(1)

12 METER MILLIMETER WAVE TELESCOPE
MEMO No. 136

2/8/82

Lee,

I've attached 9 sketches of the proposed receiver mount for the 12 meter telescope. They are:

FIG. #1	proposed receiver location
FIG #2	Receiver mount attached to BUS
FIG #3	Present receiver mounted on proposed mount. (Reference plate mount eliminated for clarity)
FIG #4	New Receiver mounted on proposed mount (Reference plate mount eliminated for clarity)
FIG #5	Proposed receiver mount detail
FIG #6A	Reference plate mounted on proposed Receiver mount (Ref. plate. stiffener plates not shown)
FIG #6B	Reference plate attached to Receiver mount.
FIG #7	Reference plate detail
FIG #8	Present receiver modified for proposed mount.

We need your help in (1) determining if it is poisible to mount the receivers in such a manner, (2) the type of material to be used, (3) the size of the various members, and (4) the attachment points on the BUS.

We propose to mount both new and old receivers to the reference plate. The stiffeners on the reference plate would be

2/8/92

pinned and/or BOLTED TO THE 8" LIP on the receiver mount. The present receivers would also have a mounting bracket, located near the rear, which would be bolted and/or pinned to the 8" lip. That bracket has not been shown.

The Thompson Super 32-OPN Super Ball Bushings we specified for ease of loading the receivers. The specs. indicate that they are an over-kill as far as load capacity is concerned, however, I feel that we need to make the loading process as easy as possible.

The weight of the present receivers is ≈ 800#, and we would like to hold the position of the reference plate to the following:

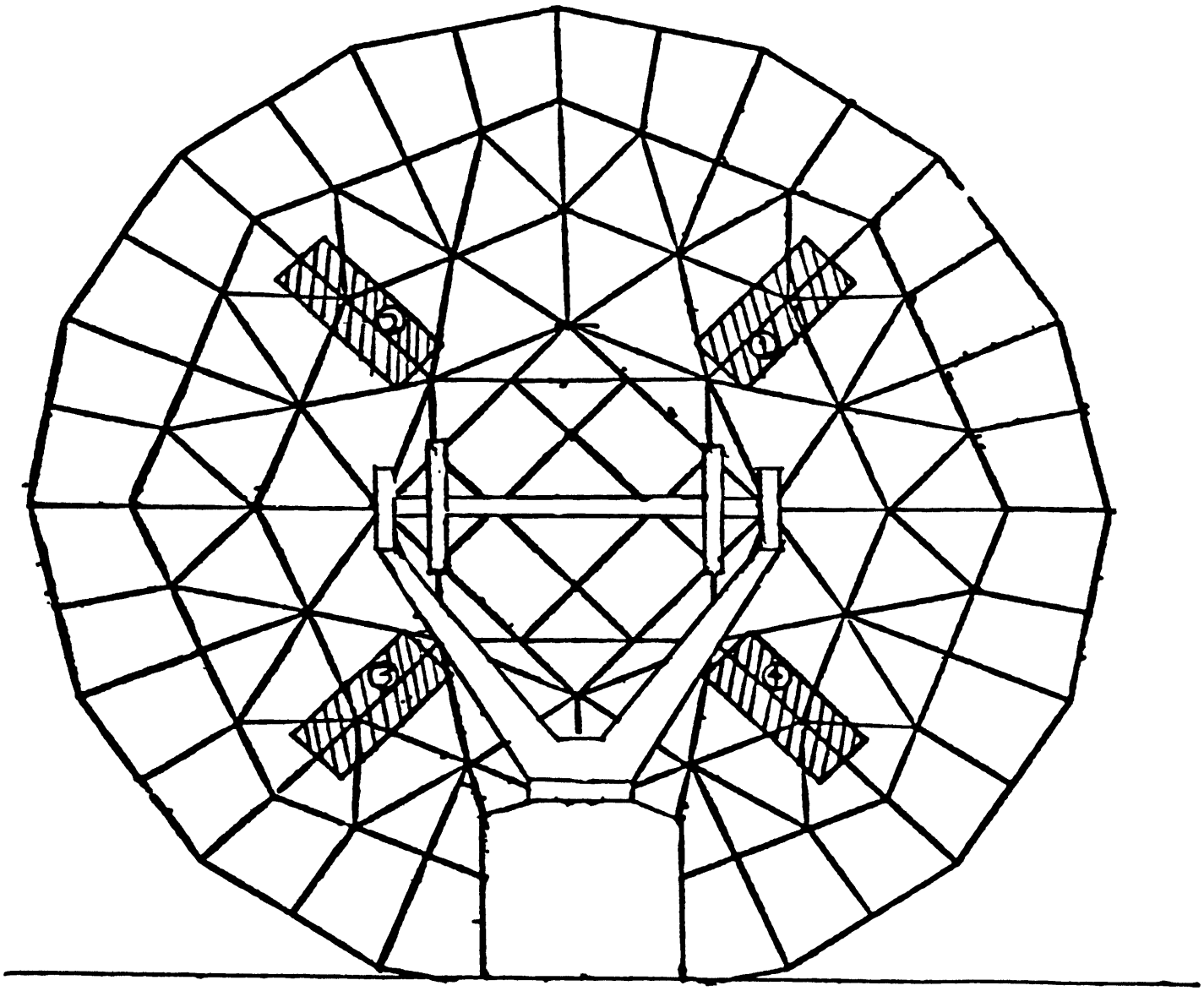
AXIAL STABILITY	± 5mm	Zenith to Horizon
LATERIAL STABILITY	± 2mm	" " "
ANGULAR STABILITY	± 0.15°	" " "

I have attached a copy of John's calculations.

Thanks for your help

Dewey

POSITIONS 1&2 for PRESENT RECEIVERS.



T0010-01

12 METER TELESCOPE
PROPOSED RECEIVER MOUNTING.

11/29/82
DER

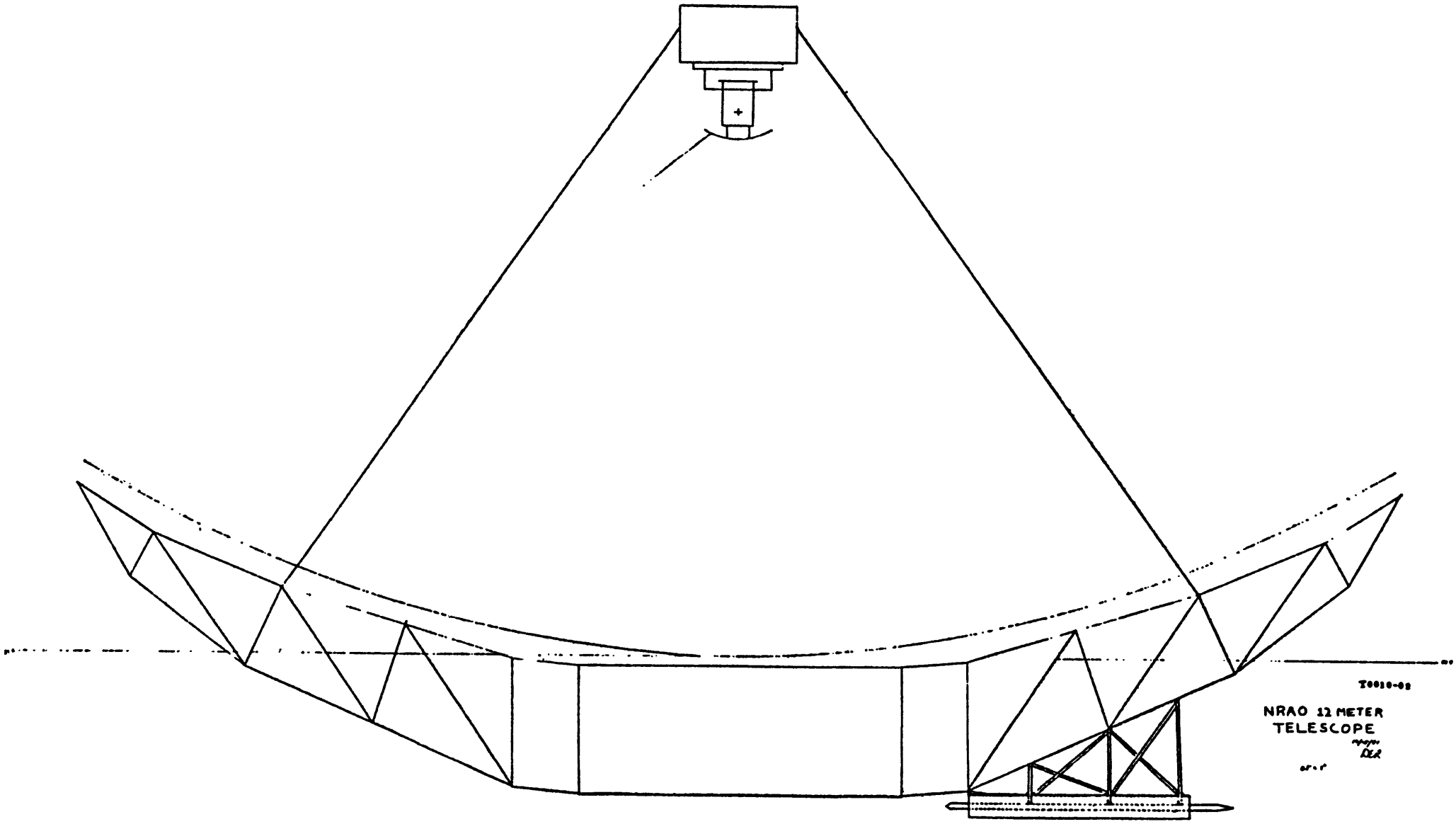


FIG 2

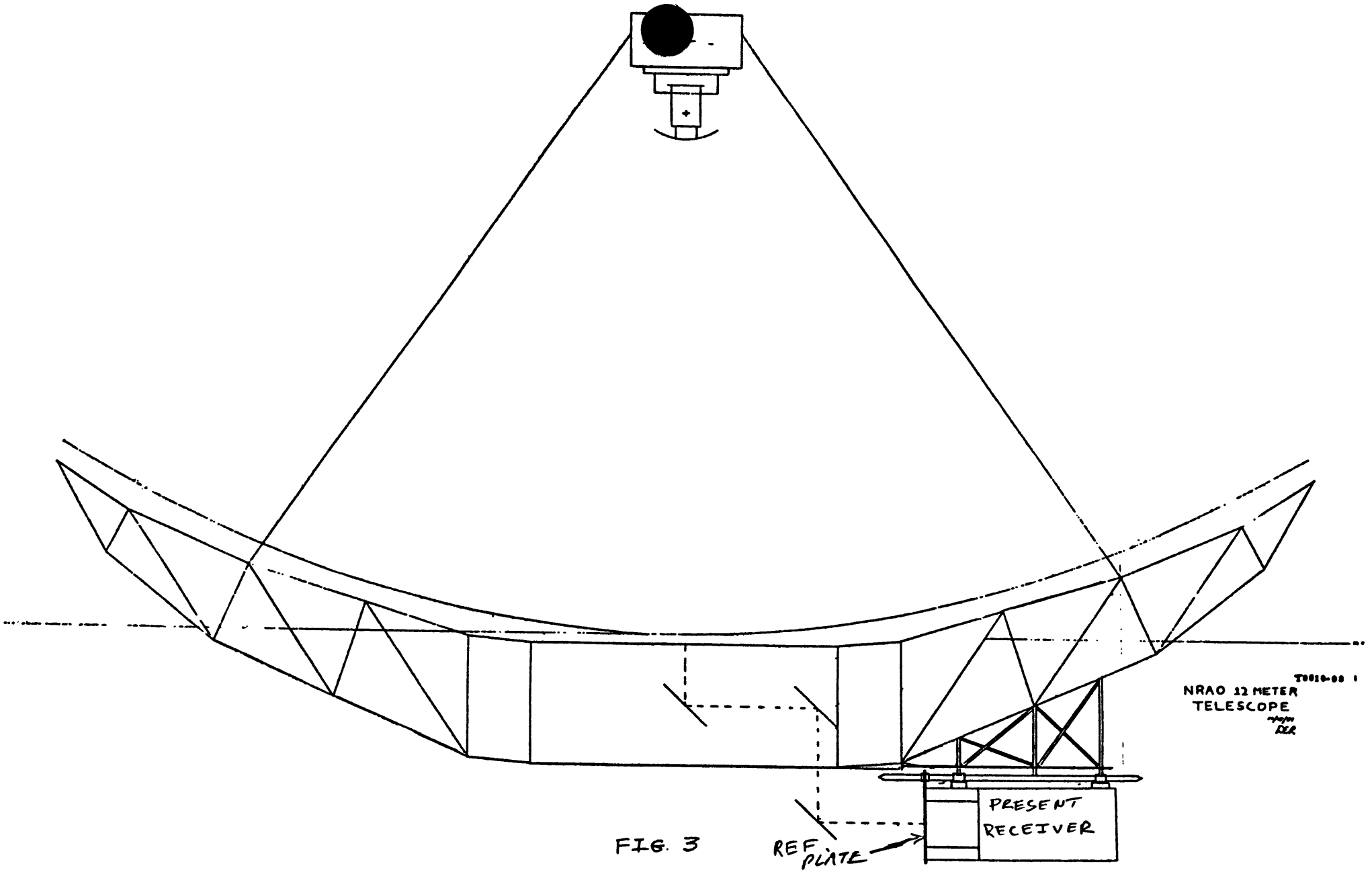

T0010-08 1
NRAO 12 METER
TELESCOPE
PRESENT
RECEIVER
REF
PLATE

FIG. 3

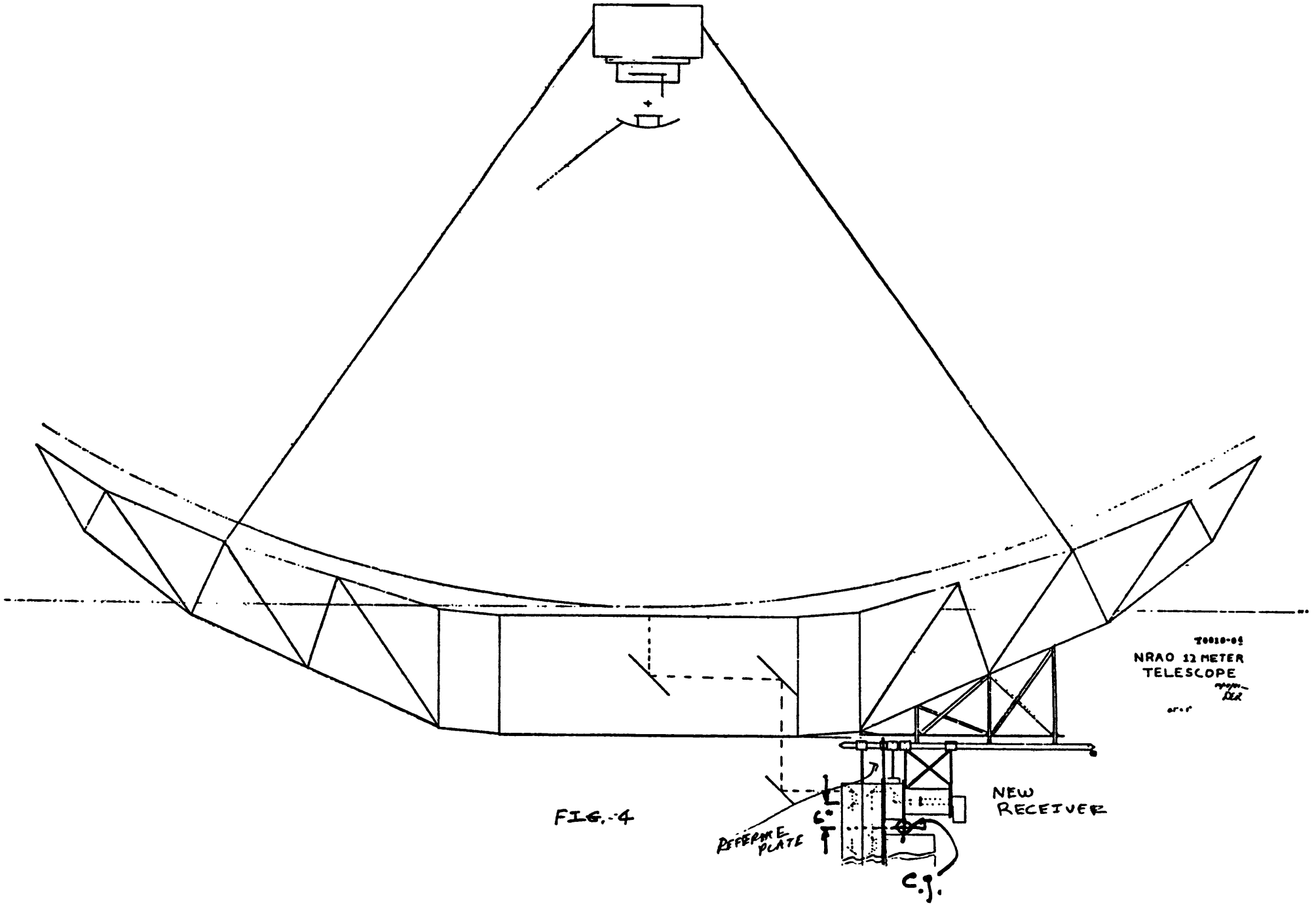
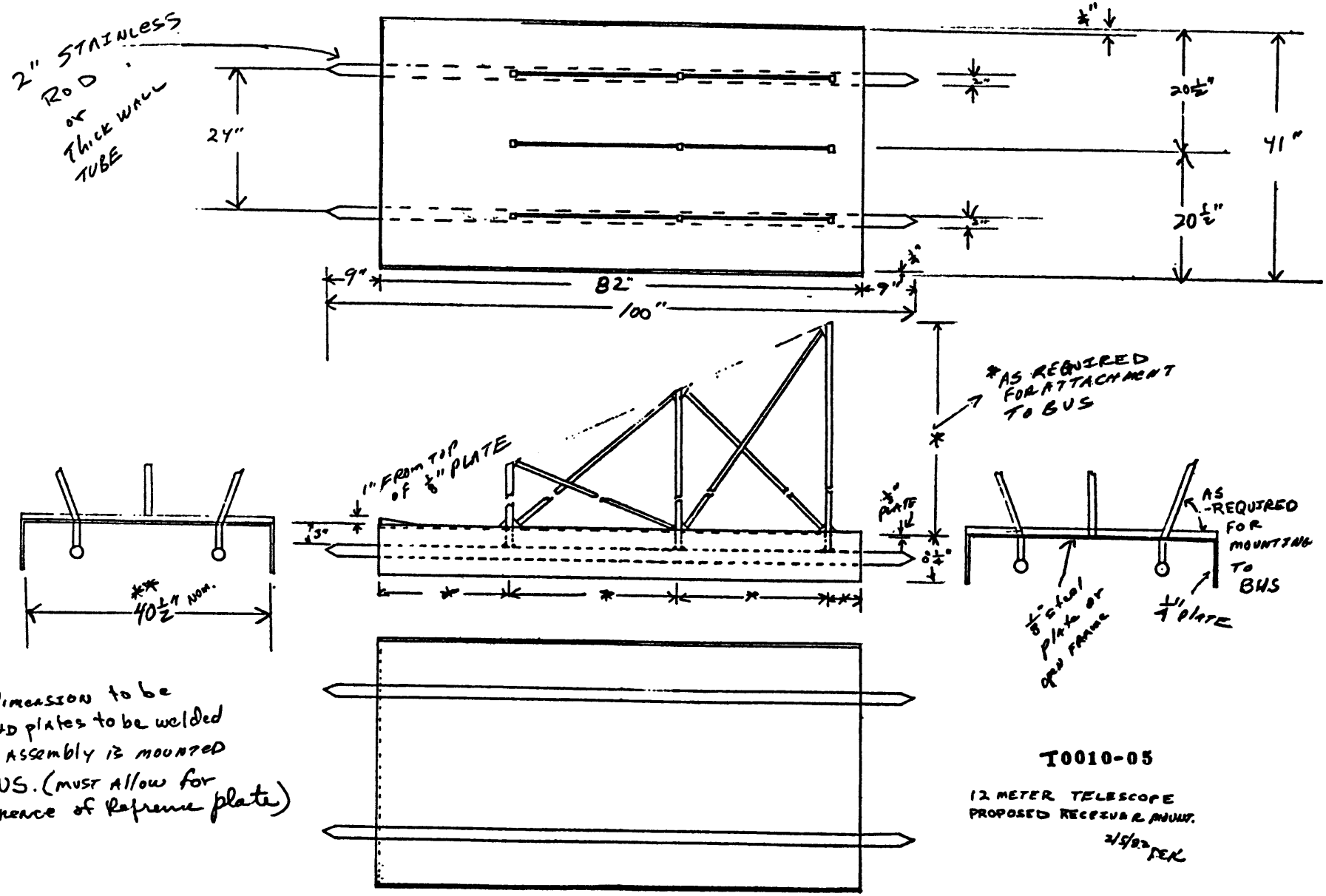


FIG.-4

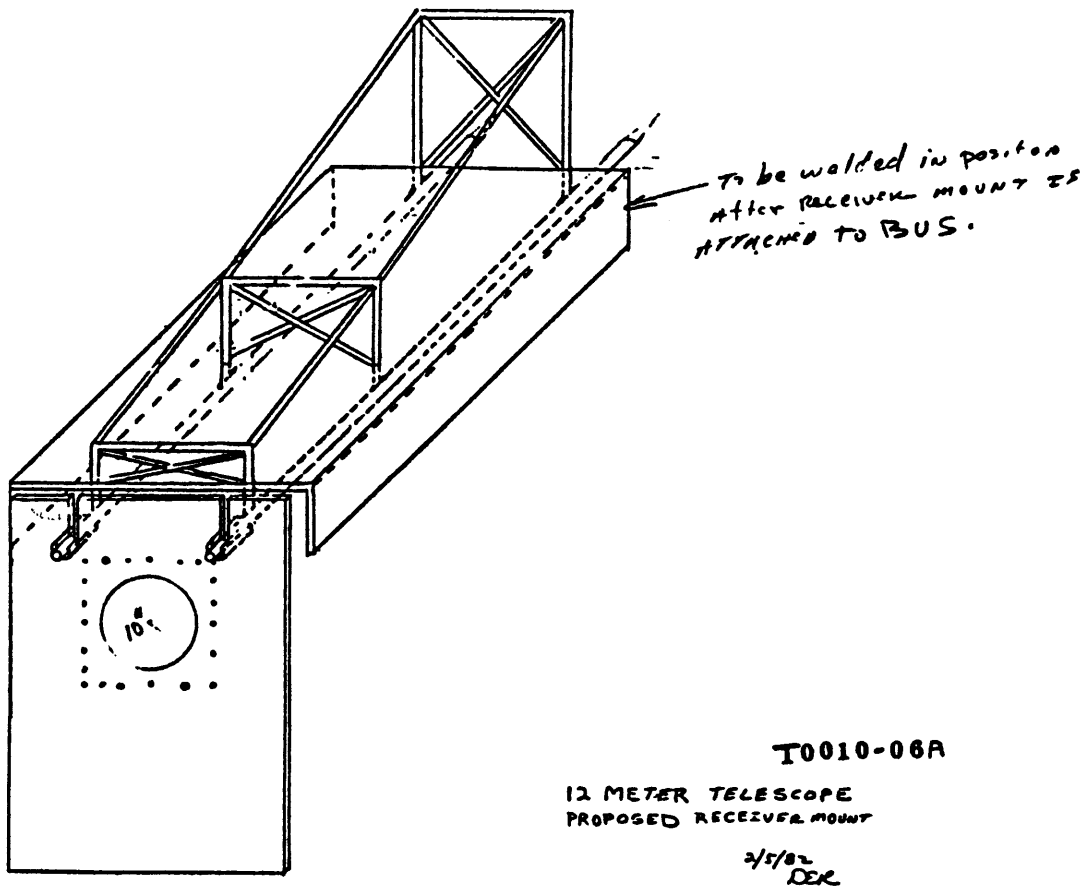


** This dimension to be set AND plates to be welded after assembly is MOUNTED To BUS. (MUST Allow for clearance of Reference plate)

T0010-05

12 METER TELESCOPE
PROPOSED RECEIVER MOUNT.
2/5/02 TEK

FIG. 5



T0010-06A

12 METER TELESCOPE
PROPOSED RECEIVER MOUNT

3/5/82
DCR

FIG.-6A

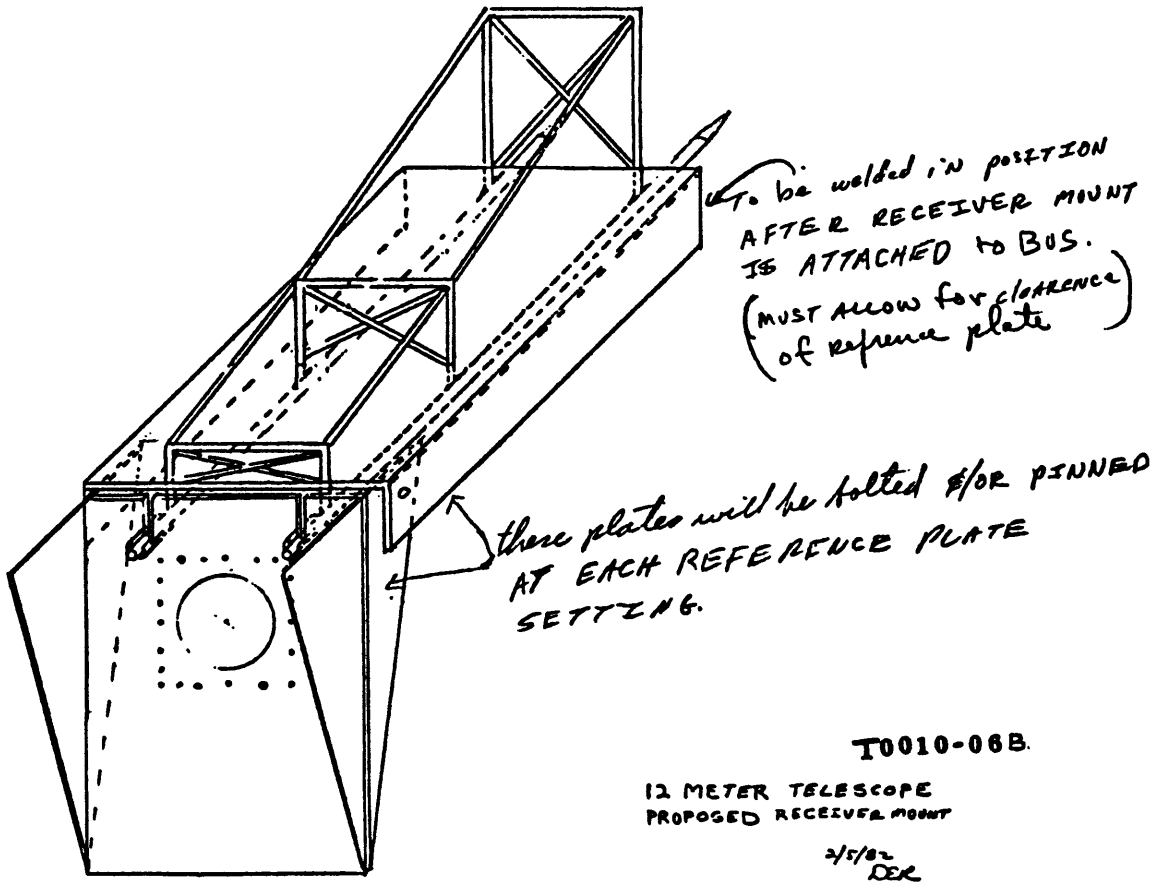
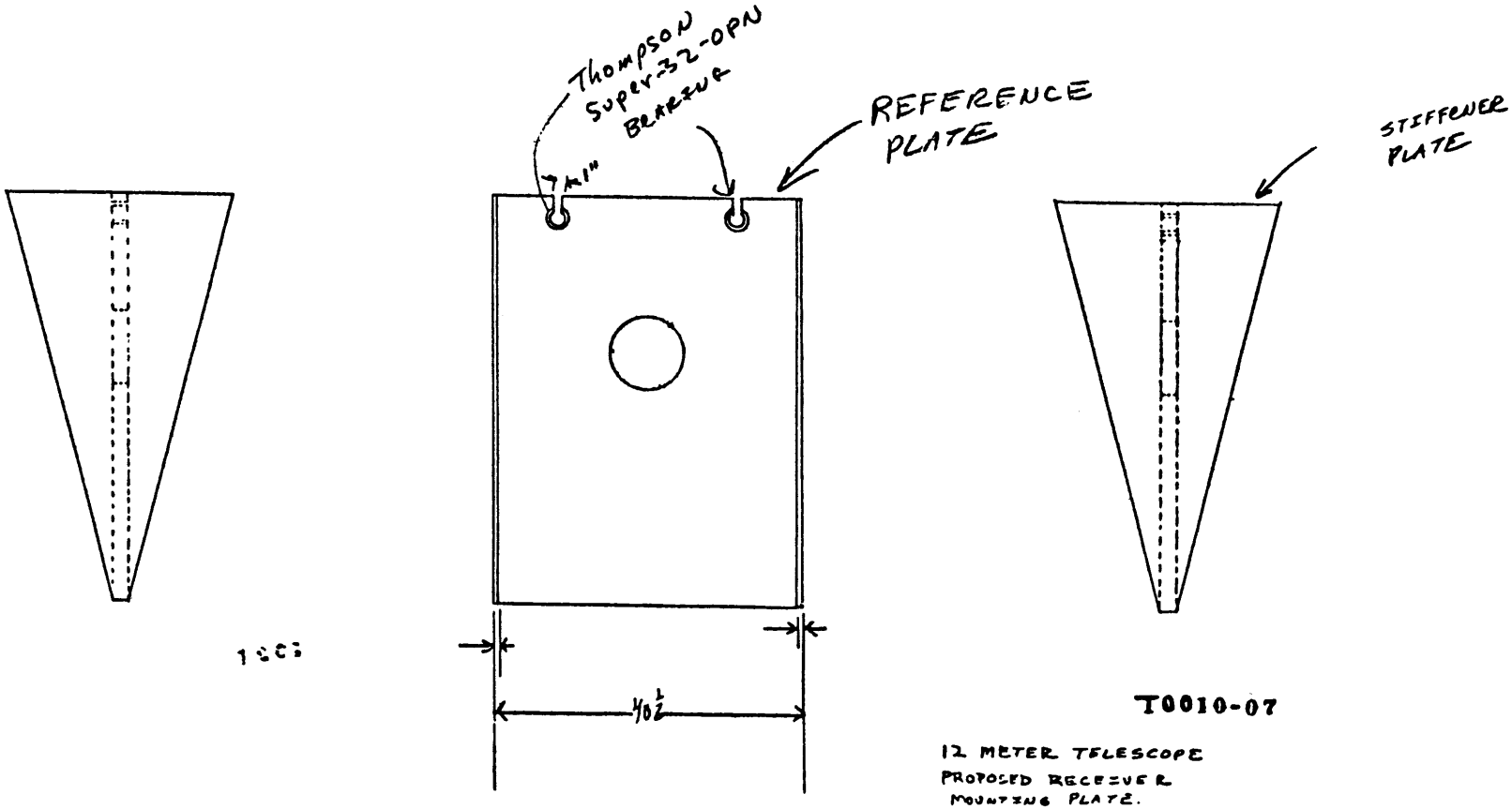

T. be welded in position
AFTER RECEIVER MOUNT
IS ATTACHED to BUS.
(MUST ALLOW for clearance
of reference plate)
these plates will be bolted &/OR PINNED
AT EACH REFERENCE PLATE
SETTING.
T0010-06B.
12 METER TELESCOPE
PROPOSED RECEIVER MOUNT
2/5/82
DER

FIG. 6B

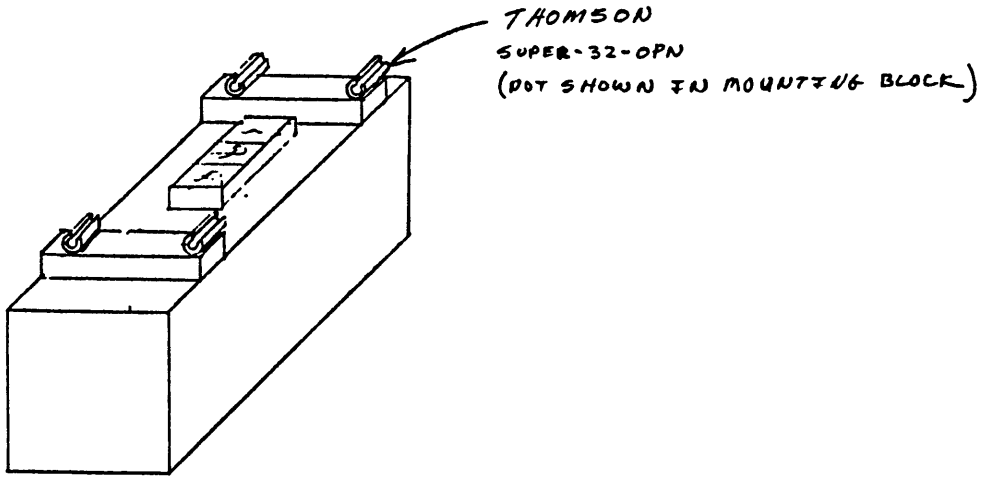


T0010-07

12 METER TELESCOPE
PROPOSED RECEIVER
MOUNTING PLATE.
(REFERENCE PLATE)

2/5/92
DER.

FIG. 7



T0010-08.

12 METER TELESCOPE
PRESENT DAY RECEIVER
(modified for proposed mount)

2/5/82
DER.

FIG. 8

JP Feb 82

(1)

RECEIVER STABILITY

1) FEED AXIAL FOCUS

$$\frac{G}{G_0} \simeq 1 - \frac{\beta^2}{18} \qquad [\beta = \text{phase error}]$$

$$\beta = 2\pi\left(\frac{\epsilon}{\lambda}\right)(1 - \cos\theta)$$

$$\theta_s = 2.1^\circ$$

Say gain must be constant to $\pm 1\%$.

$$\frac{\beta^2}{18} \leq 0.01$$

$$\beta \leq 0.424$$

$$\frac{\epsilon}{\lambda} \leq \frac{0.424}{2\pi(1-\cos\theta)} = 104 \text{ (Cassegrain)}$$

So at $\lambda = 1$ mm, ϵ can be as high as 104 mm. ie extremely insensitive.

Specify ~~axially~~ axial stability as

$$\boxed{\pm 5 \text{ mm} - \text{Zenith to Horizon}}$$

2) FEED LATERAL MOTION.

PLATE SCALE = 1.34 arc sec / mm

To keep pointing errors $< \frac{1}{10}$ BW

at $\lambda = 1$ mm we should keep movement

of feed $< \pm 2$ mm

± 2 mm FROM ZENITH TO HORIZON

Note: This specification is in "the nice to have" category. Any gravitational deformations may be taken out with the pointing constants. In any case I think we should keep these deformations $< \pm 5$ mm.

3) RECEIVER ANGULAR STABILITY

The ~~rec~~ receiver should be mounted or the optical axis to within ± 5 mm, should be parallel with the optical axis to ± 1° and should be stable to better than ± 0.15°.