

March 12, 1982

MEMORANDUM

TO: J. M. Payne
 FROM: P. J. Rhodes
 SUBJECT: 12 Meter Subreflector Translation Stage

Attached are the specifications, components and drawings for the Subreflector Translation Stage. The components have been ordered and I have obtained an estimate for the cost of material and shop labor.

SPECIFICATIONS

Maximum movement .500 inches
 Accuracy .002 inches
 Total expected Movement .157 inches @ 90° - 0° Elevation
 Anticipated Weight Approx. 400 lbs max (6400 oz)
 Torque Required Approx. 190 oz in (Using 1 mm Lead Screw)

200 - 250 lb

COMPONENTS

Rollerscrew for lifting subreflector and sterling mount expected maximum weight approx. 400 lbs (181.44 kg)

$$w = mg \quad m = \text{weight kilograms}_2$$

$$g = \text{gravity } 9.81 \text{ m/s}^2$$

$$w = (181.44) (9.81 \text{ m/s}^2)$$

$$w = 1779.9 \text{ N or } 181.44 \text{ kgf}$$

TRANSROL

Rollerscrew #PVUZ 16 x 1R1L90 P10TL 180

Zero backlash, preloaded to 25 oz in. to prevent
backscrow. 16 mm x 1 mm leads 180 mm total length,
right hand threads. Dynamic load rating 4050 N.

\$1550.00

Linear Bearing Dovetail Slides

TURNOMAT

Dovetail linear ball bearing slides
750 lb dynamic load capacity ea.
3 1/2" travel length

\$523.00 x 4 = \$2092.00

Bearings for rollerscrew

TIMKIN

2 ea. A4138 cup & A4059 cone.
Rated at 500 rpm thrust = 387 radial = 500 lbs.
\$ 18.00

Transducer to measure position.

SCHAEVITZ LVTD

Part #GCD-121-125
80 mv/.001 inch \$ 427.00

Planetary gearmotor

GLOBE TRW

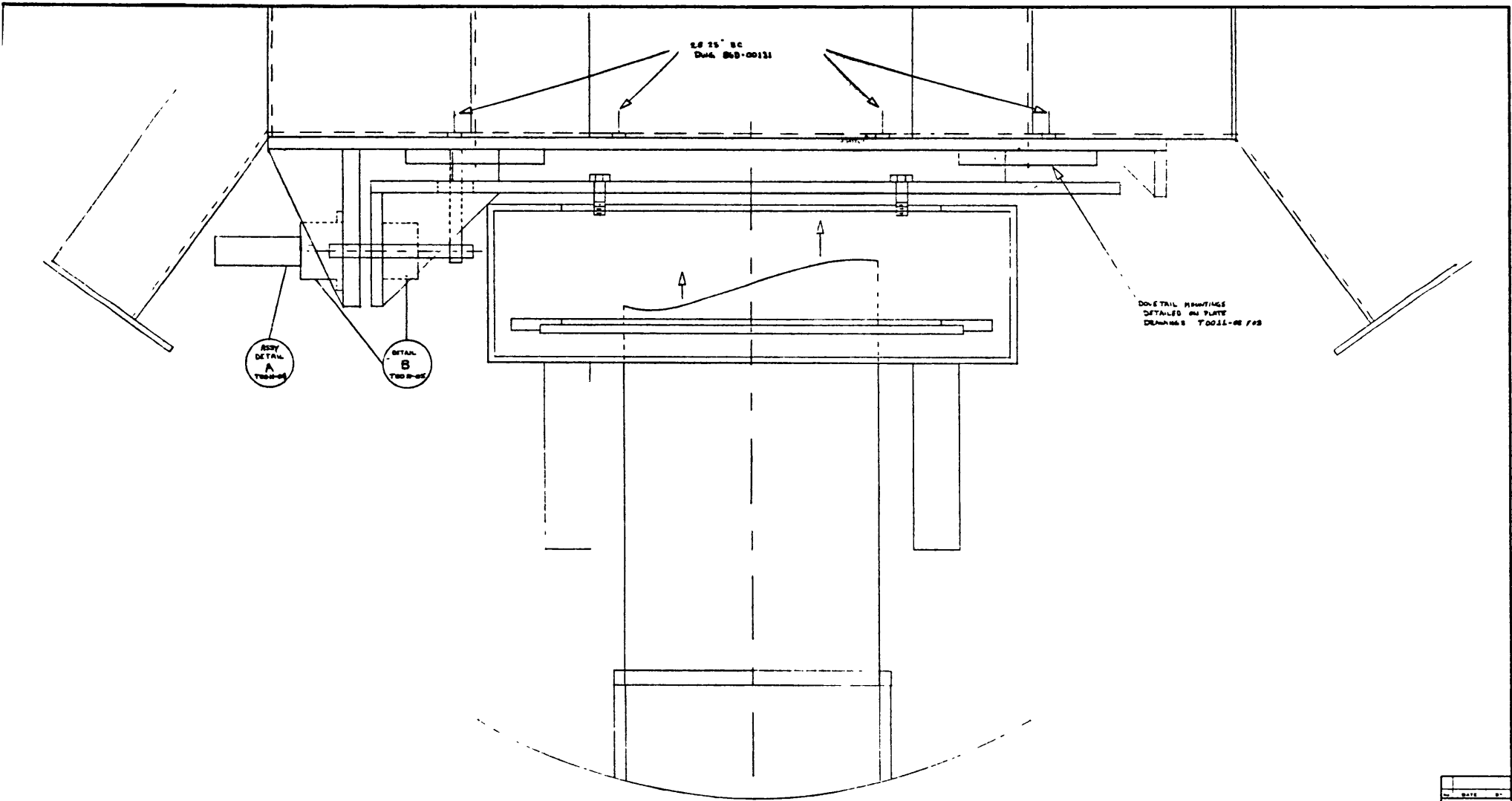
Part #317A146-4
12 VDC 1.2A 3.7A stall rated torque 1.0 oz in.
11,000 - 13,000 motor rpm
3000:1 reduction ratio. Torque multiplier 980:1
Calculated torque required to lift sterling mount and
subreflector (400 lbs);
200 oz inches. Torque available 980 oz inches.

Materials & Machine Shop Estimates

All plates 1/2" 6061-T6	Aluminum	\$ 332.00
Machining labor		1068.00

Electronic components for servo control and monitoring	estimated	500.00
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Total	Cost Estimate	\$6164.00
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DETAIL
A
T0011-01

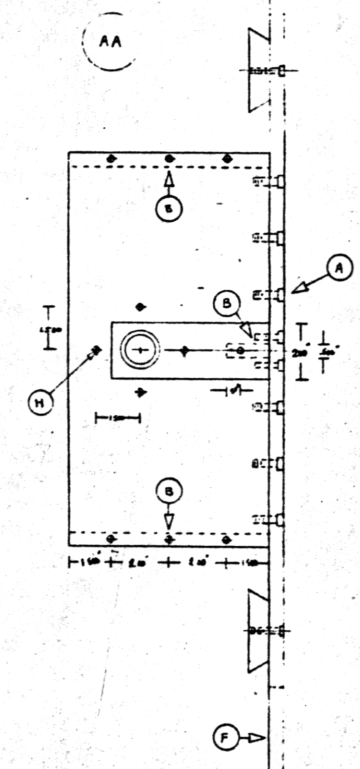
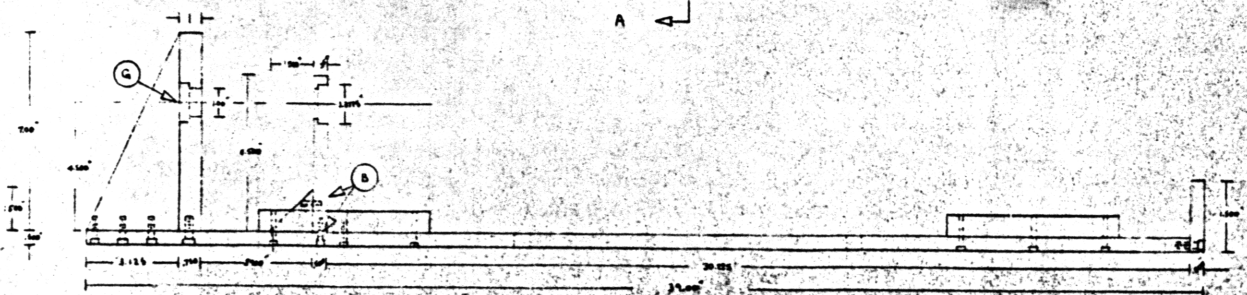
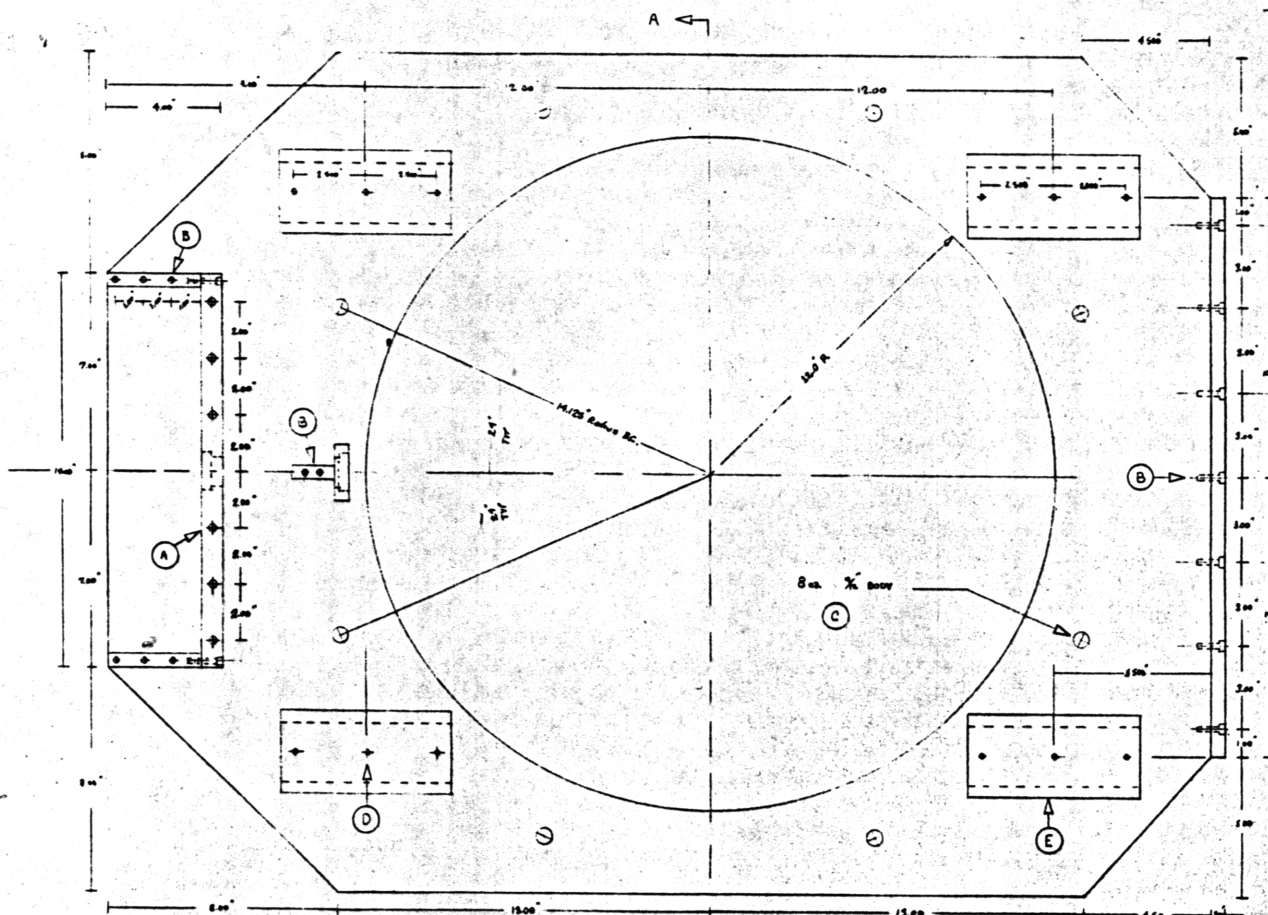
DETAIL
B
T0011-01

2.0 15' SC
DWG. 800-00131

DETAIL DRAWINGS
DETAILED ON PLATE
DRAWING T0011-01

NO.	DATE	BY

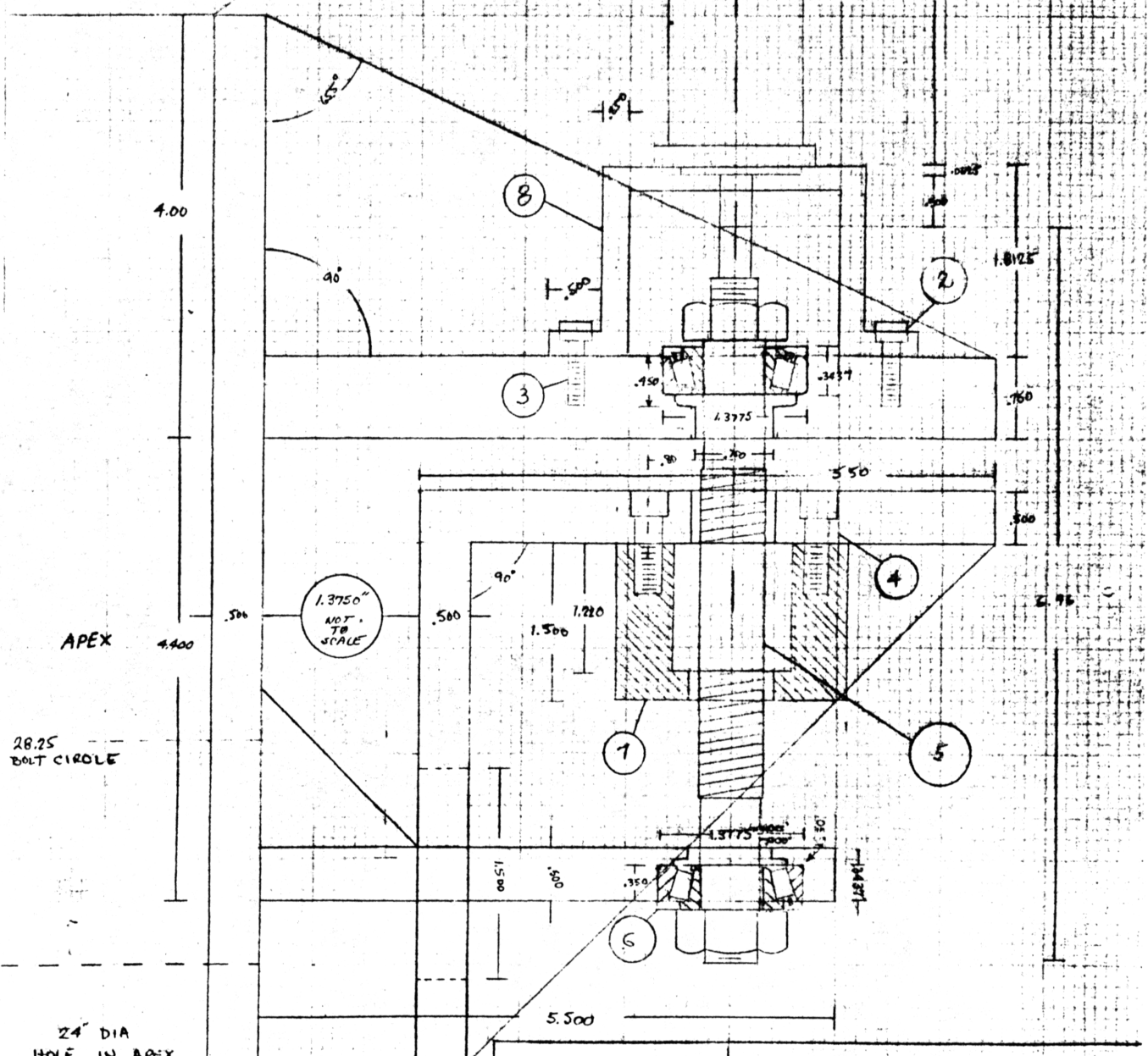
NATIONAL RADIO ASTRONOMY OBSERVATORY ASSOCIATED UNIVERSITIES INC. GREEN BANK, W. VA.			
TITLE 12 Meter Subreflector Translation Assy Dwg			
DESIGNED BY	CHKD BY	APPROVED BY	DATE
PKR	J. DL		
SCALE 1" = 1'		NO. T0011-01	



NOTES	
A 1/8-20 TAP-3/4" to match five holes countersink for cap screw	6 pieces
B 10-32 TAP-3/4" to match five holes countersink for cap screw	24 pieces
C 9/16" Thru holes to match 2225 BC in motor apex	8 pieces
D 7/8 diameter countersink to match 12-20 thread tap in metal slide	12 pieces
E Detail slide for matching bearing TURNONAT DT 750-2-3	4 pieces
F Plate and pieces of 1/2" 6061-T6	4 pieces
G Bearing seats for TURNONAT A4024 / A-4128	7 pieces
H 10-32 TAP THRU to match motor mounting holes any TAP-10 AA	4 pieces

BOTTOM VIEW APPROXIMATE DIMENSIONS - NOT TO SCALE	
Part Name	Bottom View Approximate Dimensions - Not to Scale
Part Number	Bottom View Approximate Dimensions - Not to Scale
Part Description	Bottom View Approximate Dimensions - Not to Scale
Part Material	Bottom View Approximate Dimensions - Not to Scale
Part Quantity	Bottom View Approximate Dimensions - Not to Scale
Part Drawing	Bottom View Approximate Dimensions - Not to Scale
Part Date	Bottom View Approximate Dimensions - Not to Scale
Part Author	Bottom View Approximate Dimensions - Not to Scale
Part Checker	Bottom View Approximate Dimensions - Not to Scale
Part Engineer	Bottom View Approximate Dimensions - Not to Scale
Part Designer	Bottom View Approximate Dimensions - Not to Scale
Part Drafter	Bottom View Approximate Dimensions - Not to Scale
Part Title	Bottom View Approximate Dimensions - Not to Scale
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Part Unit	Bottom View Approximate Dimensions - Not to Scale
Part Status	Bottom View Approximate Dimensions - Not to Scale
Part Revision	Bottom View Approximate Dimensions - Not to Scale
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Part Status	Bottom View Approximate Dimensions - Not to Scale
Part Revision	Bottom View Approximate Dimensions - Not to Scale

1	GLOBE CAM GEOMETRIC 317A196-7	1
2	CAP SCREW 10-32 x 3/4	4
3	TIMKIN A-A059 CUP # A43B	1
4	CAP SCREW 1/4-20 x 3/4	4
5	ANTI FRICTION SCREW TRANSFER LTI PVUSE 16WIR1190P10 TOTAL LENGTH 150 MM	
6	TIMKIN A-A059 CUP # A43B	
7	MACHINED NUT HOUSING DETAIL B	
8	MACHINED MOTOR MOUNT DETAIL B	



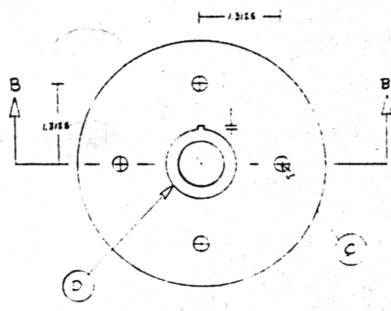
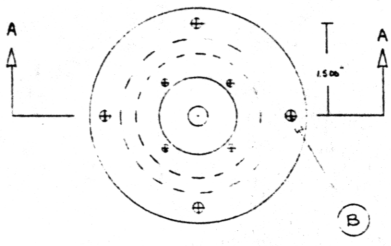
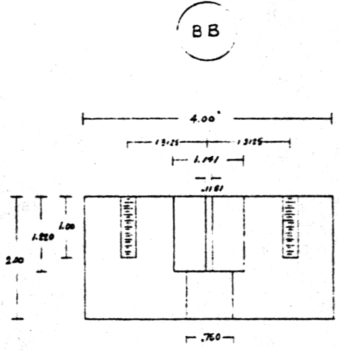
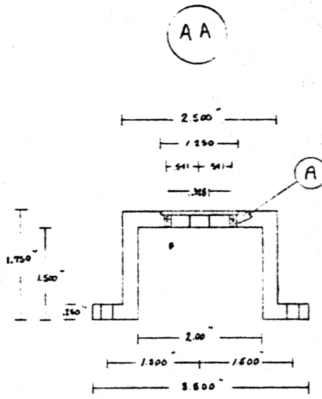
APEX 4.400

28.25
BOLT CIRCLE

24" DIA
HOLE IN APEX
AND FIRST 1/2"
PLATE

STERLING MOUNT CASE

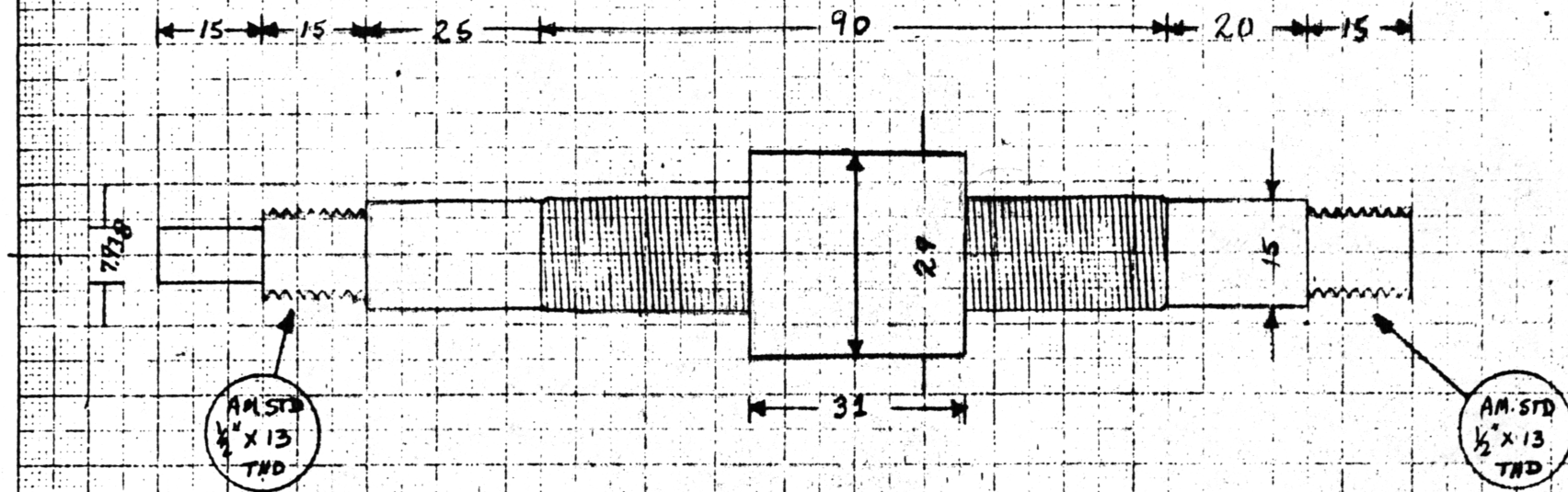
TOLERANCES UNLESS OTHERWISE SPECIFIED		FRACTIONS DEC ANGLES		NATIONAL RADIO ASTRONOMY OBSERVATORY — TUCSON OPERATIONS operated by ASSOCIATED UNIVERSITIES INC. under contract with THE NATIONAL SCIENCE FOUNDATION	
±	±	±	±	12 METER	
APPROVALS	DATE	VERTICAL TRANSLATION			
DRAWN L.T.B.	1-21-82	DETAIL A			
CHECKED		SCALE	SIZE	DRAWING NO.	
		1:1		T0011-04	



Notes	# Places
A 6-32 TAP TWLD	4 places
B 10-32 Bore to match 3/8" plate on top plate eng # Toost-02	4 places
C 1/4-20 TAP to match holes on 1/2 x 1 1/4 5/8 plate eng # Toost-08	4 places
D Transfer out mounting see Detail C	

DESIGNED BY P. JAMES	CHECKED BY P. JAMES	NATIONAL BUREAU OF STANDARDS - TOLSON OPERATIONS DIVISION OF ENGINEERING AND TECHNOLOGY U.S. DEPARTMENT OF COMMERCE
APPROVALS DATE	DATE	Detail B Translation Stage AA - plate mount BB - Transfer out mount
SCALE FULL	SHEET NO. T0011 05	DO NOT SCALE DRAWING SHEET 1 of 1

Detail C



PVUZ 16x1R1 L 90 P10 TL180

ENDS THREADED TO AMERICAN STANDARD
 $\frac{1}{2}$ INCH x 13

SIMILAR TO TYPE II END IS .3125 inches or 7.938 mm
 ALL DIMENSIONS IN MILLIMETERS EXCEPT THREADED ENDS