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SC-DR-65-473

RESULTS OF TX-61 WEAPON TEST 100-10

(Title Unclassified)

AEC ATOMIC WEAPON DATA SIGMA 3

F. W. Millikin and R. D. Lindsey, 1512 Sandia Laboratory, Albuquerque

RS 3410/474

INVENTORIED

MAR 1 1966

3428-3

Approved by: D. M. Olson
D. M. Olson, 1510

October 1965

ABSTRACT (U)

This report supplements SC-DR-64-1654, Test Plan for TX-61 Weapon Test 100-10, with the test results of the ballistic drop. The unit performed satisfactorily.

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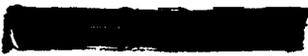
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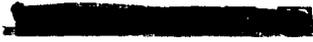


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RESULTS OF TX-61 WEAPON
TEST 100-10

Introduction

Weapon Test 100-10 was a ballistic drop designed to check the stability of the unit with the XMC1951 spin rocket and canted fins. A parachute was deployed before impact in an attempt to recover the hardware for reuse. Table I summarizes the delivery conditions for Test 100-10.

TABLE I

Date	Feb. 18, 1965
Carrier	F-4B/363
Release altitude (ft msl)	58,000
Release speed (Mach)	1.784
Release attitude	4° down

Test Objectives

The purposes of this test were:

1. To determine trajectory.
2. To determine the stability of the unit during free fall, especially with regard to aerodynamic coupling, with spin rockets and with the fins canted for clockwise rotation.

Summary

The unit appeared to be stable. It had a 45-minute fin cant and one XMC1951 spin generator. It reached a roll rate of 4.9 rps at 3 seconds.

The timer setting for deployment of a recovery parachute was a second or two long. Therefore, although the parachute deployed before impact, the unit was still dropping at over 400 feet per second when it impacted the ground target. Consequently, the hardware was severely damaged.

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Description of Test Vehicle

Mechanical

Unit 100-10 was described in SC-DR-64-1654. The center case was the steel ballistic type shown in Figure 1. An additional weight was added at its forward end to simulate proper weight distribution. The preflight section was of the latest design and included an XMC1951 spin rocket. Table II summarizes the physical characteristics of Unit 100-10.

TABLE II

Length (in.)	141.0
Diameter (in.)	12.75
Weight (lb)	590.0
CG (station)	60.3
Roll MI (lb-in. ²)	14,568.
Pitch MI (lb-in. ²)	630,148.
Yaw MI (lb-in. ²)	632,039.

Electrical

The electrical system for Unit 100-10 (Figure 2) was as described in SC-DR-64-1654. The MC1356 timer setting (time of parachute deployment) was 58 seconds.

Instrumentation

The instrumentation was as described in SC-DR-64-1654. Data were obtained on ejection velocity, roll rate, and stability of the unit, longitudinal acceleration, and operation of the electrical system.

Test Results

The special test pulse initiator used to fire the XMC1951 spin generator was set to fire at 0.025 second after release; it fired at 0.026 second. The XMC1951 operated normally, and the unit attained a roll rate of 4.8 rps in 3 seconds. The unit was stable, and the trajectory was good. A maximum roll rate of 6.3 rps was reached when the parachute was deployed at 58.9 seconds after release. The timer had been set to fire the deployment system at 58 seconds. The parachute operated satisfactorily, but the unit had not slowed down sufficiently to survive impact. The unit impacted the earth target at 62.03 seconds after release, with a velocity of over 400 fps. The unit suffered extensive damage, and none of the hardware

[REDACTED]

or components could be reused.

A summary of trajectory data for this test is shown in Table III. Graphs of trajectory, speed, dynamic pressure, and roll rate for the unit are shown in Figures 3 through 11.

TABLE III

Trajectory Data on Test 100-10

Release altitude (ft msl)	58,000
Release attitude	4° down
Release speed (Mach)	1.784
Ejection velocity (fps)	9.5
Time of chute deployment (sec)	59
Velocity of chute deployment (fps)	1595
Q at chute deployment (lb/ft ²)	2328
Time of fall (sec)	62.034
Terminal velocity (fps)	413
Range (ft)	83,347
Trajectory length (ft)	103,062
Time of spin rocket fire setting (sec)	0.025
Roll rate at 3 seconds (rps)	4.8
Maximum roll rate (rps)	6.3
Roll rate at chute deployment (rps)	6.3

& DIAS T(MMC) & S(MMC) DATUM(ORIENT)

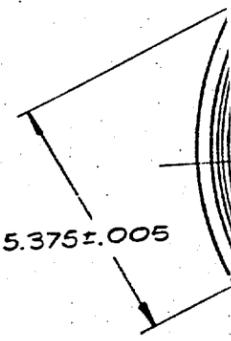
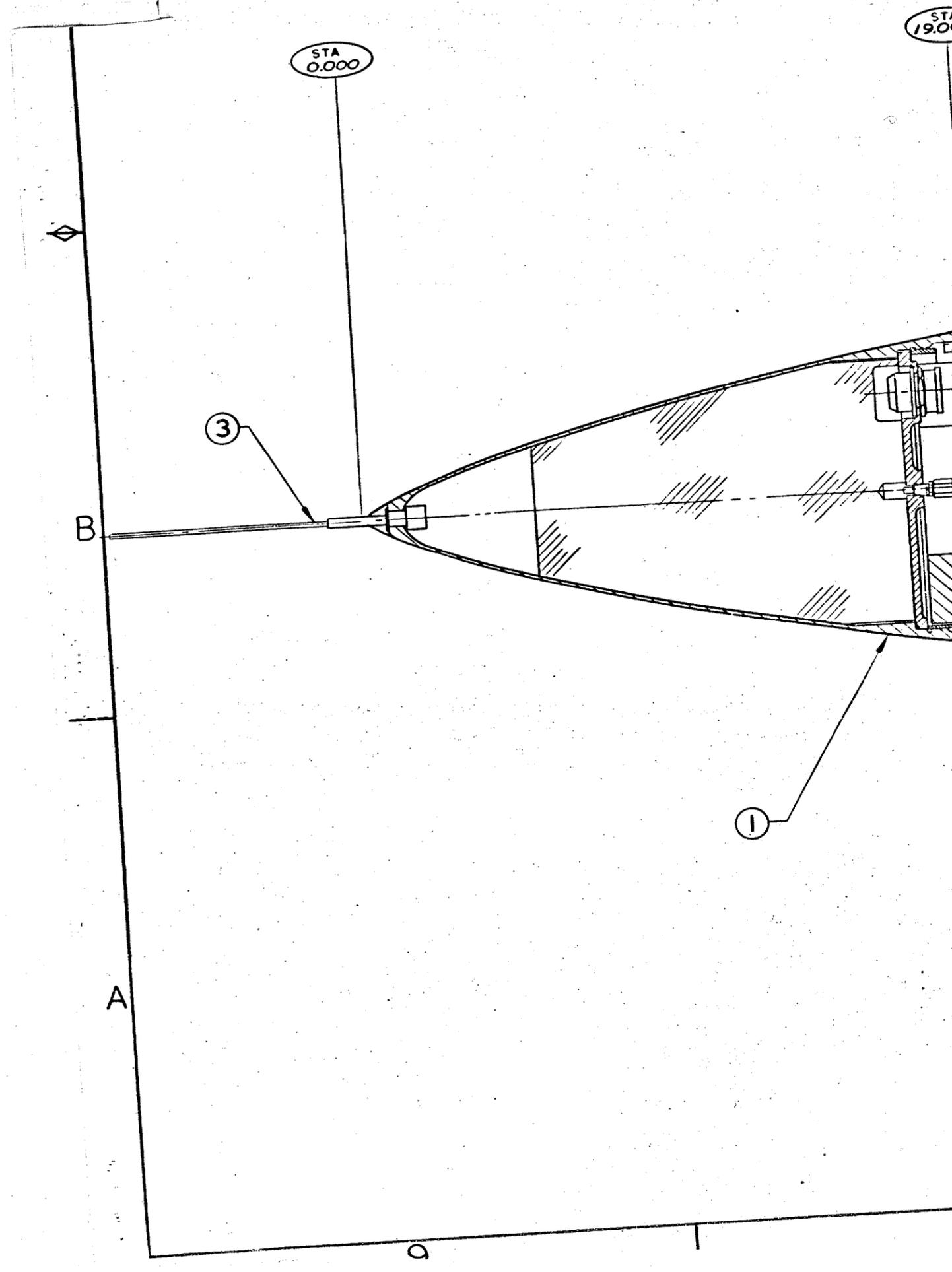


TABLE OF COORDINATES		
HOLE NO.	X TP	Y TP
1	2.687	4.655
2	4.655	2.687
3	5.375	0.000
4	0.000	5.375



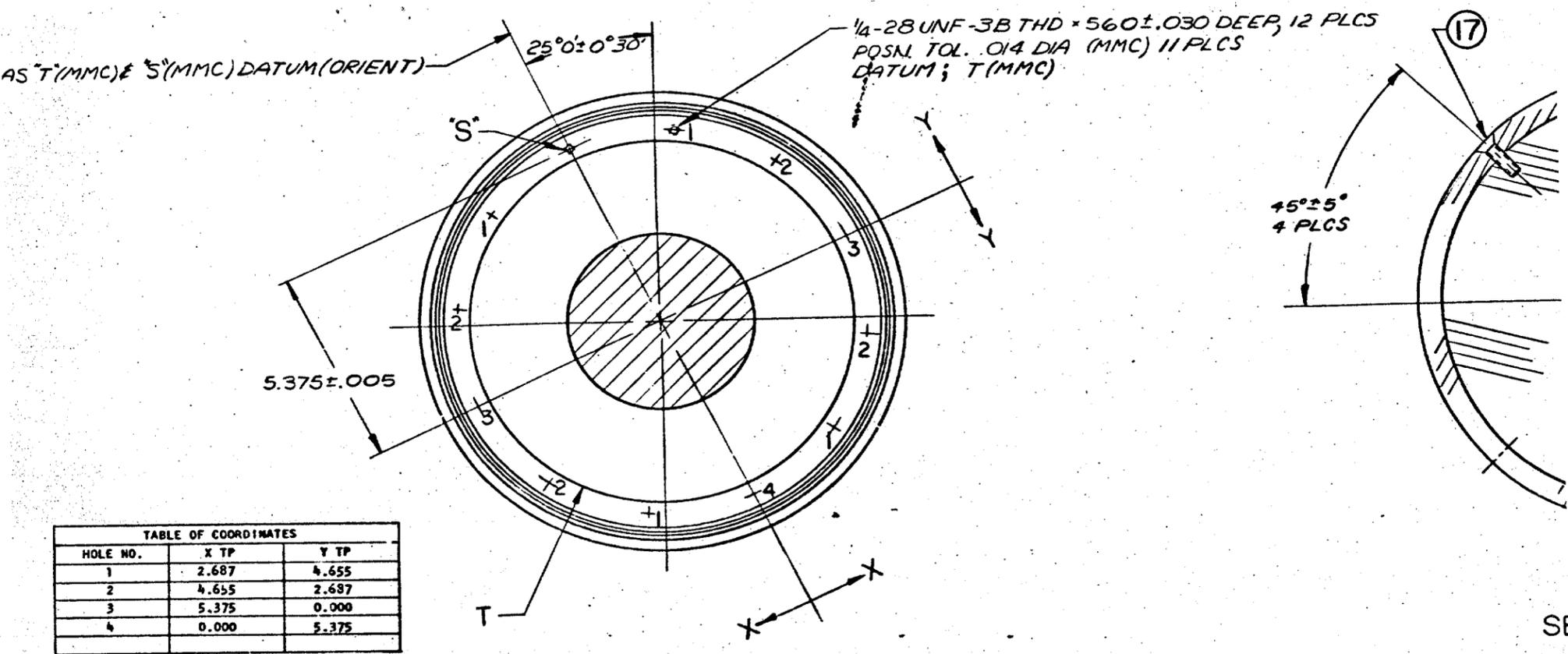
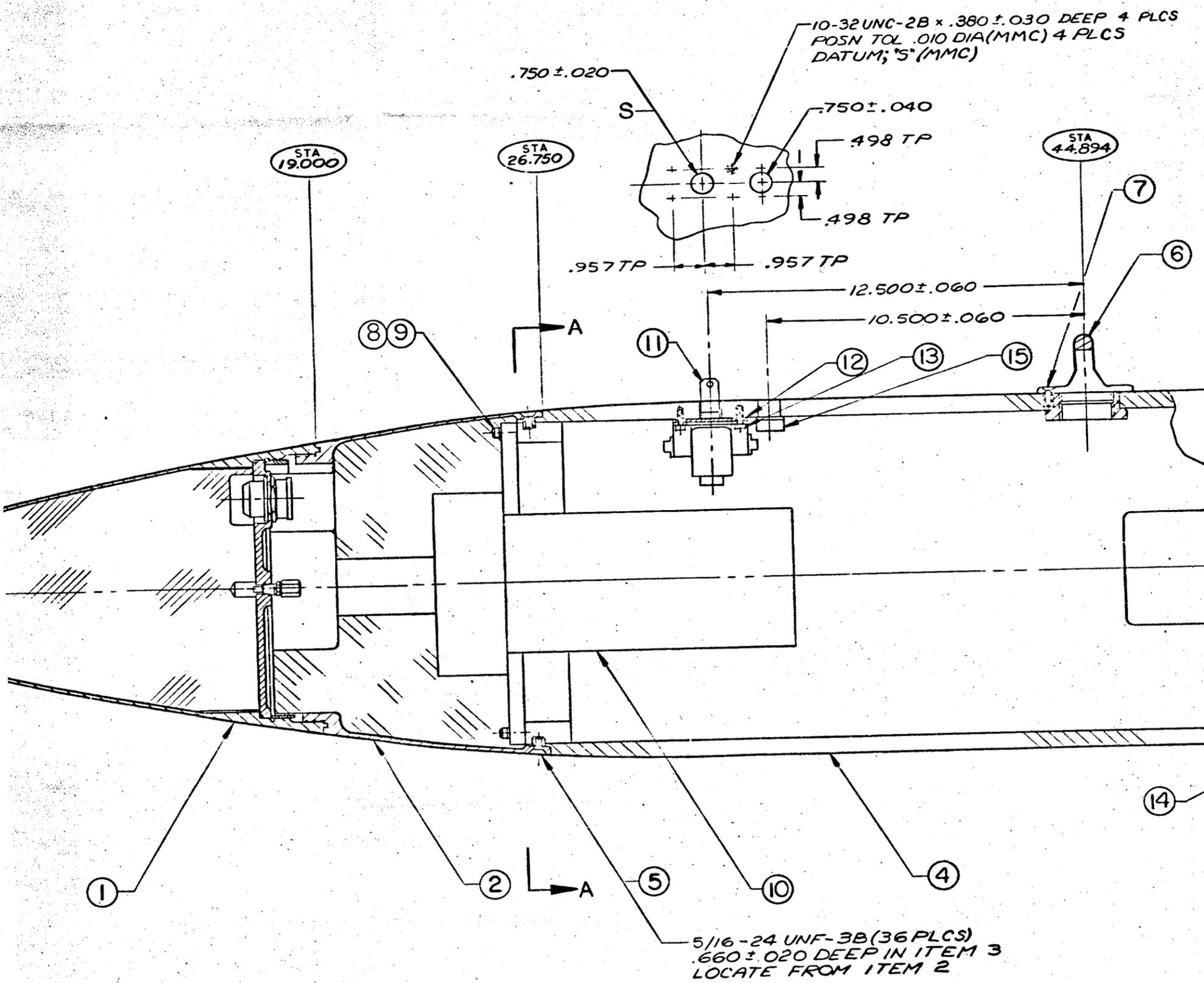


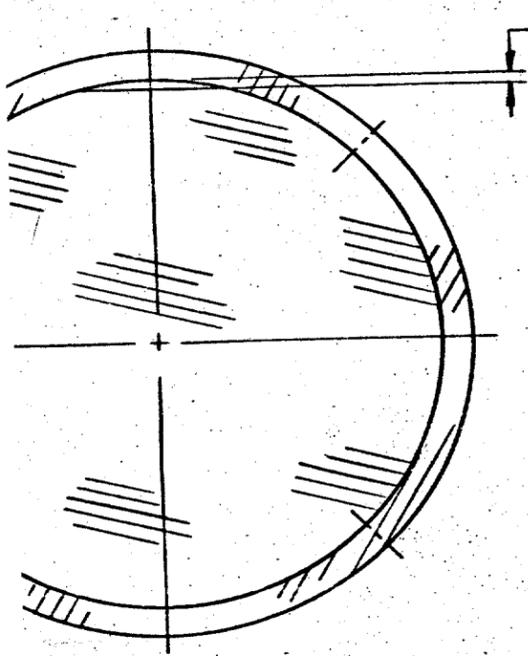
TABLE OF COORDINATES

HOLE NO.	X TP	Y TP
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2	4.655	2.687
3	5.375	0.000
4	0.000	5.375

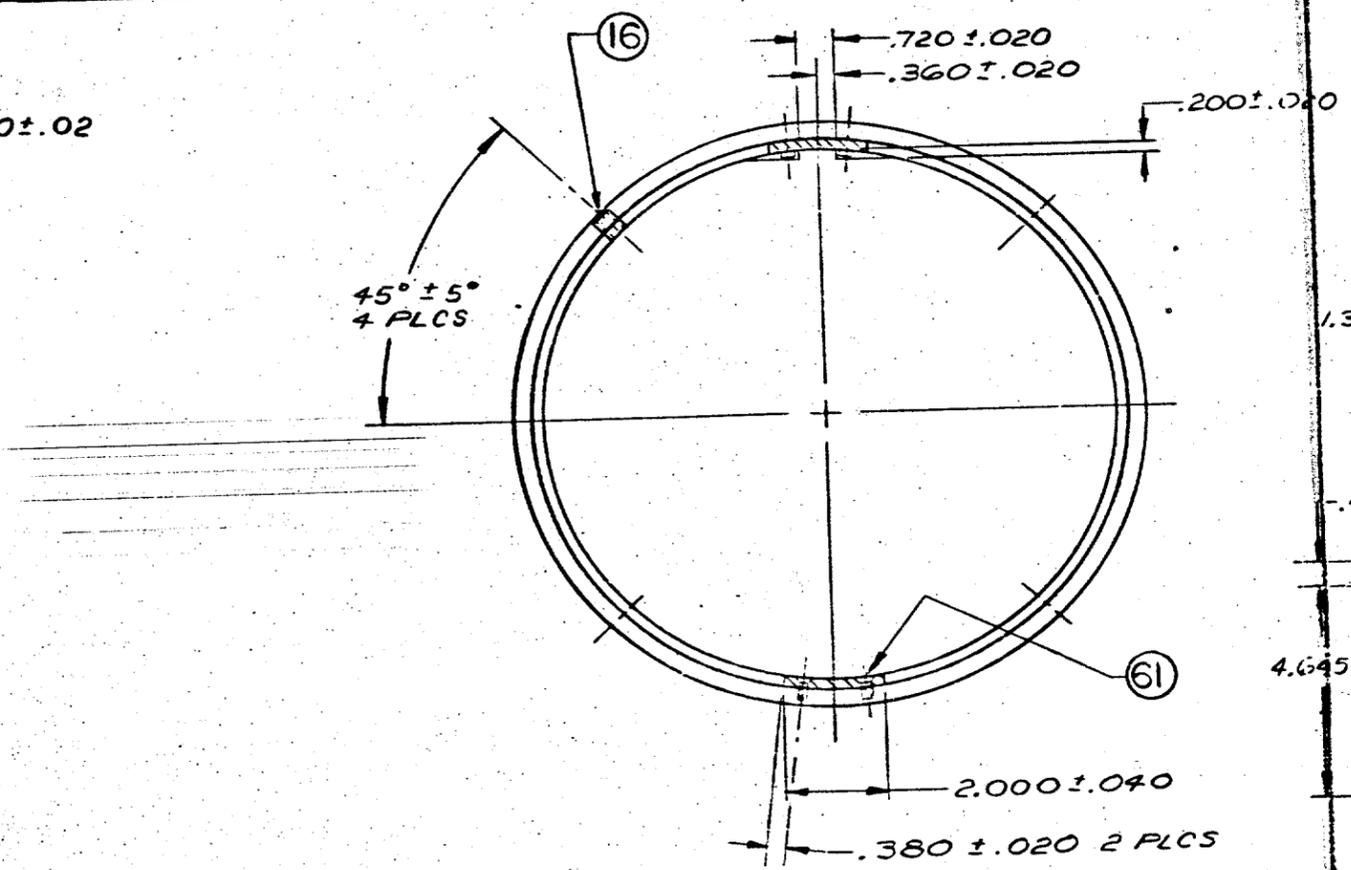
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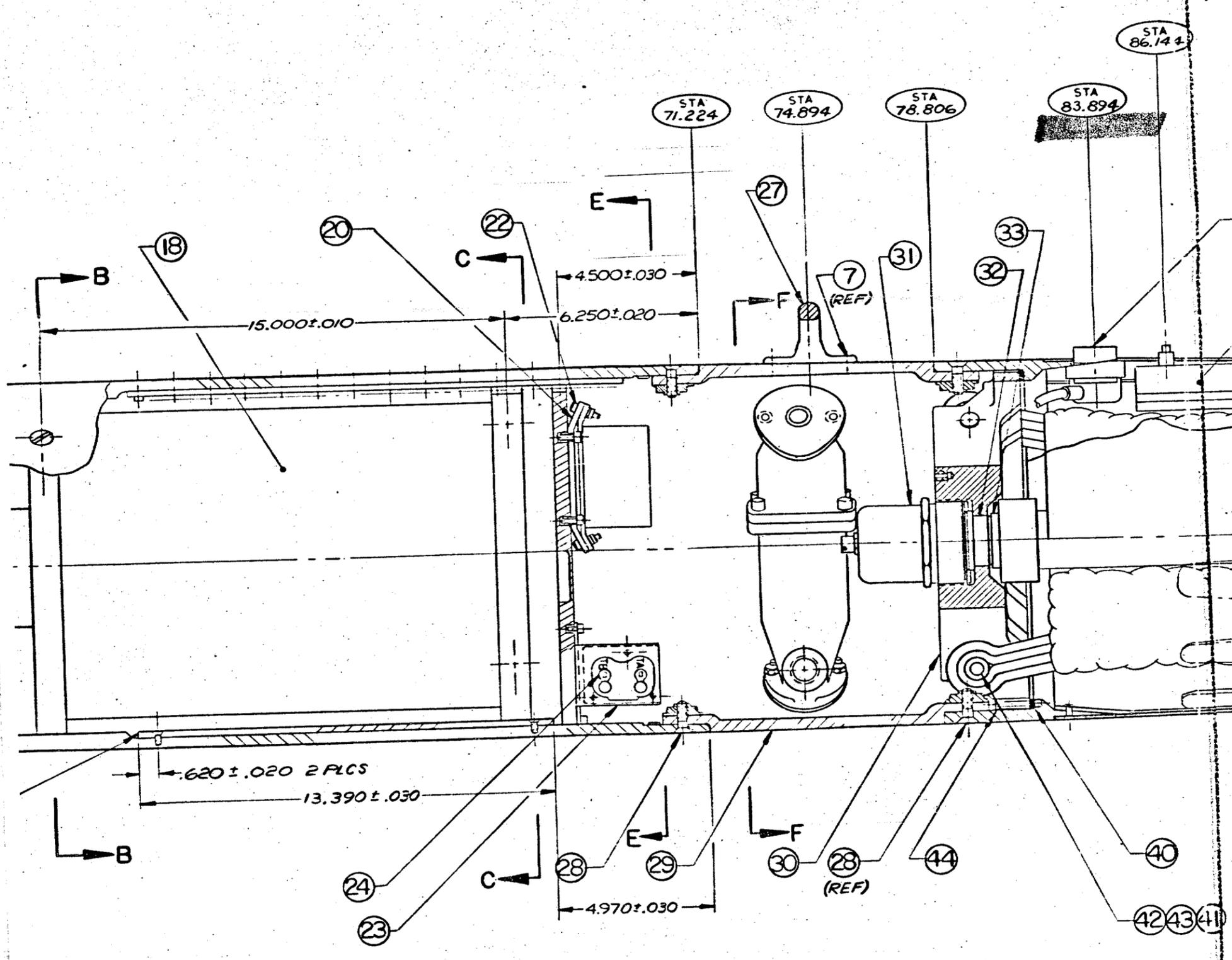
DR. N79512
 ISS. 1 SHT. 1
 FR. 3 OF 3
 CLASS UNC.



SECTION B-B



SECTION C-C



1.3357
 (38)
 P-
 .4857
 4.645 TP

STA 86.144

Ø DIAS T(MMC) & S(MMC) DATUM (ORIENT)

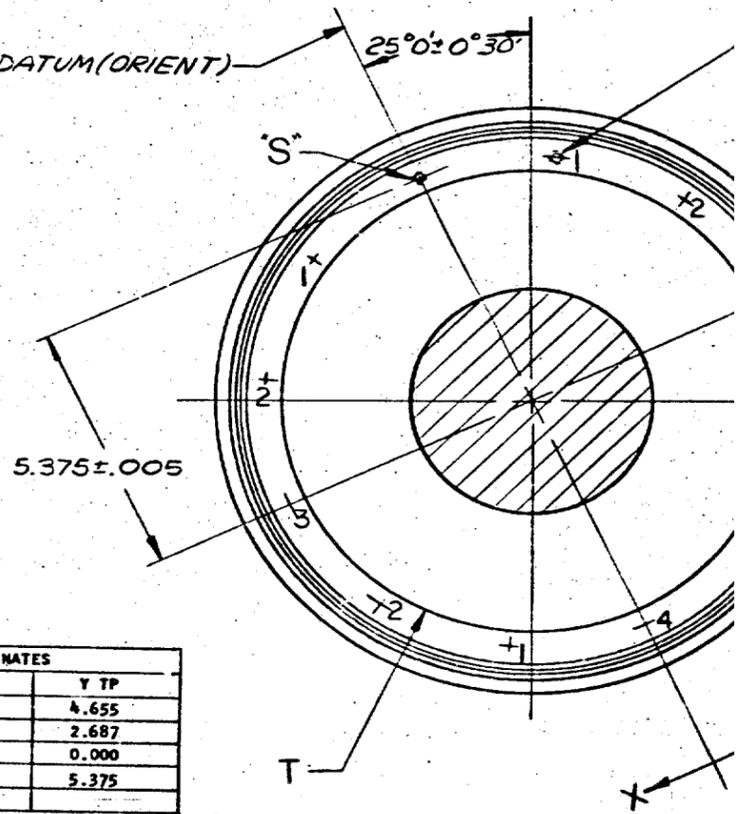
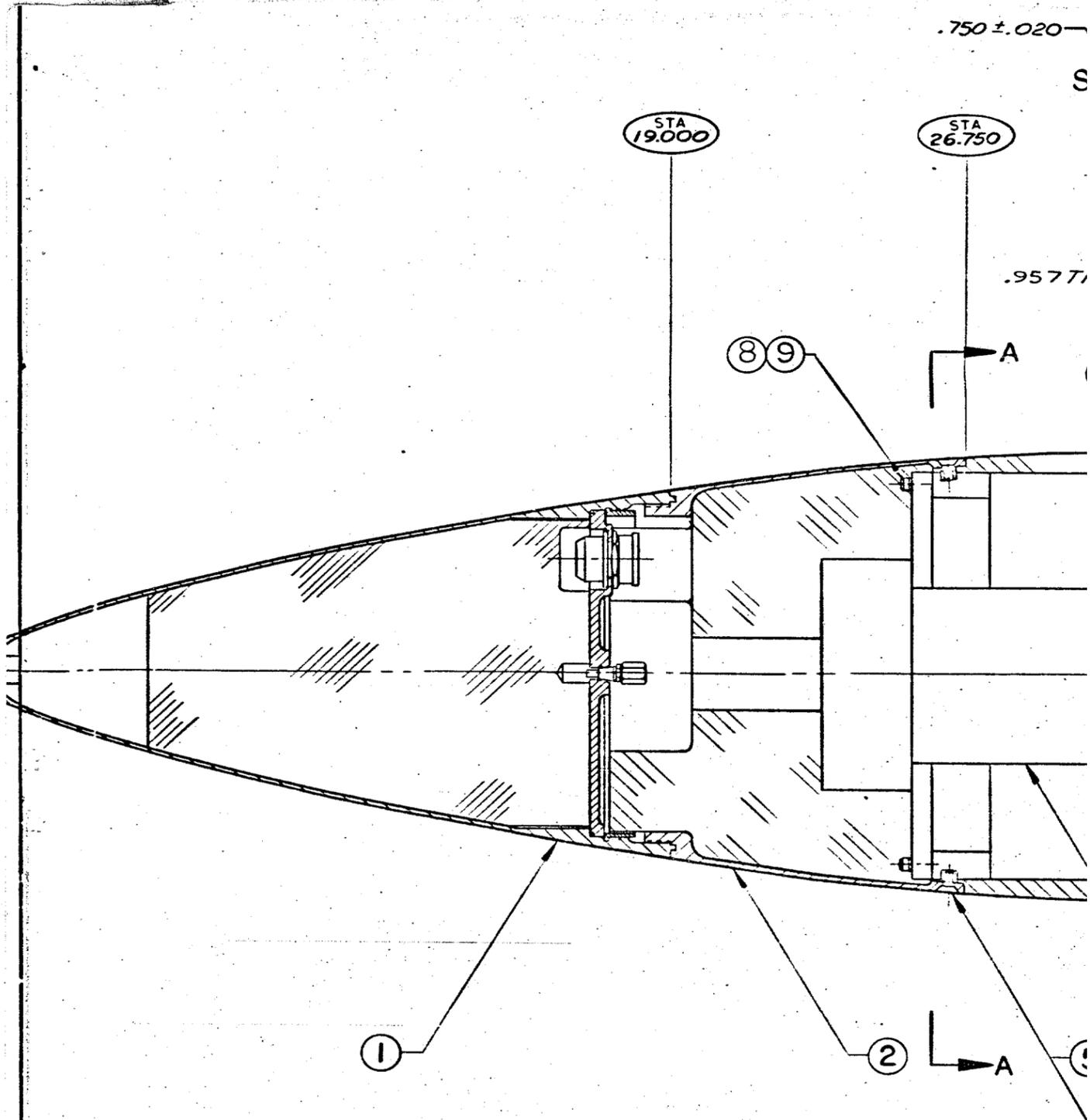
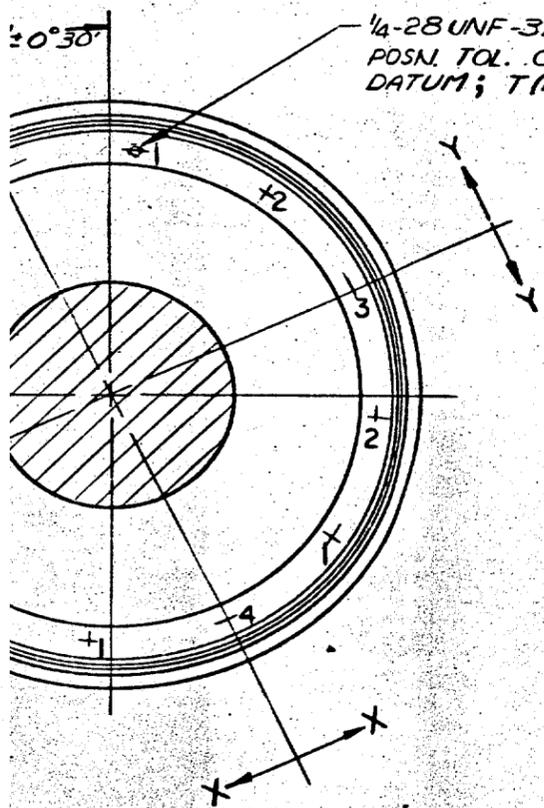


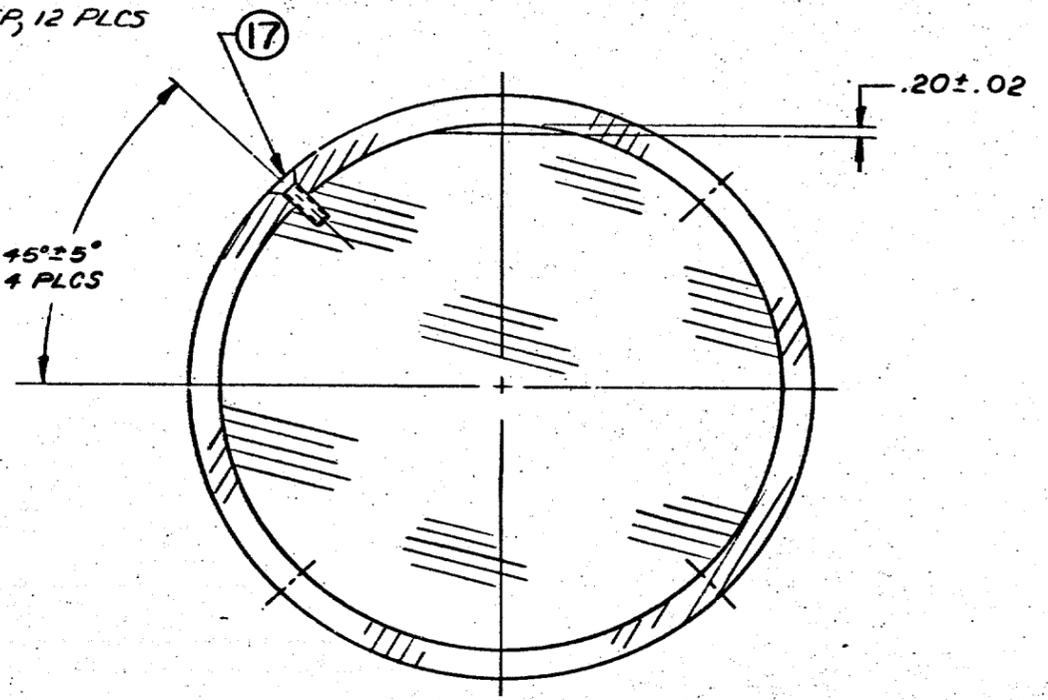
TABLE OF COORDINATES		
HOLE NO.	X TP	Y TP
1	2.687	4.655
2	4.655	2.687
3	5.375	0.000
4	0.000	5.375

SECTION A-A



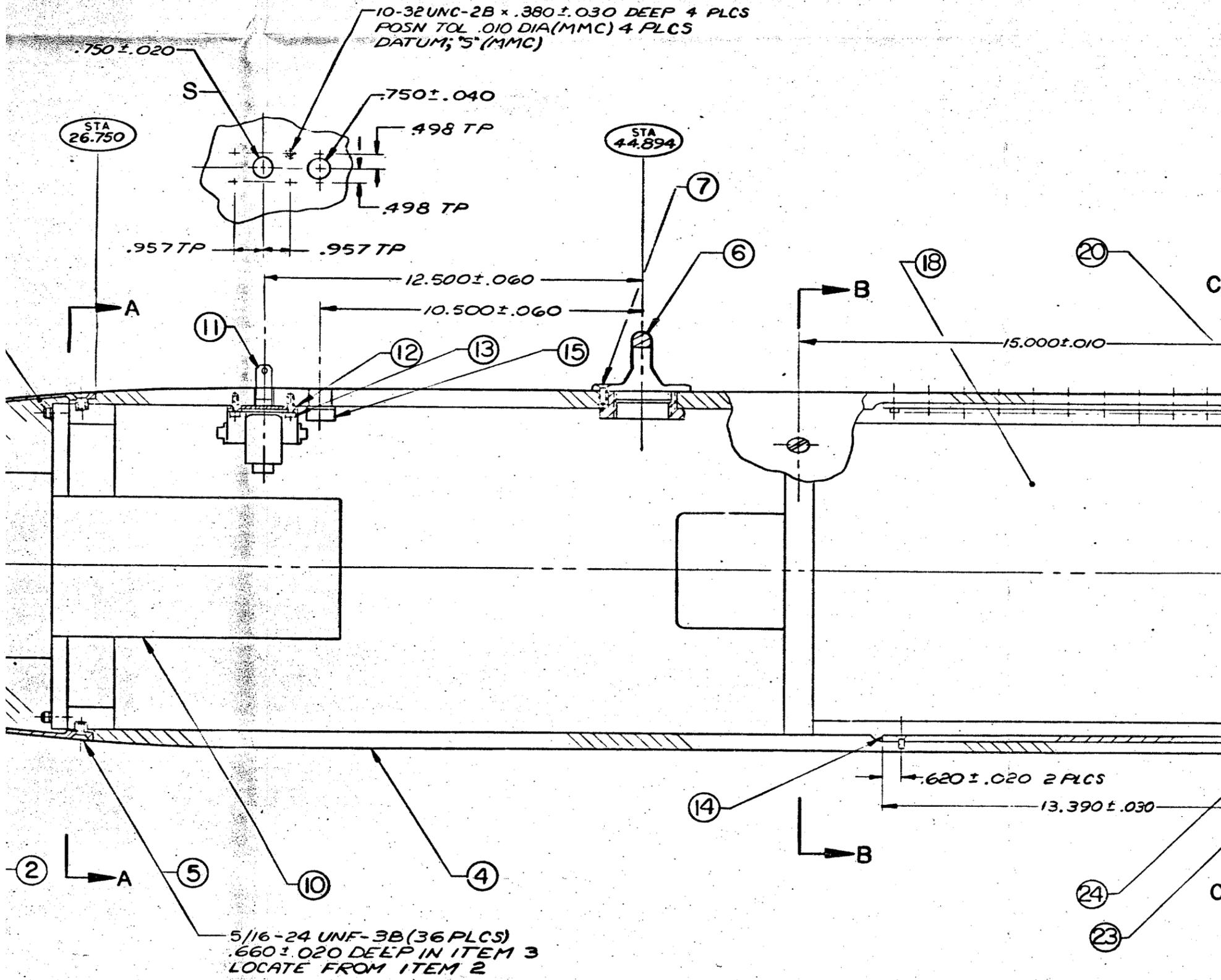


1/4-28 UNF-3B THD $\times 560 \pm .030$ DEEP, 12 PLCS
 POSN. TOL. .014 DIA (MMC) 11 PLCS
 DATUM; T (MMC)



SECTION B-B

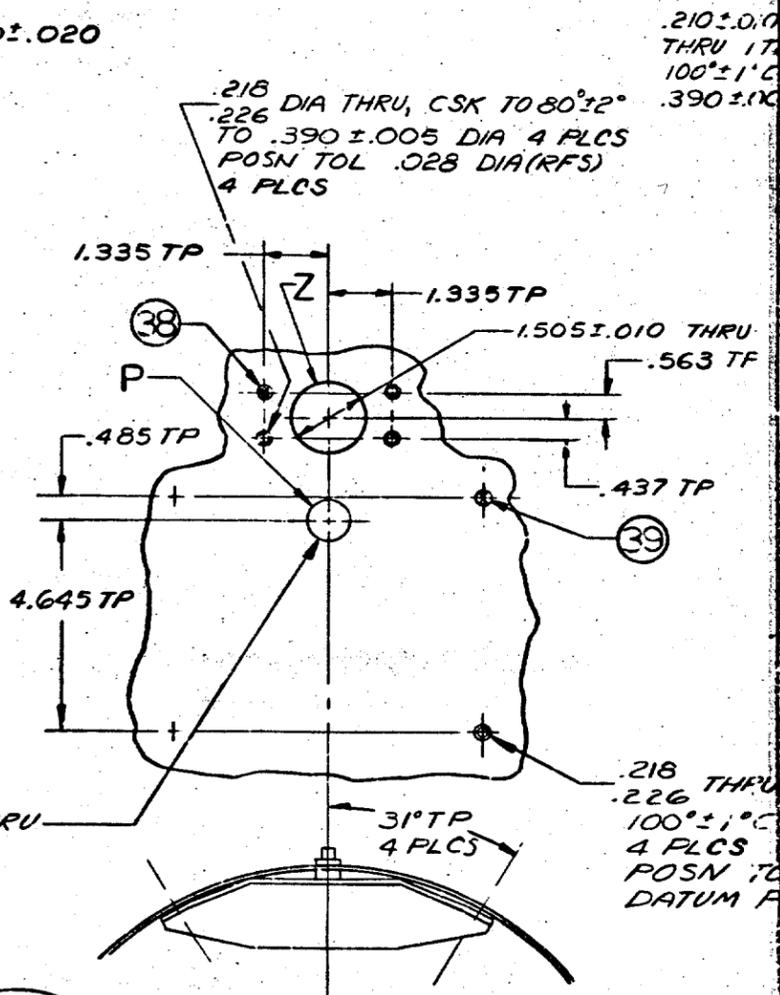
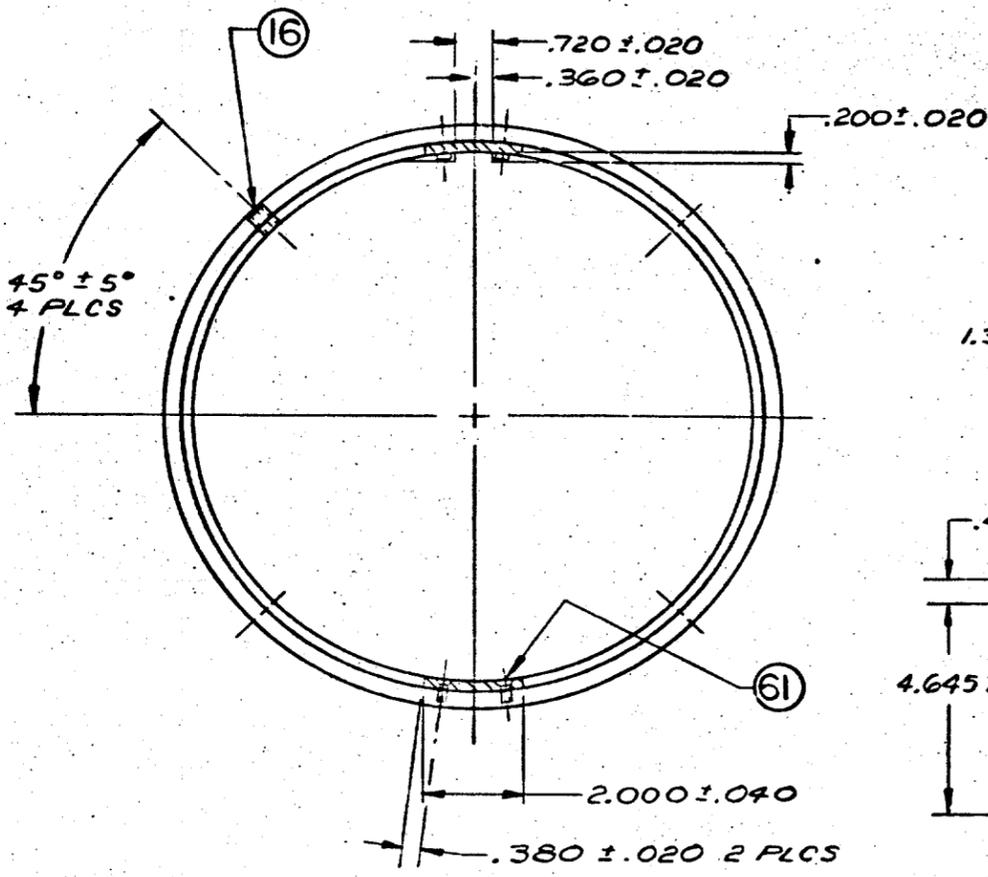
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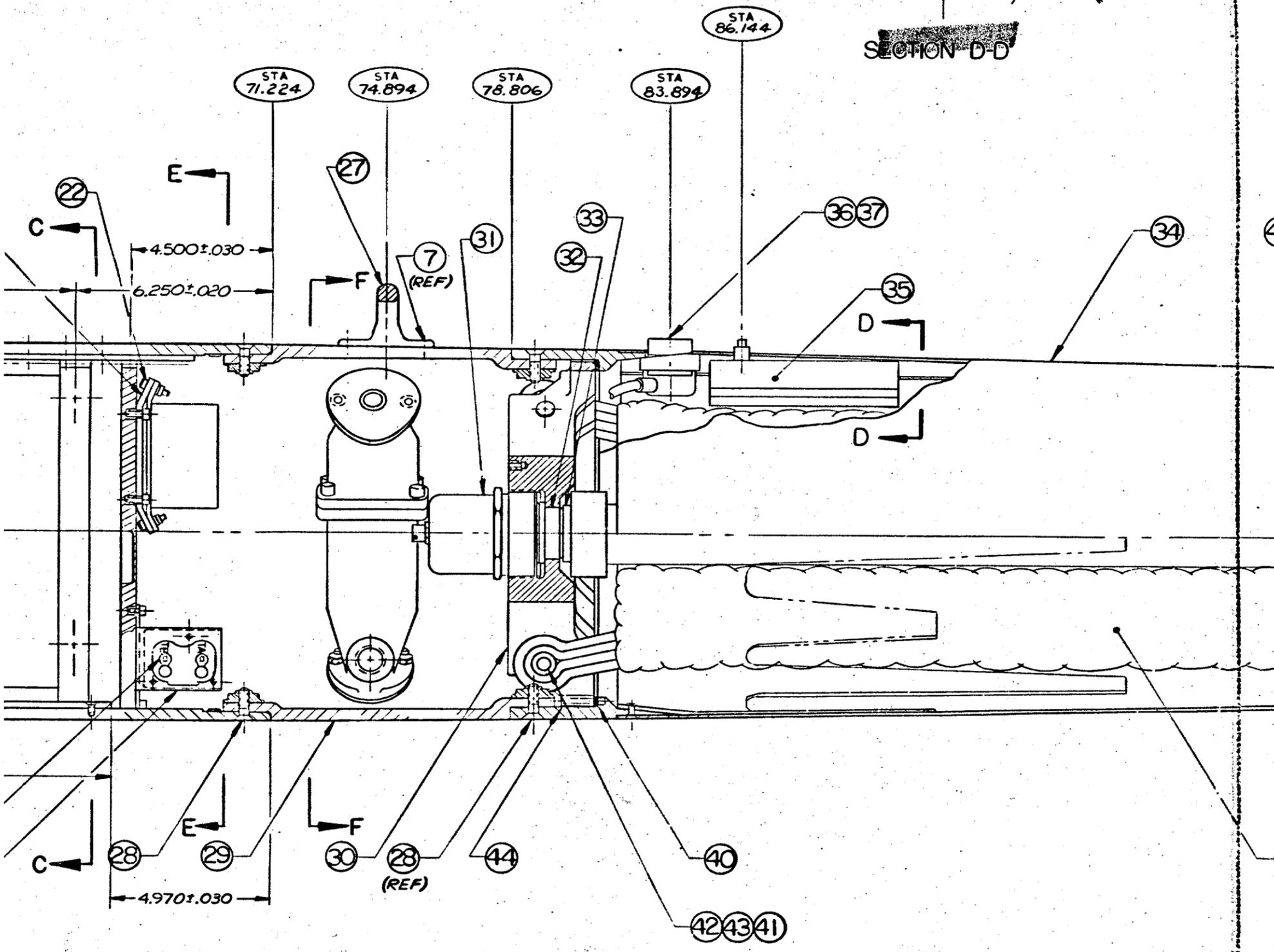
10-32 UNC-2B $\times .380 \pm .030$ DEEP 4 PLCS
 POSN TOL .010 DIA (MMC) 4 PLCS
 DATUM; 5 (MMC)

5/16-24 UNF-3B (36 PLCS)
 $.660 \pm .020$ DEEP IN ITEM 3
 LOCATE FROM ITEM 2

DR. N79512
 ISS. 1 SHT. 1
 FR. 2 OF 3
 CLASS UNC.



$.210 \pm .005$ DIA THRU ITEM #3
 $100^\circ \pm 1^\circ$ CSK TO
 $.390 \pm .005$ DIA



NOTES

1. MATERIAL FOR ITEM 26 TO BE STEEL PLATE, HIGH STRENGTH, LOW ALLOY (4130) PER MIL-S-18729, COND H, OR EQUIVALENT STEEL, YIELD STRENGTH 60,000 P.S.I.
2. ITEM 46(FIN) IS CANTED 45° FROM LONGITUDINAL CENTER LINE AS MODIFIED PER 160406.
3. FOR ELECTRICAL SCHEMATIC OF "100-9", SEE DRAWING NO. CRN 78752.

ISSUE		REVISIONS		PREPARED BY	DATE	CHKD	ENGR
NO.	ZONE	DESCRIPTION					
1		Z T DAVIS 4412-5	(E)		10-5-64		

NO.	QTY	DESCRIPTION	ISS	ZONE	ITEM
4		MS35192-27			61
	1	192169-00			60
	1	311932-00			59
	1	311816-00			58
	4	192165-00			57
	4	MS20392-7C-57			56
	4	MS35455-17			55
	1	192125-00			54
	1	186753-00			53
	1	180370-00			52
	1	180363-00			51
	8	180364-00			50
	32	NAS1216-4-8			49
	4	180397-00			48
	4	180396-00			47
	4	186730-00		3	46
	1	(AF)			45
	18	MS16997-37			44
	6	MS24665-285			43
	6	180380-00			42
	6	MS20392-7C-67			41
	6	192174-00			40
	4	AMS09-10R5			39
	4	MS35193-58			38
	1	N65384			37
	1	188923-00			36
	1	N60445			35
	1	180391-00			34
	1				33
	1	180361-00			32
	1	311784-00			31
	1	180372-00			30
	1	199030-00			29
	72	194092-00			28
	1	199629-00			27
	8	AMS07-1032R16			26
	7	MS35456-11			25
	1	311164-02			24
	1	N65327			23
	6	MS35456-13			22
	1	MS4857			21
	1	N65310			20
	1	N65313			19
	1	MS1444			18
	4	AMS09-616R18			17
	4	NAS1081-6D0N			16
	1				15
	1				14
	4	MS35210-17			13
	1	N65307			12
	1	310712-00			11
	1	N60447			10
	12	MS35456-25			9
	12	MS35338-25			8
	16	194079-00			7
	1	194059-00			6
	36	194091-00			5
	1	MS54835			4
	1				3
	1	194025-00			2
	1	194024-00			1

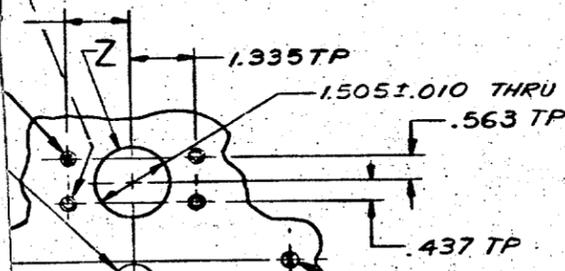
DR. NO. N79512
 ISS. / SHT. /
 FR. / OF 3
 CLASS UNC.

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1	1	513			TX-61
					FREE FALL (BTS)
					100-9
					MFG AGENCY APPROVALS
					MFG AGENCY NUMBER
DWG CLASSIFICATION LEVEL			PART CLASSIFICATION		SIZE DWG NUMBER
UNCLASSIFIED			UNCLASSIFIED		J N79512

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.218 DIA THRU, CSK TO $80^{\circ} \pm 2^{\circ}$
.226 TO $.390 \pm .005$ DIA 4 PLCS
POSN TOL $.028$ DIA (RFS)
4 PLCS

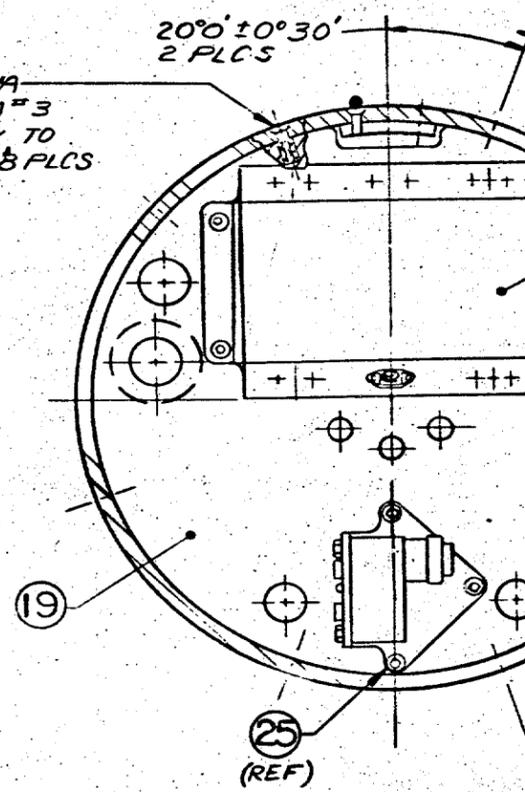


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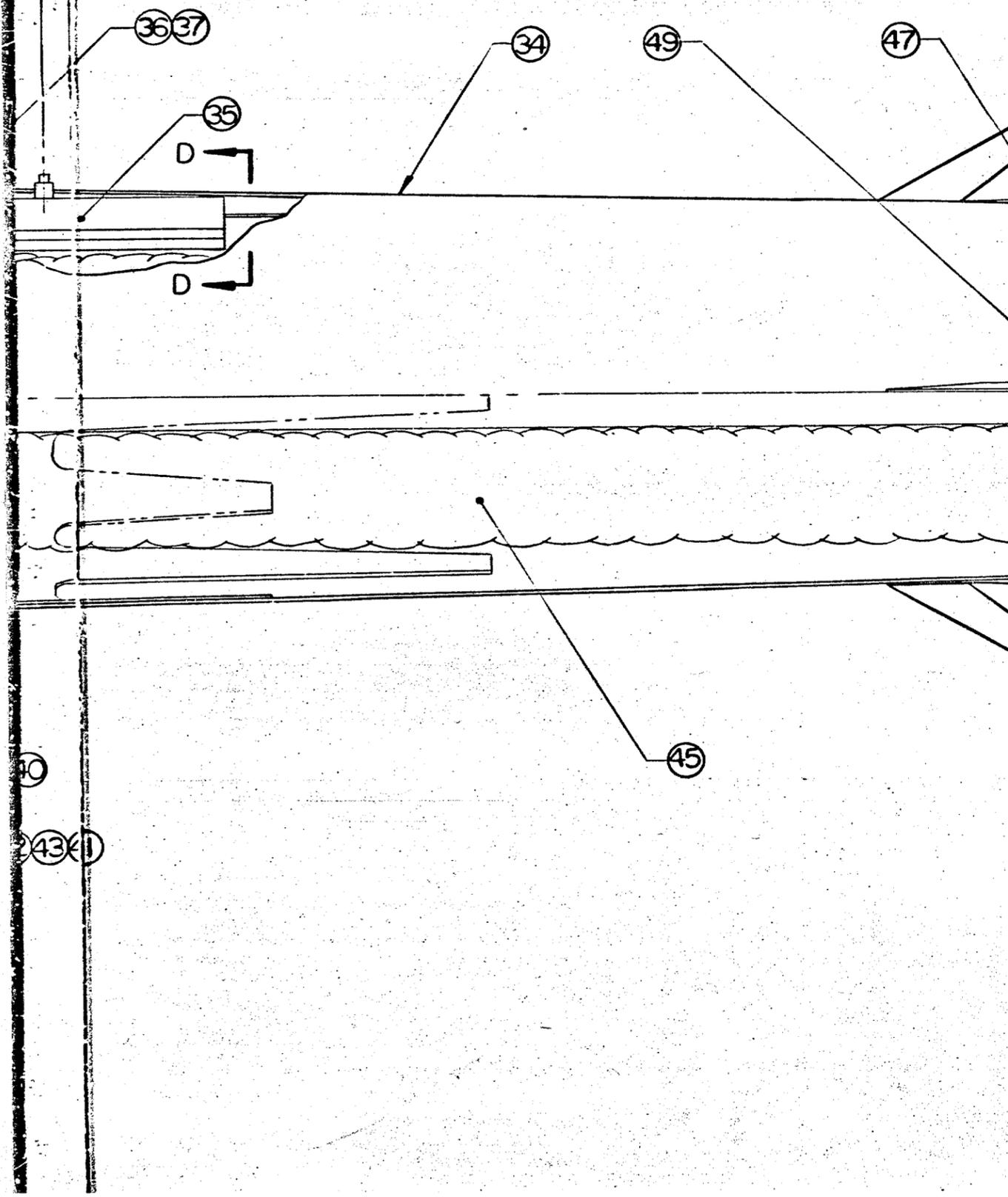
.218 THRU
.226 THRU
 $100^{\circ} \pm 1^{\circ}$ CSK TO $.390 \pm .005$ DIA
4 PLCS
POSN TOL $.014$ DIA (MMC) 4 PLCS
DATUM P (MMC)

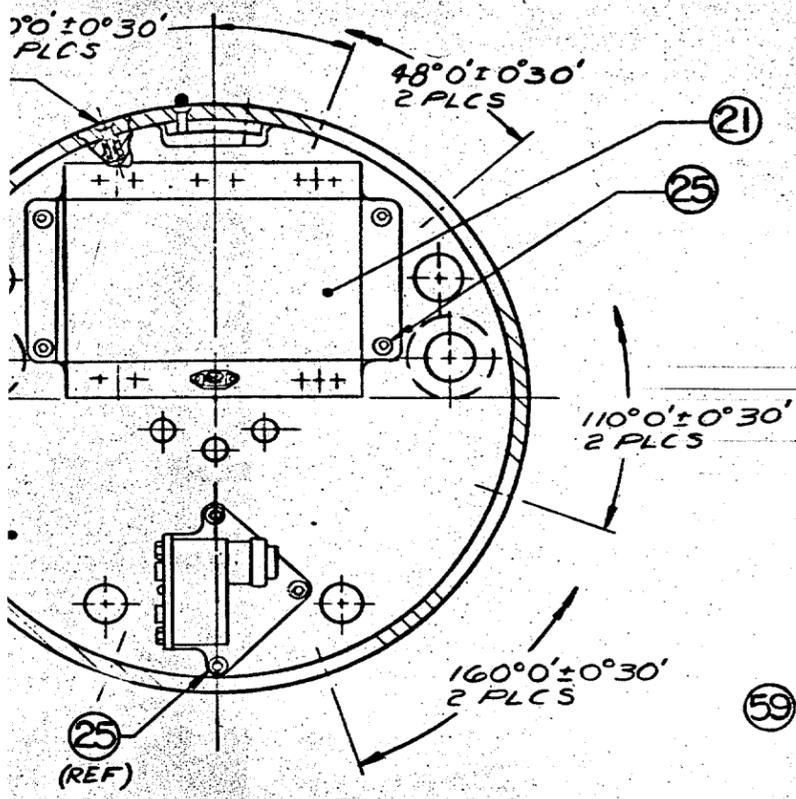
SECTION D-D

$.210 \pm .010$ DIA
THRU ITEM #3
 $100^{\circ} \pm 1^{\circ}$ CSK TO
 $.390 \pm .005$ DIA 8 PLCS



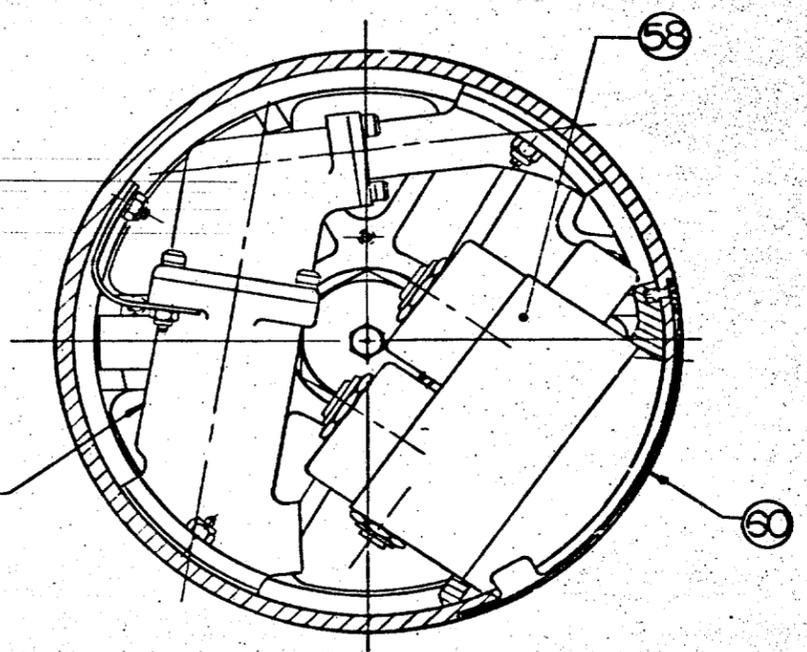
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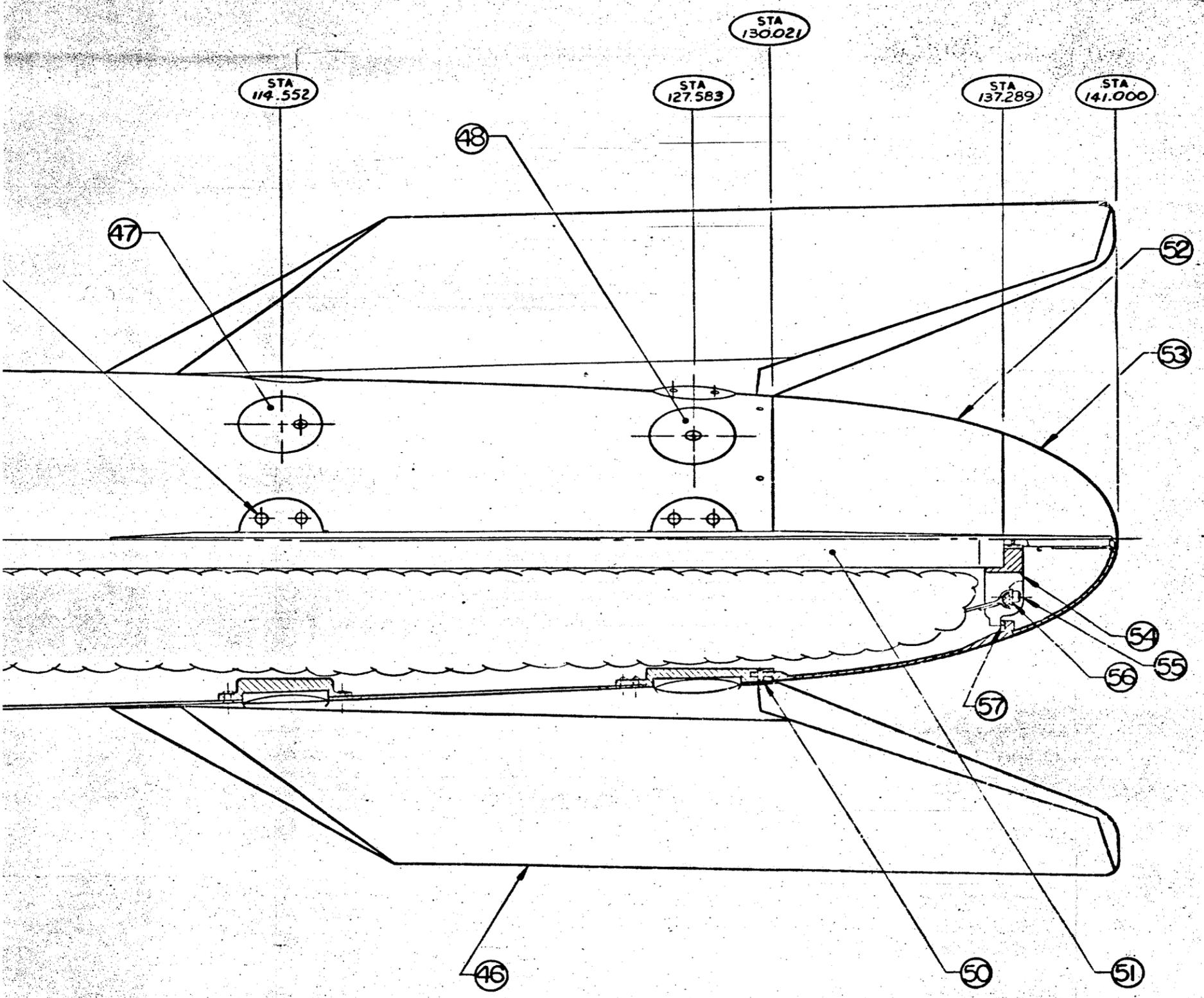


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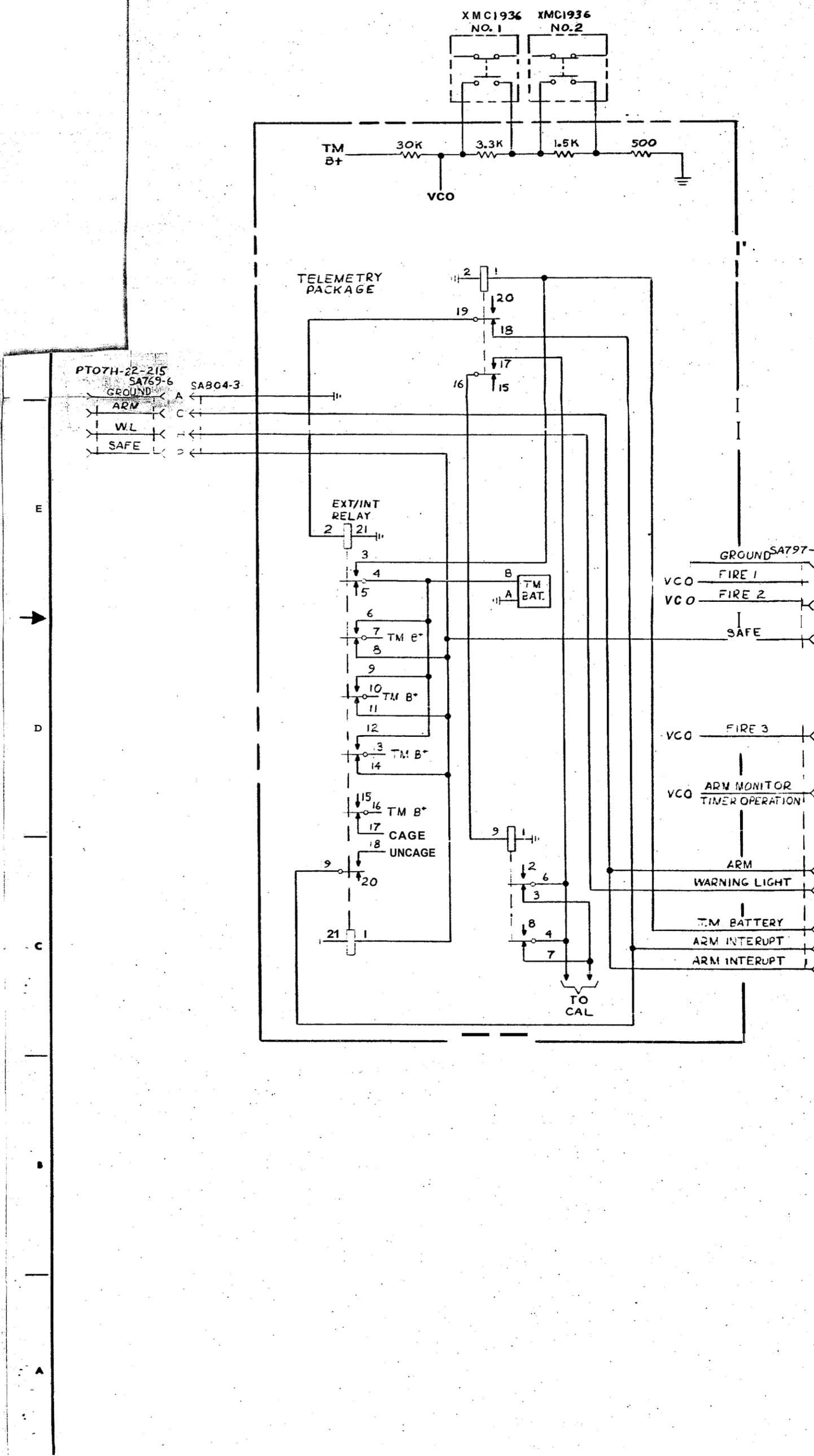
±.005 DIA
(MMC) 4 PLCS

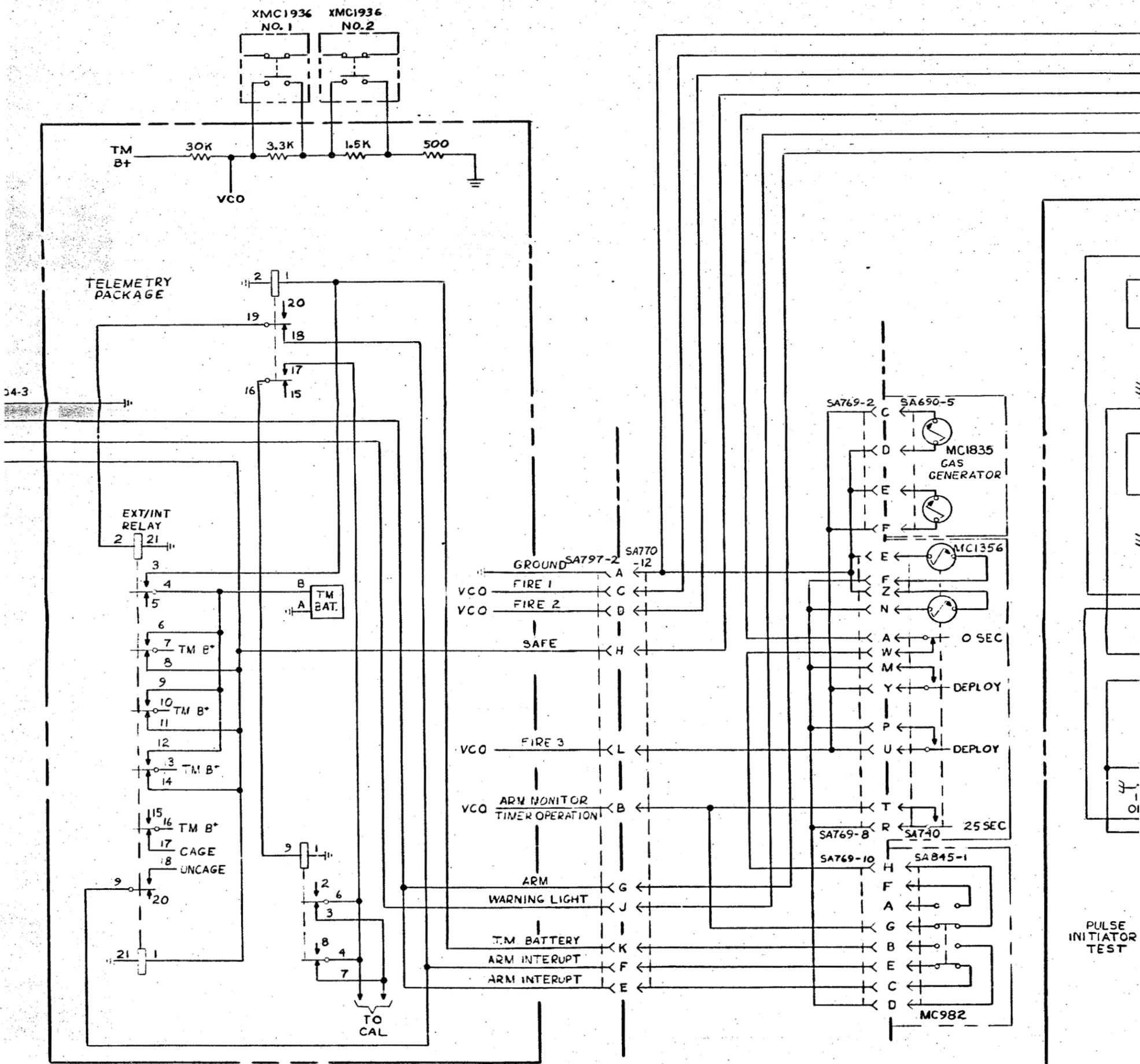


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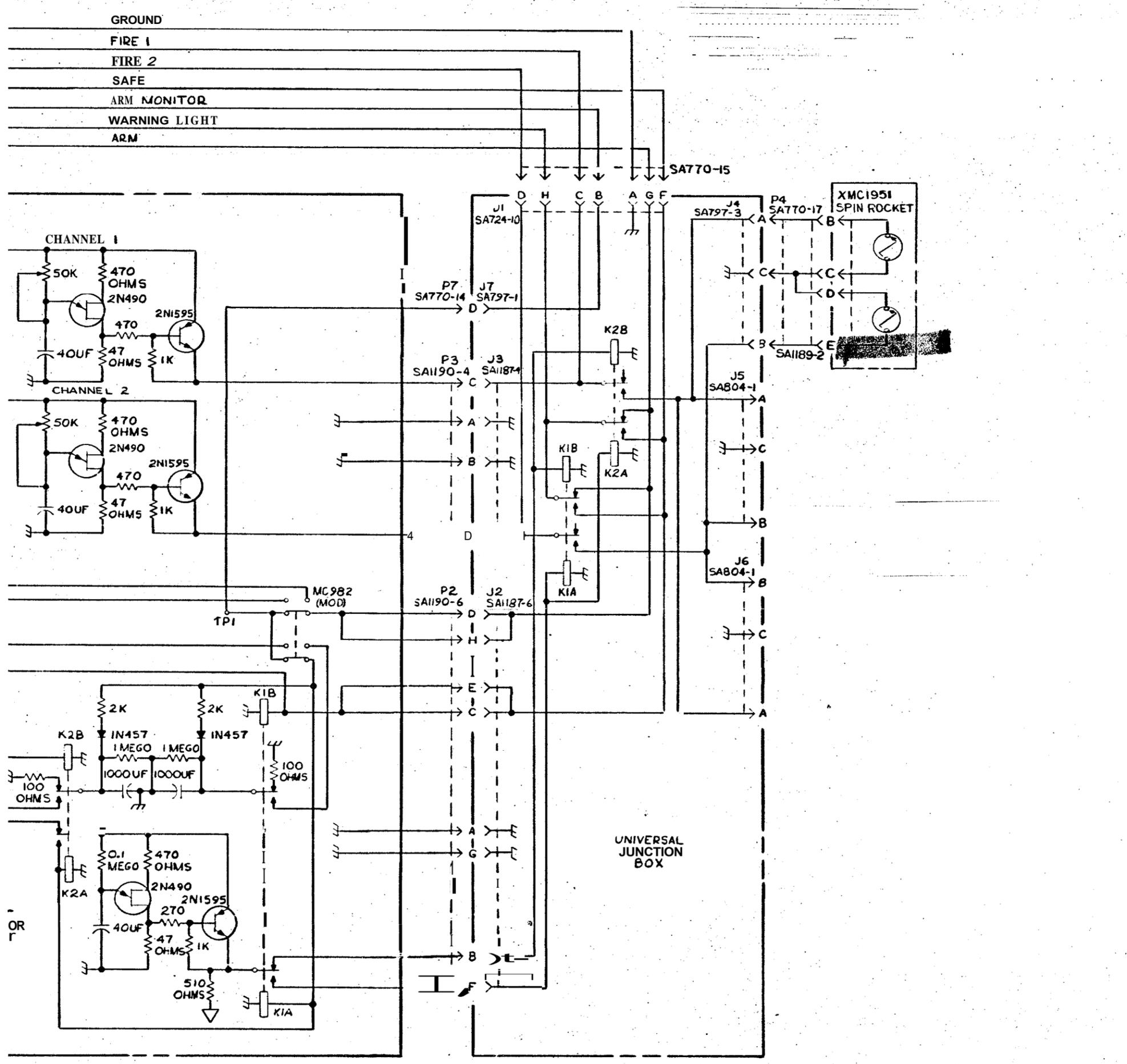


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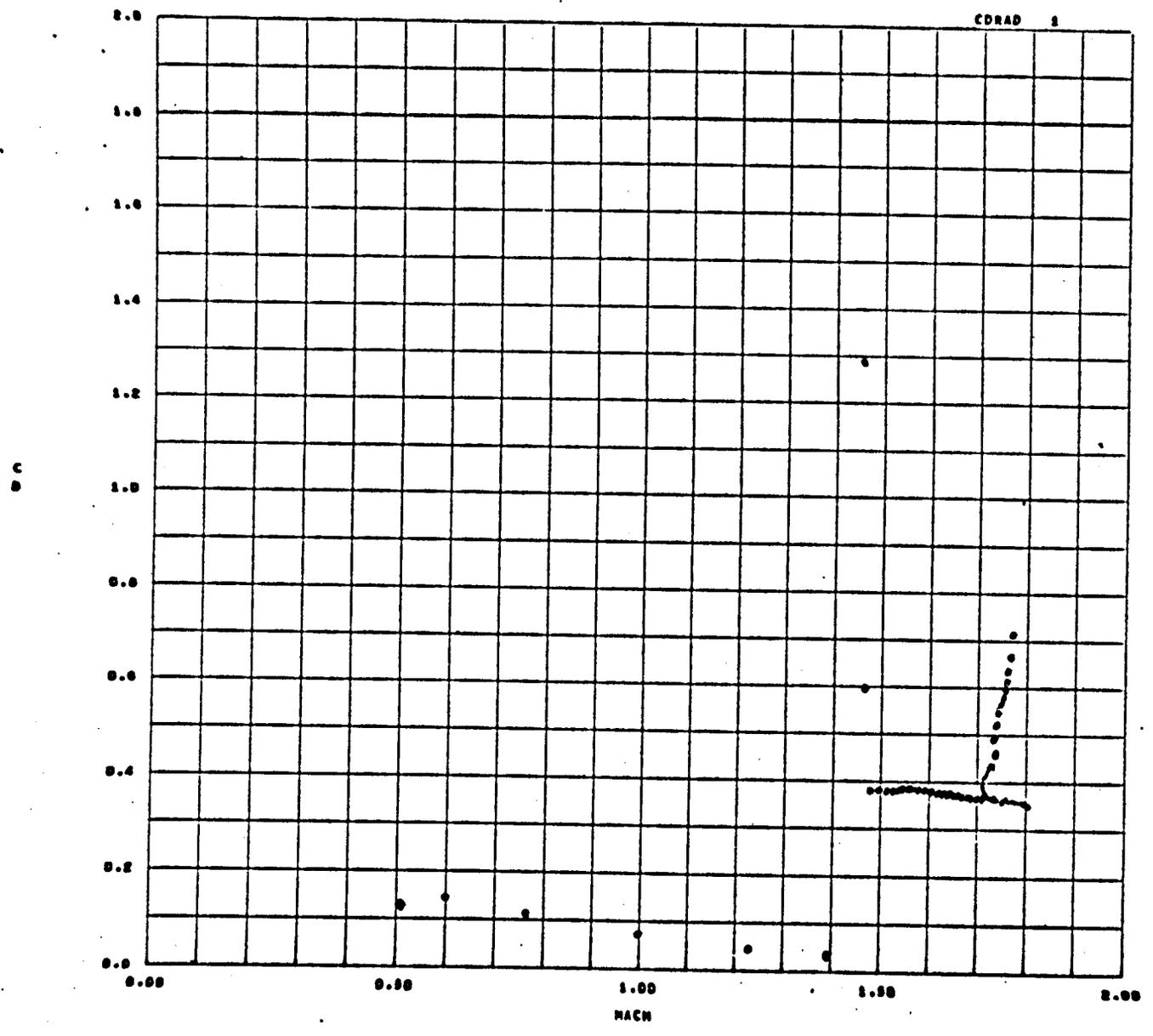
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DWG CLASSIFICATION LEVEL	PART CLASSIFICATION	SHEET	SHEET INDEX			
UNCLASSIFIED		1				
CLASSIFICATION CATEGORY	ORG	DATE	INITIALS	TITLE		FIRST APPLICATION
				SCHEMATIC, 100-10		SIZE E
	MFG AGENCY APPROVALS		MFG AGENCY NO.			DWG NO. CKN79752

[REDACTED]

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DRAG COEFFICIENT VS MACH NUMBER



TEST 100 10 DATE 081000 SITE 7TR
CARRIER F4B OPTICAL DATA

Figure 3.

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[REDACTED]

[REDACTED]

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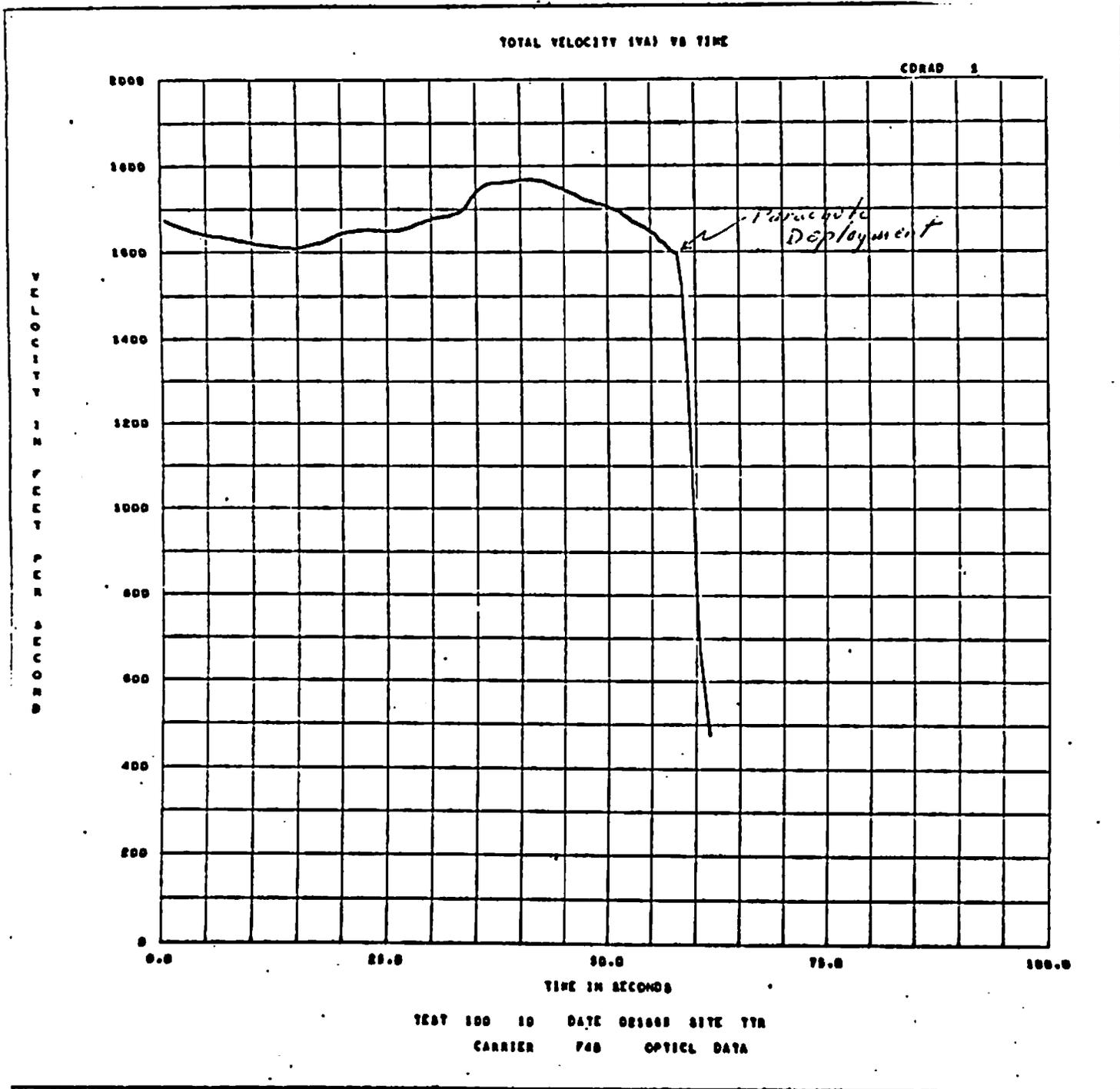


Figure 4.

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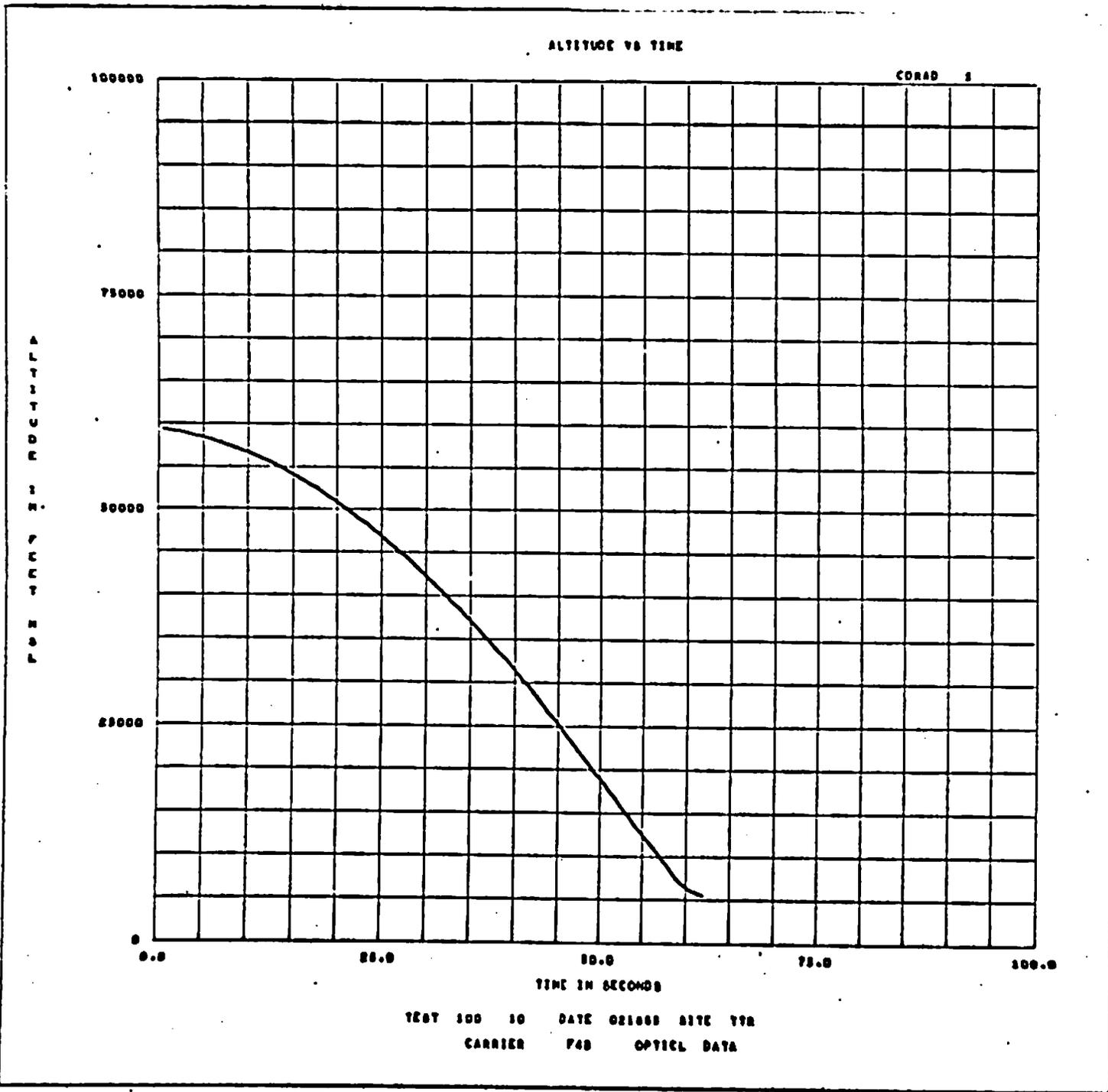


Figure 5.

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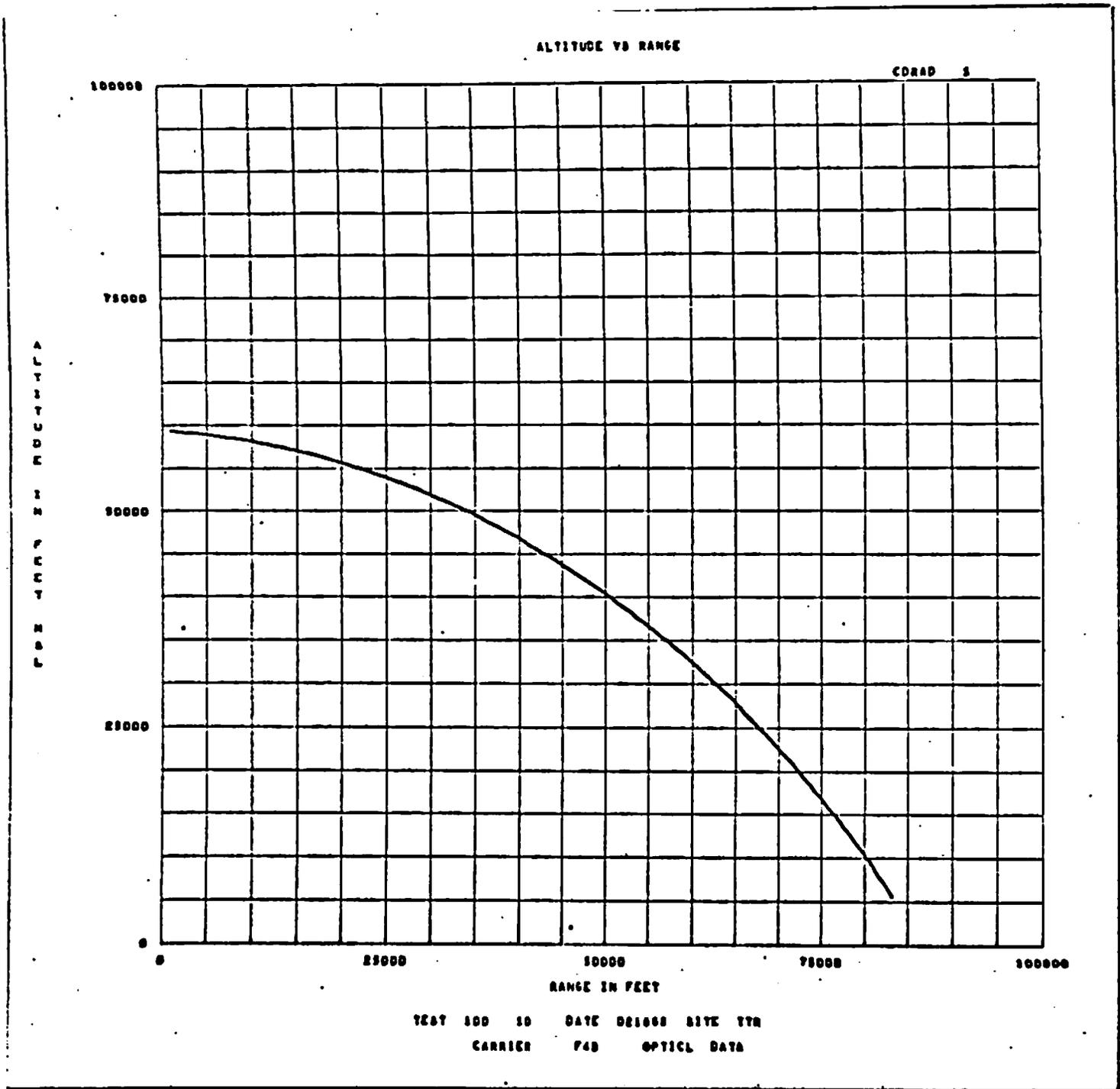


Figure 6.

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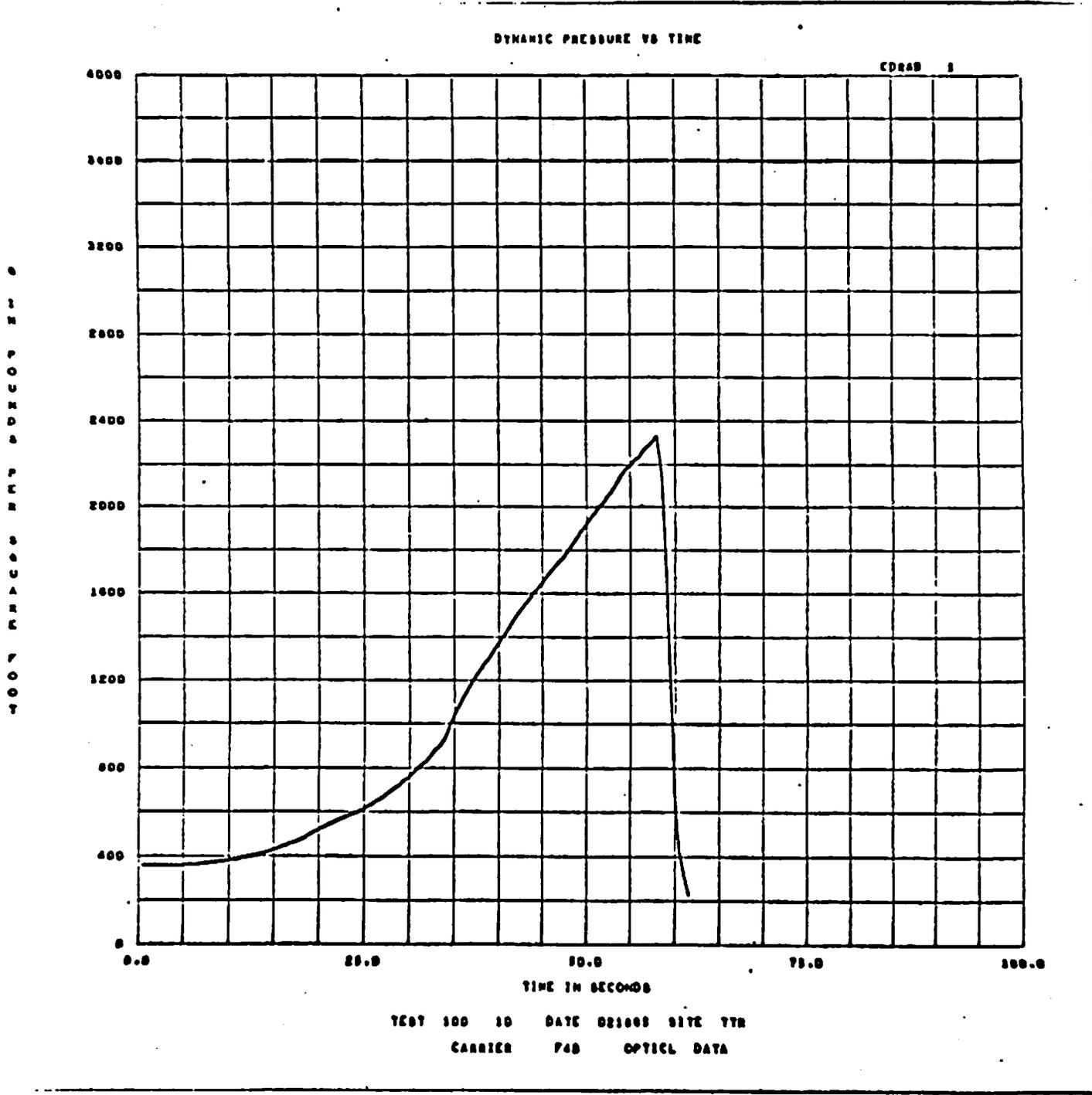


Figure 7.

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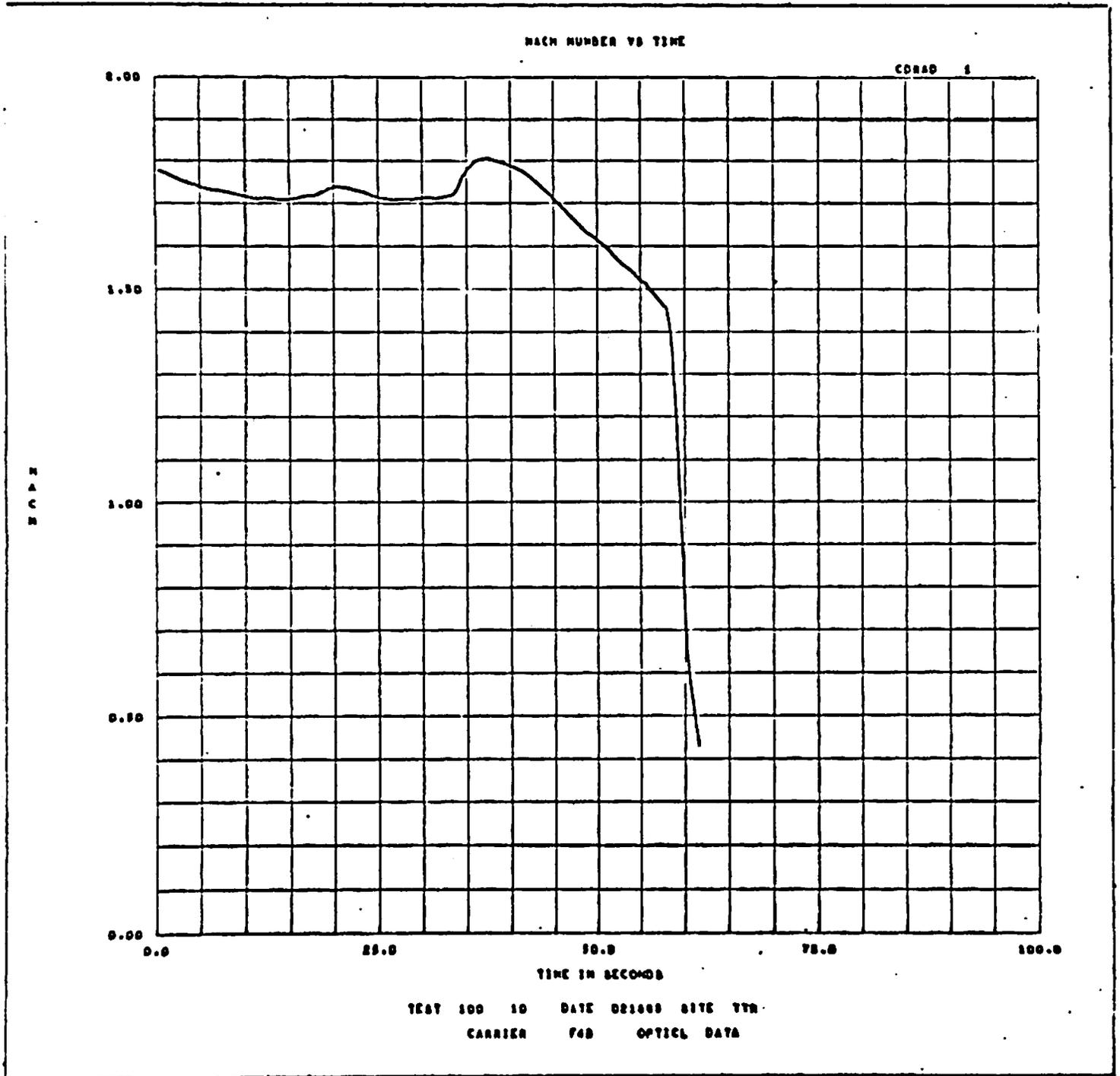


Figure 8.

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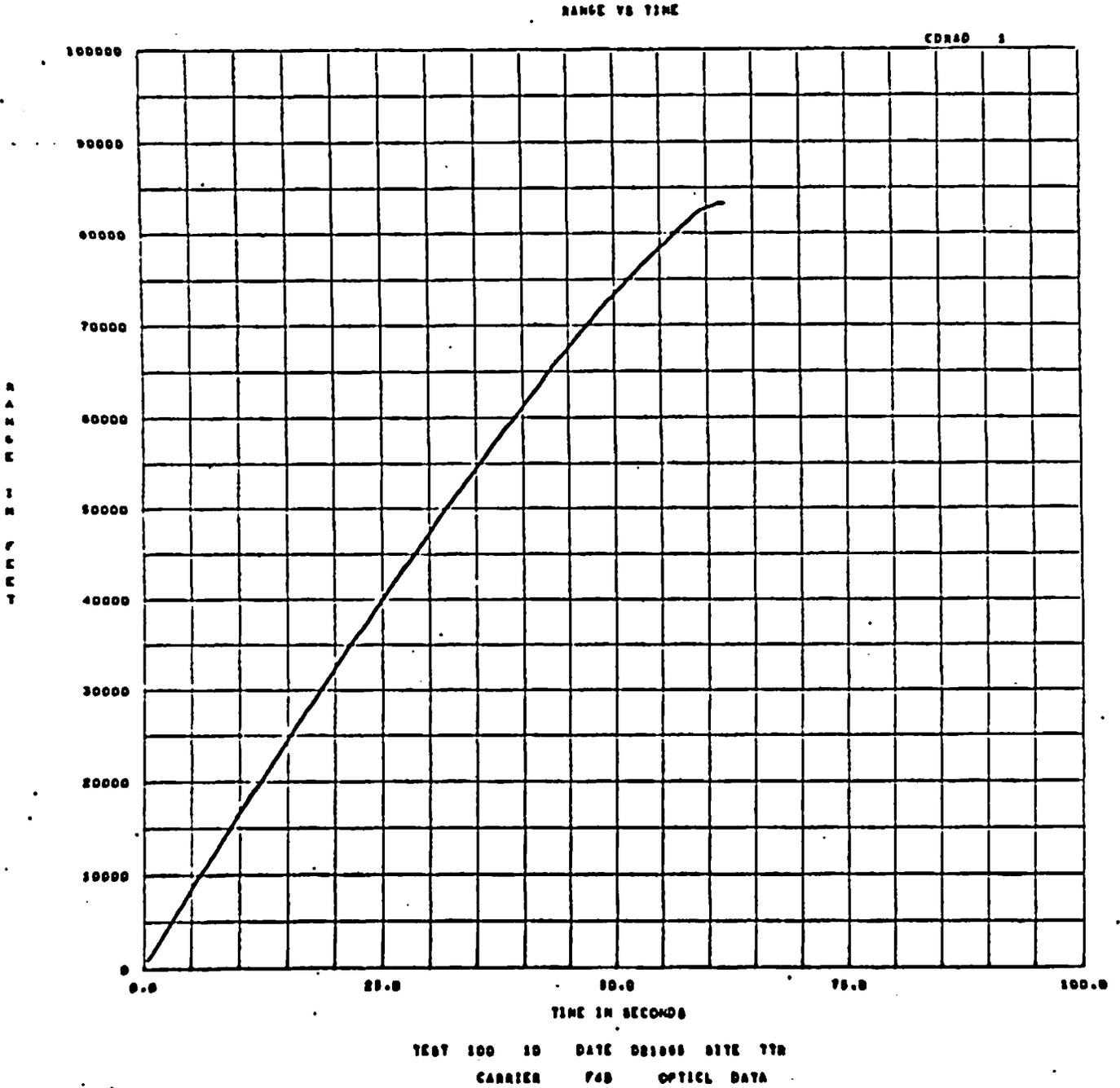


Figure 9.

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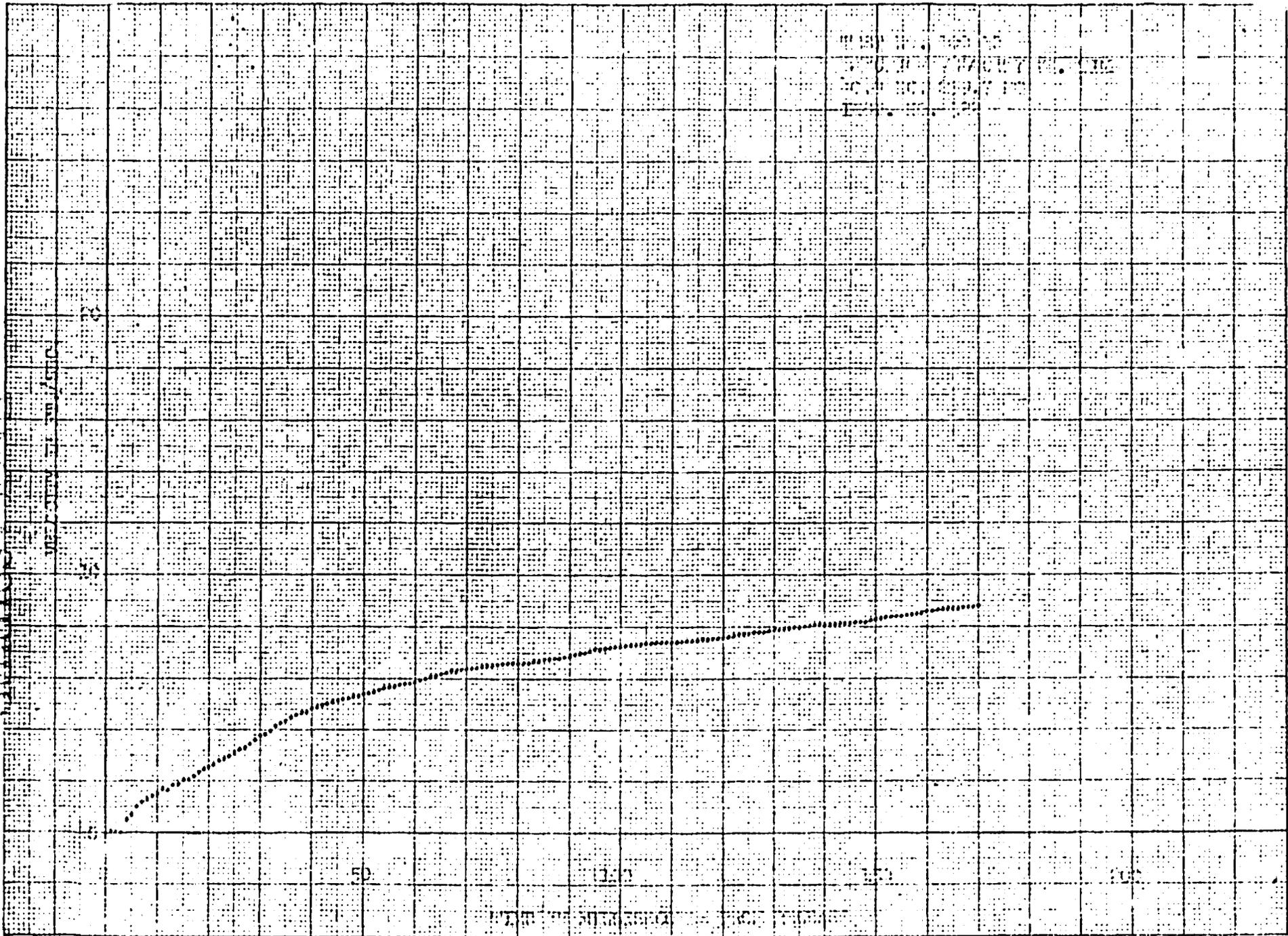


Figure 10.

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TEST NO. 100-10
ROLL RATE VS. TIME
30.0 KC, 259.7 MC
Inst. No. 64-97

Figure 11.

TIME IN SECONDS FROM RELEASE

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