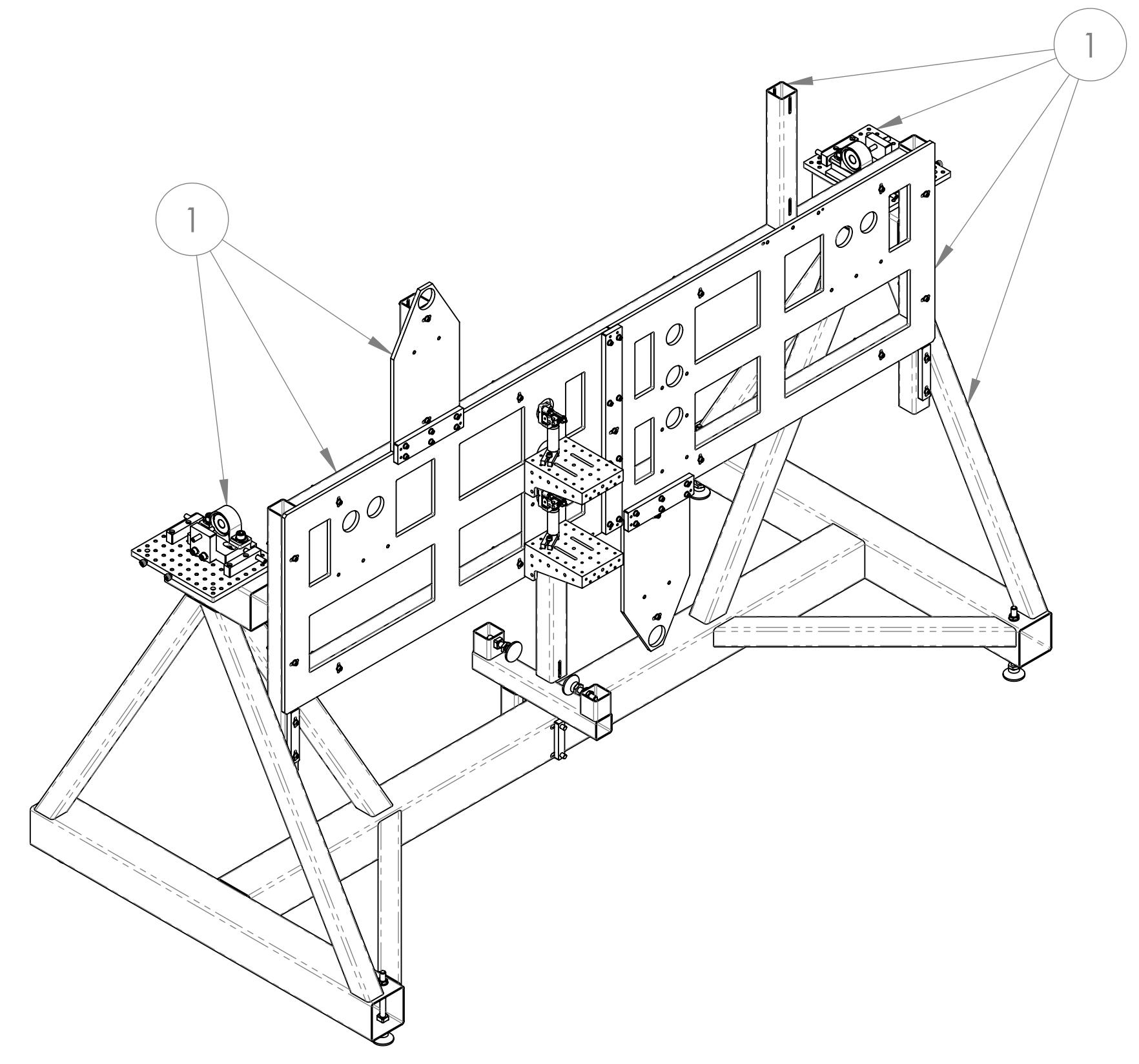
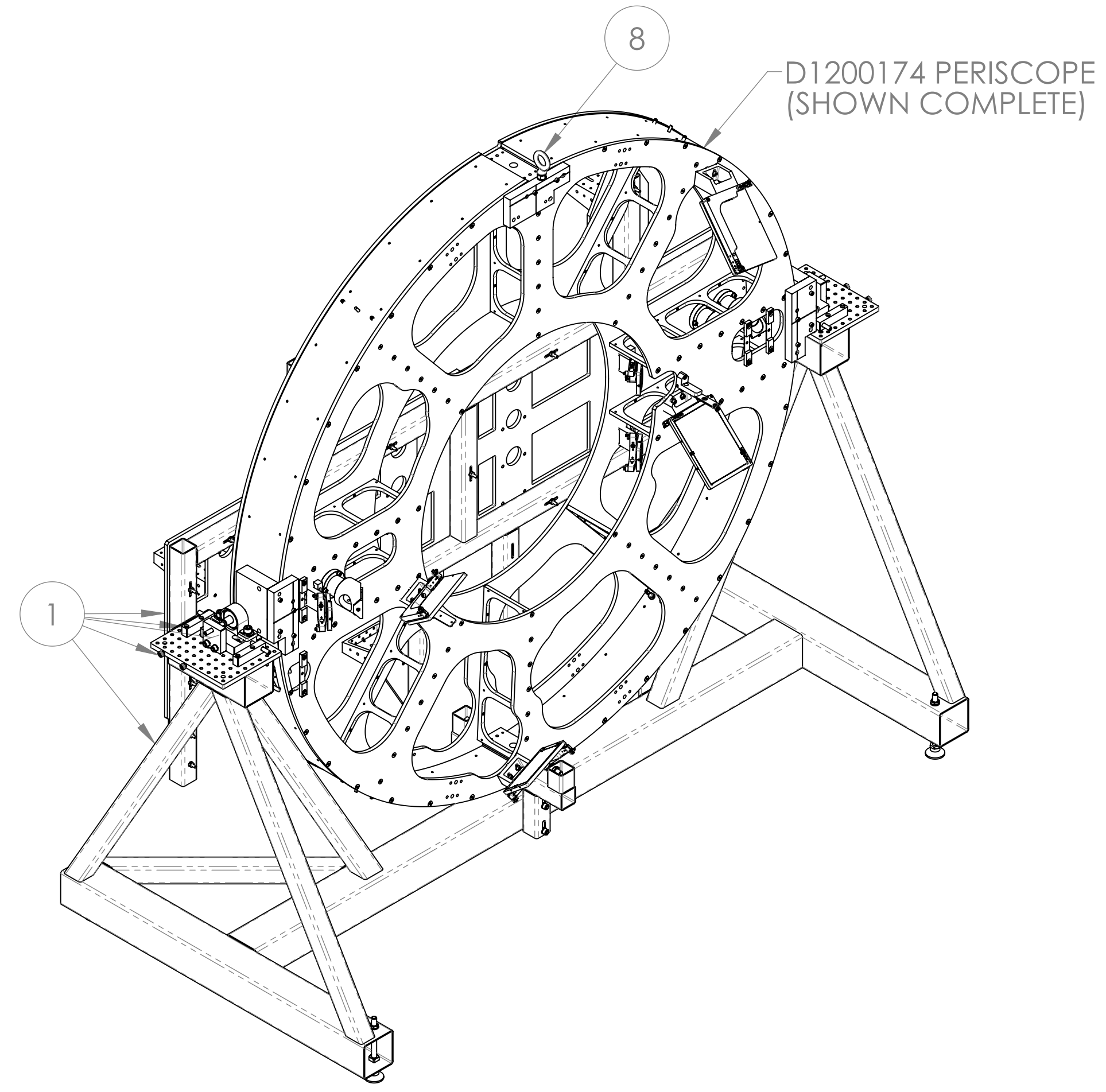


- NOTES:
- ① NOTED FOUR BREADBOARDS EACH TO BE LEVEL WITHIN 0.3 MRAD, AND EQUAL IN ELEVATION WITHIN 0.01" BY OPTICAL LEVEL.
  - ② CENTER EACH TEMPLATE ASSEMBLY HORIZONTALLY WITHIN ITS CRADLE TO BE EQUIDISTANT FROM THE NOTED HOLES TO THE BREADBOARDS. FOR EACH TEMPLATE ASSEMBLY, THESE TWO DIMENSIONS SHOULD MATCH WITHIN 0.02".
  - ③ NOTED ANGLE BRACKETS ARE BASE OF LASER SYSTEMS. LASER SYSTEMS NOT SHOWN.
  - ④ NOTED MIRROR (ITEM ⑮) HR FACES TO BE POSITIONED 159.155 ± .060" FROM PERISCOPE FRAME FRONT PLATE (NEAREST FACE), AND ROUGHLY CONENTRIC WITH 2" TEMPLATE HOLES.
  - ⑤ SHOWING FLOOR MARK LOCATIONS FOR SET-UP OF SUPPORT ASSEMBLIES (ITEM ①). SEE LIGO-T1300585, SECTION 2.

REV.	DATE	DCN #	DRAWING TREE #
v1	25 JUN 2013	-	
v2	30 JAN 2014	E1400015-x0	

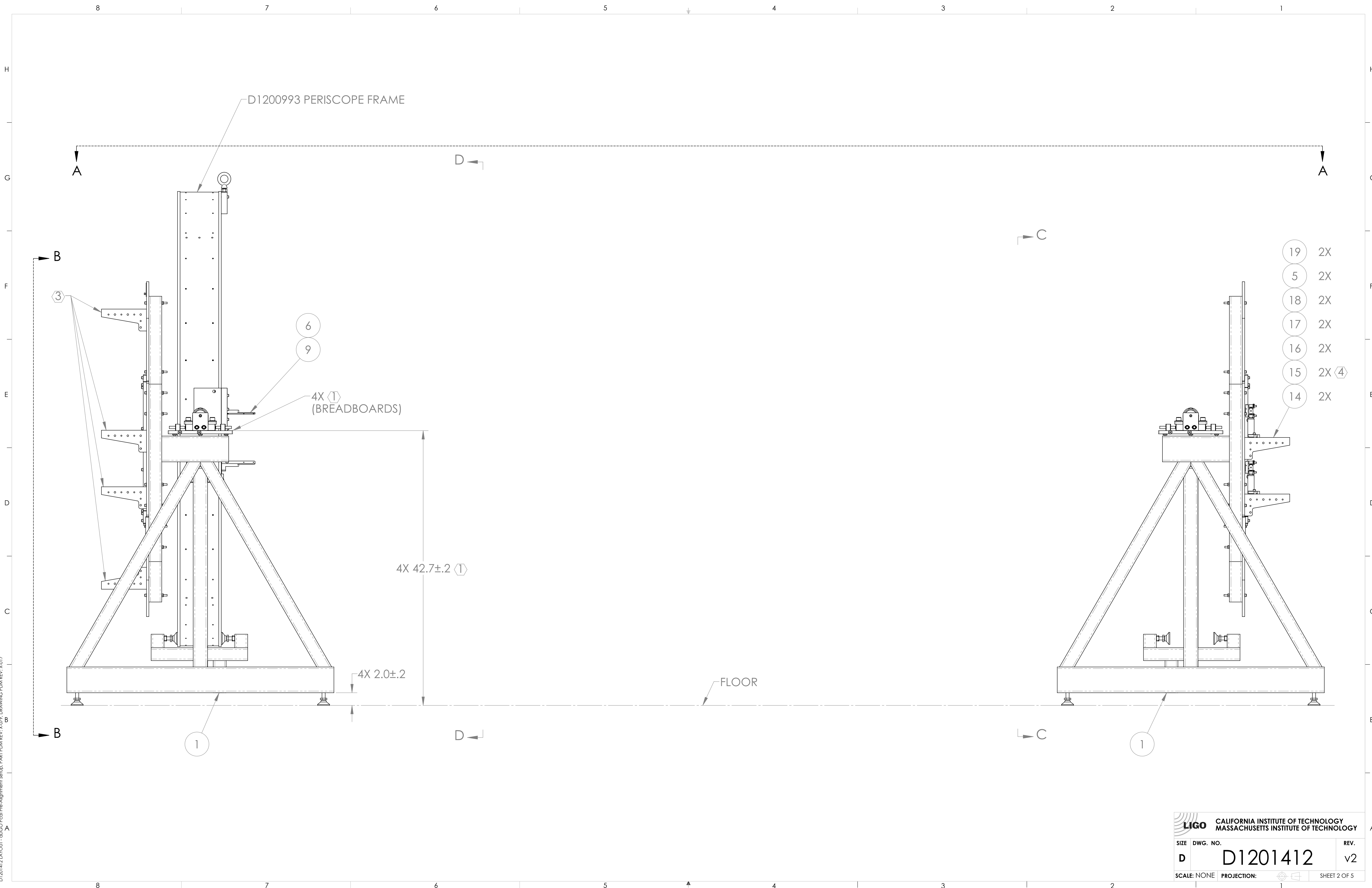


ITEM NO.	PART NUMBER	DESCRIPTION	REV	MATERIAL	QTY	SPARE	TOTAL
19	92196A541 (McM-Carr) or equiv	SCREW, SOCKET HEAD CAP, 1/4-20 UNC-2A X 0.875 LONG		18-8 SSSL	2		2
18	UPH3 (Thorlabs)	POST HOLDER, 3" HEIGHT		6061-T6 Al	2		2
17	TR2 (Thorlabs)	OPTICAL POST, 1/2" DIA., 2"L, 8-32 STUD, 1/4-20 HOLE		300 SSSL	2		2
16	U100-A2H (Newport)	MIRROR MOUNT, 1" DIA., TIP TILT, LOCKING, RIGHT HAND		6061-T6 Al	2		2
15	MI2045-1047 (PRECISION PHOTONICS)	MIRROR, 1" DIAMETER, 1047NM HR, 45 DEGREE INCIDENCE		TRANSPARENT GLASS	2		2
14	AP90RL (Thorlabs)	ANGLE BRACKET		6061-T6 Al	2		2
13	92196A191 (McM-Carr) or equiv	SCREW, SOCKET HEAD CAP, #8-32 UNC-2A X 0.3125 LONG		18-8 SSSL	4		4
12	D1300072	αLIGO PCAL TOOLING, PERISCOPE TARGET DISC	v1	6061-T6 Al	AR		AR
11	92196A537 (McM-Carr) or equiv	SCREW, SOCKET HEAD CAP, 1/4-20 UNC-2A X 0.5 LONG		18-8 SSSL	8		8
10	D1200170	αLIGO PCAL TOOLING, TARGET APERTURE	v1	6061-T6 Al	AR		AR
9	D1300138	αLIGO PCAL TOOLING, ALIGNMENT FLAG	v1	N/A	AR		AR
8	D1300621	αLIGO PCAL TOOLING, PERISCOPE LIFT BLOCK ASSEMBLY	v1	N/A	1		1
7	MS16555-660	DOWEL PIN, 3/8D, 1-1/4L		416 SSSL	6		6
6	92196A540 (McM-Carr) or equiv	SCREW, SOCKET HEAD CAP, 1/4-20 UNC-2A X 0.75 LONG		18-8 SSSL	14		14
5	98017A655 (McM-Carr) or equiv per NAS 1149-C0432R	WASHER, FLAT, 1/4		300 SSSL	12		12
4	92196A545 (McM-Carr) or equiv	SCREW, SOCKET HEAD CAP, 1/4-20 UNC-2A X 1.375 LONG		18-8 SSSL	6		6
3	D1201576-02	αLIGO PCAL TOOLING, PERISCOPE PRE-ALIGNMENT TIP AXIS ASSEMBLY, LH	v1	N/A	1		1
2	D1201576-01	αLIGO PCAL TOOLING, PERISCOPE PRE-ALIGNMENT TIP AXIS ASSEMBLY, RH	v1	N/A	1		1
1	D1201544	αLIGO PCAL TOOLING, PERISCOPE PRE-ALIGNMENT SUPPORT ASSEMBLY	v1	N/A	2		2

DIMENSIONS ARE IN		TOLERANCES:		ANGULAR ± °	
.XX	±	.XXX	±		
MATERIAL		FINISH		NEXT ASSY	
N/A		N/A μinch		N/A	

CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY		PART NAME		<b>LAYOUT - αLIGO PCAL, PRE-ALIGNMENT SETUP</b>	
SYSTEM	ADVANCED LIGO	SUB-SYSTEM	AOS	DESIGNER	R. SAVAGE C. CONLEY
CHECKER		DATE	12 DEC 2012	SIZE	D
APPROVAL		DCN	25 JUN 2013	DWG. NO.	<b>D1201412</b>
		SCALE	NONE	PROJECTION	
					REV. v2
					SHEET 1 OF 5

D1201412 LAYOUT - αLIGO PCAL Pre-Alignment Setup, PART PDM REV. X-029, DRAWING PDM REV. X-017



D1200993 PERISCOPE FRAME

4X (1)  
(BREADBOARDS)

4X 42.7±.2 (1)

4X 2.0±.2

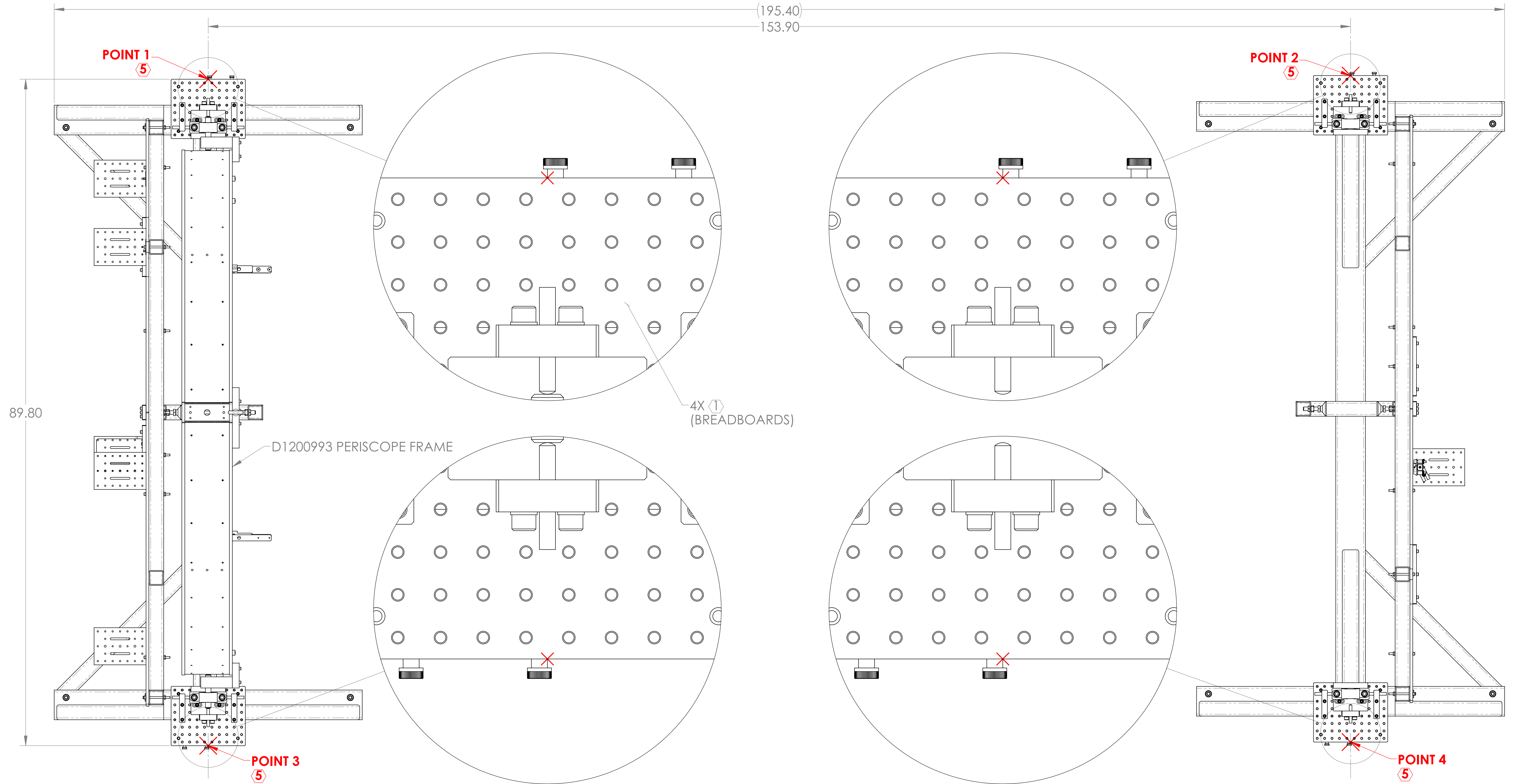
- (19) 2X
- (5) 2X
- (18) 2X
- (17) 2X
- (16) 2X
- (15) 2X (4)
- (14) 2X

		CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY	
SIZE	DWG. NO.	REV.	
D	D1201412	v2	
SCALE: NONE		PROJECTION:	SHEET 2 OF 5

D:\2014\12\LAYOUT - d1201412\Front Pre-Alignment Setup, PART PDM REV: X.025, DRAWING PDM REV: X.017

8 7 6 5 4 3 2 1

H  
G  
F  
E  
D  
C  
B  
A



VIEW A-A

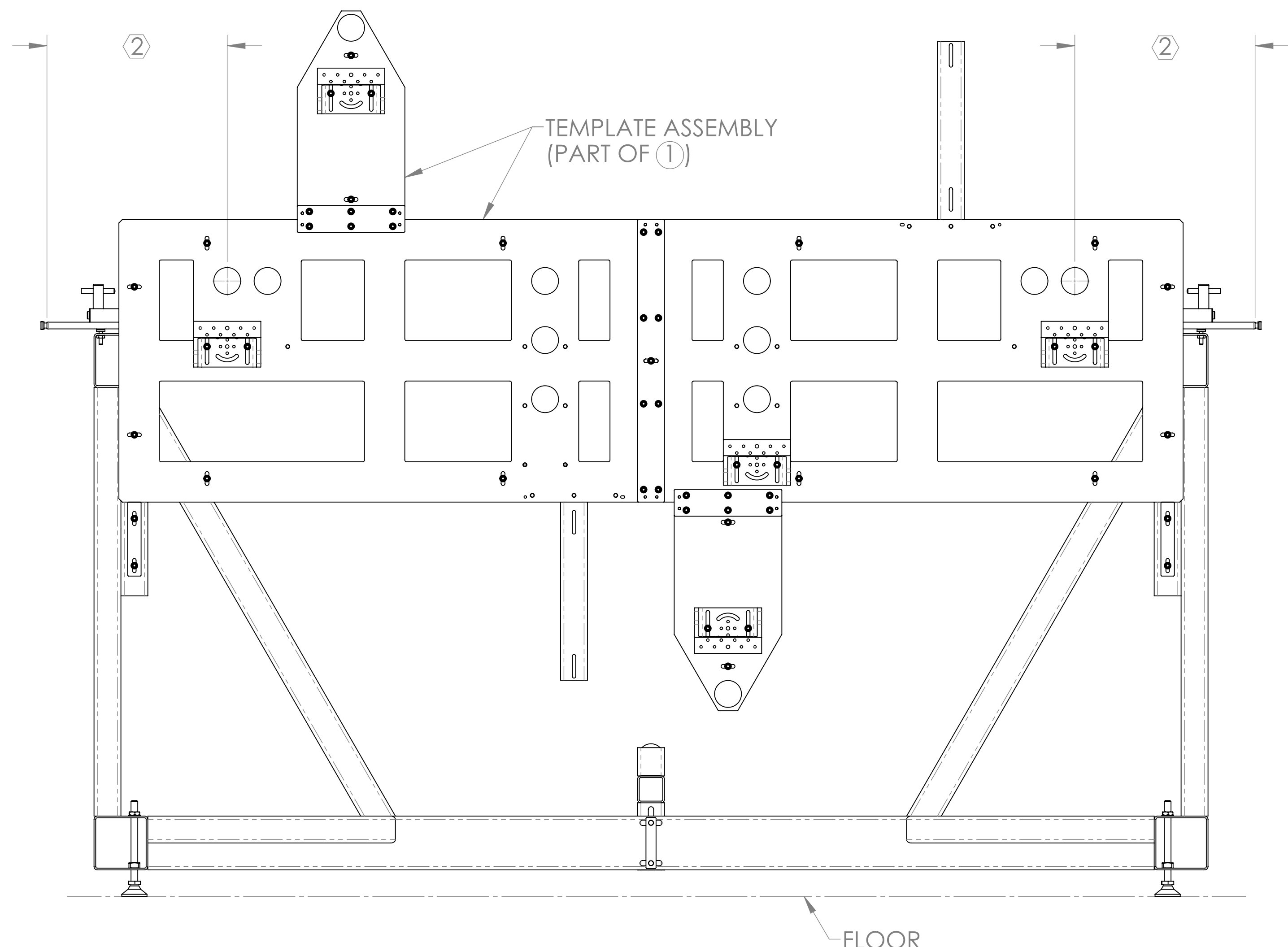
**LIGO** CALIFORNIA INSTITUTE OF TECHNOLOGY  
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

SIZE	DWG. NO.	REV.
D	D1201412	v2
SCALE: NONE PROJECTION:		SHEET 3 OF 5

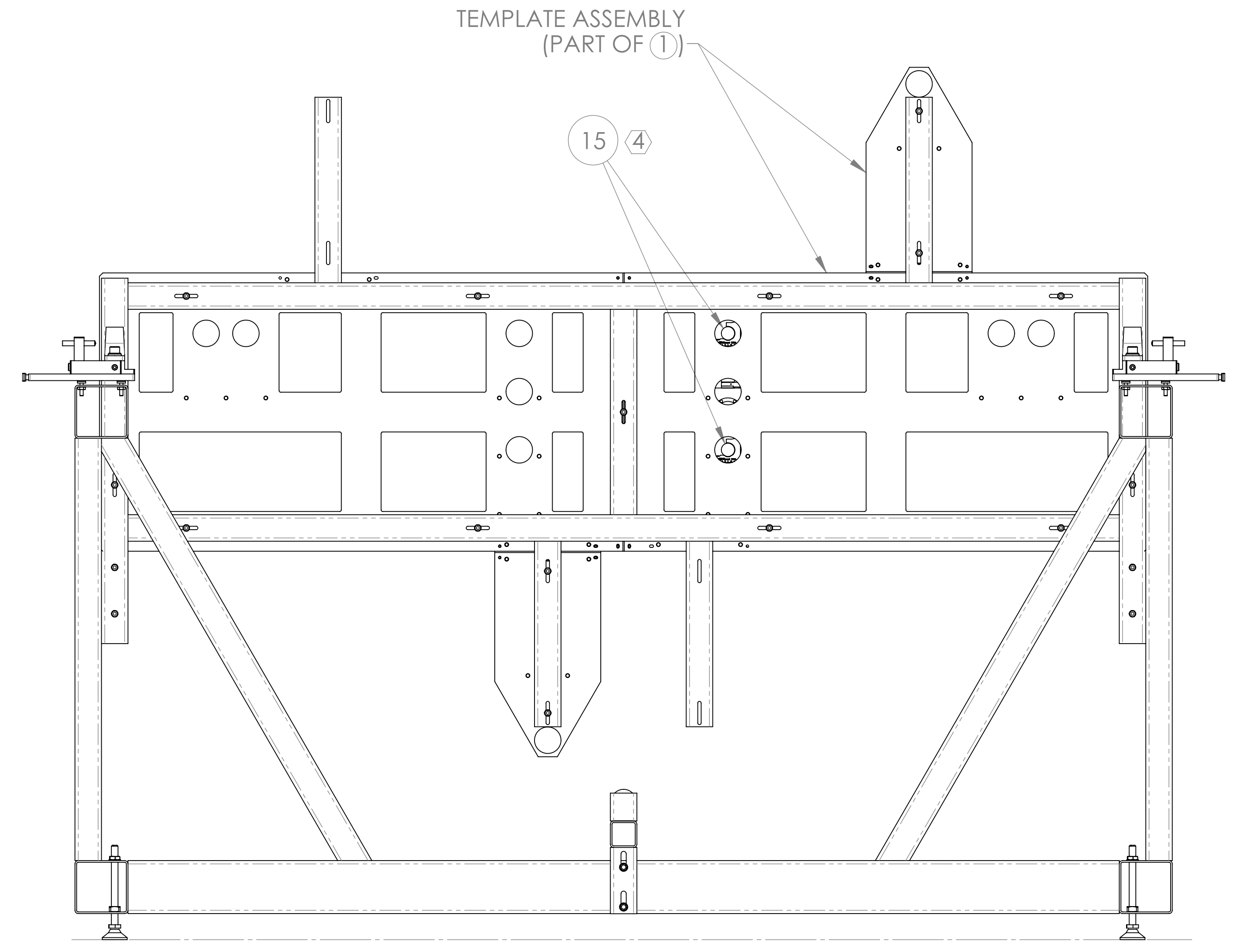
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8 7 6 5 4 3 2 1

H  
G  
F  
E  
D  
C  
B  
A



VIEW B-B  
(SHOWING TOOLING ONLY)



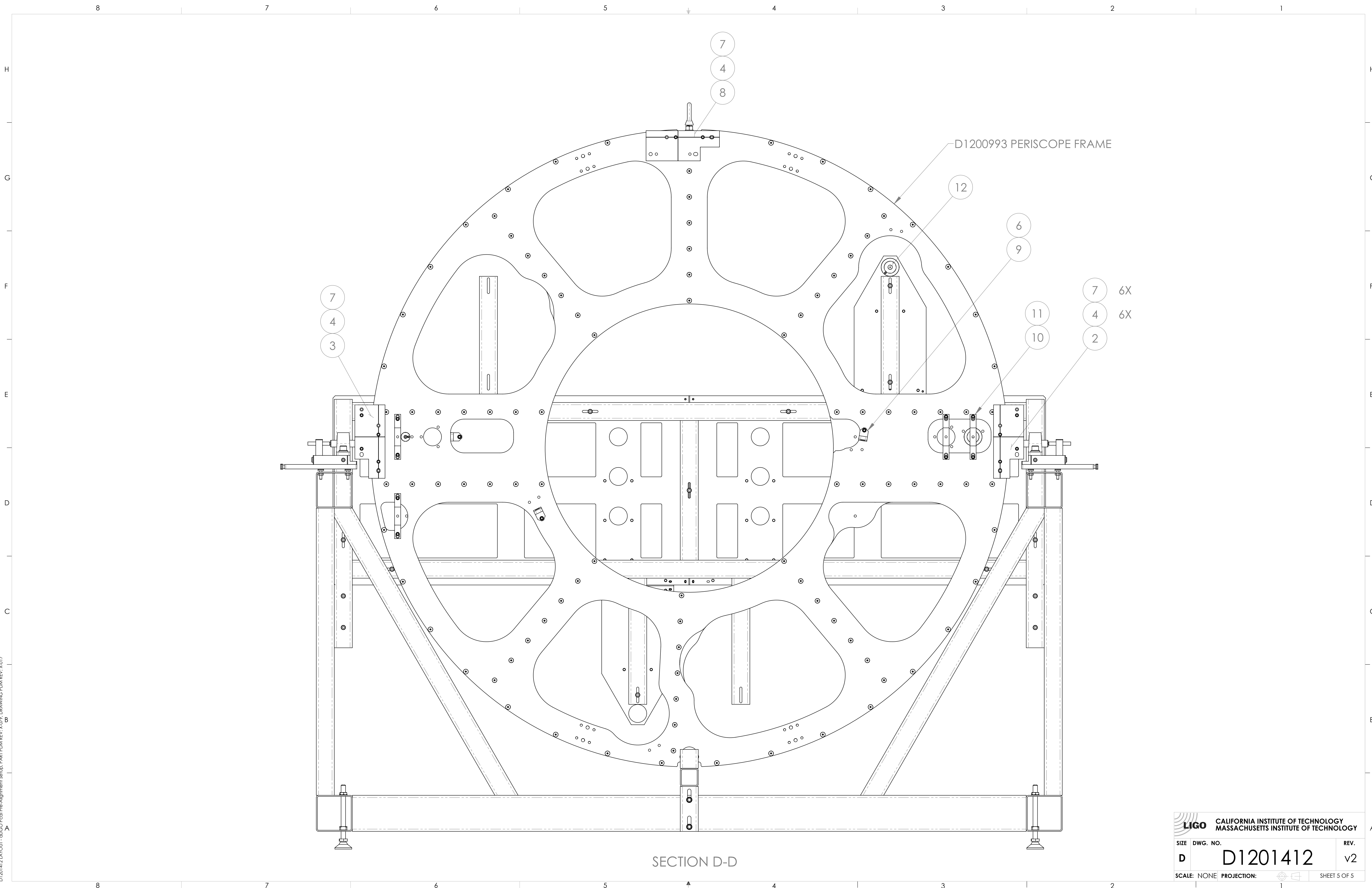
SECTION C-C

**LIGO** CALIFORNIA INSTITUTE OF TECHNOLOGY  
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

SIZE	DWG. NO.	REV.
D	D1201412	v2
SCALE: NONE		PROJECTION:
		SHEET 4 OF 5

D:\2014\12\Layout - d1201412\Final Pre-Alignment Setup, PART PDM REV.X.025, DRAWING PDM REV.X.017

8 7 6 5 4 3 2 1



SECTION D-D

D1200993 PERISCOPE FRAME

- 7 6X
- 4 6X
- 2

<b>LIGO</b> CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY		
SIZE	DWG. NO.	REV.
D	D1201412	v2
SCALE: NONE PROJECTION:		SHEET 5 OF 5

D:\2014\12\14\OUT - d:\ICD\Final Pre-Alignment Setup, PART FDM REV.X.029, DRAWING FDM REV.X.017