV.	SH.
21F7124		-	1

DESCRIPTION	MATERIAL	MAT. LOCATION





MATL: STEEL GROUND FLATSTOCK

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46,1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 FRAC. ± 1/64
X.XX ± 0.25 ANGLES ± 30'
X.XXX ± 0.013 FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	
DEL TO		DATE ISSD	
SURFACE TREATMENT		DATE REQD	
IDEN METHOD TAG			
PROJECT NUMBER	ATL-IP-ED-XXXX	(IF ATLAS SILICON SUBSYSTEM ISSUED)	
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E ANDERSSEN	DATE	4/16/2002

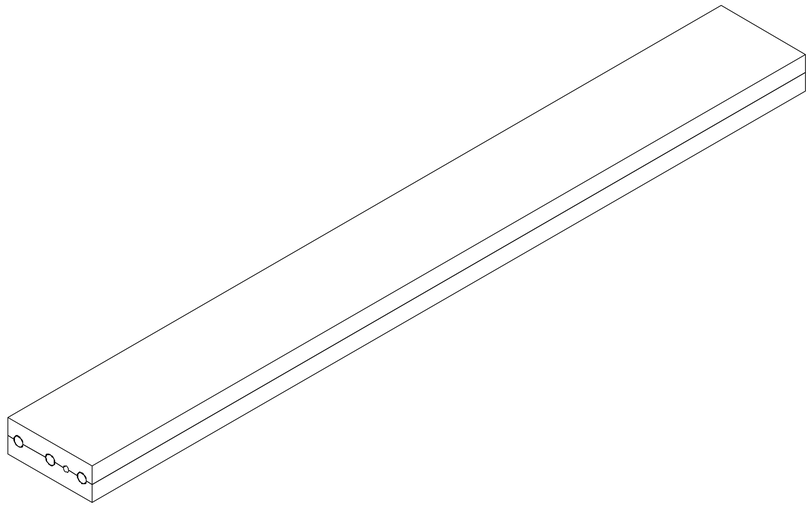
ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY ≠

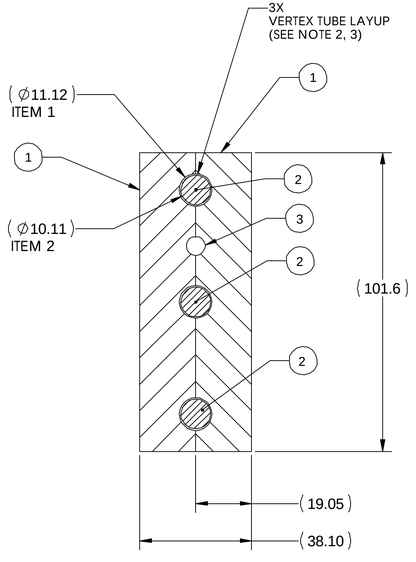
ATLAS PIXEL DETECTOR
SPACEFRAME
VERTEX STIFFENER TUBE MOLD CAVITY

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	21F711	1:1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CIDE	SHEET 1 OF 1	
	P1AP-11	AP6250	DWG. NO. 21F7124	SIZE - REV. -

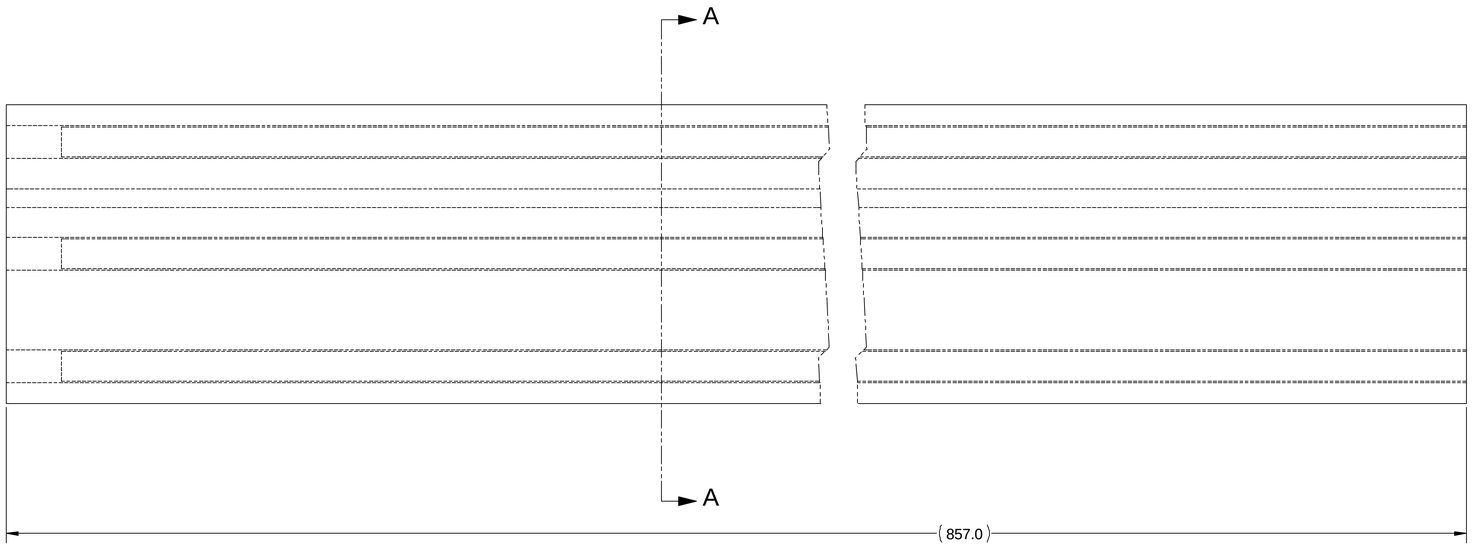
DWG. NO.	SIZE	REV.	SH.
21F714		-	1

ITEM	PART NO.	REQD	DESCRIPTION	MATERIAL
3	21F715-9	1	6.35 DIA. MOLD ALIGNMENT ROD	STEEL
2	21F715-7	3	VERTEX STIFFENING TUBE MANDREL	STEEL
1	21F712	2	VERTEX STIFFENING TUBE MOLD CAVITY	STEEL





SECTION A-A
SCALE 1 : 1



NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS IN MILLIMETERS
2. MOLD USED TO FORM CENTRAL AND END SECTION VERTEX STIFFENER TUBES (PART 21F653 AND 21F673)
3. SEE PART DRAWINGS FOR MATERIAL SPECIFICATION

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 | FRAC. ± 1/64
X.XX ± 0.25 | ANGLES ± 30'
X.XXX± 0.013 | FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	
DEL TO		DATE ISSD	
SURFACE TREATMENT		DATE REQD	
IDEN METHOD	TAG		
PROJECT NUMBER	ATL-IP-ED-XXXX	(IF ATLAS SILICON SUBSYSTEM (SSS))	
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	5/8/2001
CHK BY	BILL WILDS	DATE	5/31/2001
APR BY	E. ANDERSSEN	DATE	????

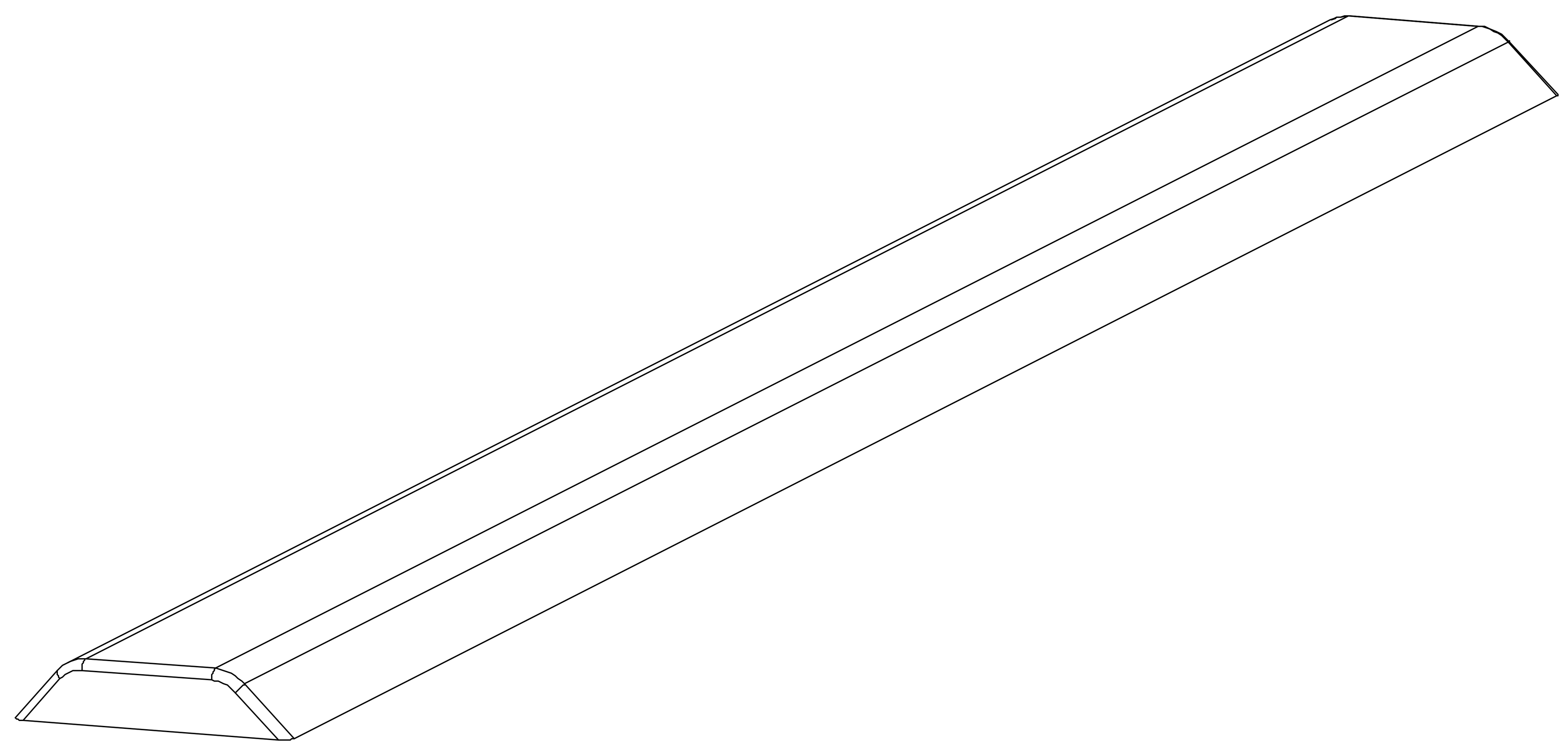
ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY ±

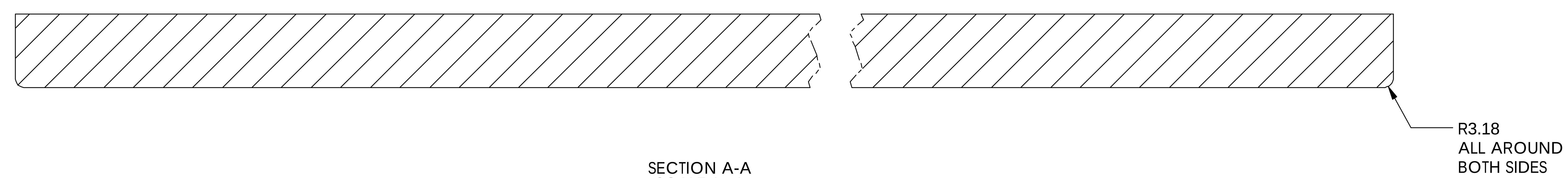
ATLAS PIXEL DETECTOR
SPACEFRAME
STIFFENING TUBE MOLD ASSEMBLY

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 1:1	DO NOT SCALE PRINTS
	ASSEM	N/A	SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CIDE	DWG. NO. 21F7114	SIZE	REV. -
	P1AP-11	AP6250		

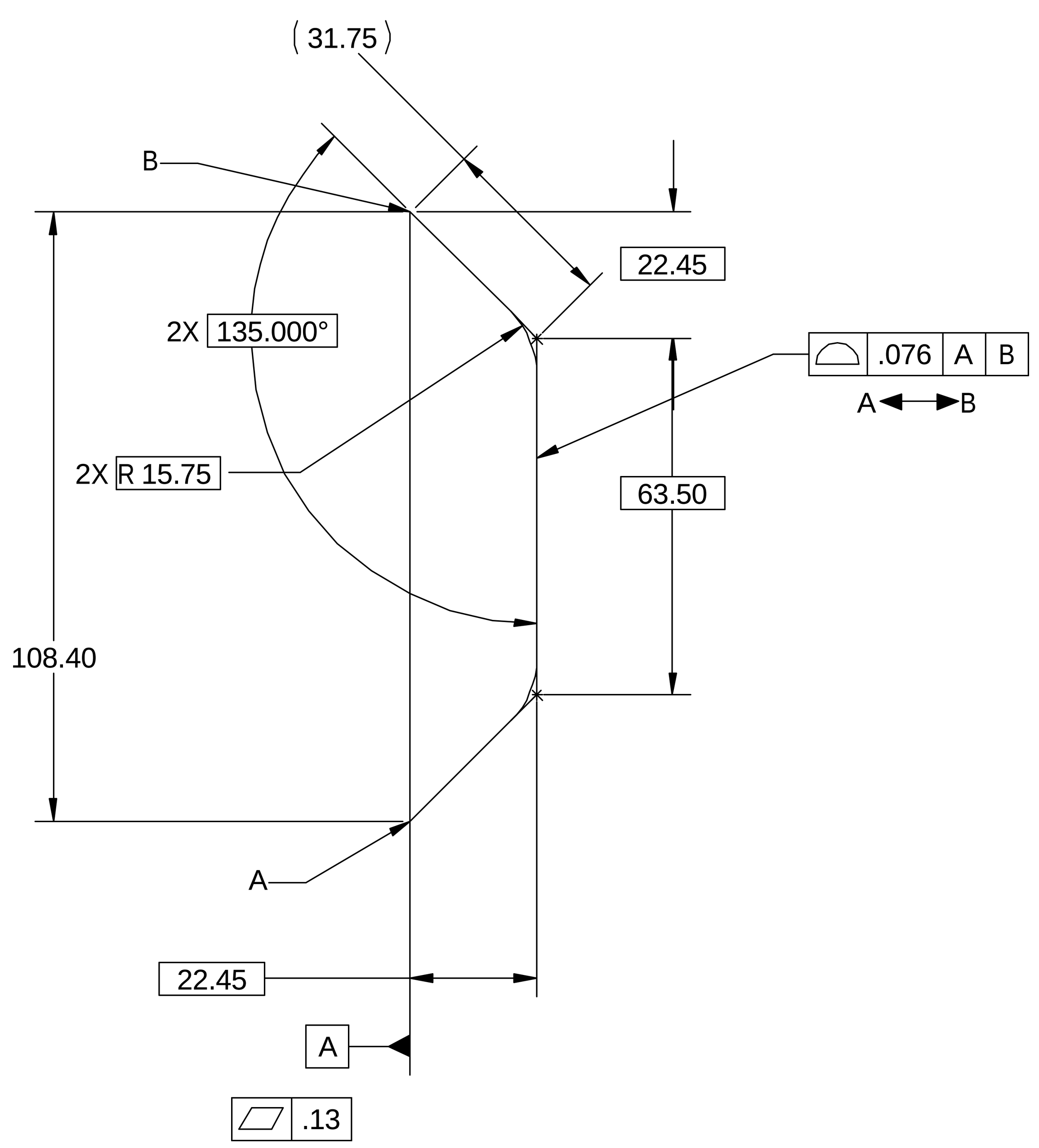
DWG. NO.	SIZE	REV.	SH.
21F710 4		-	1

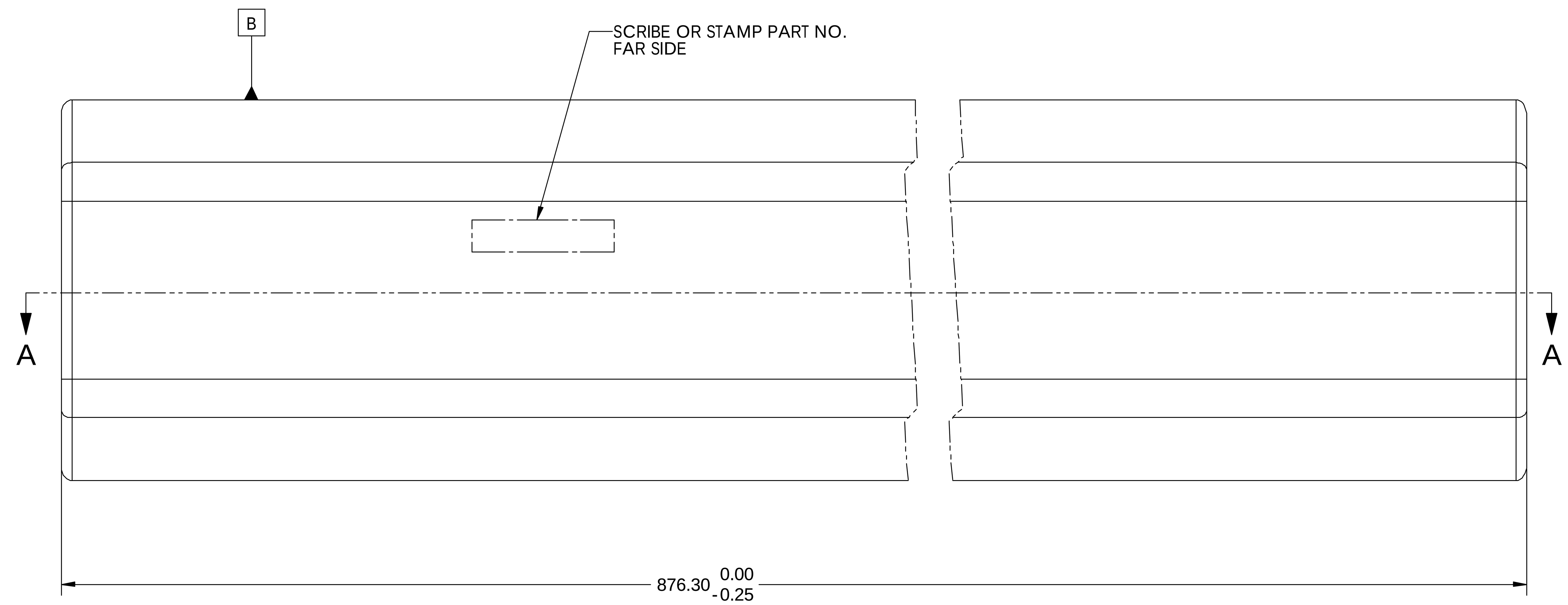
DESCRIPTION	MATERIAL	MAT. LOCATION





SECTION A-A
SCALE 1 : 1





MATL: STEEL GROUND FLATSTOCK

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES		
X.X ± 0.5	FRAC. ± 1/64	
X.XX ± 0.25	ANGLES ± 30'	
X.XXX± 0.013	FINISH 1.6	

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	
DEL TO		DATE ISSD	
SURFACE TREATMENT		DATE REQD	
IDEN METHOD	TAG		
PROJECT NUMBER	ATL-IP-ED-XXXX	US ATLAS SILICON SUBSYSTEM (LOGO)	
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E ANDERSSEN	DATE	4/16/2002

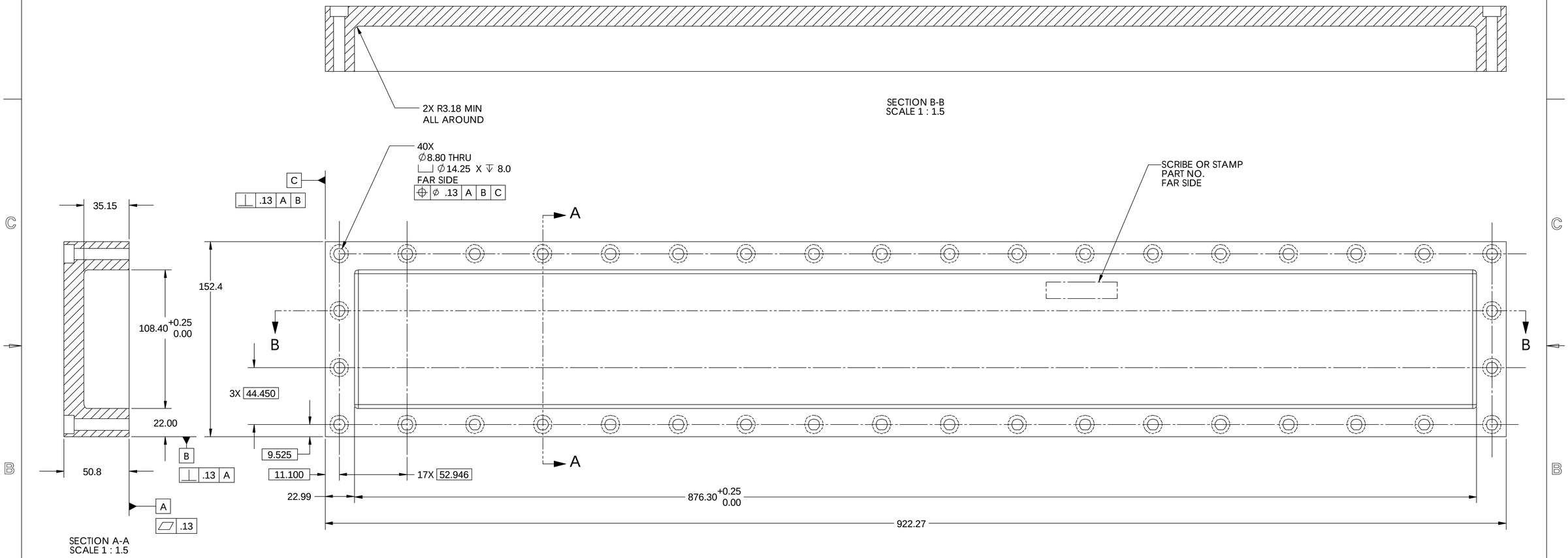
ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

ATLAS PIXEL DETECTOR
SPACEFRAME CENTRAL AND END SECTION
PANEL OUTER CORNER MOLD INSERT

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 1:1	DO NOT SCALE PRINTS
	PART	21F708	SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CIDE	DWG. NO. / SIZE	REV.
	P1AP-11	AP6250	21F710 4	-

DWG. NO.	SIZE	REV.	SH.
21F709 4	-	-	1

DESCRIPTION	MATERIAL	MAT. LOCATION



MATL: STEEL GROUND FLATSTOCK

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 | FRAC. ± 1/64
X.XX ± 0.25 | ANGLES ± 30'
X.XXX ± 0.013 | FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	
DEL TO		DATE ISSD	
SURFACE TREATMENT		DATE REQD	
IDEN METHOD TAG			
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E ANDERSSEN	DATE	4/16/2002

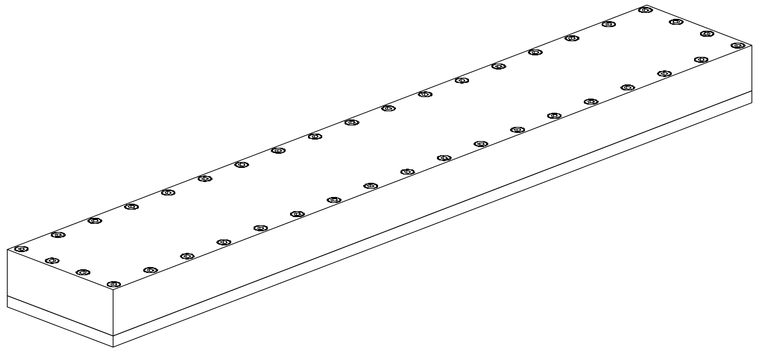
ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

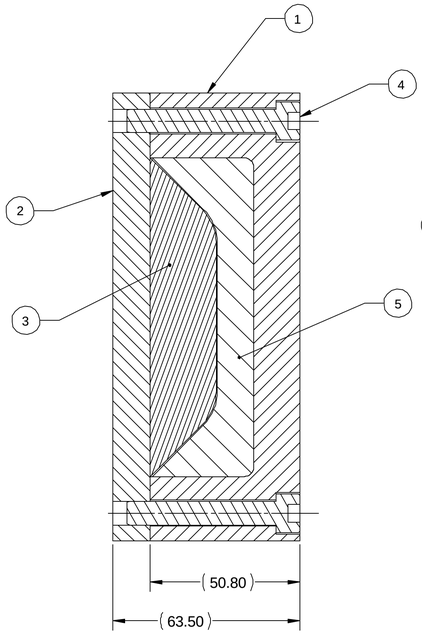
ATLAS PIXEL DETECTOR
SPACEFRAME CENTRAL AND END SECTION
PANEL OUTER CORNER MOLD CAVITY

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	21F708	1:1.5	SHEET 1 OF 1
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CIDE	DWG. NO.	SIZE / REV.
	P1AP-11	AP6250	21F709 4	-

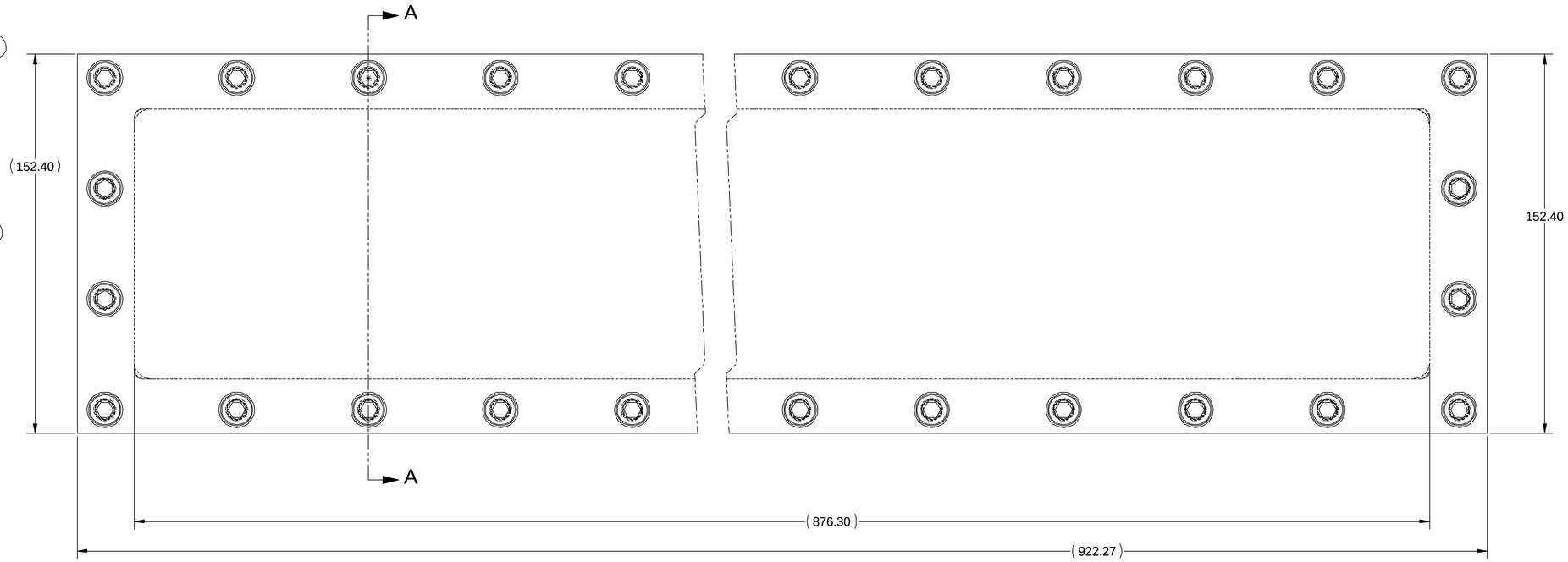
DWG. NO.	SIZE	REV.	SH.
21F708 4		-	1

ITEM	PART NO.	REQD	DESCRIPTION	MATERIAL
5		1	OUTER VERTEX STIFFENER SILICONE MOLD INSERT	
4		40	M8 X 1.25 SOCKET HD CAP X 50.8 LONG	STEEL
3	21F710	1	PANEL OUTER CORNER MOLD INSERT	
2	21F707	1	MOLD COVERPLATE	
1	21F709	1	PANEL OUTER CORNER MOLD CAVITY	





SECTION A-A
SCALE 1 : 1



NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS IN MILLIMETERS
2. ASSEMBLY USED TO MOLD THE OUTER CORNERS FOR SPACEFRAME THE CENTRAL AND END SECTION (PART 21F658 AND 21F675)
3. ASSEMBLY WEIGHS 130 Lbs.

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES: X.X ± 0.5 FRAC. ± 1/64; X.XX ± 0.25 ANGLES ± 30'; X.XXX ± 0.013 FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2

CHAMFER ENDS OF ALL SCREW THREADS 30°

CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS

BREAK EDGES .016 MAX. ON MACHINED WORK

REMOVE BURRS, WELD SPLATTER & LOOSE SCALE

IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	
DEL TO		DATE ISSD	
SURFACE TREATMENT		DATE REQD	
IDEN METHOD	TAG		
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E. ANDERSSEN	DATE	4/16/2002

US ATLAS SILICON SUBSYSTEM (USASS)

ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

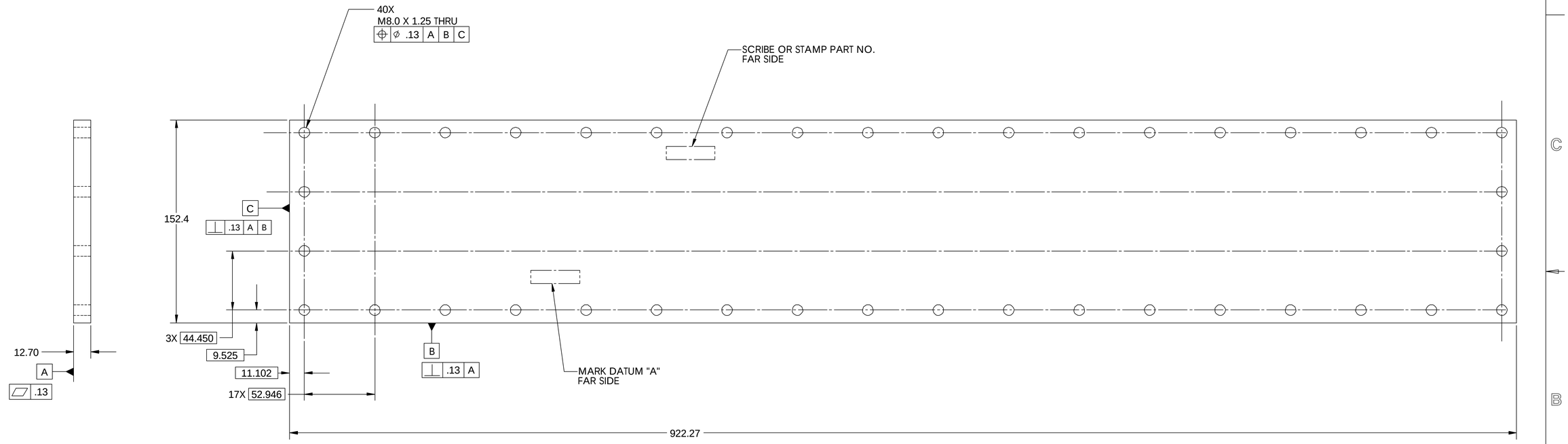
ATLAS PIXEL DETECTOR
SPACEFRAME CENTRAL AND END SECTION
PANEL OUTER CORNER MOLD ASSEMBLY

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	ASSEM	N/A	1:1	SHEET 1 OF 1

PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE	REV.
	P1AP-11	AP6250	21F708 4		-

DWG. NO.	SIZE	REV.	SH.
21F707 4		-	1

DESCRIPTION	MATERIAL	MAT. LOCATION



MATL: STEEL GROUND FLATSTOCK

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 | FRAC. ± 1/64
X.XX ± 0.25 | ANGLES ± 30'
X.XXX ± 0.013 | FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	
DEL TO		DATE ISSD	
SURFACE TREATMENT		DATE REQD	
IDEN METHOD	TAG		
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E ANDERSSEN	DATE	4/16/2002

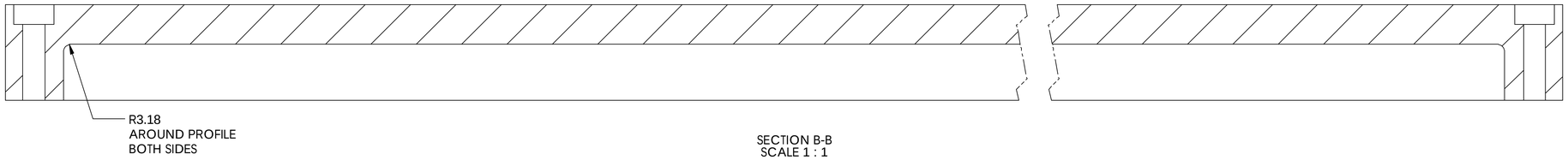
ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY ±

ATLAS PIXEL DETECTOR
SPACEFRAME CENTRAL AND END SECTION
MOLD COVERPLATE

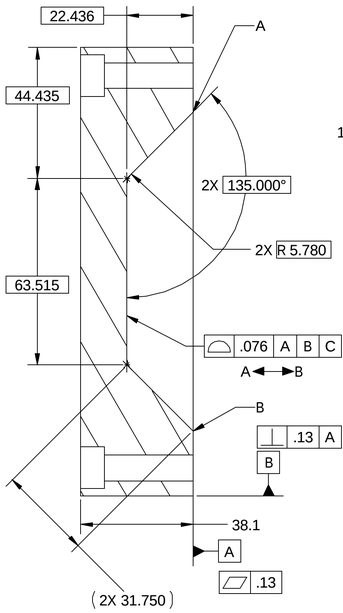
MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	21F705	1:1.5	
			SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CIDE	DWG. NO.	SIZE / REV.
	P1AP-11	AP6250	21F707 4	-

DWG. NO.	SIZE	REV.	SH.
21F706 4		-	1

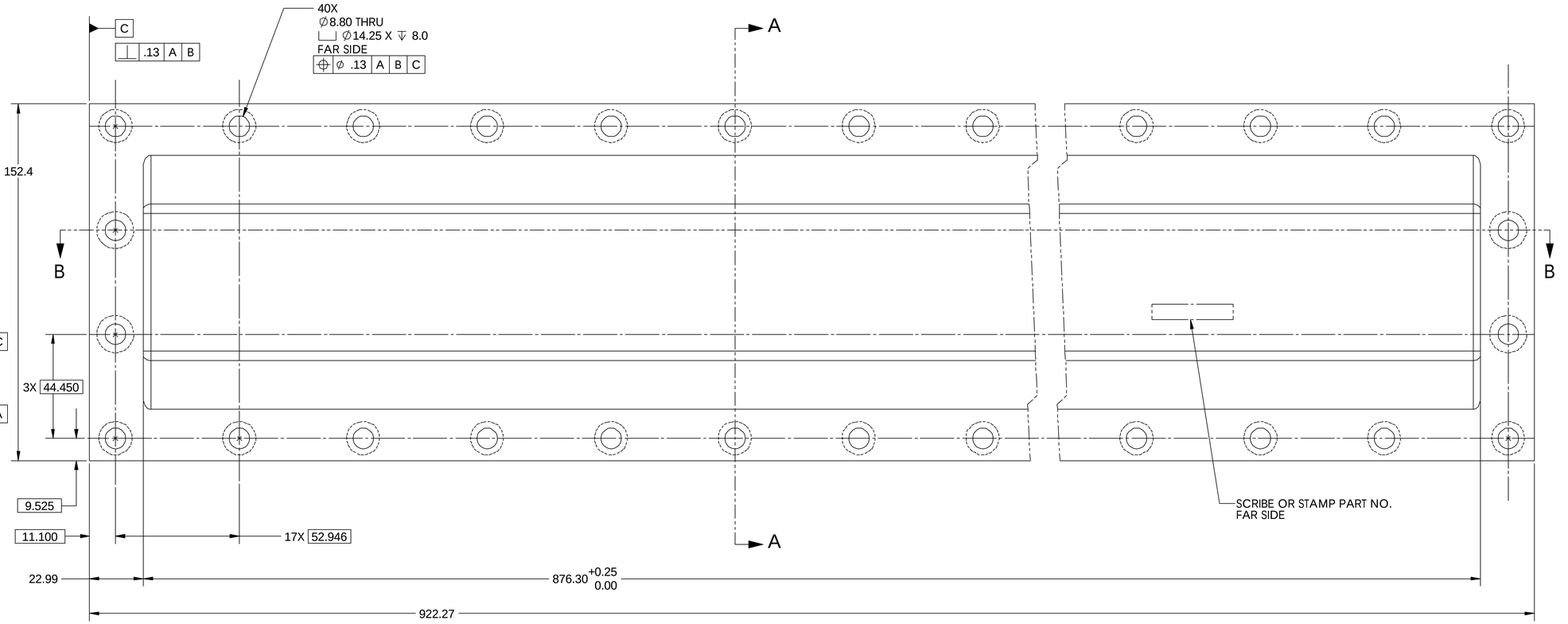
DESCRIPTION	MATERIAL	MAT. LOCATION



SECTION B-B
SCALE 1 : 1



SECTION A-A
SCALE 1 : 1



MATL: STEEL GROUND FLATSTOCK

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 FRAC. ± 1/64
X.XX ± 0.25 ANGLES ± 30'
X.XXX ± 0.013 FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD
DEL TO	
SURFACE TREATMENT	
IDEN METHOD	TAG
PROJECT NUMBER	ATL-IP-ED-XXXX
PROJECT NAME	US ATLAS SILICON SUBSYSTEM
DWG BY	W. K. MILLER
CHK BY	BILL WILDS
APR BY	E ANDERSSEN

SER NO.	
DATE ISSD	
DATE REQD	
DATE	4/16/2002
DATE	4/16/2002
DATE	4/16/2002

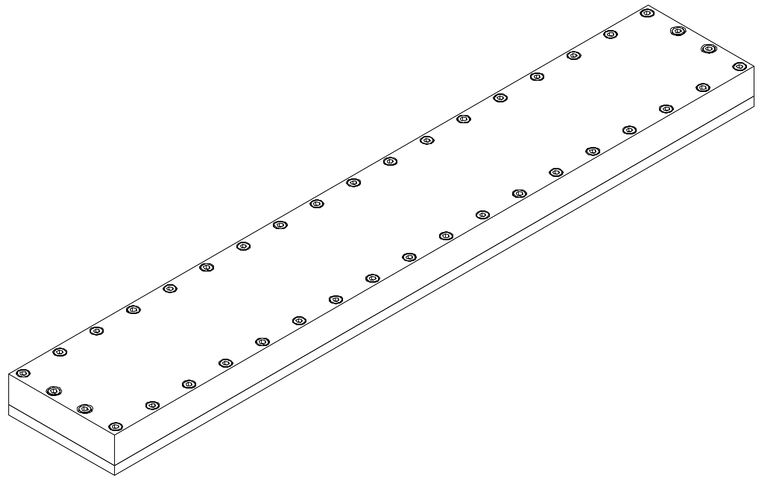
ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

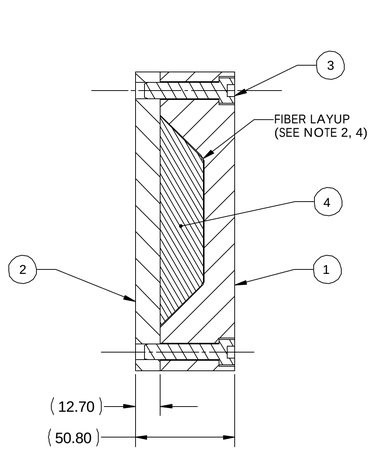
ATLAS PIXEL DETECTOR
SPACEFRAME CENTRAL AND END SECTION
PANEL INNER CORNER MOLD CAVITY

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	21F705	1:1.25	
			SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CIDE	DWG. NO.	SIZE / REV.
	P1AP-11	AP6250	21F706 4	-

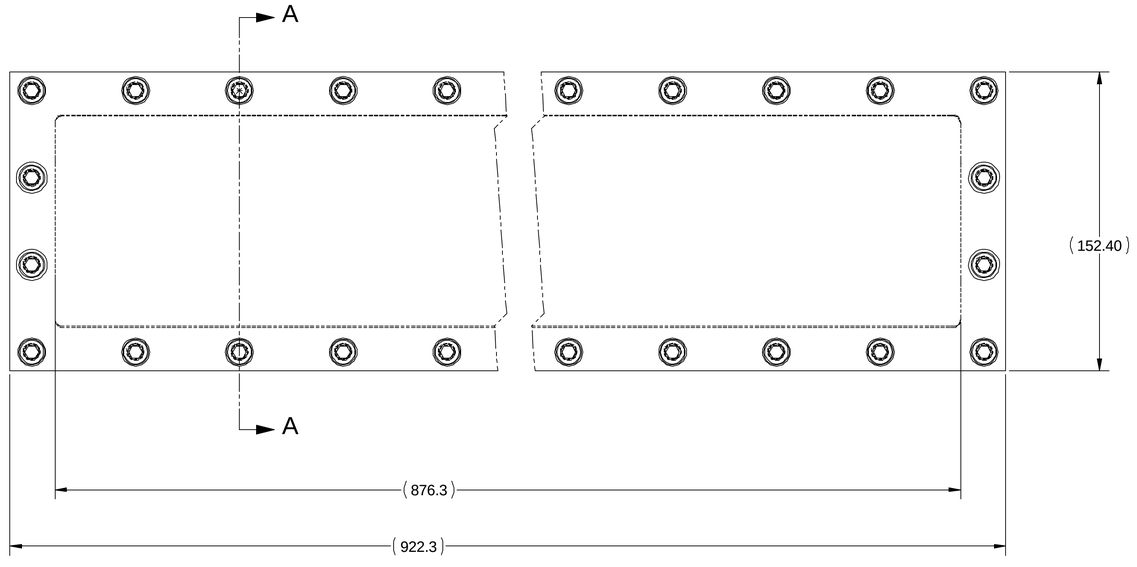
DWG. NO.	SIZE	REV.	SH.
21F705 4		-	1

ITEM	PART NO.	REQD	DESCRIPTION	MATERIAL
4		1	INNER VERTEX STIFFENER SILICONE MOLD INSERT	
3		40	M8.0 X 1.25 SOCKET HD CAP X 38.1	STEEL
2	21F707	1	MOLD COVERPLATE	
1	21F706	1	PANEL INNER CORNER MOLD CAVITY	





SECTION A-A



NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS IN MILLIMETERS
2. ASSEMBLY USED TO MOLD THE INNER CORNERS FOR SPACEFRAME CENTRAL AND END SECTION (PARTS 21F655 AND 21F671)
3. ASSEMBLY WEIGHS 100 Lbs.
4. SEE PART DRAWINGS FOR MATERIAL SPECIFICATIONS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 FRAC. ± 1/64
X.XX ± 0.25 ANGLES ± 30'
X.XXX± 0.013 FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD
DEL TO	
SURFACE TREATMENT	
IDEN METHOD TAG	
PROJECT NUMBER	ATL-IP-ED-XXXX
PROJECT NAME	US ATLAS SILICON SUBSYSTEM
DWG BY	W. K. MILLER — DATE 4/16/2002
CHK BY	BILL WILDS — DATE 4/16/2002
APR BY	E. ANDERSSEN — DATE 4/16/2002

SER NO.
DATE ISSD
DATE REQD
US ATLAS SILICON SUBSYSTEM (USSS)

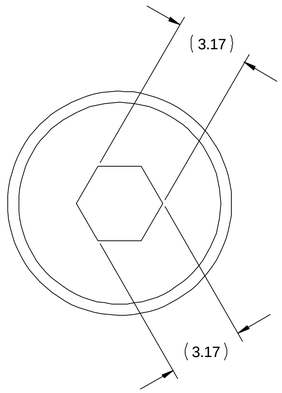
ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

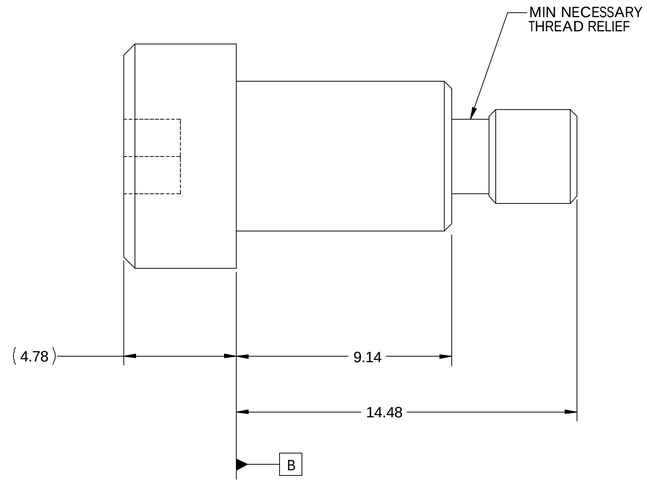
ATLAS PIXEL DETECTOR
SPACEFRAME CENTRAL AND END SECTION
PANEL INNER CORNER MOLD ASSEMBLY

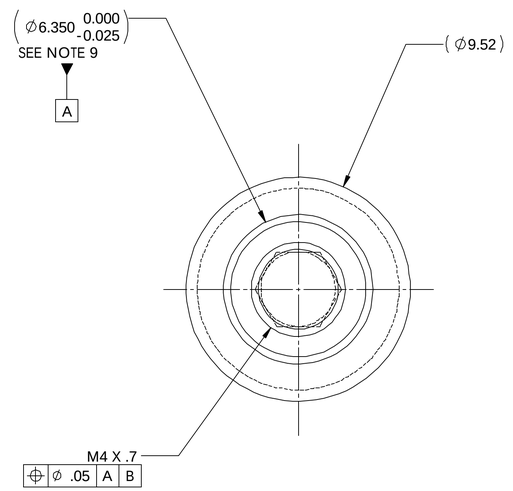
MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 1:1.5	DO NOT SCALE PRINTS
	ASSEM	N/A	SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CIDE	DWG. NO. 21F705 4	SIZE - REV. -
	P1AP-11	AP6250		

DWG. NO.	SIZE	REV.	SH.
21F704 4	-	1	

DESCRIPTION	MATERIAL	MAT. LOCATION







MATL: 18-8 SSTL 1/4" PRECISION SHOULDER SCREW
(SEE NOTE 9)

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS
9. SCREW PURCHASED FROM McMASTER-CARR #94035A542

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 FRAC. ± 1/64
X.XX ± 0.25 ANGLES ± 30'
X.XXX ± 0.013 FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD
DEL TO	
SURFACE TREATMENT	
IDEN METHOD / TAG	
PROJECT NUMBER	ATL-IP-ED-XXXX
PROJECT NAME	US ATLAS SILICON SUBSYSTEM
DWG BY	W. K. MILLER
CHK BY	BILL WILDS
APR BY	E ANDERSSEN

SER NO.	
DATE ISSD	
DATE REQD	
	DATE 4/16/2002
	DATE 4/16/2002
	DATE 4/16/2002

US ATLAS SILICON SUBSYSTEM (USSS)

ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

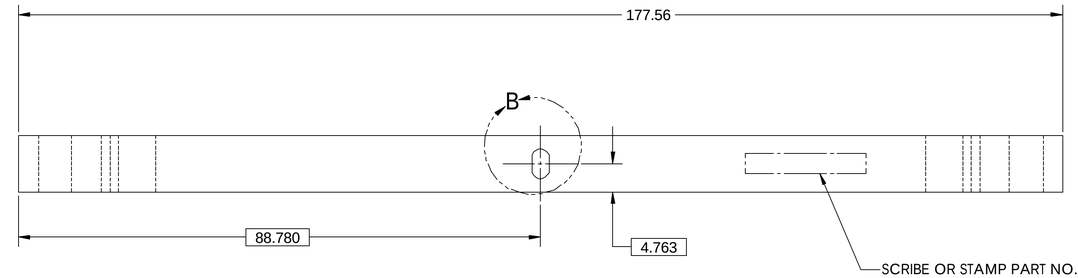
ATLAS PIXEL DETECTOR
SPACEFRAME CENTRAL AND END SECTION
SUB-PANEL BOND FIXTURE SHOULDER BOLT

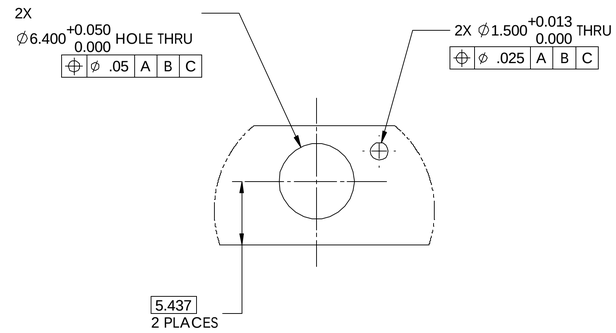
MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 8:1	DO NOT SCALE PRINTS
	PART	N/A	SHEET 1 OF 1	

PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE	REV.
	P1AP-11	AP6250	21F704 4		-

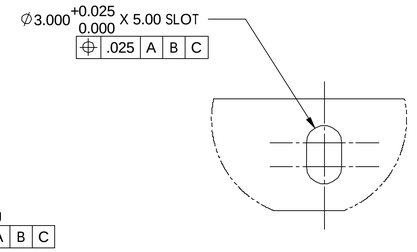
DWG. NO.	SIZE	REV.	SH.
21F703 4	-	1	

DESCRIPTION	MATERIAL	MAT. LOCATION

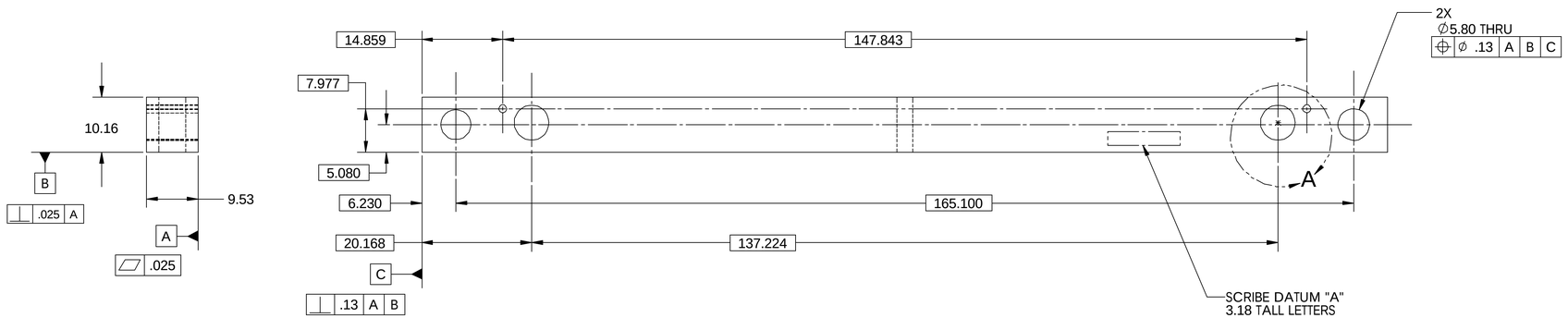




DETAIL A
SCALE 4 : 1



DETAIL B
SCALE 4 : 1



MATL: TOOL STEEL

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 FRAC. ± 1/64
X.XX ± 0.25 ANGLES ± 30'
X.XXX ± 0.013 FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2

CHAMFER ENDS OF ALL SCREW THREADS 30°

CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS

BREAK EDGES .016 MAX. ON MACHINED WORK

REMOVE BURRS, WELD SPLATTER & LOOSE SCALE

IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	
DEL TO		DATE ISSD	
SURFACE TREATMENT		DATE REQD	
IDEN METHOD	TAG		
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E ANDERSSEN	DATE	4/16/2002

US ATLAS SILICON SUBSYSTEM (USASS)

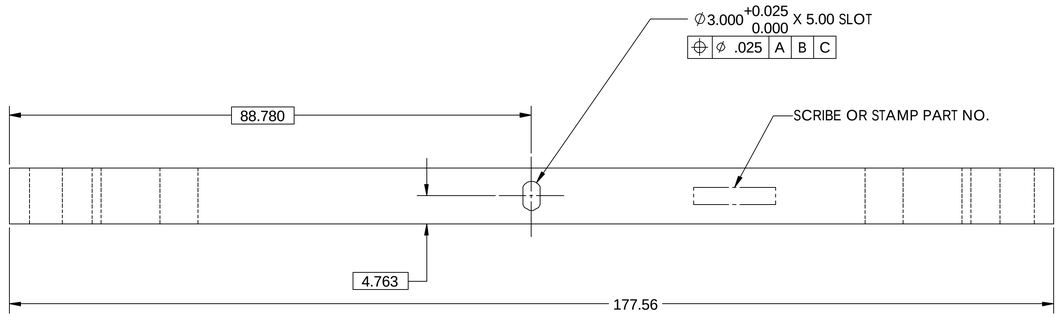
ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY ≠

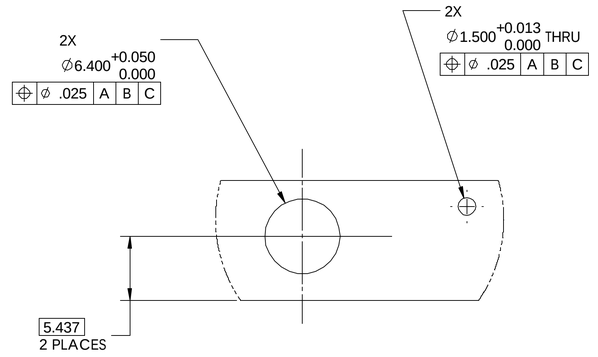
ATLAS PIXEL DETECTOR
SPACEFRAME END SECTION
SUB-PANEL BOND FIXTURE END PLATE

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 2:1	DO NOT SCALE PRINTS
	PART	21F700	SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO. 21F703 4	SIZE - REV. -
	P1AP-11	AP6250		

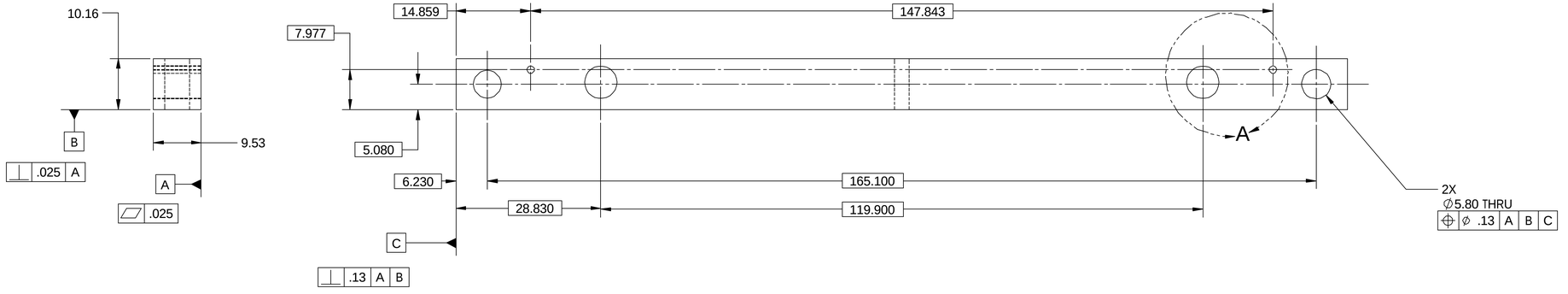
DWG. NO.	SIZE	REV.	SH.
21F702 4		-	1

DESCRIPTION	MATERIAL	MAT. LOCATION





DETAIL A
SCALE 4 : 1



MATL: TOOL STEEL

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 FRAC. ± 1/64
X.XX ± 0.25 ANGLES ± 30'
X.XXX ± 0.013 FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.		NO. REQD	
DEL TO			DATE REQD
SURFACE TREATMENT			
IDEN METHOD	TAG		
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E ANDERSSEN	DATE	4/16/2002

SER NO
DATE ISSD
(IF ATLAS SILICON SUBSYSTEM USED)

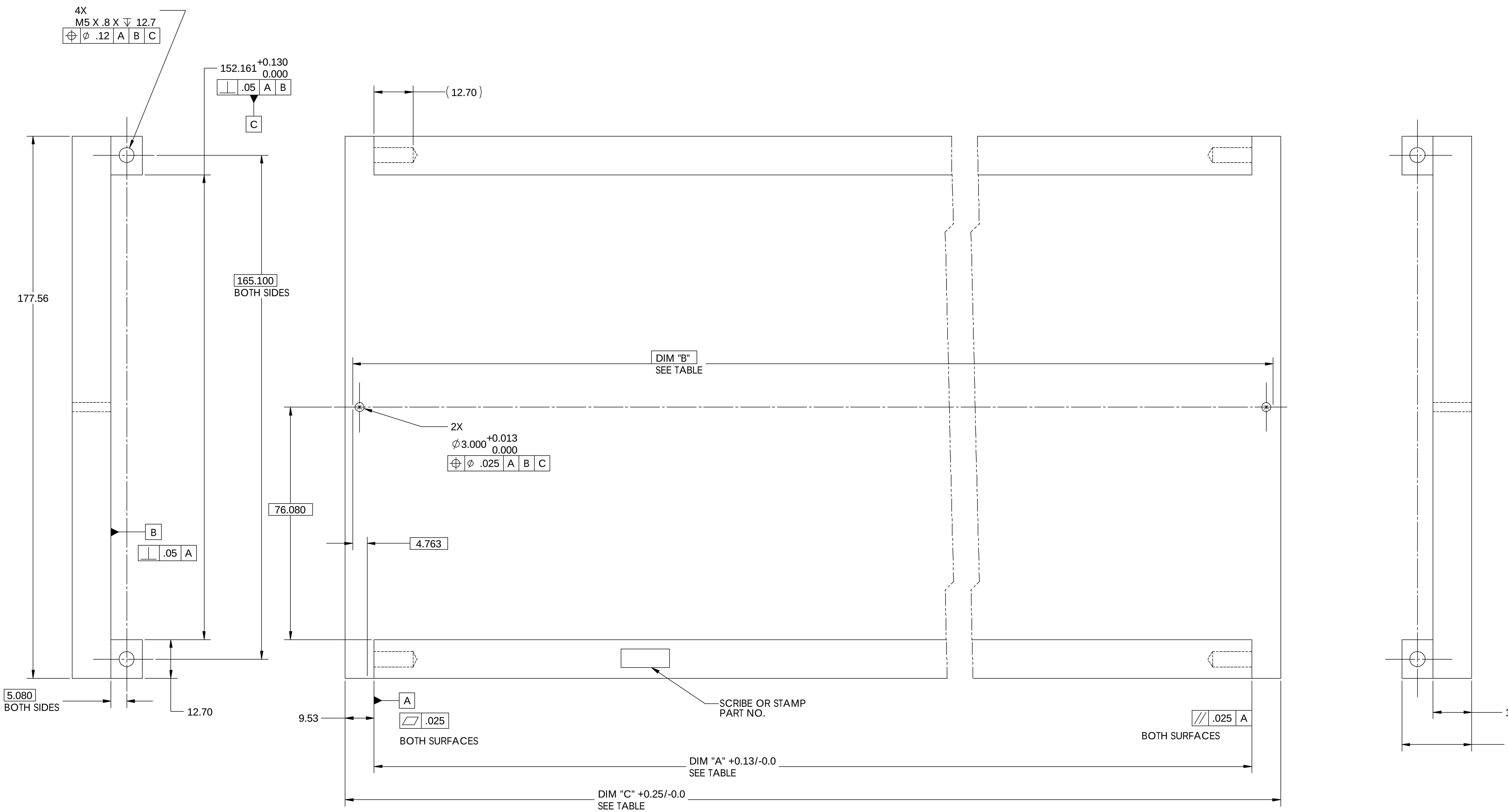
ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY ≠

ATLAS PIXEL DETECTOR
SPACEFRAME CENTRAL SECTION
SUB-PANEL BOND FIXTURE END PLATE

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	21F699	2:1	
			SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CIDE	DWG. NO.	SIZE / REV.
	P1AP-11	AP6250	21F702 4	-

DWG. NO.	SIZE	REV.	SH.
21F701	4	-	1

DESCRIPTION	MATERIAL	MAT. LOCATION



PART NO	DIM "A"	DIM "B"	DIM "C"	ASSEMBLY
21F701-1	292.000	301.525	311.050	END SECTION
21F701-3	840.000	849.525	859.050	CENTRAL SECTION

MATL: TOOL STEEL

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES		
	X.X ± 0.5	FRAC. ± 1/64
	X.XX ± 0.25	ANGLES ± 30'
	X.XXX ± 0.013	FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.
		DATE ISSD
DEL TO		DATE REQD
SURFACE TREATMENT		
IDEN METHOD TAG		
PROJECT NUMBER ATL-IP-ED-XXXX		US ATLAS SILICON SUBSYSTEM (LOGO)
PROJECT NAME US ATLAS SILICON SUBSYSTEM		
DWG BY W. K. MILLER		DATE 4/16/2002
CHK BY BILL WILDS		DATE 4/16/2002
APR BY E ANDERSSEN		DATE 4/16/2002

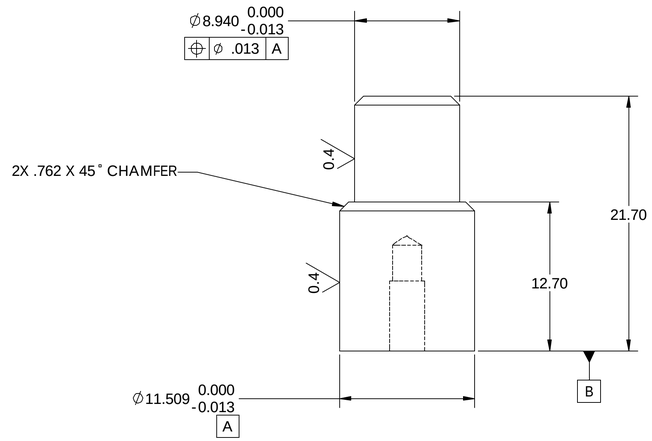
ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

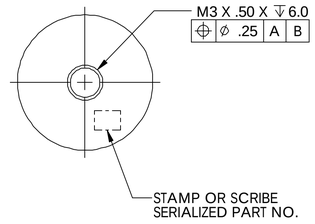
ATLAS PIXEL DETECTOR
SPACEFRAME END AND CENTRAL SECTION
SUB-PANEL BOND FIXTURE BASEPLATE

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	N/A	1.5:1	
			SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CIDE	DWG. NO. / SIZE	REV.
	P1AP-11	AP6250	21F701 4	-

DWG. NO.	SIZE	REV.	SH.
21F695 4	-	-	1

DESCRIPTION	MATERIAL	MAT. LOCATION





CAPTIVE PIN
MATL: 17-4 PH STEEL
SCALE 4:1

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 FRAC. ± 1/64
X.XX ± 0.25 ANGLES ± 30'
X.XXX ± 0.013 FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

SER NO.			
ACCT NO.	NO. REQD	DATE ISSD	
DEL TO		DATE REQD	
SURFACE TREATMENT			
IDEN METHOD TAG			
PROJECT NUMBER	ATL-IP-ED-XXXX	(IF ATLAS SILICON SUBSYSTEM)	
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE 4/16/2002	
CHK BY	BILL WILDS	DATE 4/16/2002	
APR BY	E ANDERSSEN	DATE 4/16/2002	

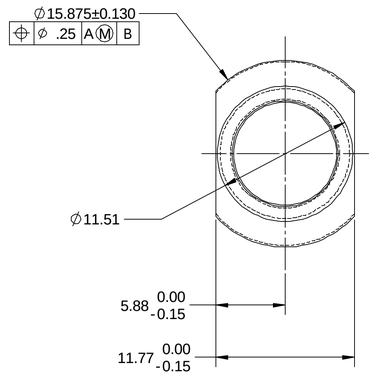
ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

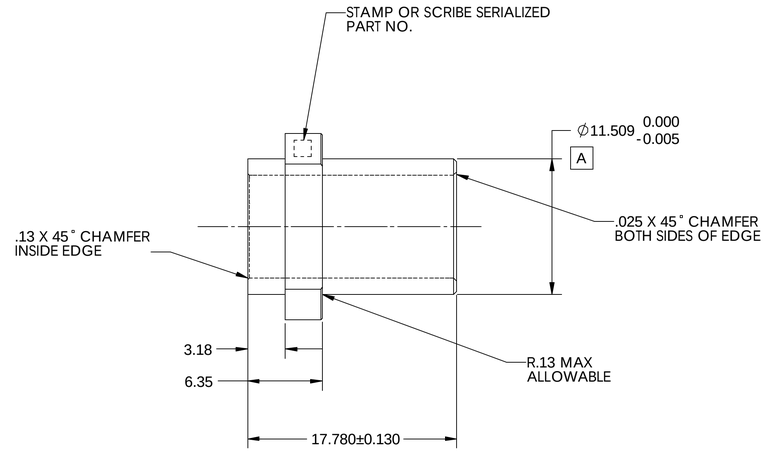
ATLAS PIXEL DETECTOR
SPACEFRAME BOND FIXTURE
CUSTOM TOOLING PINS AND BUSHINGS

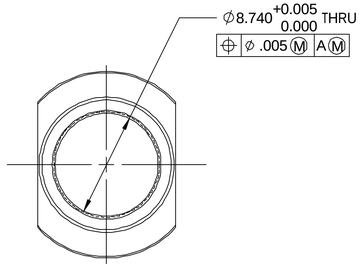
MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	nnXnnn	N/A	
			SHEET 1 OF 2	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CIDE	DWG. NO.	SIZE / REV.
	P1AP-11	AP6250	21F695 4	-

DWG. NO.	SIZE	REV.	SH.
Sheet2		-	2

DESCRIPTION	MATERIAL	MAT. LOCATION







JOINING PIN CENTERING BUSHING
MATL: STANDARD BRASS
SCALE 4:1

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 FRAC. ± 1/64
X.XX ± 0.25 ANGLES ± 30'
X.XXX ± 0.013 FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.		NO. REQD	
DEL TO			
SURFACE TREATMENT			
IDEN METHOD	TAG		
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICONE SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E ANDERSSEN	DATE	4/16/2002

SER NO.
DATE ISSD
DATE REQD
(IF ATLAS SILICON SUBSYSTEM USED)

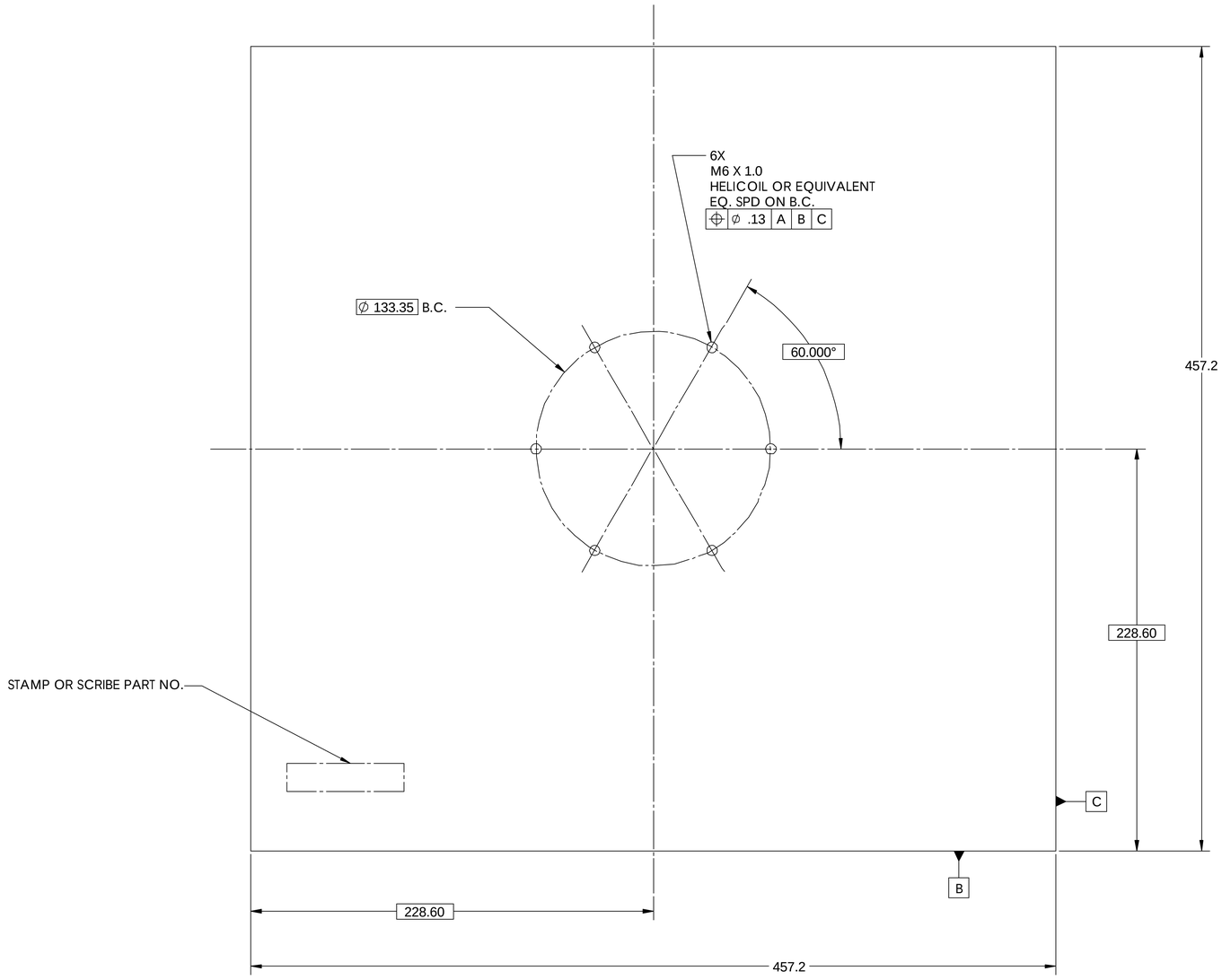
ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

ATLAS PIXEL DETECTOR
SPACEFRAME BOND FIXTURE
CUSTOM TOOLING PINS AND BUSHINGS

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: N/A	DO NOT SCALE PRINTS
	PART	nnXnnn	SHEET 2 OF 2	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CIDE	DWG. NO.	SIZE / REV.
	P1AP-11	AP6250	21F695 4	-

DWG. NO.	SIZE	REV.	SH.
21F694 4	-	1	

DESCRIPTION	MATERIAL	MAT. LOCATION



MATL: ALUM

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 FRAC. ± 1/64
X.XX ± 0.25 ANGLES ± 30'
X.XXX ± 0.013 FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	
DEL TO		DATE ISSD	
SURFACE TREATMENT		DATE REQD	
IDEN METHOD	TAG		
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E ANDERSSEN	DATE	4/16/2002

(IN ATLAS SILICON SUBSYSTEM USAGE)

ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

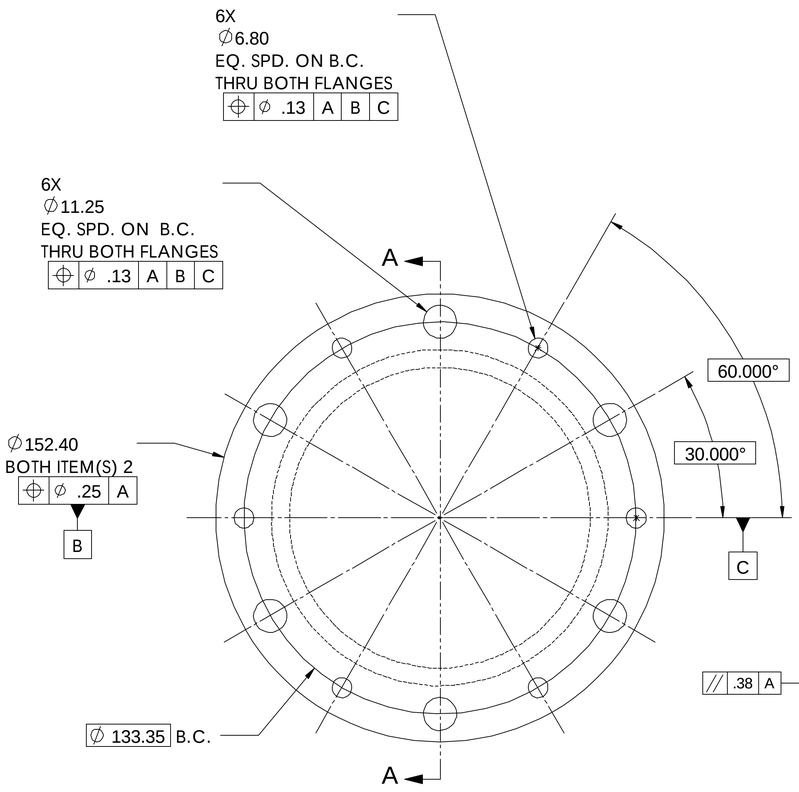
ATLAS PIXEL DETECTOR
SPACEFRAME BONDING FIXTURE
BASEPLATE

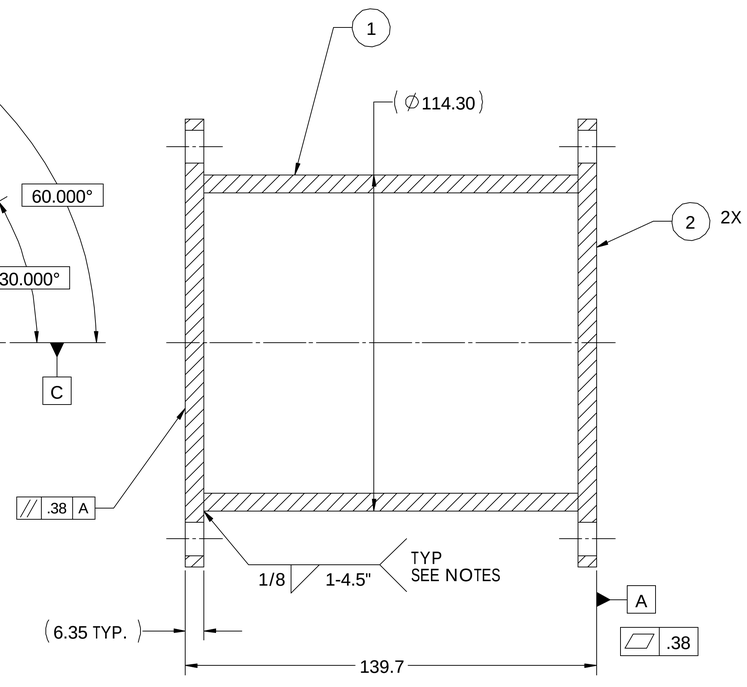
MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	21F694	1:1.5	SHEET 1 OF 1

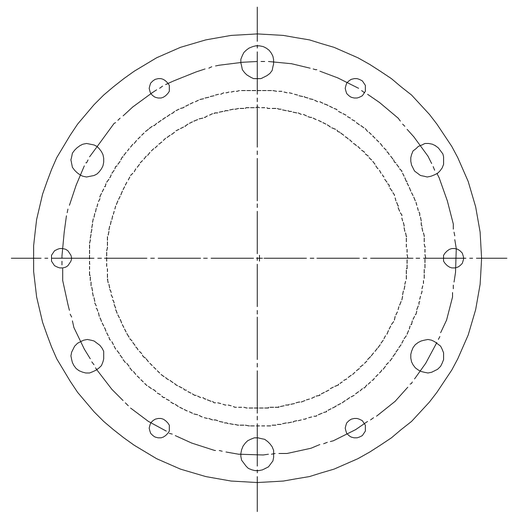
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE	REV.
	P1AP-11	AP6250	21F694 4	-	

DWG. NO.	SIZE	REV.	SH.
21F693 4		-	1

ITEM	PART NO.	REQD	DESCRIPTION	MATERIAL
2		2	END PLATE	6061-T6 ALUM
1		1	4.0" DIA. SCH 40 TUBE	6061-T6 ALUM







SECTION A-A
SCALE 1 : 1

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS
9. PLACE WELD BEAD IN LINE WITH 7.14 DIA. HOLE AND AWAY FROM 11.11 DIA. HOLE

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 FRAC. ± 1/64
X.XX ± 0.25 ANGLES ± 30'
X.XXX± 0.013 FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2

CHAMFER ENDS OF ALL SCREW THREADS 30°

CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS

BREAK EDGES .016 MAX. ON MACHINED WORK

REMOVE BURRS, WELD SPLATTER & LOOSE SCALE

IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.		NO. REQD	
DEL TO			
SURFACE TREATMENT			
IDEN METHOD	TAG		
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E ANDERSSEN	DATE	4/16/2002

SER NO.
DATE ISSD
DATE REQD

US ATLAS SILICON SUBSYSTEM (LBNL)

ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY ±

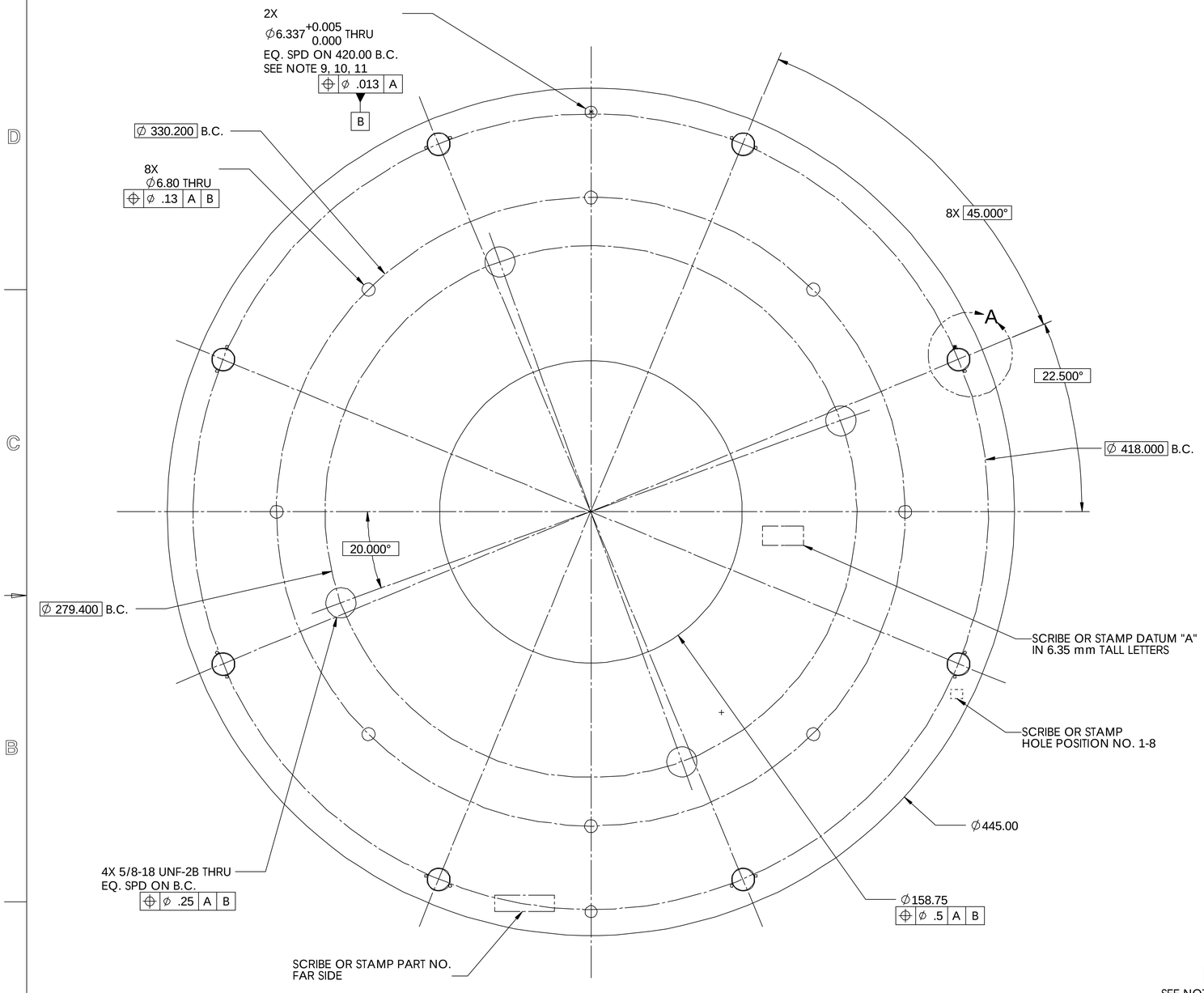
ATLAS PIXEL DETECTOR
SPACEFRAME BONDING FIXTURE
TUBE BASEPLATE STAND

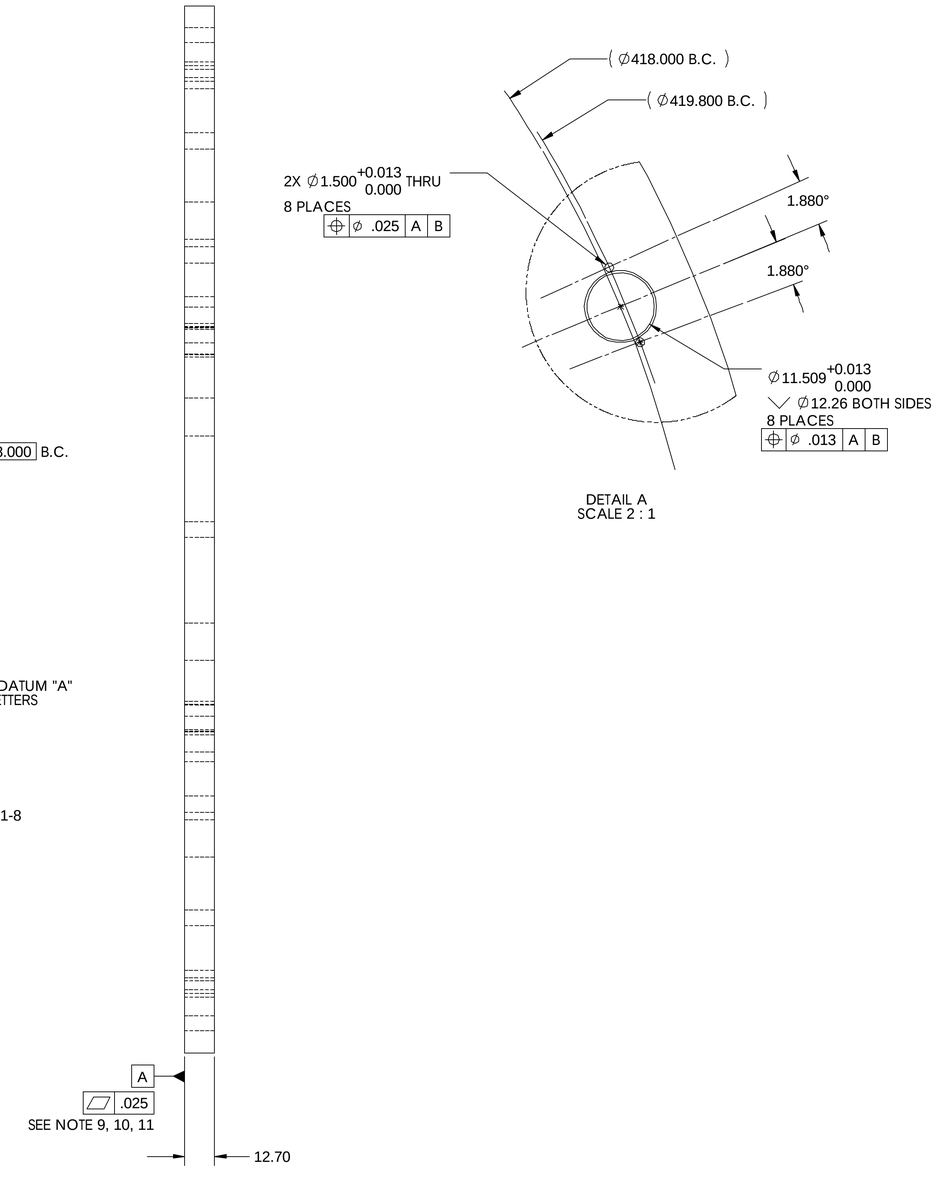
MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 1:1	DO NOT SCALE PRINTS
	ASSEM	nnXnnn	SHEET 1 OF 1	

PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CIDE	DWG. NO.	SIZE	REV.
	P1AP-11	AP6250	21F693 4		-

DWG. NO.	SIZE	REV.	SH.
21F692 4	-	-	1

DESCRIPTION	MATERIAL	MAT. LOCATION





DETAIL A
SCALE 2 : 1

MATL: 6061-T6 ALUM PLATE
(SEE NOTE 10, 11)

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .038
5. ALL INSIDE CORNERS TO BE .038 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .038 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS
9. HOLES USED FOR TEMPORARY 1/2" DIA. TOOLING BALLS
10. STRESS RELIEVE PLATE @ 350 F FOR 6 HOURS TO ACHIEVE DIMENSIONAL STABILITY
11. CMM INSPECTION REQUIRED. INSPECTION REPORTS PROVIDED TO HYTEC FOR REVIEW AND APPROVAL. INSPECTION REPORTS TO INDICATE INSPECTION TEMPERATURE.

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 | FRAC. ± 1/64
X.XX ± 0.25 | ANGLES ± 30'
X.XXX ± 0.013 | FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	
DEL TO		DATE ISSD	
SURFACE TREATMENT		DATE REQD	
IDEN METHOD	TAG		
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E ANDERSSEN	DATE	4/16/2002

IF ATLAS SILICON SUBSYSTEM (SAME)

ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY ±

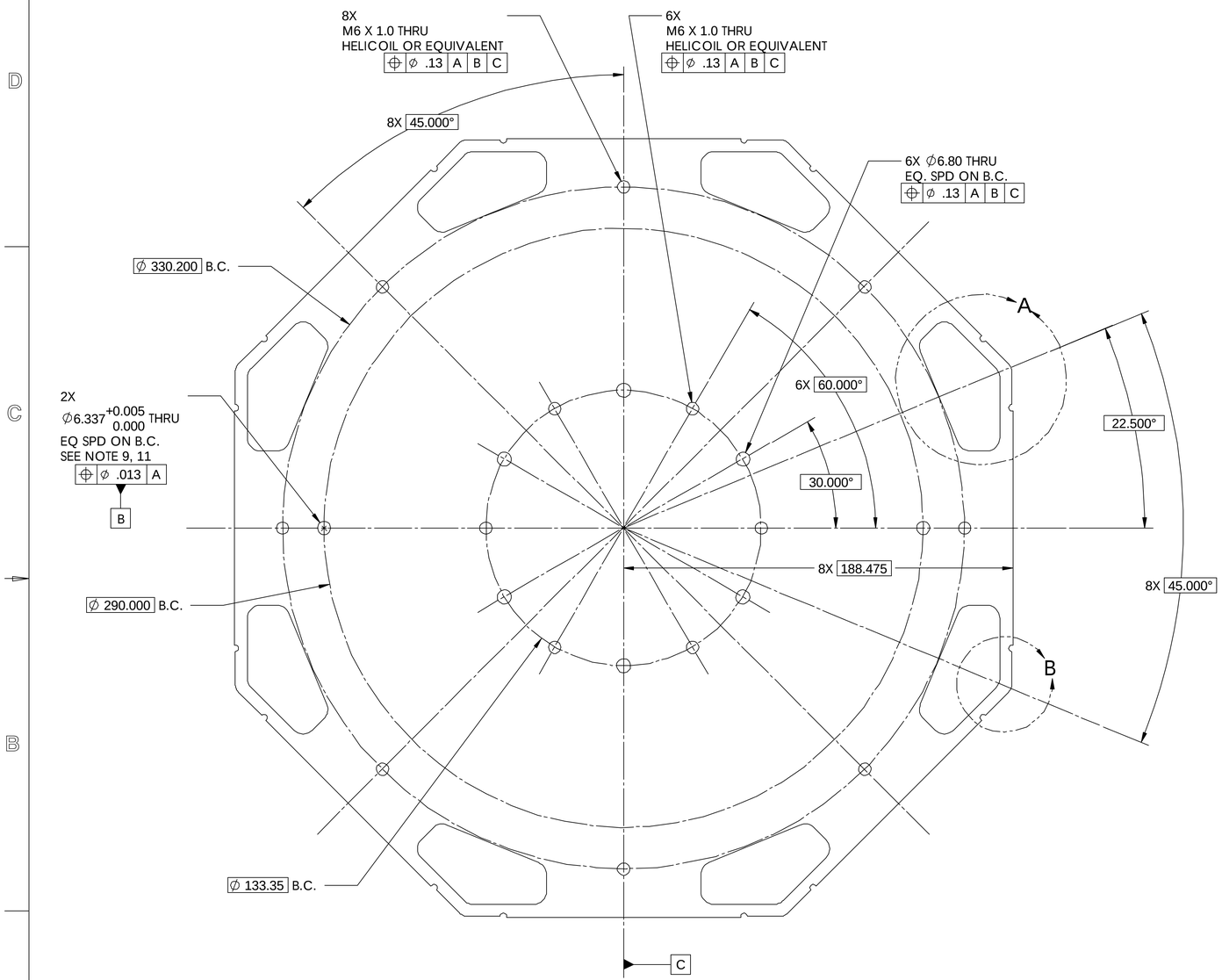
ATLAS PIXEL DETECTOR
SPACEFRAME BOND FIXTURE
VERTEX CORNER JOINT ALIGNMENT PLATE

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	21F690	1:1.25	SHEET 1 OF 1

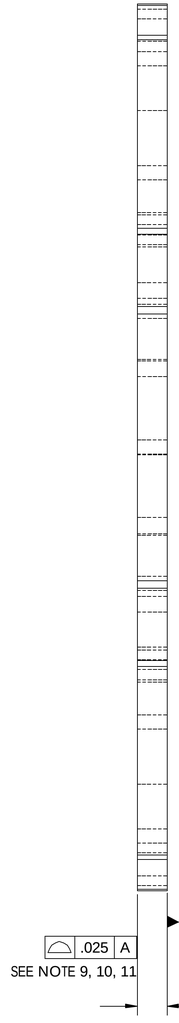
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE	REV.
	P1AP-11	AP6250	21F692 4		-

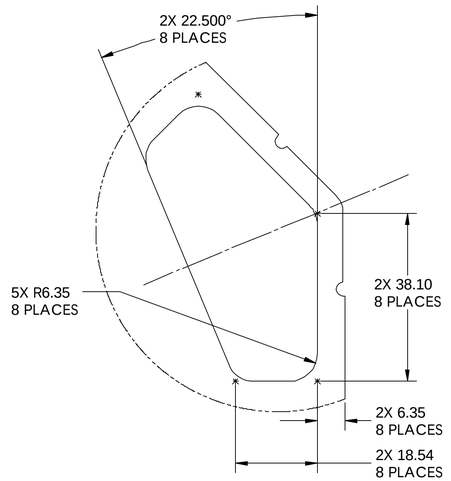
DWG. NO.	SIZE	REV.	SH.
21F691 4	-	1	

DESCRIPTION	MATERIAL	MAT. LOCATION

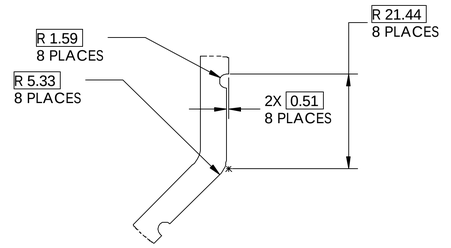


MATL: 6061-T6 ALUM
(SEE NOTE 10)





DETAIL A
SCALE 1.5 : 1



DETAIL B
SCALE 1.5 : 1

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS
9. HOLES FOR 1/2" DIA. PERMANENT TOOLING BALLS
10. STRESS RELIEVE PLATE @ 350 F FOR 6 HOURS TO ACHIEVE DIMENSIONAL STABILITY
11. CMM INSPECTION REQUIRED. CMM REPORT TO BE PROVIDED TO HYTEC FOR REVIEW AND APPROVAL. INSPECTION TEMPERATURE TO BE INDICATED ON REPORT.

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
X.X ± 0.5 | FRAC. ± 1/64
X.XX ± 0.25 | ANGLES ± 30'
X.XXX ± 0.013 | FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD
DEL TO	
SURFACE TREATMENT	
IDEN METHOD TAG	
PROJECT NUMBER	ATL-IP-ED-XXXX
PROJECT NAME	US ATLAS SILICON SUBSYSTEM
DWG BY	W. K. MILLER — DATE 4/16/2002
CHK BY	BILL WILDS — DATE 4/16/2002
APR BY	E ANDERSSEN — DATE 4/16/2002

SER NO	
DATE ISSD	
DATE REQD	

(IF ATLAS SILICON SUBSYSTEM USED)

ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY ±

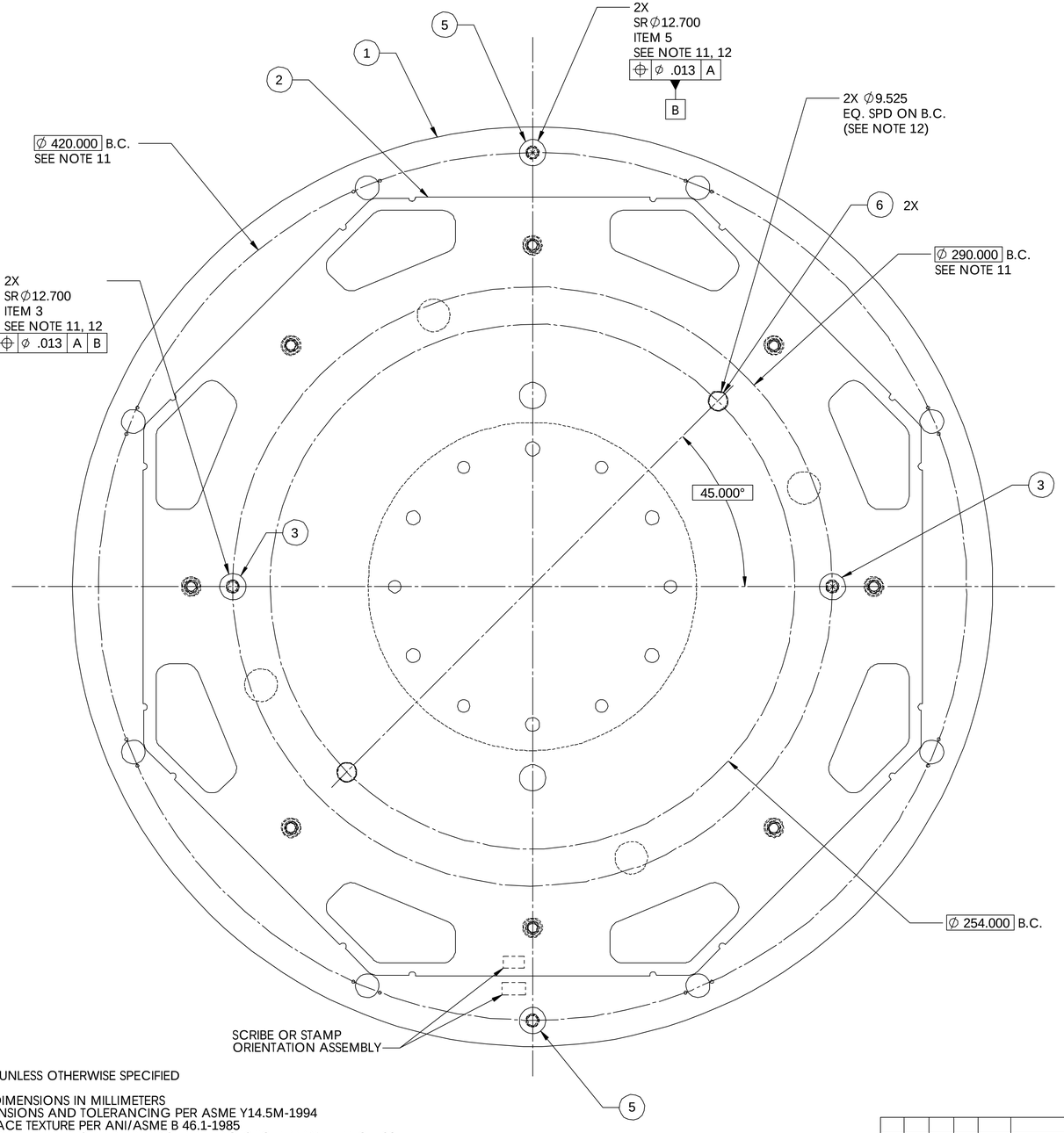
ATLAS PIXEL DETECTOR
SPACEFRAME BOND FIXTURE
SUB-PANEL ORIENTATION PLATE

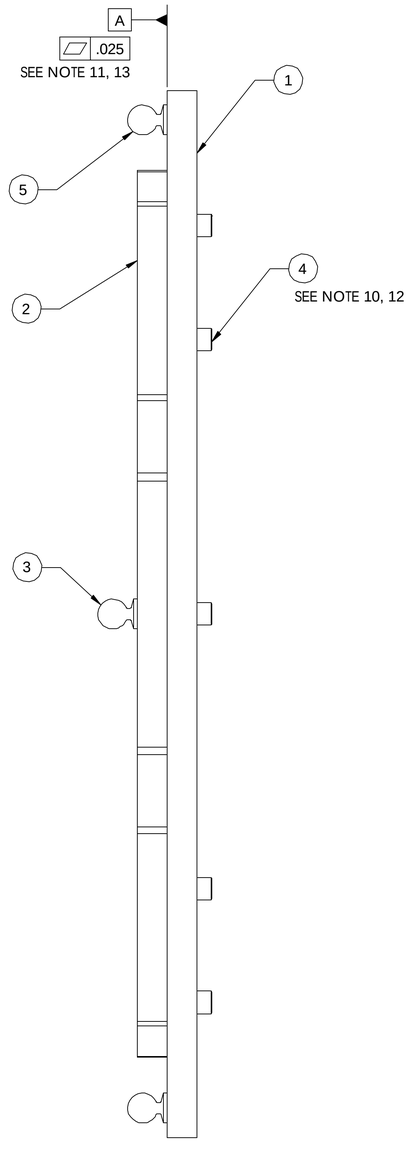
MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	21F690	1:1.25	SHEET 1 OF 1

PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE	REV.
	P1AP-11	AP6250	21F691 4	-	

DWG. NO.	SIZE	REV.	SH.
21F690 4		-	1

ITEM	PART NO.	REQD	DESCRIPTION	MATERIAL
6		2	9.525 DIA. GAGE PIN	STEEL
5		2	12.7" DIA. TOOLING BALL (TEMPORARY FIT)	STEEL
4		8	M6 X 1.0 SOCKET HEAD CAP SCREW X 20.0	STEEL
3		2	12.7" DIA. TOOLING BALL (PERMANENT FIT)	STEEL
2	21F691	1	SUB-PANEL ORIENTATION PLATE	
1	21F692	1	VERTEX CORNER JOINT ALIGNMENT PLATE	





NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS
9. TORQUE SOCKET HEAD CAP SCREWS TO 24.3in-Lbs (2.0 ft-Lbs) FOR ALUMINUM PLATE WITH HELICOIL
10. APPLY LOCKTITE THREADLOCK BLUE TO THREADS TO PREVENT THEM FROM LOOSENING
11. DIMENSIONS AND TOLERANCES ARE BASED UPON INDIVIDUAL PART TOLERANCES, AND ARE REFERENCE
12. ANGULARLY ORIENT ITEM 1 AND 2 USING TOOLING BALLS, MATCH DRILL AND PIN TOGETHER, BOLT PLATES TOGETHER
13. CMM INSPECTION REQUIRED; INSPECTION REPORTS PROVIDED TO HYTEC FOR REVIEW AND APPROVAL. INSPECTION TEMPERATURE MUST BE INDICATED

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES: X.X ± 0.5 | FRAC. ± 1/64 | X.XX ± 0.25 | ANGLES ± 30' | X.XXX ± 0.013 | FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2

CHAMFER ENDS OF ALL SCREW THREADS 30°

CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS

BREAK EDGES .016 MAX. ON MACHINED WORK

REMOVE BURRS, WELD SPLATTER & LOOSE SCALE IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO. | NO. REQD

DEL TO

SURFACE TREATMENT

IDEN METHOD | TAG

PROJECT NUMBER: ATL-IP-ED-XXXX

PROJECT NAME: US ATLAS SILICON SUBSYSTEM

DWG BY: W. K. MILLER — DATE: 4/16/2002

CHK BY: BILL WILDS — DATE: 4/16/2002

APR BY: E. ANDERSSEN — DATE: 4/16/2002

SER NO. | DATE ISSD | DATE REQD

(IF ATLAS SILICON SUBSYSTEM USED)

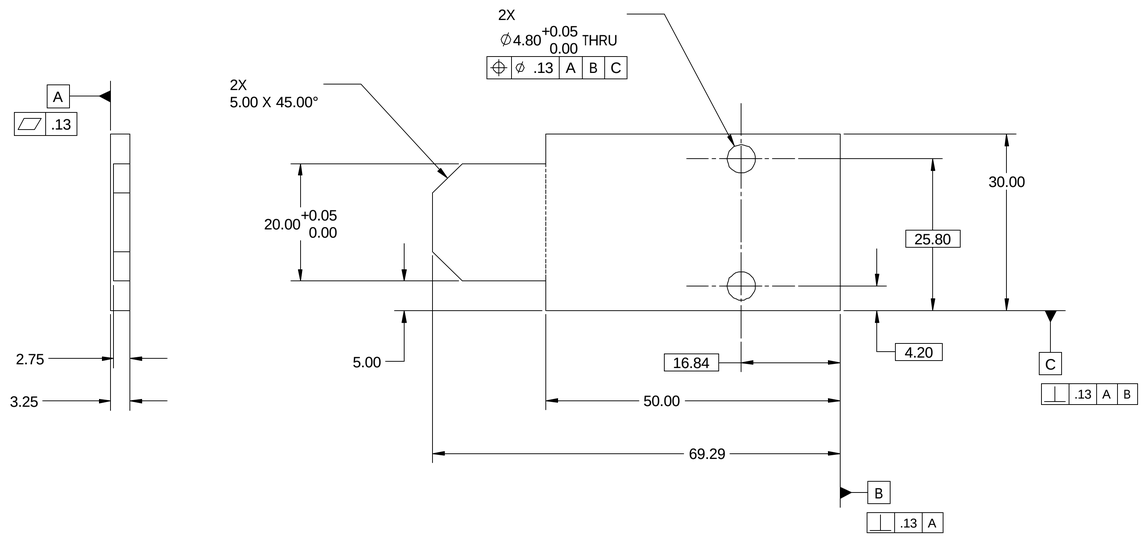
ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY ±

ATLAS PIXEL DETECTOR
SPACEFRAME BOND FIXTURE
PRE-ALIGNMENT ASSEMBLY

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE: 1:1.25	DO NOT SCALE PRINTS
	ASSEM	21F688	SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CIDE	DWG. NO. 21F690 4	SIZE	REV. -
	P1AP-11	AP6250		

DWG. NO.	SIZE	REV.	SH.
21F774		-	1

DESCRIPTION	MATERIAL	MAT. LOCATION



MATL: ALUMINUM

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994
3. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
4. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAXIMUM OF .38
5. ALL INSIDE CORNERS TO BE .38 RADIUS MAX
6. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
7. COUNTERSINK 82 DEGREES APPROXIMATELY .38 DEEP ALL DRILLED HOLES
8. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREASE, DIRT AND CHIPS

REV	DWG	CHK	ZONE	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
- X.X ± 0.5 — FRAC. ± 1/64
- X.XX ± 0.25 — ANGLES ± 30'
- X.XXX ± 0.013 — FINISH 1.6

DO NOT SCALE PRINT

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT ROUND, 1.5 THREAD RELIEF ON MACHINED THREADS
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS, WELD SPLATTER & LOOSE SCALE
IN ACCORDANCE WITH ASME Y14.5m & B46.1

SHOP ORDERS

ACCT NO.	NO. REQD	SER NO.	
DEL TO		DATE ISSD	
SURFACE TREATMENT		DATE REQD	
IDEN METHOD	TAG	(IF ATLAS SILICON SUBSYSTEM ISSUED)	
PROJECT NUMBER	ATL-IP-ED-XXXX		
PROJECT NAME	US ATLAS SILICON SUBSYSTEM		
DWG BY	W. K. MILLER	DATE	4/16/2002
CHK BY	BILL WILDS	DATE	4/16/2002
APR BY	E ANDERSSEN	DATE	4/16/2002

ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

ATLAS PIXEL DETECTOR
SPACEFRAME END STIFFENER
HONEYCOMB ALIGNMENT PLATE

MICROFILMED:	DWG. TYPE	SHOWN ON	SCALE:	DO NOT SCALE PRINTS
	PART	21F775	2:1	
			SHEET 1 OF 1	
PATENT CLEAR:	DESIGN ACCT. NO.	CATEGORY CIDE	DWG. NO.	SIZE / REV.
	P1AP-11	AP6250	21F774	-