



## DOCUMENT CHANGE NOTICE (DCN)

DOCUMENT No. (DOC-REV-GP. ID)	TITLE	NEW REV.
D970551-D-D	Recycling Mirror LOS Structure Assembly	E
D960503-A-D	LOS Top Plate	B
D960505-A-D	LOS Bottom Plate	B
D960145-B-D	LOS Height Adapter Assembly	C

**CHANGE DESCRIPTION (FROM/TO):**

**D970551:** Incorporate attached DCN for revision D.

Chamfer stop angles needed to be revised to allow for input into an NC machine program. Add sheets 5 and 6. Remove Table 1. See revision C for "was" condition. Add dimension to control overall height.

**D960503:** Change holes dimension from .50" from the edges to 1.00 from the edges.

**D960505:** Change holes dimension from .50" from the edges to 1.00 from the edges.

**D960145:** Incorporate attached DCN for revision B. Change holes dimensions from .50" from the edges to 1.00 from the edges. For the rectangular hole, change 1.00 dimension to 1.50 to the edge.

**These changes affect structure assemblies, D960133 and D970551.**

**REASON FOR CHANGE:** D970551: Sub-contractor required compound angle data conversion.

D960503, D960505, D960145: Screws and nuts cannot be used to attach parts due to gusset weld radii.

**ACTION:**  Incorporate change  Attach DCN to drawing(s)  Other action (specify):

**DISPOSITION OF HARDWARE (IDENTIFY SERIAL NUMBERS)**

- No hardware affected (record change only)
- List S/Ns which comply already:
- List S/Ns to be reworked or scrapped:
- List S/Ns to be built with this change:
- List S/Ns to be retested per this change:
- D970551 - record change only. D960145, s/n 001 and 002 and D960133,
- s/n 001 will be reworked at Caltech. All future parts to be made to this
- DCN. Parts already manufactured will still have holes from previous
- revision, which is acceptable.

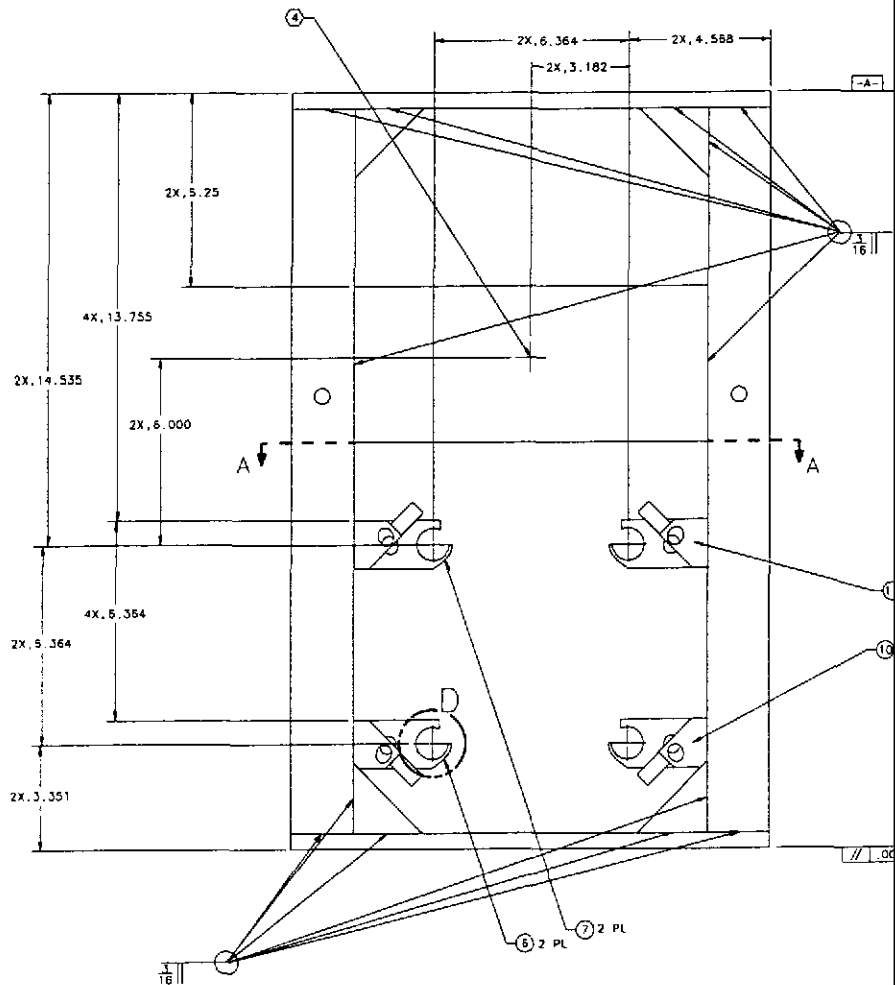
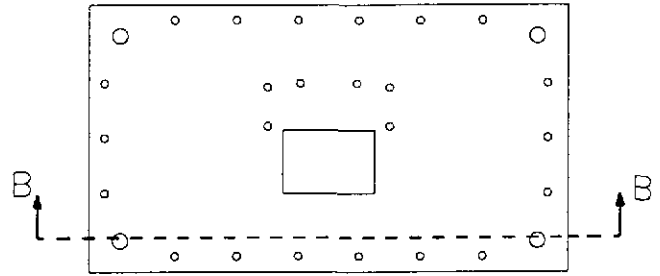
**DCN DISTRIBUTION (X=incl. docs)**

Althouse	Barish	Coles
X Coyne	Lazzarini	Lindquist
Raab	Sanders	Shoemaker
Stapfer	Tyler	Weiss
Whitcomb	Zydowicz	
Bork		Zucker
Barton		Mason
Camp		Jones
X Fine		
X Hazel		

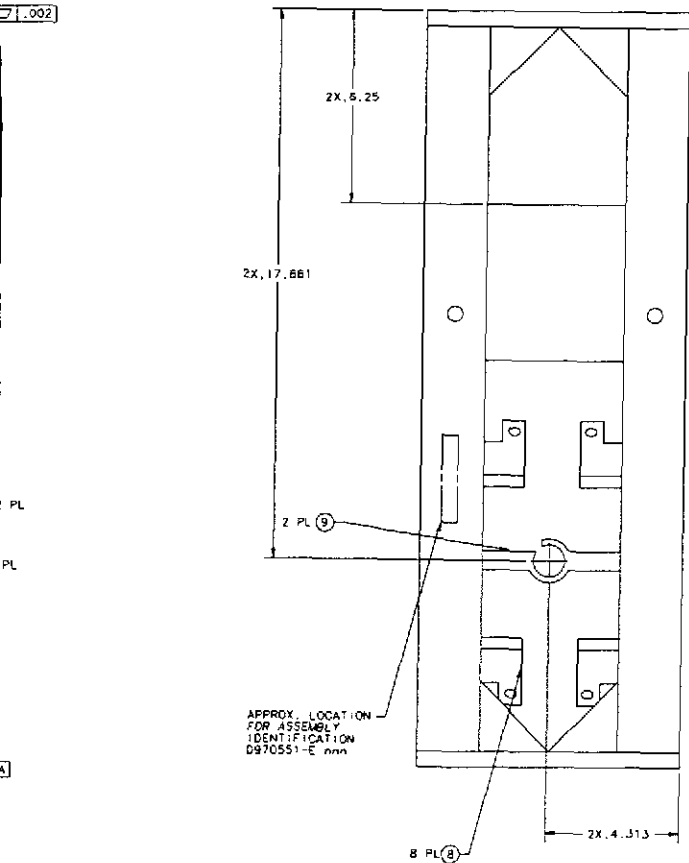
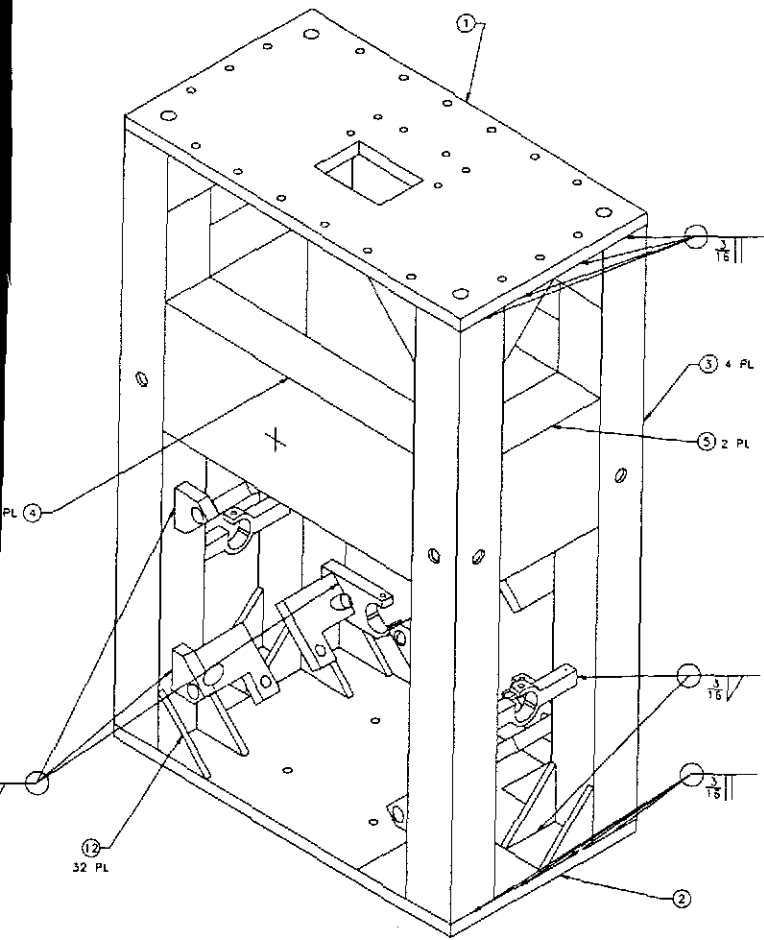
**SAFETY, COST, SCHEDULE, REQUIREMENTS IMPACT?**  No  Yes (If yes, enter Change Request number )

APPROVALS:	DATE	OTHER APPROVALS (specify)	DATE
ORIGINATOR: J. Hazel	5/11/98		
TASK LEADER: <i>Jim</i>	5/11/98		
GROUP LEADER: <i>D. Coyne</i>	5/11/98		
DCC RELEASE: <i>[Signature]</i>	5/12/98		

- NOTES: (UNLESS OTHERWISE SPECIFIED)
1. SPECIFICATIONS FOR THE CONSTRUCTION OF THIS ASSEMBLY ARE DETAILED IN LIGO E970038, THE LARGE OPTIC SUSPENSION STRUCTURAL FABRICATION SPECIFICATION.
  - ② THESE FEATURES TO BE MACHINED AFTER ANNEALING.
  - ③ FLY CUT THESE SURFACES, OF BRACKETS FIND NOS. 6 AND 7, AT A 2° ANGLE. REMOVE MATERIAL FROM THE CENTER OF THE ASSEMBLY TO .25 FROM THE LEGS.
  - ④ ETCH OR SCRIBE CROSSHAIRS, POSITION AND APPROX SIZE AS SHOWN, ONTO FRONT AND BACK OF STRUCTURE. ETCH .01 WIDE MAX. AND .02 MAX BELOW SURFACE, AFTER ANNEALING.



REV	DATE	DRAWN BY	CHECKED	DOC	DESCRIPTION
A	1/19/98	J. HORN			E980004/INITIAL RELEASE
B	2/2/98	J. HORN			E980011/CHANGE TO NOTE 1 CHANGE TO SECT ON 4-A
C	1/27/98	J. HORN			E980075/ADD SHEET 4
D	5/7/98	J. HORN			E980088/ATTACHED TO PLACEMENT
E	12/2/98	J. HORN			E980090/CHANGE CHAMFER STOP POSITION

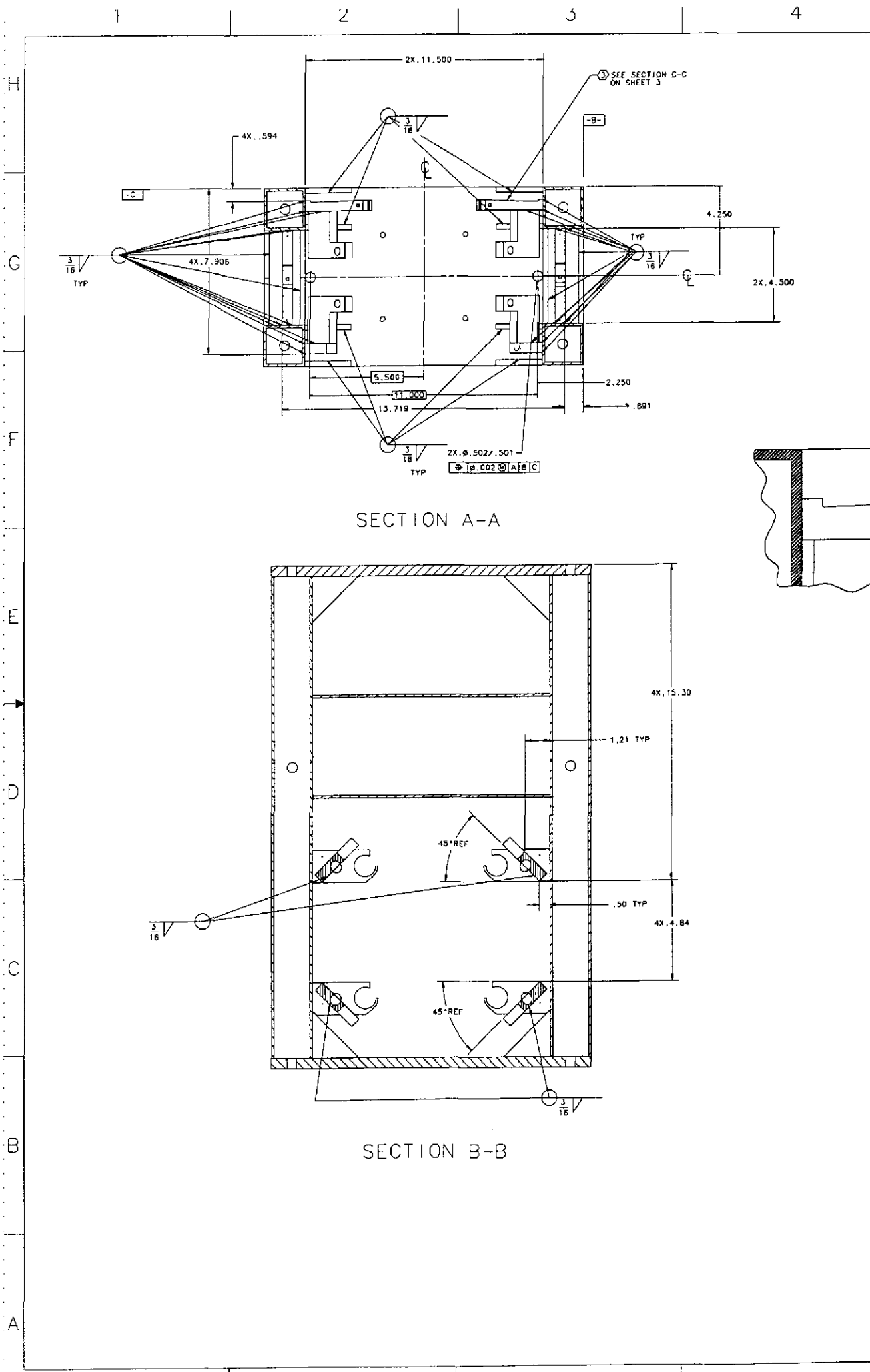


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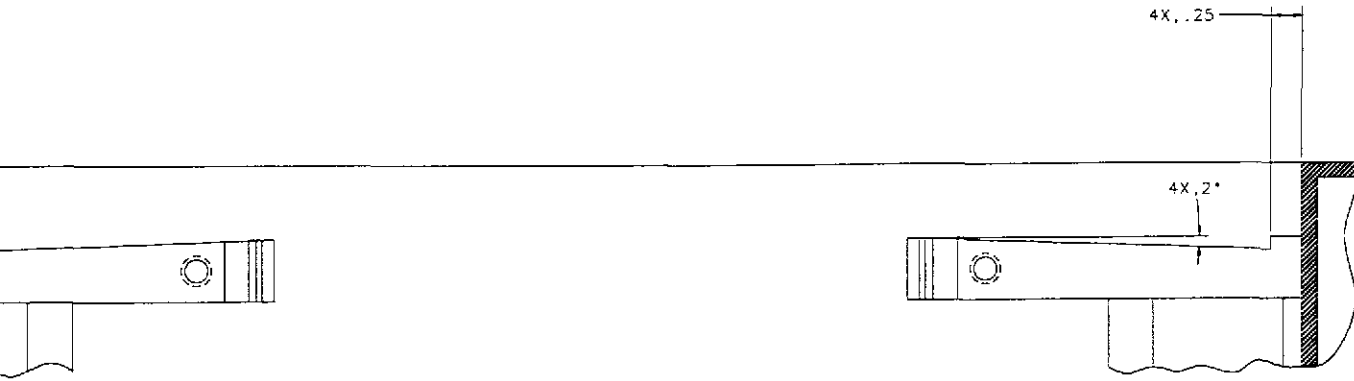
QTY	PART NO	DESCRIPTION	UNIT	QTY
32		CUSSET, 2.25 x 2.25 x .45	13 TATCO 304 STAINLESS	12
2	D960143	LCS BRACKET FRONT TOP		11
2	D960142	LCS BRACKET FRONT BOTTOM		10
2	D960141	LCS BRACKET SENSOR/ACTUATOR SIDE		9
8	D960140	LCS BRACKET SAFETY STOP		8
2	D960137	LCS BRACKET SENSOR/ACTUATOR TOP		7
2	D960136	LCS BRACKET SENSOR/ACTUATOR BOTTOM		6
2	D960506	LCS SIDE STIFFENER		5
2	D960502	LCS FRONT STIFFENER		4
4	D960504	LCS LEG		3
1	D960505	LCS BOTTOM PLATE		2
1	D960503	LCS TOP PLATE		1

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS MILLIS .005 .005 0.XX ±0.03 0.XXX ±0.005 DO NOT SCALE DRAWING	APPROVALS DATE FILE 1/98 RECYCLING MIRROR LCS STRUCTURE ASSEMBLY	LIGO CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY D970551 SHEET 1 OF 5
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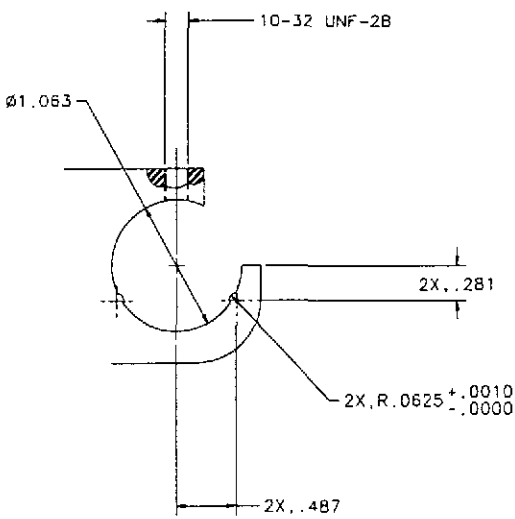
NEXT ASSEMBLY  
 D970564, D970577  
 FILE LOCATION  
 NAME JER/JOE/D970551.DDT



REV	DATE	DRAWN BY	CHECKED	DOC	CON/DESCRIPTION
A	1/18/90	J. Morel			EG80004/INITIAL RELEASE
B	2/5/88	J. Morel			EG80011/CHANGE TO NOTE 3 CHANGE TO SECTION 4-A
C	4/2/90	J. Morel			EG80075/ADD SHEET 4
D	3/7/90	J. Morel			EG80088/ ATTACHED, 10 PLACEMENT
E	8/7/90	J. Morel			EG80090/CHANGE CHAMFER SIZE SEE SECTION



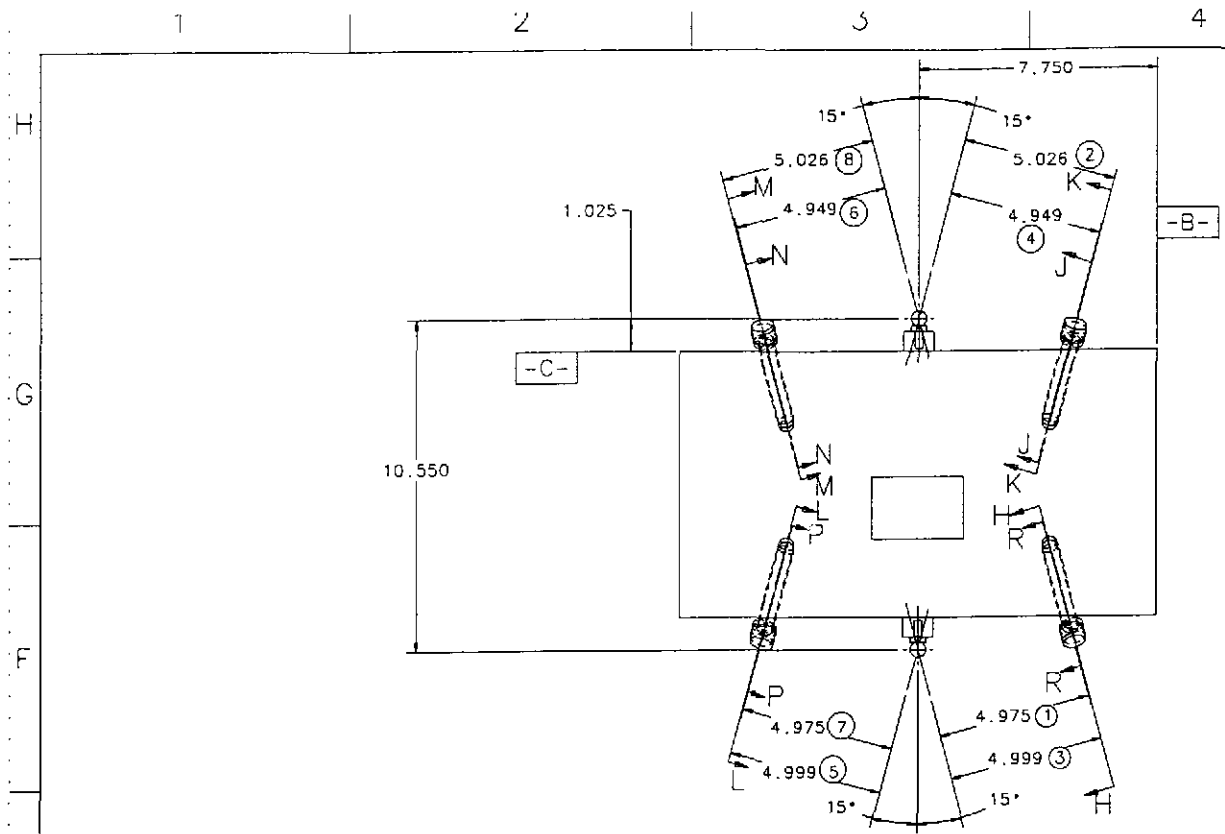
SECTION C-C  
FLY CUT DEFINED  
IN NOTE ③



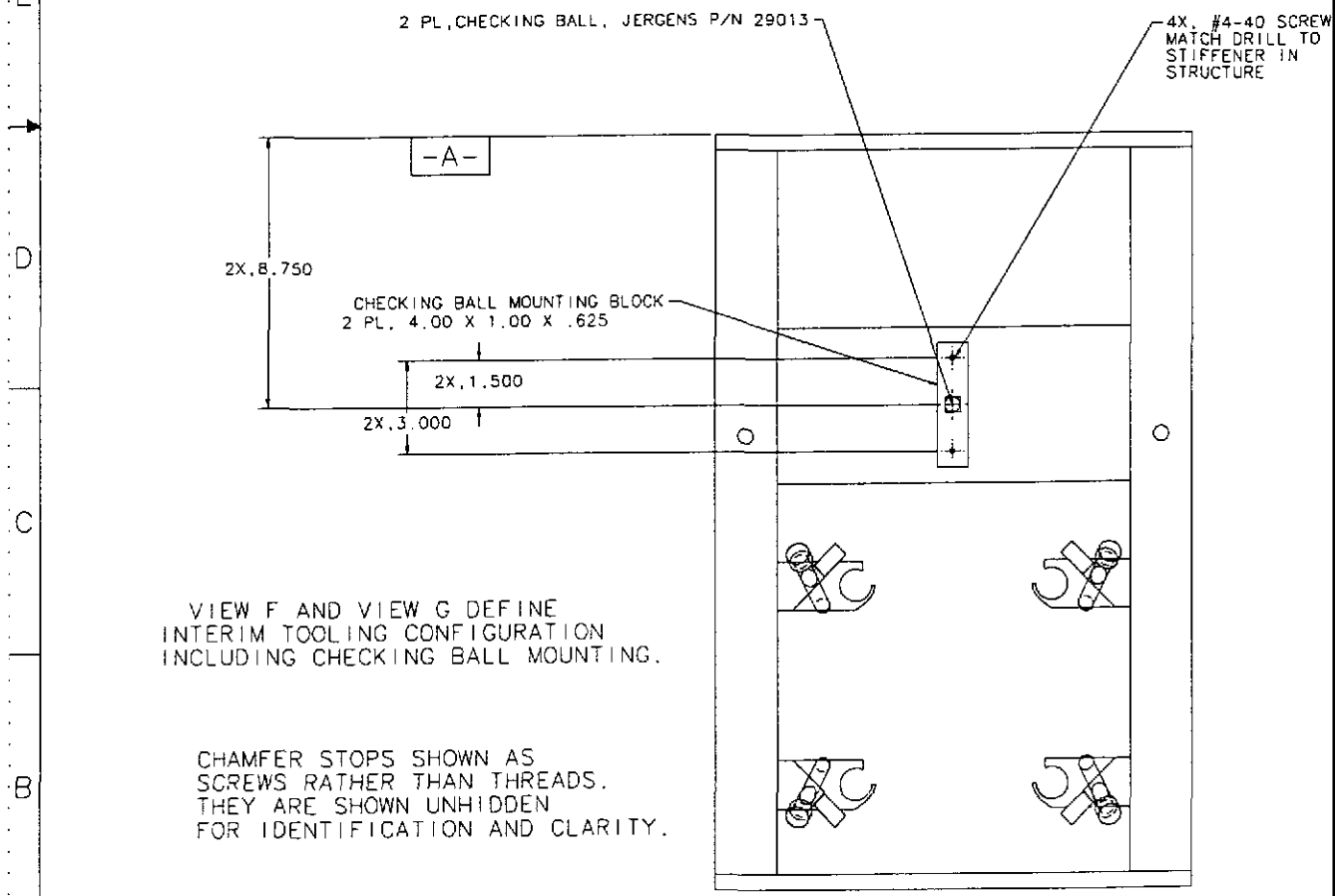
VIEW D ②  
SCALE 4/1  
TYPICAL 6 PLACES

**ELECTRONIC COPY**

REV	DATE	DRAWN BY	CHECKED	DOC	CON/DESCRIPTION
PARTS LIST					
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES FRACTIONS DECIMALS ANGLES :5			APPROVALS DATE		
0.XX = ±0.03 0.XXX = ±0.005 DO NOT SCALE DIMENSIONS			LIGO CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY		
NEXT ASSEMBLY D970564, D970577			DRAWN J. HOZEL		
FILE LOCATION name/rev/docs/D970551.pdf			CHECKED		
MATERIAL			DATE 1/98		
FINISH			TITLE RECYCLING MIRROR LOS STRUCTURE ASSEMBLY		
			SCALE 1/2		
			SHEET 2 OF 6		



VIEW F



VIEW G

VIEW F AND VIEW G DEFINE INTERIM TOOLING CONFIGURATION INCLUDING CHECKING BALL MOUNTING.

CHAMFER STOPS SHOWN AS SCREWS RATHER THAN THREADS. THEY ARE SHOWN UNHIDDEN FOR IDENTIFICATION AND CLARITY.

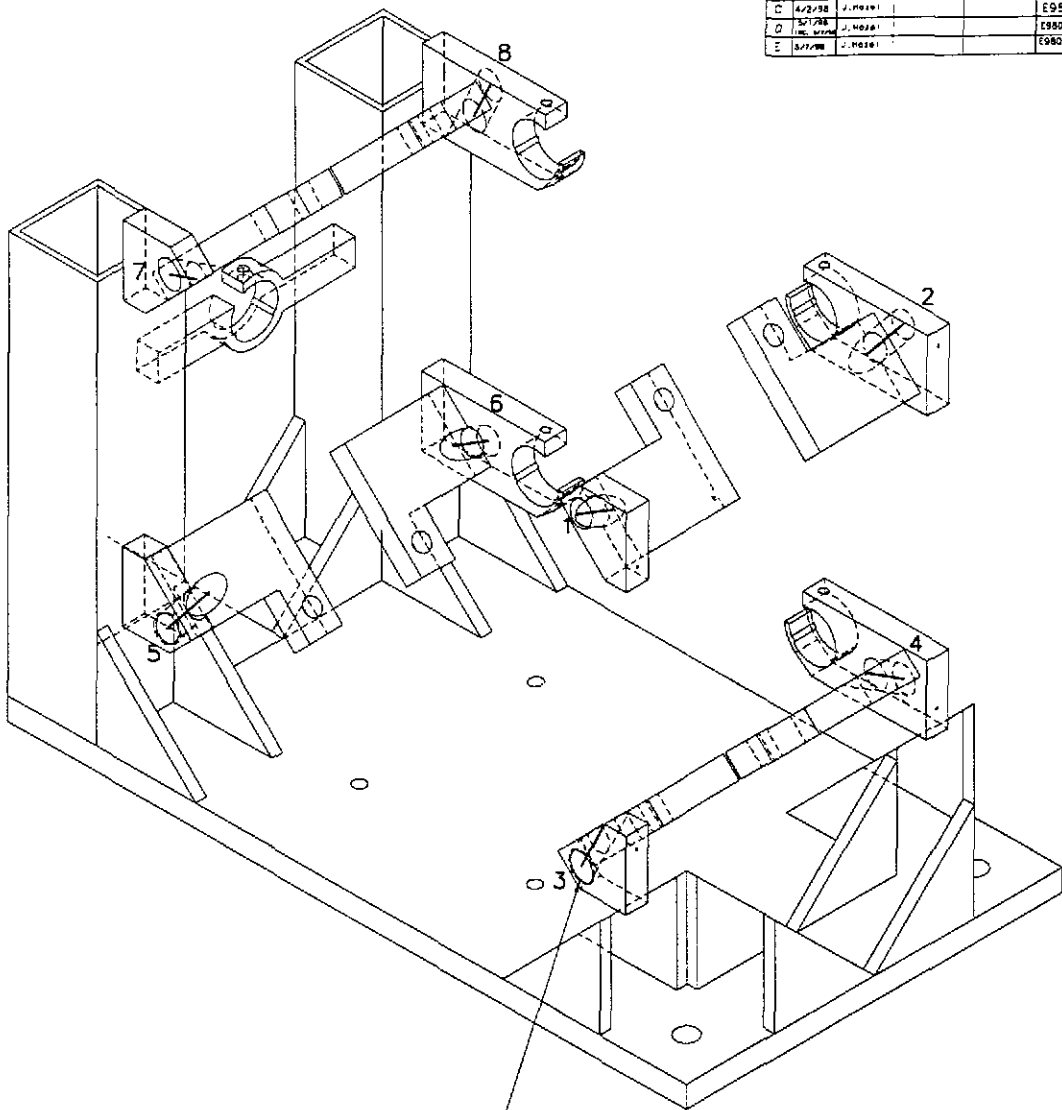
5

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REV	DATE	DRAWN BY	CHECKED	DOC	DESCRIPTION
A	1/18/98	J. Hoze			E980004/INITIAL RELEASE
B	2/5/98	J. Hoze			E980011/CHANGE TO NOTE 3 CHANGE TO SECTION A-A
C	4/2/98	J. Hoze			E980075/ADD SHEET 4
D	3/7/98	J. Hoze			E980088/ ATTACHED, 1D PLACEMENT
E	3/7/98	J. Hoze			E980090/CHANGE CHAMFER STOP POSITION



CHAMFER STOPS  
 $8 \times \frac{1}{2} - 13 \text{ UNC} - 2\text{B}$

### VIEW E

ISO VIEW OF STRUCTURE  
 WITHOUT: RIGHT LEGS, TOP PORTION OF LEFT LEGS,  
 RIGHT LOS BRACKET, SENSOR/ACTUATOR, SIDE  
 TOP PLATE AND STIFFENERS.

CHAMFER STOP CENTERLINES  
 HIGHLIGHTED AND NUMBERED.

H  
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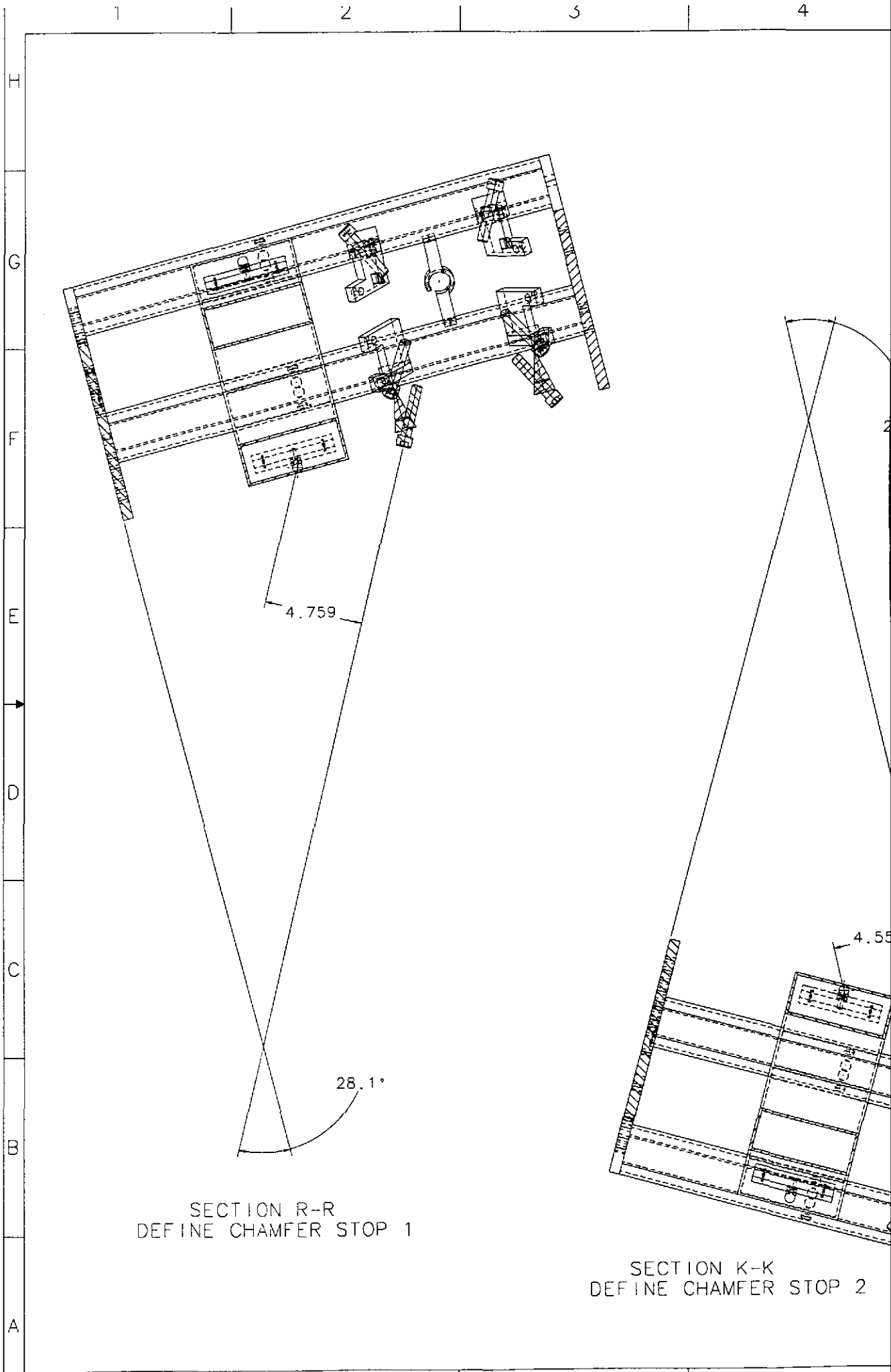
REV		DATE		DRAWN BY		CHECKED		DOC		DESCRIPTION	
PARTS LIST											
UNLESS DIMENSIONS SPECIFIED DIMENSIONS ARE IN INCHES FRACTIONS DECIMALS ANGLES				APPROVALS		DATE		LIGO CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY			
1 0.001±0.005 0.002±0.005 DO NOT SCALE DRAWING				Drawn J. Hoze		1/98		RECYCLING MIRROR LOS STRUCTURE ASSEMBLY			
NEXT ASSEMBLY D970564, D970577				MATERIAL		SIZE E		D970551		REV E	
FILE LOCATION Name: doc/elec/D970551.dpt				FINISH		SCALE 1/2		SHEET 1		OF 6	

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SECTION R-R  
DEFINE CHAMFER STOP 1

SECTION K-K  
DEFINE CHAMFER STOP 2

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1 2 3 4

4.759

28.1°

4.55





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3

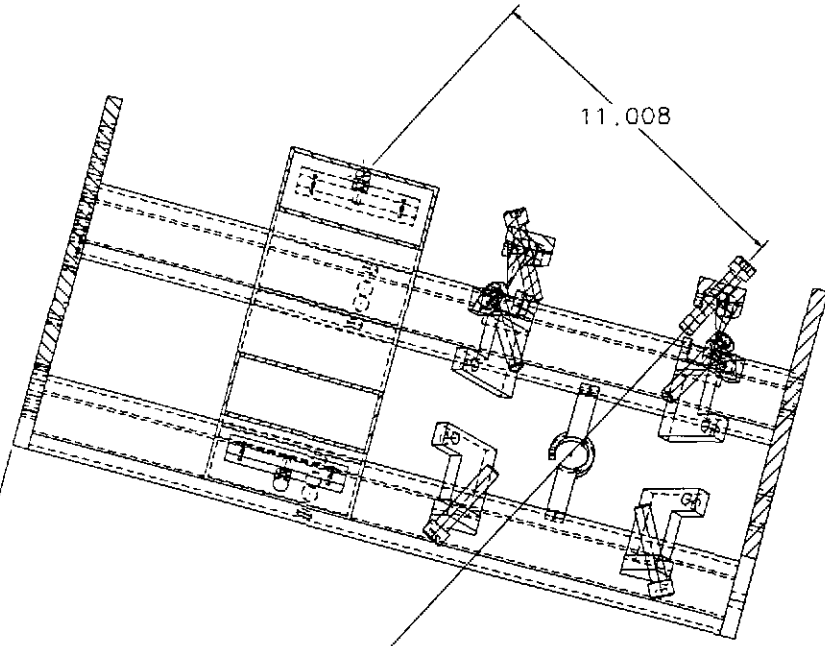
4

H  
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28.1°

11.008

SECTION J-J  
DEFINE CHAMFER STOP 4



5

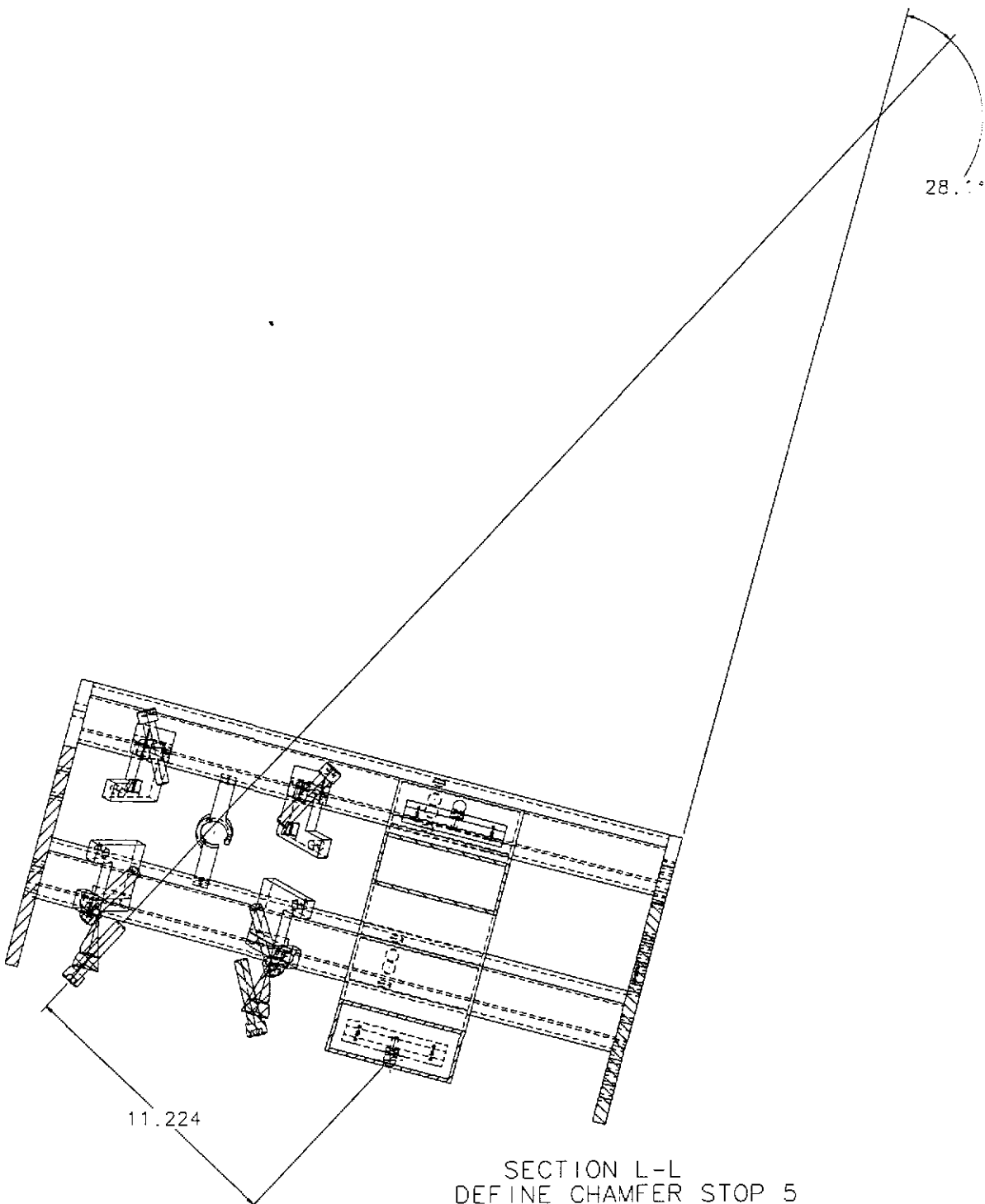
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7

8

REV	DATE	DRAWN BY	CHECKED	DCC	DESCRIPTION
A	1/19/98	J. Hoze!			E980004/ INITIAL RELEASE
B	2/5/98	J. Hoze!			ERROR! CHANGE TO NOTE 3 CHANGE TO SECTION 4-A
C	4/2/98	J. Hoze!			E980075/ADD SHEET 4
D	5/27/98	J. Hoze!			E980088/ ATTACHED TO PLACEMENT
E	5/2/98	J. Hoze!			E980090/CHANGE CHAMFER STOP SEE SECTION

H  
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A



SECTION L-L  
DEFINE CHAMFER STOP 5

11.224

28.1°

QTY	ITEM	PART OR IDENTIFYING NO.	DESCRIPTION OR IDENTIFICATION	UNIT OF MEASUREMENT
PARTS LIST				
LIGO CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY				
APPROVALS		DATE	TITLE	
DRAWN J. HOZE!		1/98	RECYCLING MIRROR LOS STRUCTURE ASSEMBLY	
CHECKED			PART NO. D97055	
NEXT ASSEMBLY		MATERIAL		REV E
D970564, D970577		FINISH		SCALE 1/2"
FILE LOCATION		DRAWING		SHEET 5 OF 6
name/dcc/dcca/D970551.pdf				

F

C

7

C

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H

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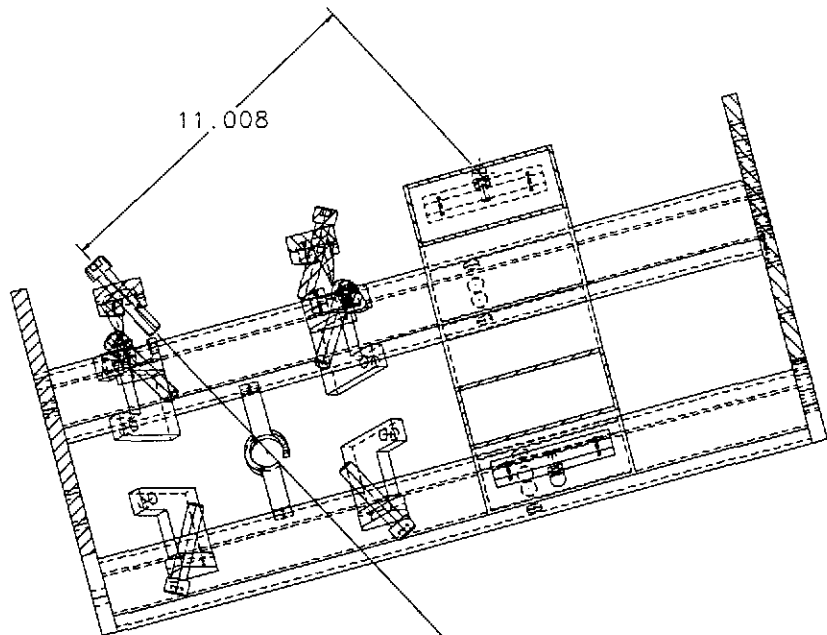
E

D

C

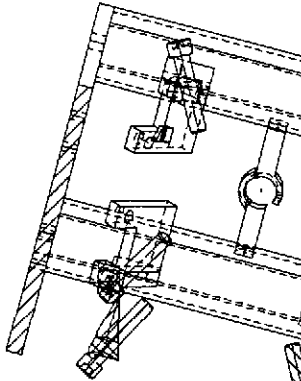
B

A



11.008

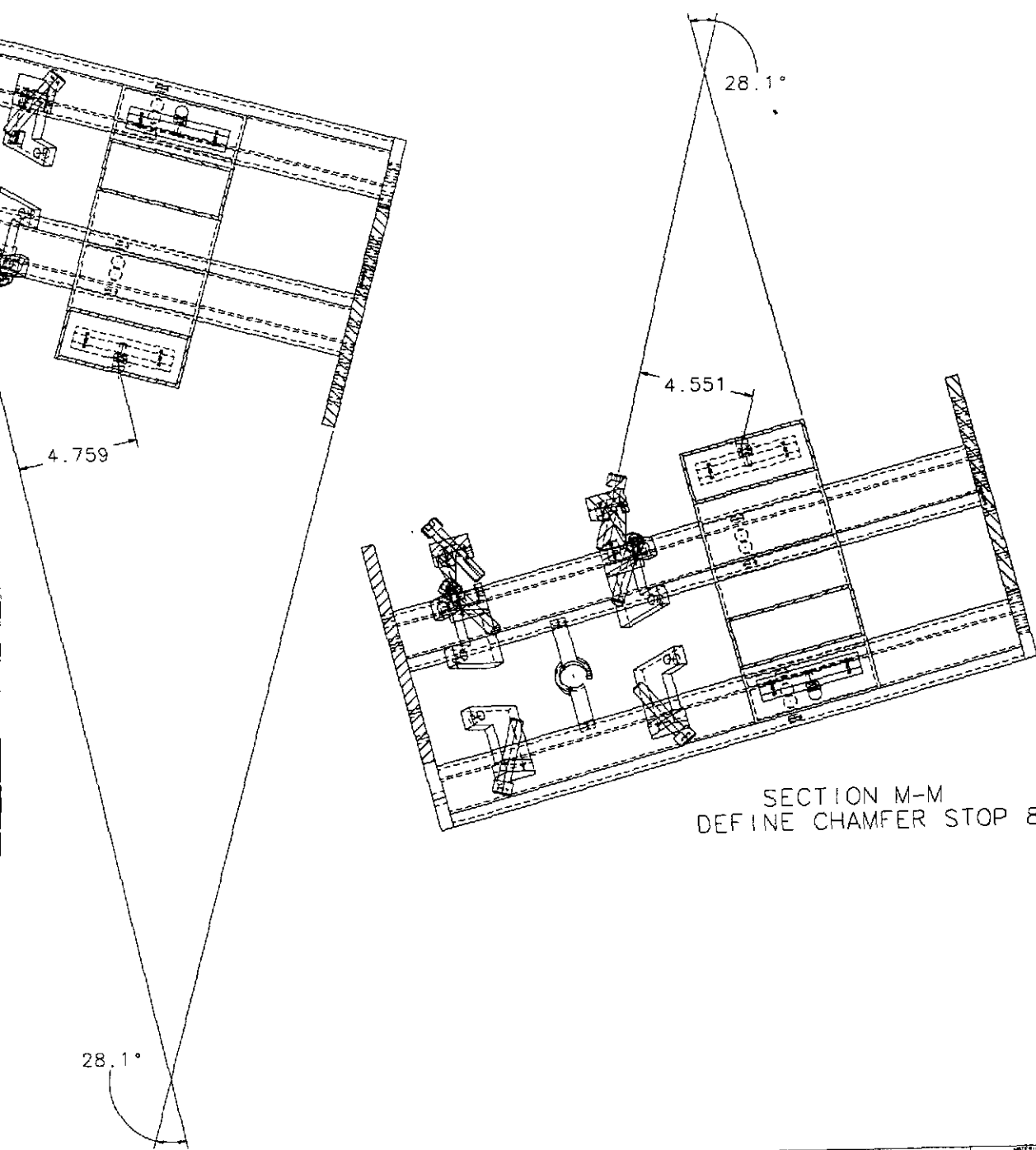
SECTION N-N  
DEFINE CHAMFER STOP 6



SECTION P-P  
DEFINE CHAMFER STOP

28.1°

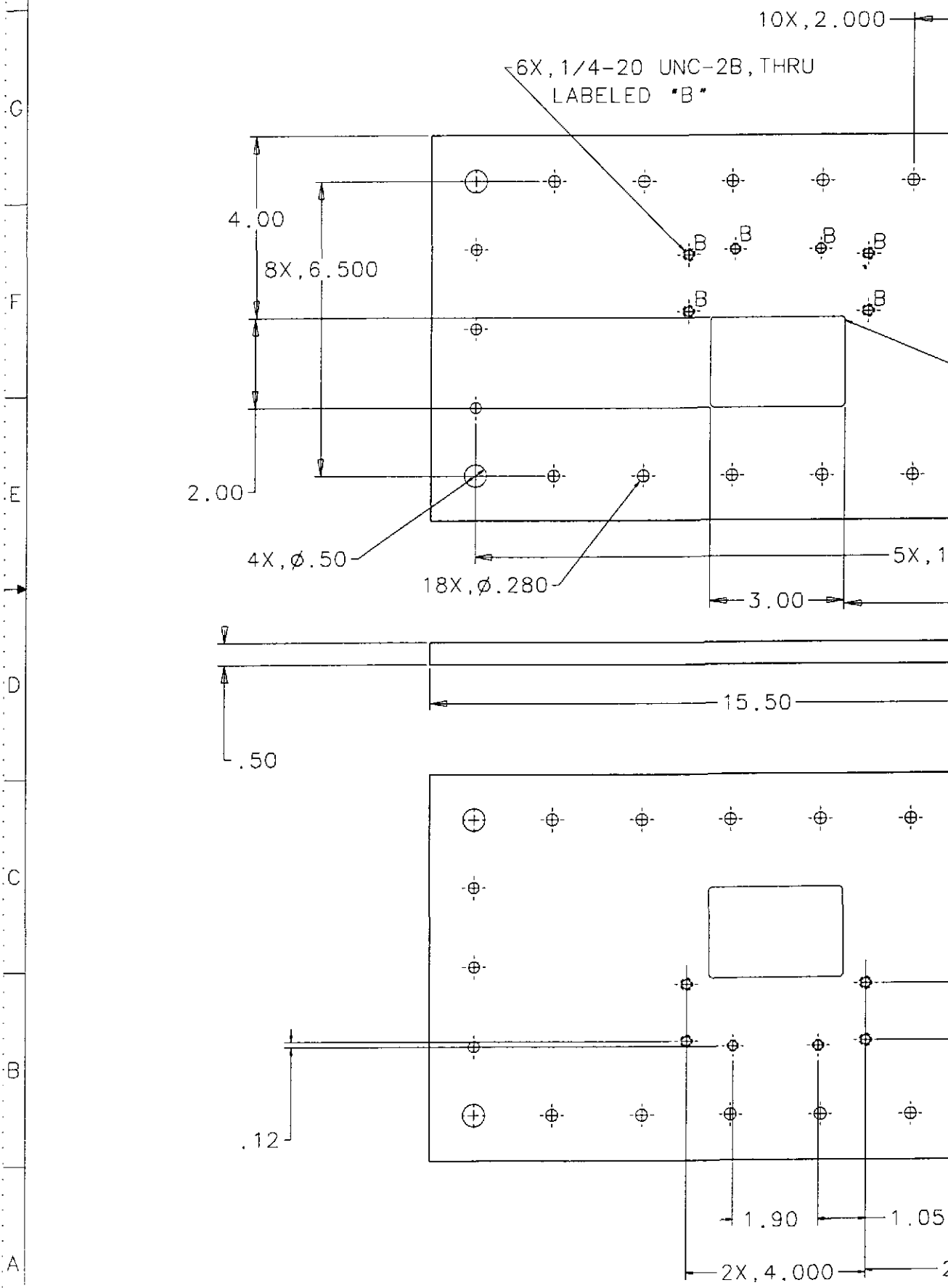
REV	DATE	DRAWN BY	CHECKED	DOC	CON/DESCRIPTION
A	1/19/98	J. Hozei			E980004/INITIAL RELEASE
B	2/3/98	J. Hozei			E980011/CHANGE TO NOTE 3 CHANGE TO SECTION A-A
C	4/2/98	J. Hozei			E980075/ADD SHEET 4
D	5/1/98	J. Hozei			E980088/ ATTACHED TO PLACEMENT
E	8/7/98	J. Hozei			E980090/CHANGE CHAMFER STOP DEFINITION



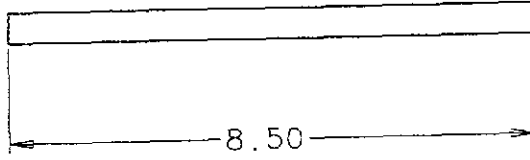
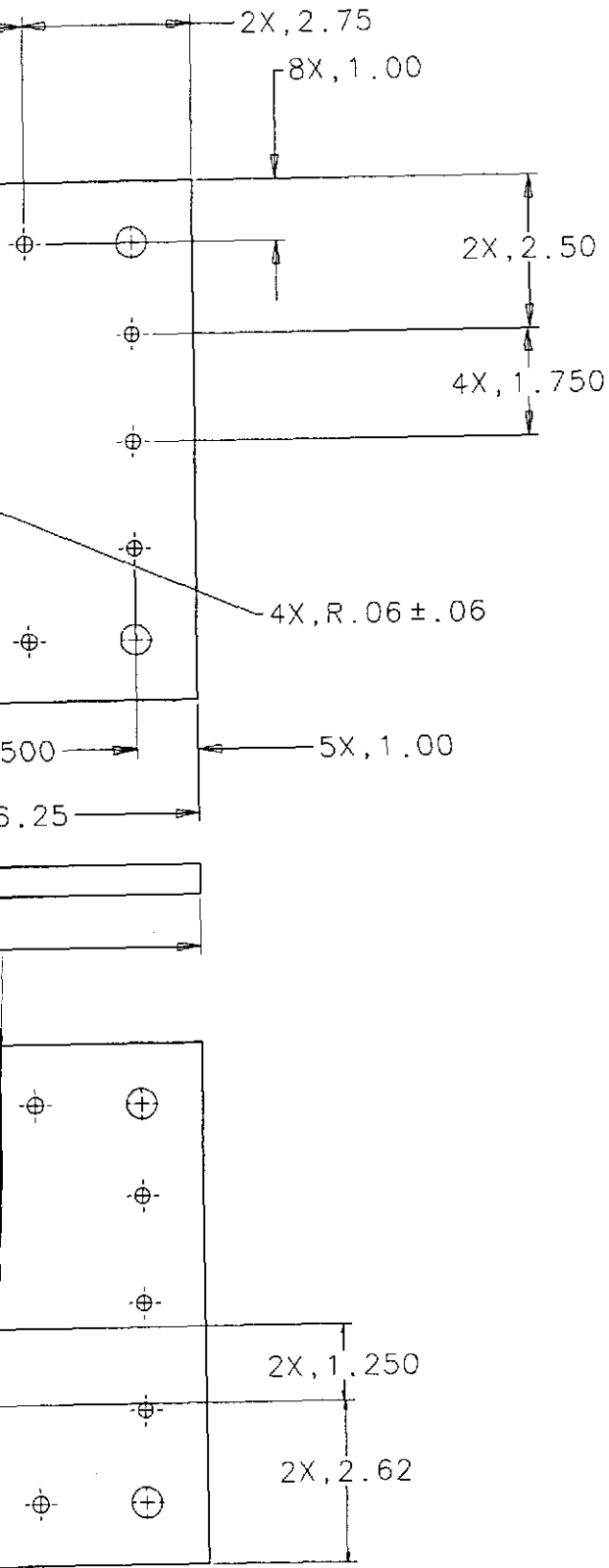
SECTION M-M  
DEFINE CHAMFER STOP 8

PART OR IDENTIFYING NO.		DATE		SIGNATURE OR DESIGNATION	
PARTS LIST		APPROVALS	DATE	LIGO CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES FRACTIONS DECIMALS ANGLES 1 0.0005 0. XX = ±0.03 0. XXX = ±0.005 30 NOT SCALE DRAWING		DRAWN: Hozei CHECKED:	1/98	FILE: RECYCLING MIRROR LOS STRUCTURE ASSEMBLY	
NEXT ASSEMBLY: D970564, D970577		MATERIAL:		REV: E	D970551
FILE LOCATION: hmsa/pscc/4mc/v08/0231.dwt		FINISH:		SCALE: 1/2	SHEET: 6 OF 6

NOTES: (UNLESS OTHERWISE SPECIFIED)  
1. BREAK ALL SHARP EDGES AND CORNERS.



REV	DATE	DRAWN BY	CHECKED	SEC	DESCRIPTION
A	2/2/98	J. HAZEL			E980010/INITIAL RELEASE
B	5/11/98	J. HAZEL			ISSUED BY: 00 014 FROM 1352 WAS 36 / NOV 1992



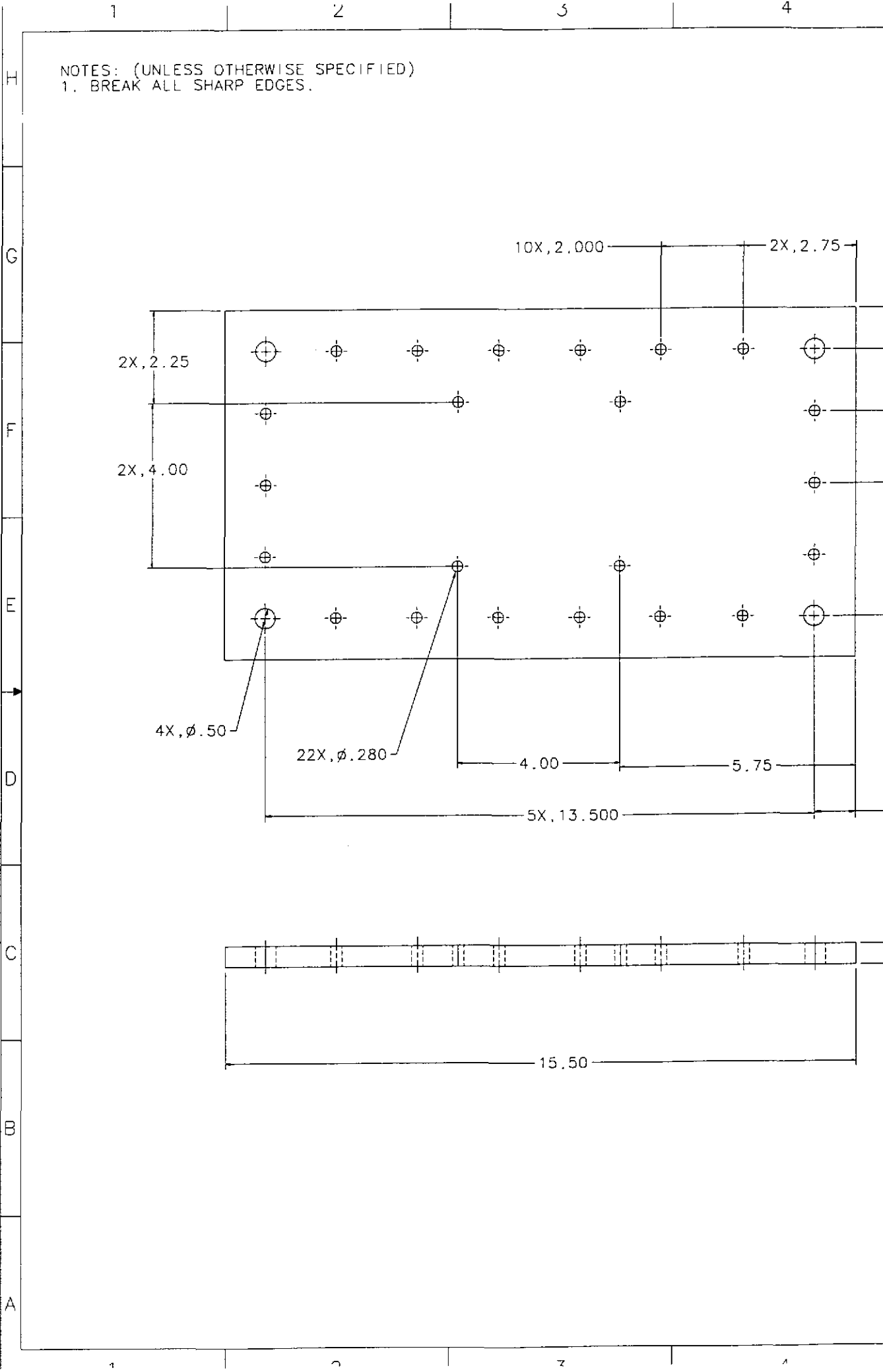
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COPY**

REV	DATE	DRAWN BY	CHECKED	SEC	DESCRIPTION
A	2/2/98	J. HAZEL			E980010/INITIAL RELEASE
B	5/11/98	J. HAZEL			ISSUED BY: 00 014 FROM 1352 WAS 36 / NOV 1992

UNITS: DIMENSIONS SPECIFIED DIMENSIONS ARE IN INCHES FRACTIONS - DECIMALS ANGLES D.XX±0.01 0.XXX±0.005 ANGLES±0.5° DO NOT SCALE DRAWING	APPROVALS DRAWN: J. Hazel CHECKED:	DATE: 4/96 TITLE: LOS TOP PLATE
NEXT ASSEMBLY: 0960133, 0970551 FILE LOCATION: /home/001/001/0960503.dwg	MATERIAL: 304 STAINLESS FINISH: NONE	SHEET: E SCALE: 1/1 REV: B SHEET 1 OF 1

NOTES: (UNLESS OTHERWISE SPECIFIED)  
1. BREAK ALL SHARP EDGES.





5

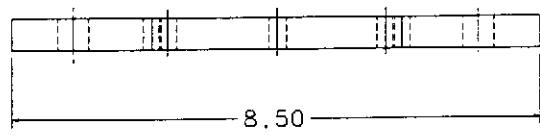
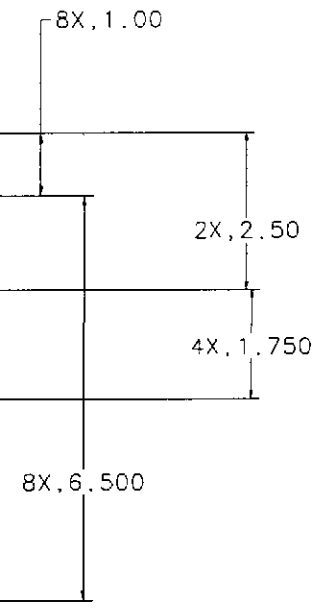
6

7

8

REV	DATE	DRAWN BY	CHECKED	DCS	DESCRIPTION
A	2/5/98	J. Hezel			EBB0010/INITIAL RELEASE
B	8/11/98	J. Hezel			EBB00021.00 DIM FROM EDGE WAS .50 FROM EDGE

H  
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E  
D  
C  
B  
A



**ELECTRONIC COPY**

PART NAME		DESCRIPTION		DATE	
D960133, D970551		304 STAINLESS		4/98	
FILE LOCATION /home/dcc/bdes/D960505.pdf		MATERIAL 304 STAINLESS		DATE 4/98	
		FINISH NONE		TITLE LOS BOTTOM PLATE	
				PARTS LIST D960505	
				SCALE 1:1	
				SHEET 1 OF 1	

E

C

7

9

NOTES: (UNLESS OTHERWISE SPECIFIED)  
1. BREAK ALL SHARP EDGES.  
2. SPECIFICATIONS FOR THE CONSTRUCTION  
OF THIS ASSEMBLY ARE COVERED IN  
THE LARGE OPTIC SUSPENSION  
SPECIFICATION, LIGO E970038.

H

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E

D

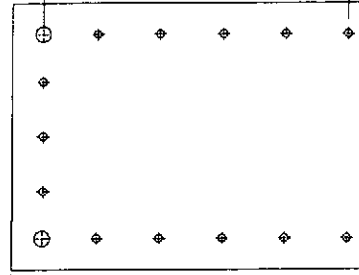
C

B

A

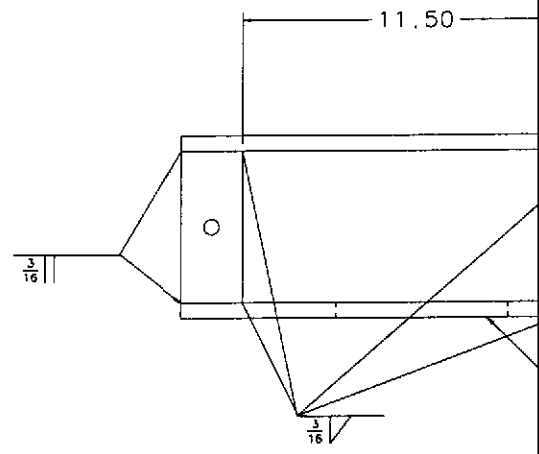
10X, 13.500

20X, 2.000



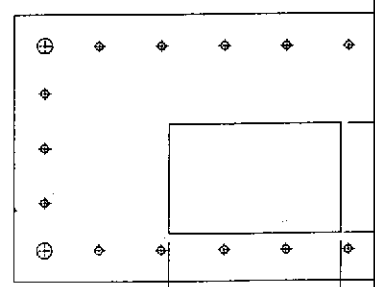
15.50

11.50



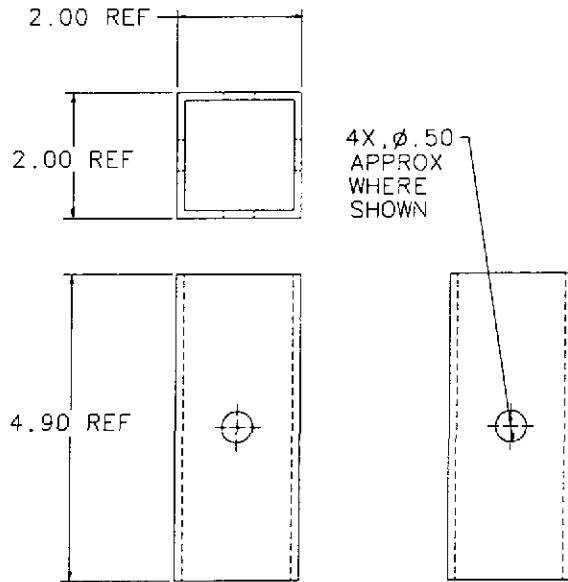
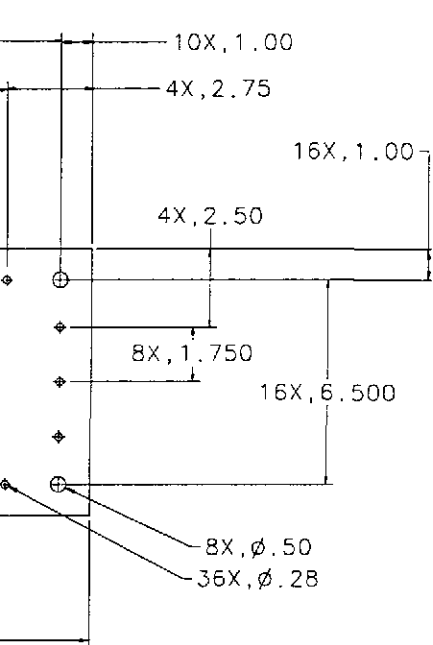
3/16

3/16

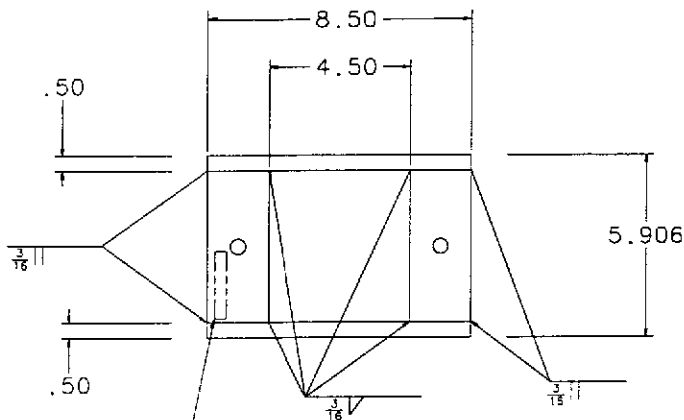
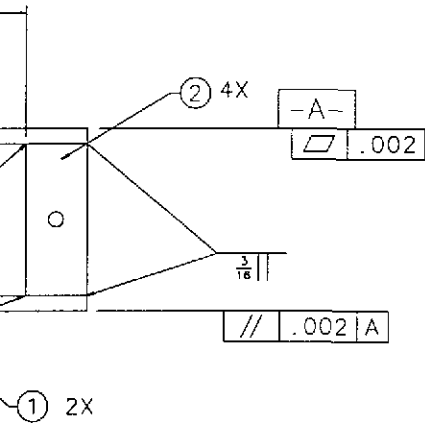


5.50

REV	DATE	DRAWN BY	CHECKED	DOC	304 DESCRIPTION
A	1/18/98	J. HAZEL			E980CC04/INITIAL RELEASE
B		J. HAZEL			E980CC08/ATTACHED, I.D. PLACEMENT
C	5/11/98	J. HAZEL			E980CC09/20 DIM FROM EDGE BAS 30 FROM EDGE 122 HOLE-1.50 MAX 1.00

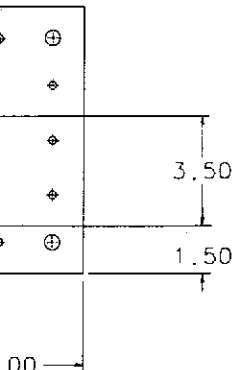


LEG DETAIL  
SCALE 1/1



APPROX LOCATION  
FOR ASSEMBLY  
IDENTIFICATION  
D960145-C nnn

**ELECTRONIC  
COPY**



REV	DATE	DRAWN BY	CHECKED	DOC	304 DESCRIPTION
4					LEGS: 2.0 x 2.0 x .125 WALL THICKNESS
2					PLATES: 15.5 x 8.5 x .5 (REF)
2					304 STAINLESS
1					304 STAINLESS

APPROVALS	DATE	FILE
J. Hazel	5/98	0960145

MATERIAL	304 STAINLESS	REV	C
FILE LOCATION	home/dcc/docs/D960145.ppt	REV	C
SEE NOTES		MAX 1/2	SHEET 1 OF 1