Hi Gentlemen,

Here are some drawings for a design review.

Warren Davison and Mario Rascon have checked these drawings to a limited point of view. So we are asking you to look at them.

David Dean D.C.

John Hill		-
Gary Schmidt		
David Ouellete _	9/24/02 Notes on separa	te cover

9/24/02 D.H.D.

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Warren Davison and Mario Rascon have checked these drawings to a limited point of view. So we are asking you to look at them.

David Dean D.C.

John Hill			W
Gary Schmidt _	See	attached	comments
David Ouellete			

9/24/02 D.H.D.

Memo: Comments on the 90Prime Guider Assembly

From: G. Schmidt

Date: 10/4/02

My general concerns focus on the pickoff mirror/lens/guide camera stage. I do not know what the tolerances for tip/tilt and placement of the lens are, but the adjustment provisions that have been included in the design seem inconsistent with what I would imagine are warranted.

- 1) There appears to be no tip/tilt adjustment of the lens (part 9) per se. The lens may be so weak that this is not an issue, but it should be checked.
- 2) I realize there is an overall focus adjustment (Z axis) for the guider stage, provided by a motor (apparently part 8). There must also be the ability for a one-time focus of the lens independently of the guider head, to account for the (non-reproducible) placement of the CCD surface inside the dewar. This seems to be provided by the vertical slots in part 30. Is the range of this motion sufficient? A crude adjustment via slots allows for tipping of the lens as well in one direction, which could be viewed either as an attempt to address (1) above or as a weakness in the design, since it will be difficult to set correctly, particularly if the tolerance for tip/tilt of the lens is tight. If it is intended for the lens tip to be set by rotating in these slots, I don't see any corresponding ability to adjust for tilt.
- 3) There is an ability to adjust the lens location in one transverse direction (say, X axis) provided by slots in part 22. However, I do not see any provision for adjustment in the orthogonal (say, Y axis) direction. Moreover, the X axis adjustment is equivalent to moving along a chord of the image, where the aberrations being corrected by the lens are nearly constant with position. The Y axis (the one that appears to have no adjustment provision) translates to a radial motion in the image, the direction in which I would think the aberrations show greatest variation with position.
- 4) Finally, I see a slot in part(s) 25 for adjustment of the tip angle of the pickoff mirror. Is there any ability to adjust for tilt (the orthogonal direction)? Might this adjustment be necessary?

	REVISIONS			
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Α		10/30/02	DAVID DEAN	W. DAVISON

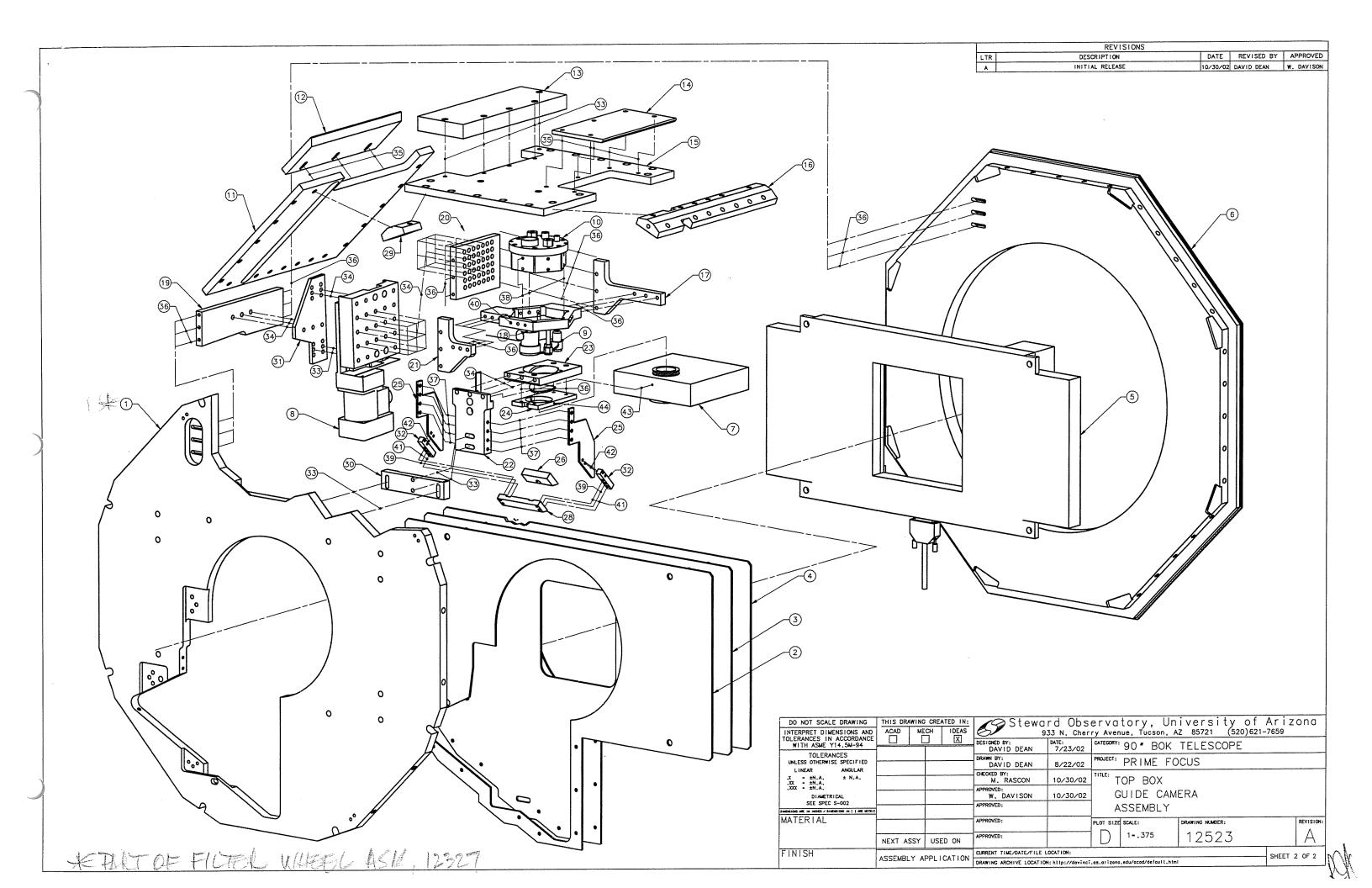
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\geq	\triangleright	3		6-32 X 3/8' SOCKET HEAD CAP SCREW	×	43	3
\times	\triangleright	1		6-32 X 1/2" SOCKET HEAD CAP SCREW	××	42	2
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X	X	2	12754	PICK OFF MIRROR SIDE BLOCK	×	32	1
X	X	1	12538	STAGE MID ADAPTER PLATE	X X	31	1
X	X	1	12529	MAIN CROSS BAR	××	30	1
X	X	1	12630	SIDE PLATE BAR (SHORT)	×	29	1
X	X	1	12525	PICK OFF MIRROR DIAGINAL BLOCK	×	28	1
X	X	1	12535	PICK OFF MIRROR SPACER BLOCK	×	27	-
∇		1	12636	PICK OFF MIRROR	×	26	1
\triangleright		2	12530	PICK OFF MIRROR BLOCK SIDE PLATE	X	25	1
\Longrightarrow		1	12527	FILTER WHEEL MOUNT PLATE	X X	24	1
\triangleright		1	12533	PICK OFF MIRROR LENS BLOCK	x	23	-
\triangleright	$\langle \cdot \rangle$	1	12531	PICK OFF MIRROR CENTER BLOCK	X X	22	1
\triangleright	$\stackrel{\smile}{\nabla}$	1	12539	STAGE SMALL PERPENDICULAR PLATE	X X	21	1
\Longrightarrow	$\langle \rangle$,	. 12537	STAGE INTERFACE PLATE	X X X	20	1
		1	12536	STAGE BRIDGE PLATE	x	19	1
\Longrightarrow	\Diamond	 ,	12528	MAIN MOUNT CAMERA PLATE	X X X	18	1
	\Diamond	,	12526	STAGE LARGE PERPENDICULAR PLATE	x	17	1
$\langle \cdot \rangle$	\Diamond		74041_(EXISTING)		X X X	16	1
$ \bigcirc $		1 1	12541	TOP BOX SIDE PLATE NORTH LOCATION (MODIFIED)	X X	15	1
$ \bigcirc $		1	12524	CABLE SHIELD PLATE	x	14	1
\bigotimes		1	12540	STAGE TOP END OUTER PLATE	X X X	13	1
		1	12543	STAGE LIGHT SHIELD PLATE	x x	12	1
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				E.O. O. MARCHAEO			

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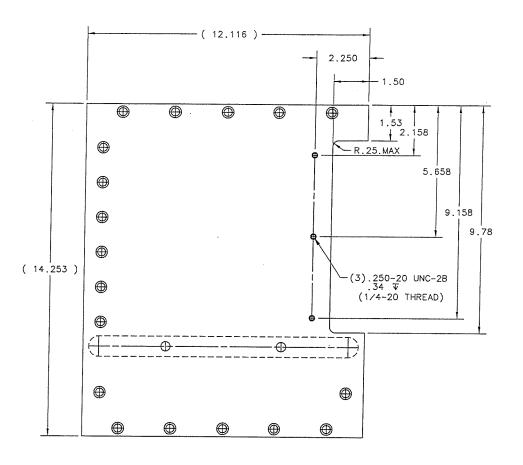
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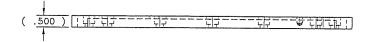
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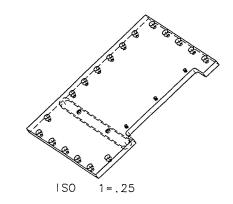
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7	WITH ASME Y14.5M-94 TOLERANCES			DESIGNED BY: DAVID DEAN	DATE: 7/23/02	CATEGORY:	90 * BOK	TELESCOPE				
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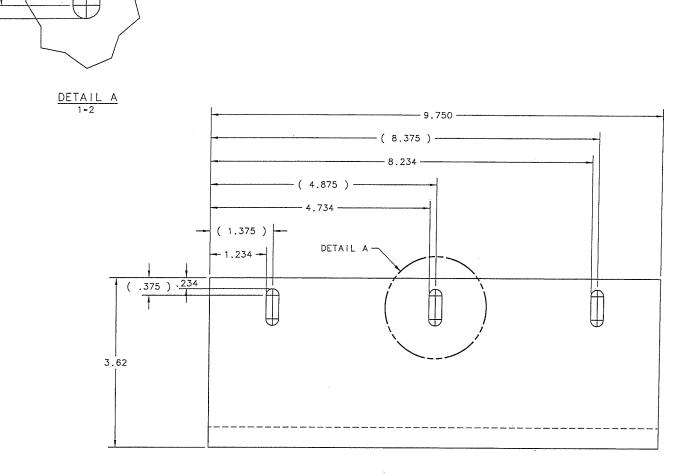


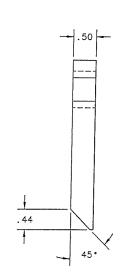
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1. MODIFY EXISTING TOP BOX SIDE PLATE 12057 STAMPED S.E. PER THE DIMENSIONS ON THIS DRAWING.
2. THIS PLATE WILL BE MOVED TO THE N.E. SIDE OF THE TOP BOX.
3. ORIATATION OF TOP BOX IS TELESCOPE POINTING ZENITH.
4. BREAKE SHARPE EDGES & DEBURR.

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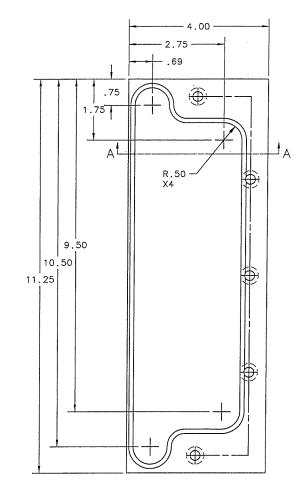
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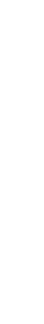
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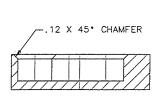
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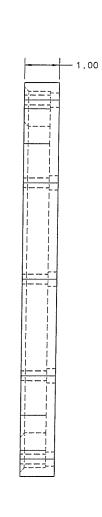


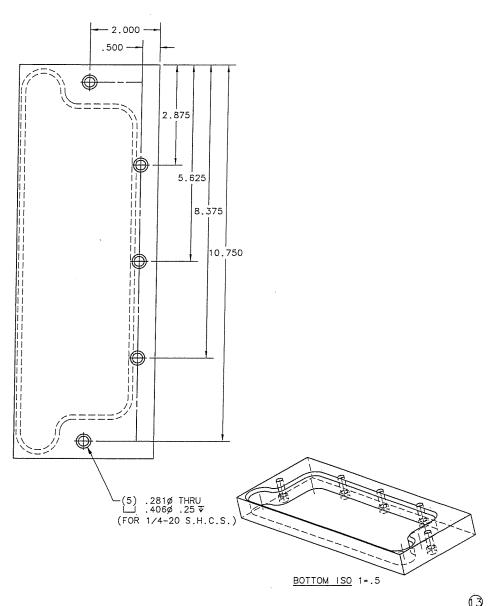




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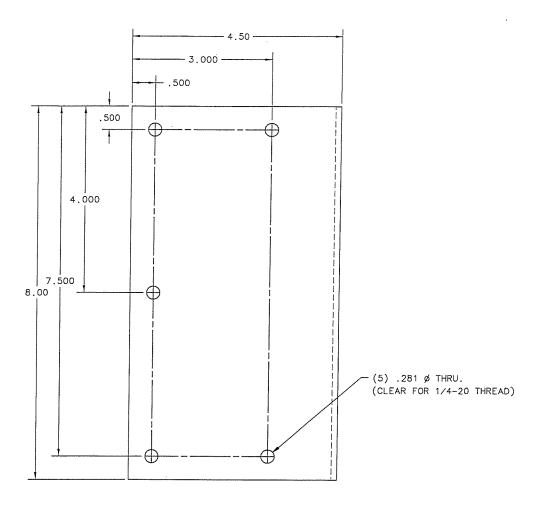
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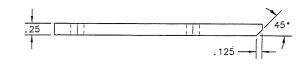


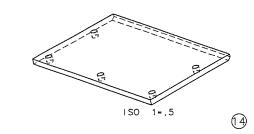


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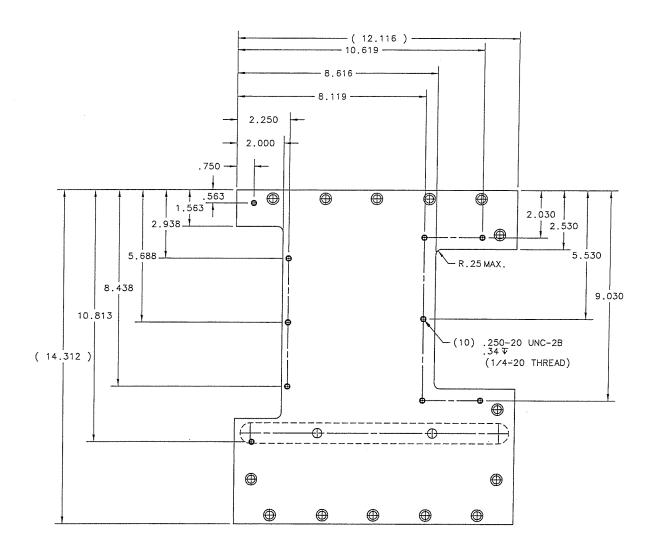


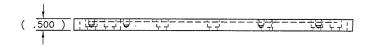
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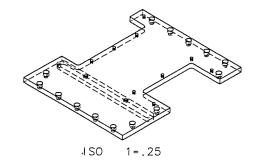
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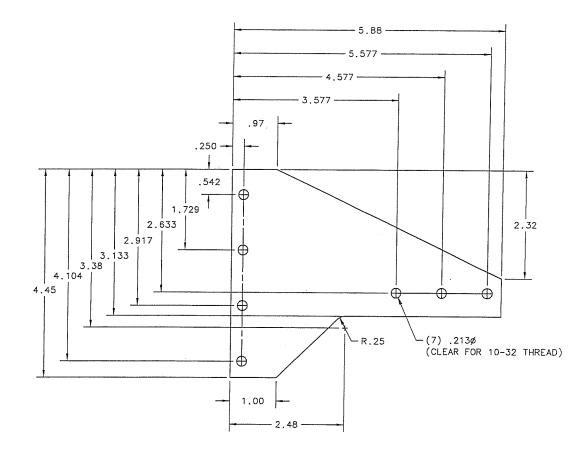
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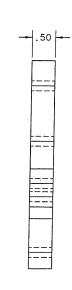
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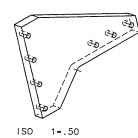
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 3. BREAKE SHARPE EDGES & DEBURR.

REVISIONS

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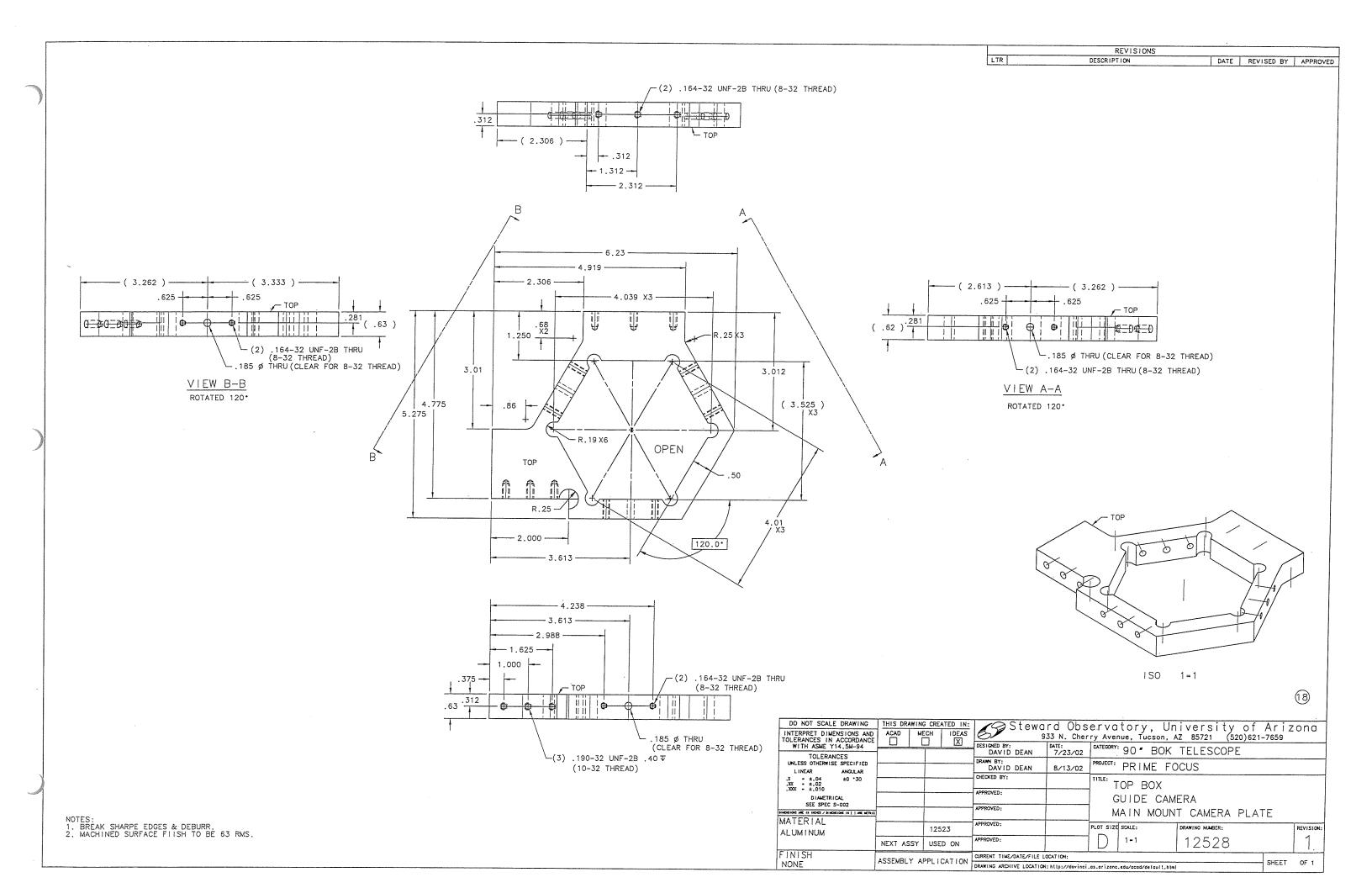




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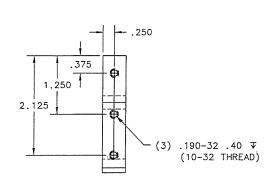
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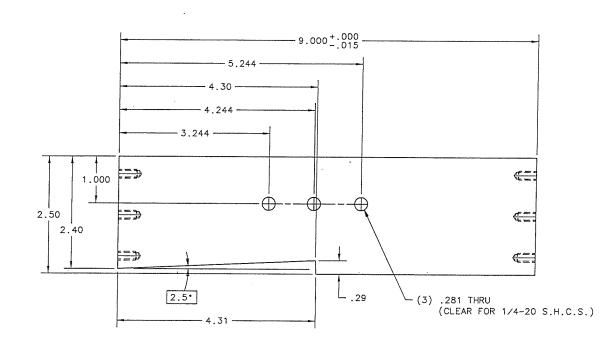
NOTES: 1. BREAK SHARP EDGES & DEBURR. 2. MACHINED SURFACE FINISH TO BE 63 RMS.

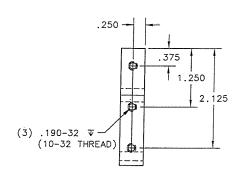


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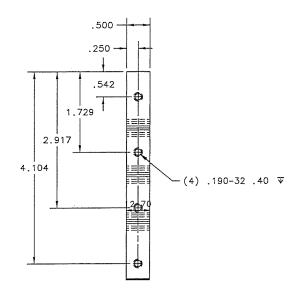


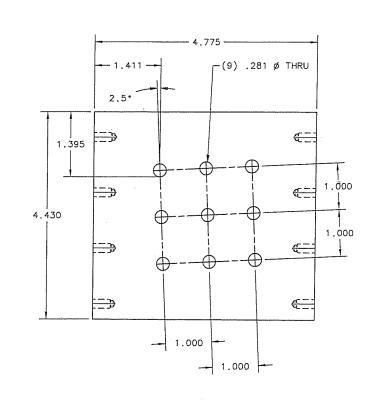
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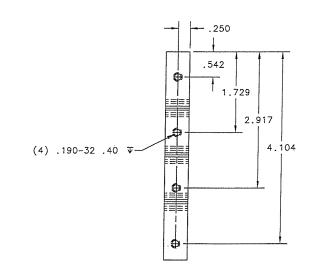
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DO NOT SCALE DRAWING	THIS DRAWING	G CREATED IN:	10 Stewa	ird Obs	ervo	tory Ur	niversity o	f Ariz	ona
INTERPRET DIMENSIONS AND TOLERANCES IN ACCORDANCE		ECH IDEAS	0	933 N. Cher	ry Aver	nue, Tucson,	AZ 85721 (520)6	21-7659	.0110
WITH ASME Y14.5M-94	 		DESIGNED BY: DAVID DEAN	DATE: 7/23/02	CATEGORY	90 * BOK	TELESCOPE		
TOLERANCES UNLESS OTHERWISE SPECIFIED LINEAR ANGULAR			DRAWN BY: DAVID DEAN	8/12/02	PROJECT:	PRIME FO	ocus		
,X - ±.04 ± 0°30 ,XX - ±.02 ,XXX - ±.008			CHECKED BY:		TITLE: T	OP BOX			
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DIMENSIONS AND IN INCHES / BINESSIONS IN [] AND METRIC			APPROVED:		S	TAGE BRI	DGE PLATE		
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/ LOM FROM	NEXT ASSY	USED ON	APPROVED:		1 D	1-1	12536		1
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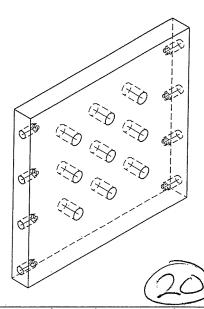
NO.	TES:							
1.	BREAKE	SHARPE	EDGES	& DE	BUP	₹R.		
2.	MACHINE	ED SURFA	ACE FII	41SH	TO	BE	63	RMS.

REVISIONS LTR DATE REVISED BY APPROVED DESCRIPTION





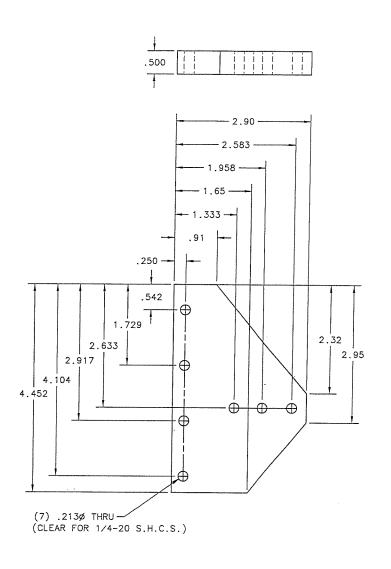


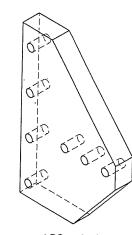


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DO NOT SCALE DRAWING	THIS DRAWIN	G CREATED IN:	✓ Stewo	rd Obs	erva	torv. Ur	niversity of	Ariz	ona
INTERPRET DIMENSIONS AND TOLERANCES IN ACCORDANCE		ECH IDEAS		333 N. Cher	ry Avei	rue, Tucson, A			
WITH ASME Y14.5M-94		<u> </u>	DESIGNED BY: DAVID DEAN	DATE: 7/23/02	CATEGORY	90 " BOK	TELESCOPE		
TOLERANCES UNLESS OTHERWISE SPECIFIED LINEAR ANGULAR			DRAWN BY: DAVID DEAN	8/14/02	PROJECT:	PRIME FO	ocus		
.X = ±.04 ± 0*30 .XX = ±.02			CHECKED BY:		TITLE:	OP BOX			
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NOTES: 1. BREAK SHARPE EDGES & DEBURR. 2. MACHINED SURFACE FINISH TO BE 63 RMS.

REVISIONS DESCRIPTION LTR DATE REVISED BY APPROVED





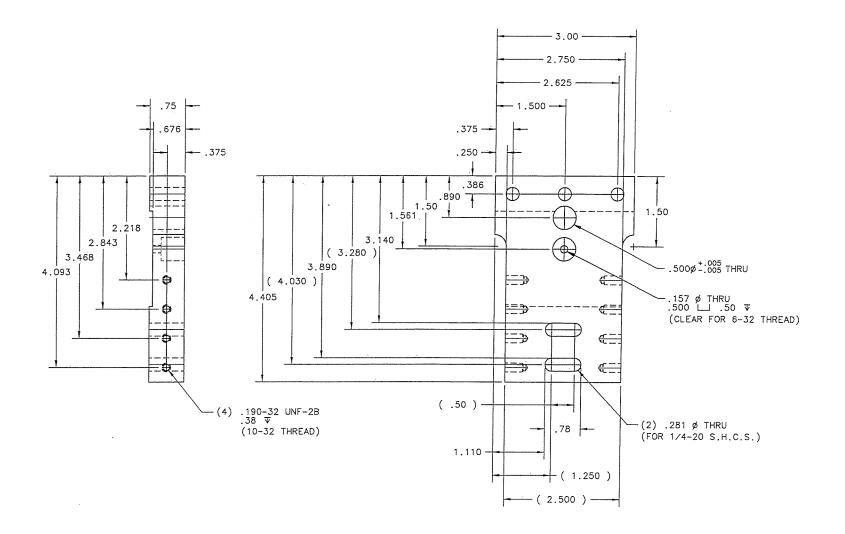
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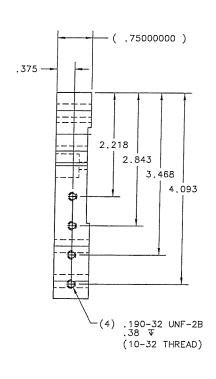
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	DO NOT SCALE DRAWING INTERPRET DIMENSIONS AND TOLERANCES IN ACCORDANCE	ACAD M	G CREATED IN: ECH IDEAS	Jacewa	rd Obs 33 N. Cher	erva ry Ave	tory, Ur	niversity of AZ 85721 (520)62	Ariz 21-7659	ona
	WITH ASME Y14.5M-94 TOLERANCES			DESIGNED BY: DAVID DEAN	DATE: 7/23/02	CATEGORY	90 * BOK	TELESCOPE		
	UNLESS OTHERWISE SPECIFIED LINEAR ANGULAR			DRAWN BY: DAVID DEAN	8/14/02	PROJECT:	PRIME FO	CUS		
	X = ±.04 ± 0°30 XX = ±.02 XX = ±.008			CHECKED BY:		TITLE:	OP BOX			
	DIAMETRICAL SEE SPEC S-002			APPROVED:		1	SUIDE CAM	ERA		
,	DINDSTONE ME IN MORE / BINDSTONE IN [] ME SETRICE MATERIAL			APPROVED:		S	STAGE S	PERPEND I CUL	AR PLA	ATE
1	MATERIAL ALUMINUM		12523	APPROVED:		PLOT SIZE	SCALE:	DRAWING NUMBER:		REVISION:
		NEXT ASSY	USED ON	APPROVED:			1=1	12539		1
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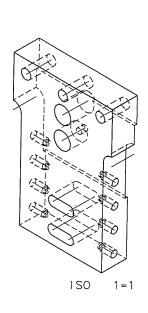
NOTES: 1. BREAK SHARP EDGES & DEBURR. 2. MACHINED SURFACE FINISH TO BE 63 RMS.

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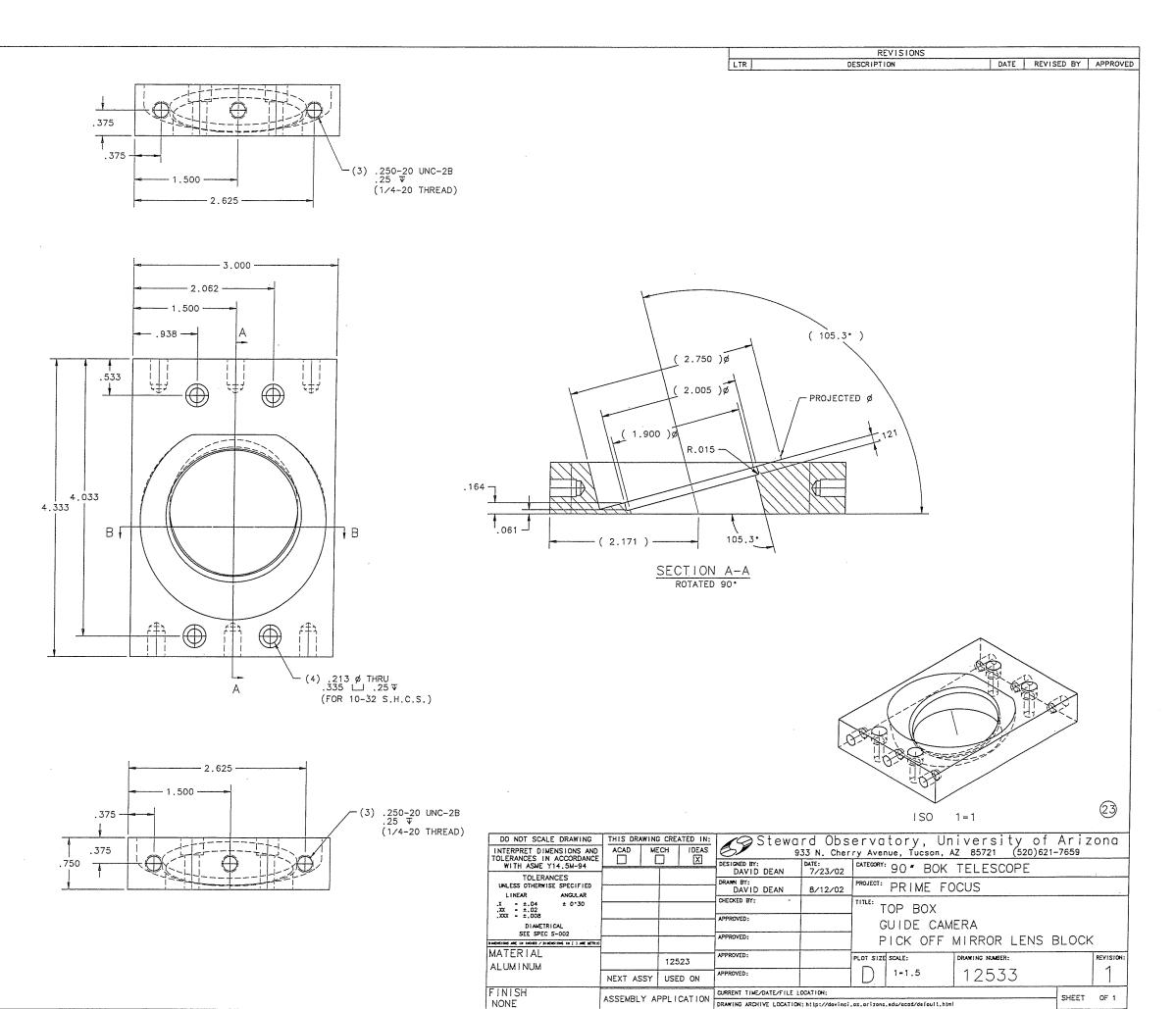






	DO NOT SCALE DRAWING INTERPRET DIMENSIONS AND		CREATED IN:	Stewa	rd Obs	ervo	tory	, Un	iversity o z 85721 (520)8	f Ari:	Arizona				
	TOLERANCES IN ACCORDANCE WITH ASME Y14.5M-94			DESIGNED BY:						21-7659					
	TOLERANCES			DAVID DEAN	7/23/02	GII COIL	90 *	BOK	TELESCOPE						
	UNLESS OTHERWISE SPECIFIED LINEAR ANGULAR			DAVID DEAN	8/12/02	PROJECT:	PRIM	1E FO	CUS						
	X - ±.04 ± 0*30 .xx - ±.02 .xx = ±.008			CHECKED BY:	TOP BOX										
	DIAMETRICAL			APPROVED:		1	SUIDE		ERA						
	SEE SPEC S-002 PINDETON ME IN HORSE / BINDSHIM IN I I MC METRIC			APPROVED:		PICK OFF MIRROR CEN				ER BL	OCK				
- 1	MATERIAL ALUMINUM		12523	APPROVED:		PLOT SIZ	SCALE:		DRAWING NUMBER:		REVISION:				
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\perp	NONE	ASSEMBLY A	PPLICATION	DRAWING ARCHIVE LOCATION	N: http://dovinci	.os.erizon	.edw/ocod/de	efault.html		SHEET	OF 1				

NOTES: 1.BREAK SHARPE EDGES & DEBURR, 2. MACHINED SUEFACE FINISH TO BE 63 RMS.



ASSEMBLY APPLICATION

DRAWING ARCHIVE LOCATION: http://dovinci.px.grizong.edu/gcgd/defoull.html

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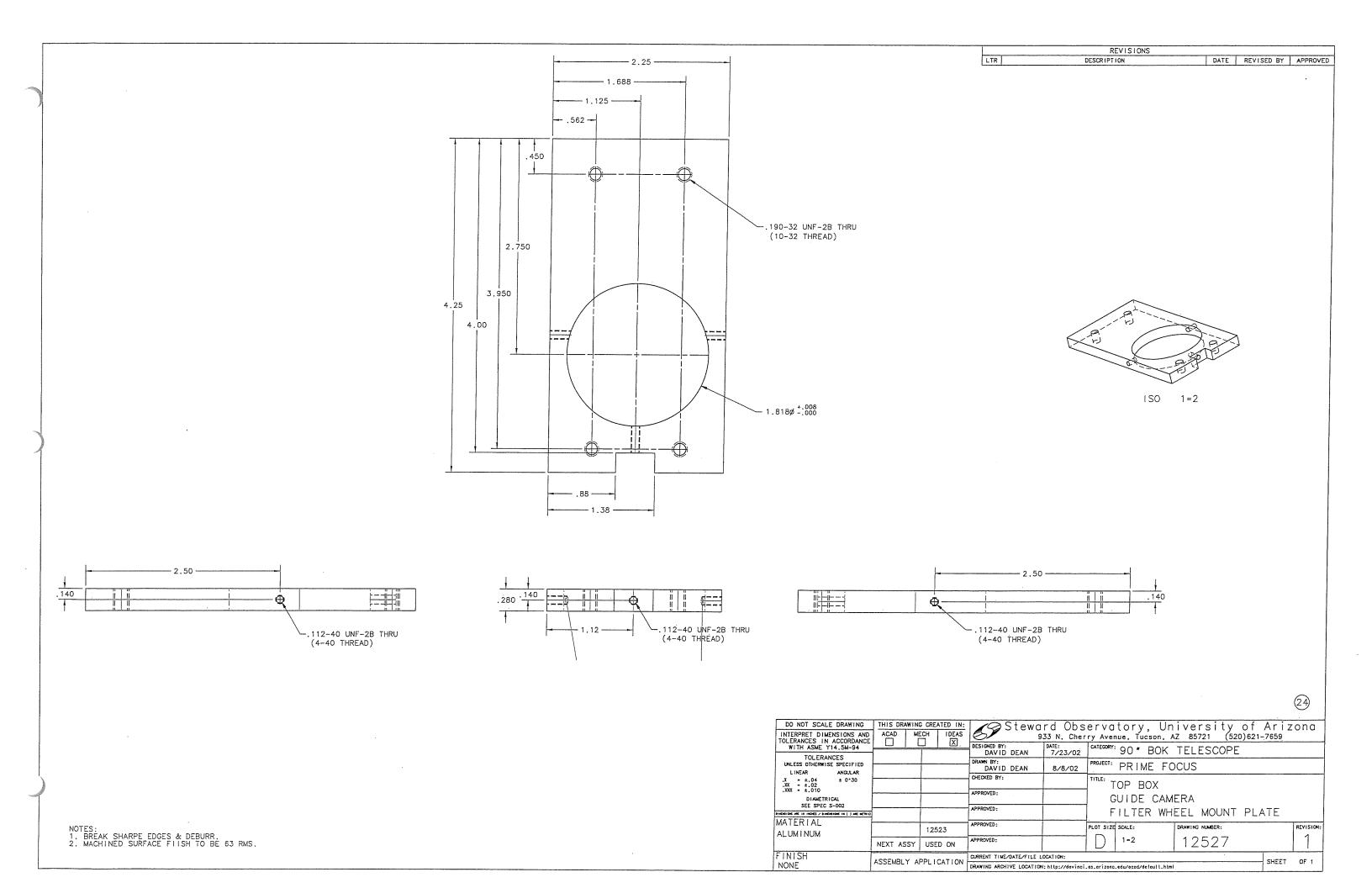
NOTES: 1. BREAK SHARPE EDGES & DEBURR. 2. MACHINED SUEFACE FINISH TO BE 63 RMS. 3. MACHINED FILLERT TO BE .015 MAX.

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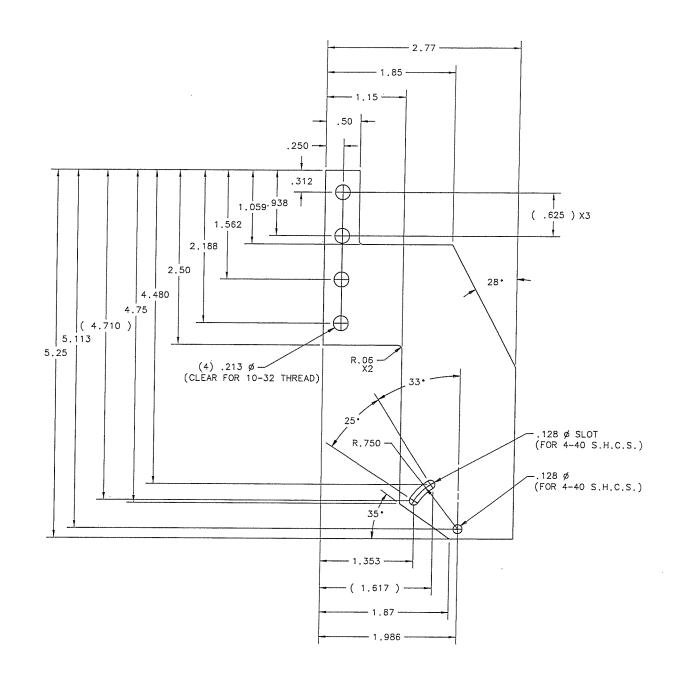
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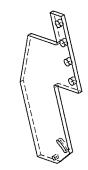
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SECTION B-B ROTATED 180°



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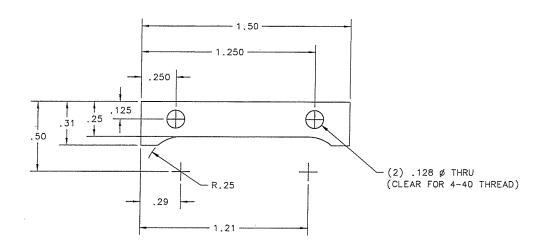
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DO NOT SCALE DRAWING		G CREATED IN:	Stewa	rd Obs	servatory, University of Arizona erry Avenue, Tucson, AZ 85721 (520)621-7659
TOLERANCES IN ACCORDANCE WITH ASME Y14.5M-94			DESIGNED BY: DAVID DEAN	DATE: 7/23/02	CATEGORY: OO * DOLY TELECOODE
TOLERANCES UNLESS OTHERWISE SPECIFIED LINEAR ANGULAR			DAVID DEAN	8/13/02	PROJECT: TOD DOV
X - ±.04 ± 0*30 XX = ±.02			CHECKED BY:		TITLE: PRIME FOCUS
,XXX = ±,008 DIAMETRICAL SEE SPEC S-002	`		APPROVED:		GUIDE CAMERA
DINCHESOR WE IN HIGHE N BANDRIONE SK]] WE NEED			APPROVED:		PICK OFF MIRROR SIDE PLATE
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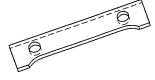
NOTES: 1. BREAKE SHARRPE EDGES & DEBURR. 2. MACHINED SURFACE FINISH TO BE 63 RMS.

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REVISIONS DESCRIPTION LTR DATE REVISED BY APPROVED







ISO 1=2

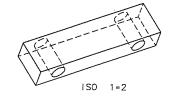
DO NOT SCALE DRAWING	THIS DRAWIN	G CREATED IN:	Stewa	rd Obs	ervat	orv. Un	iversity of	Ariz	ona .	
INTERPRET DIMENSIONS AND TOLERANCES IN ACCORDANCE		ECH IDEAS		33 N. Cher	ry Avenue	e, Tucson, A	Z 85721 (520)621	-7659		
WITH ASME Y14.5M-94			DESIGNED BY:	DATE: 7/23/02	CATEGORY: C	90 * BOK	TELESCOPE			
TOLERANCES UNLESS OTHERWISE SPECIFIED LINEAR ANGULAR			DRAWN BY: DAVID DEAN	8/12/02		PRIME FO				
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NOTES: 1. BREAK SHARPE EDGES & DEBURR. 2. MACHINED SURFACE FINISH TO BE 63 RMS.

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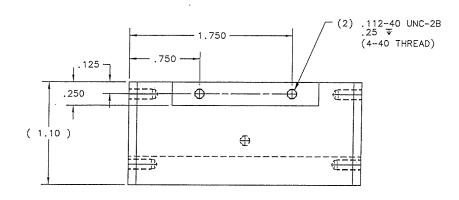
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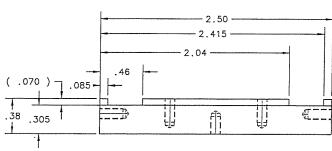


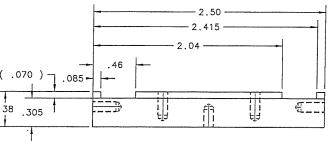
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INTERPRET DIMENSIONS AND TOLERANCES IN ACCORDANCE WITH ASME Y14.5M-94	ACAD ME	ECH IDEAS	DESIGNED BY:				niversity of AZ 85721 (520)621	-7659	.0110
TOLERANCES			DAVID DEAN	7/23/02	CATEGORY	90 BOK	TELESCOPE		.
UNLESS OTHERWISE SPECIFIED LINEAR ANGULAR			DAVID DEAN	8/26/02	PROJECT:	PRIME FO	CUS	<u> </u>	
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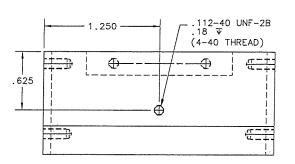
NOTES: 1. BREAK SHARPE EDGES & DEBURR. 2. MACHINED SURFACE FINISH TO BE 63 RMS.

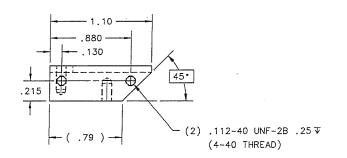
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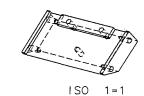












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DO NOT SCALE DRAWING INTERPRET DIMENSIONS AND TOLERANCES IN ACCORDANCE	ACAD M	G CREATED IN:				tory, Un nue, Tucson, A	iversity of AZ 85721 (520)621	AF12 -7659	zona
WITH ASME Y14.5M-94			DESIGNED BY: DAVID DEAN	DATE: 7/23/02	CATEGORY	90 * BOK	TELESCOPE		
TOLERANCES UNLESS OTHERWISE SPECIFIED		<u> </u>	DRAWN BY: DAVID DEAN	8/8/02	PROJECT:	PRIME FO	CUS.		
LINEAR ANGULAR .X = ±.04 ± 0.30 .XX = ±.02			CHECKED BY:		GUIDE CAMERA PICK OFF MIRROR DIAGINOL				
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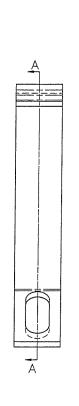
NOTES:
1. BREAK SHARPE EDGES & DEBURR.
2. MACHINED SURFACE FINISH TO BE 63 RMS.
3. MACHINED FILLETS TO BE .015 MAX.

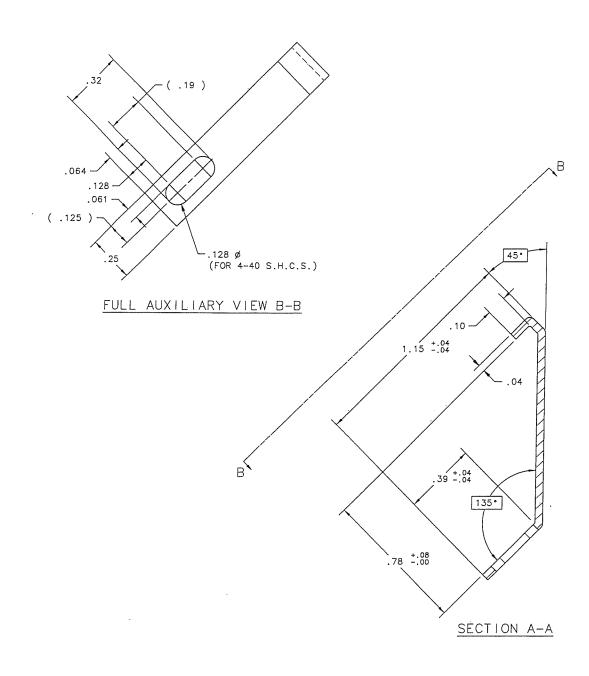
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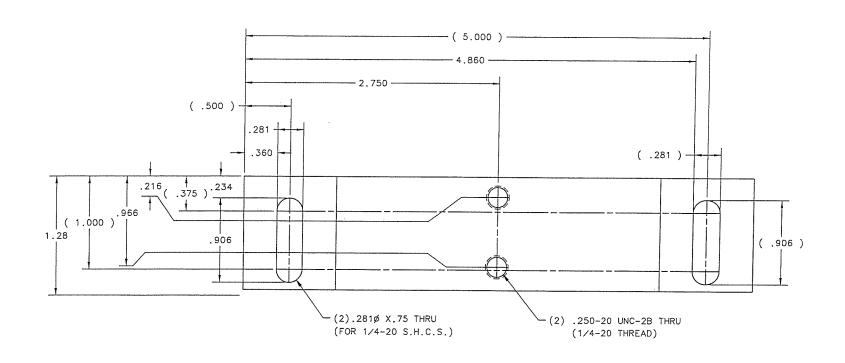


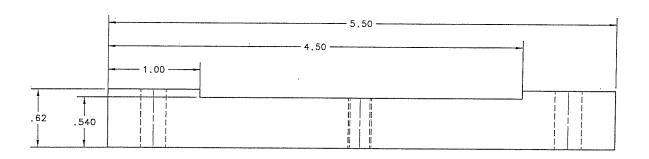


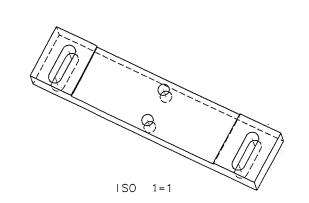
DO NOT SCALE DRAWING		G CREATED IN:	/ ⊘Stewa	rd Obs	erva	tory, Un	iversity of	Ariz	ona	
INTERPRET DIMENSIONS AND TOLERANCES IN ACCORDANCE	ACAD M	ECH IDEAS	9	33 N. Cher	ry Aver	nue, Tucson, A	X 85721 (520)621-	-7659		
WITH ASME Y14.5M-94			DESIGNED BY:	DATE: 7/23/02	CATEGORY:	90 # BOK	TELESCOPE			
TOLERANCES UNLESS OTHERWISE SPECIFIED			DRAWN BY: DAVID DEAN	8/13/02	PROJECT:	PRIME FO				
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NOTES: 1. BREAK SHARPE EDGES & DEBURR. 2. 3.

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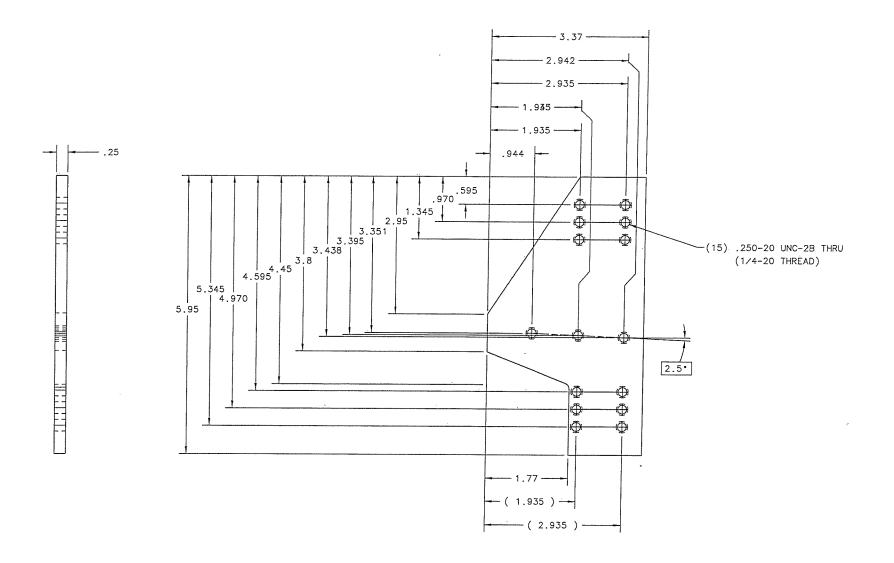
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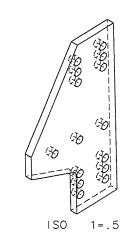
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DO NOT SCALE DRAWING INTERPRET DIMENSIONS AND TOLERANCES IN ACCORDANCE	ACAD M	G CREATED IN: ECH IDEAS	Stewa	ord Obs 933 N. Cher	erva ry Ave	tory, Ur nue, Tucson,	niversity of AZ 85721 (520)62	Ariz 1-7659	ona
WITH ASME Y14.5M-94 TOLERANCES			DESIGNED BY: DAVID DEAN	DATE: 7/23/02	CATEGORY	90 * BOK	TELESCOPE		
UNLESS OTHERWISE SPECIFIED LINEAR ANGULAR			DRAWN BY: DAVID DEAN	8/8/02	PROJECT: PRIME FOCUS				
X = ±.04 ± 0*30 XX = ±.02		CHECKED BY: TITLE: TOP BOX							
DIAMETRICAL			APPROVED:		GUIDE CAMERA MAIN CROSS BAR				
SEE SPEC S-002 SHOOLOGE MC IN HORS / DINDELOGE IN [] MC MCTRIC			APPROVED:						
MATERIAL ALUMINUM		12523	APPROVED:		PLOT SIZE	SCALE:	DRAWING NUMBER:		REVISION:
, , , , , , , , , , , , , , , , , , , ,	NEXT ASSY	USED ON	APPROVED:		1 D	1=2	12529		1
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NOTES: 1. BREAK SHARPE EDGES & DEBURR. 2. MACHINED SURFACE FINISH TO BE 63 RMS.

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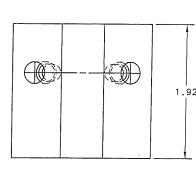


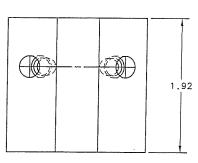


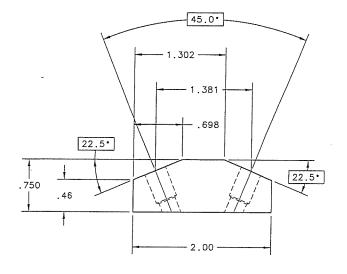
3 DO NOT SCALE DRAWING
INTERPRET DIMENSIONS AND
TOLERANCES IN ACCORDANCE
WITH ASME Y14.5M-94 Steward Observatory, University of Arizona 933 N. Cherry Avenue, Tucson, AZ 85721 (520)621-7659 INTERPRET DIMENSIONS AND TOLERANCES IN ACCORDANCE WITH ASME Y14.5M-94 DESIGNED BY: DATE:
DAVID DEAN 7/23/02 CATEGORY: 90 " BOK TELESCOPE TOLERANCES
UNLESS OTHERWISE SPECIFIED
LINEAR ANGULAR DAVID DEAN PROJECT: PRIME FOCUS 8/12/02 ANGULAR ± 0°30 TITLE: TOP BOX .X - ±.04 .XX - ±.02 .XX - ±.008 CHECKED BY: APPROVED: DIAMETRICAL SEE SPEC S-002 GUIDE CAMERA APPROVED: STAGE MID ADAPTER PLATE MATERIAL APPROVED: PLOT SIZE SCALE: DRAWING NUMBER: REVISION: 12523 ALUMINUM 1 = 1 12538 APPROVED: NEXT ASSY USED ON FINISH NONE ASSEMBLY APPLICATION | CURRENT TIME/DATE/FILE LOCATION: http://dovinci.os.orizonc.edu/ocod/defoult.html CURRENT TIME/DATE/FILE LOCATION: SHEET OF 1

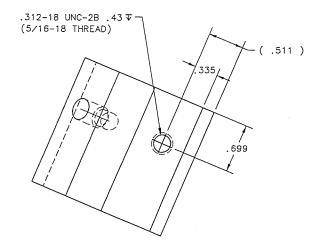
NOTES: 1. BREAKE SHARPE EDGES & DEBURR. 2. MACHINED SURFACE FIISH TO BE 63 RMS.

REVISIONS DESCRIPTION LTR DATE REVISED BY APPROVED









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DO NOT SCALE DRAWING INTERPRET DIMENSIONS AND		G CREATED IN: ECH IDEAS	Steward Observatory, University of Arizona 933 N. Cherry Avenue, Tucson, AZ 85721 (520)621-7659						
TOLERANCES IN ACCORDANCE WITH ASME Y14.5M-94			DESIGNED BY:				TELESCOPE	1-/659	
TOLERANCES UNLESS OTHERWISE SPECIFIED LINEAR ANGULAR			DRAWN BY: DAVID DEAN	8/27/02	PROJECT:	PRIME FO			
X = ±.04 ±1 *0 .xx = ±.02 .xx = ±.015			CHECKED BY:		TITLE: TOP BOX				
DIAMETRICAL SEE SPEC S-002			APPROVED:		GUIDE CAMERA SIDE PLATE BAR (SHORT)				
BINDROSE ARE IN 1904S / BINDROSE IN E I ARE NETRIC MATERIAL			APPROVED:						
ALUMINUM		12523	APPROVED:		PLOT SIZE	SCALE:	DRAWING NUMBER:		REVISION:
	NEXT ASSY	USED ON	APPROVED:		\cup	1-1.5	12630		1
FINISH	ASSEMBLY A	PPI ICATION	CURRENT TIME DATE FILE LOCATION:				-		
NONE ASSEMBLY APPLICAT			DRAWING ARCHIVE LOCATION: http://dovinci.as.arizona.edu/ocad/defaull.html				SHEET	OF 1	

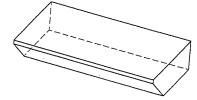
NOTES: 1. BREAKE SHARPE EDGES & DEBURR. 2. THIS PART REPLACE EXISTING PART 12051.

(.511) -

. 699

	(1.260)	
45°		
	(.062)	(.472)
	(.850)	- 1





180	1=1.5	

REVISIONS DESCRIPTION

DATE REVISED BY APPROVED

LTR

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DO NOT SCALE DRAWING INTERPRET DIMENSIONS AND TOLERANCES IN ACCORDANCE						niversity o AZ 85721 (520)6	f Ariz 621-7659	ona	
WITH ASME Y14.5M-94 TOLERANCES	<u> </u>		DESIGNED BY:	DATE: 7/23/02	CATEGORY	90 * BOK	TELESCOPE		
UNLESS OTHERWISE SPECIFIED LINEAR ANGULAR			DAVID DEAN	8/28/02	PROJECT:	PRIME FO	CUS		
.X = ±N,A, ± "N,A, .XX = ±N,A, .XXX = ±N,A,			CHECKED BY:		TITLE:	OP BOX			
DIAMETRICAL SEE SPEC S-002			APPROVED:		GUIDE CAMERA				
BINDSTORS ARE IN INDEX / BINDSTORS IN [] ARE BETRIC			APPROVED:		PICK OFF MIRROR				
MATERIAL ?		12523	APPROVED:		PLOT SIZE	SCALE:	DRAWING NUMBER:		REVISION:
?	NEXT ASSY	USED ON	APPROVED:		\cup	1=1.5	12636		1
FINISH	ASSEMBLY APPLICATION		CURRENT TIME/DATE/FILE LOCATION:						
?	ASSEMBLY A	PPLICATION	DRAWING ARCHIVE LOCATION: http://dovinci.os.grizong.edu/gcod/default.html			SHEET	OF 1		

NOTES: 1. JIM OR WARREN NEED TO SPEC OUT THIS PICK OF MIRROR. 2.

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