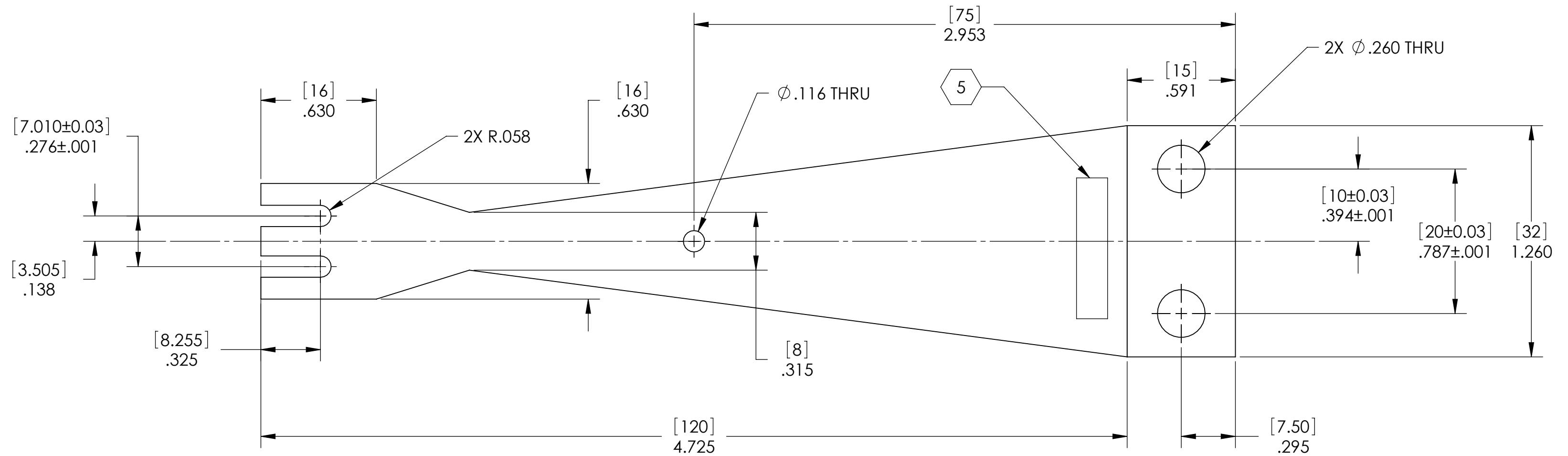


- NOTES:**
1. INTERPRET DRAWING PER ASME Y14.5-1994.
 2. REMOVE ALL SHARP EDGES, R.02 MIN.
 3. DO NOT SCALE FROM DRAWING.
 4. ALL MACHINING FLUIDS MUST BE FULLY SYNTHETIC, FULLY WATER SOLUBLE AND FREE OF SULFUR, SILICONE, AND CHLORINE.
 5. SCRIBE, ENGRAVE, OR MECHANICALLY STAMP (NO INKS OR DYES) DRAWING PART NUMBER, REVISION (AND VARIANT OR "TYPE" IF APPLICABLE) ON NOTED SURFACE OF PART FOLLOWED ON THE NEXT LINE WITH A THREE DIGIT SERIAL NUMBER. SERIAL NUMBERS START AT 500 FOR THE FIRST ARTICLE AND PROCEED CONSECUTIVELY. USE MINIMUM 0.12" HIGH CHARACTERS, UNLESS THE SIZE OF THE PART DICTATES SMALLER CHARACTERS. A VIBRATORY TOOL MAY BE USED. EXAMPLE: DXXXXXX-VY, TYPE-XX, S/N XXX
 6. ALL PARTS SHALL BE MANUFACTURED IN ACCORDANCE WITH LIGO SPECIFICATION E0900023.

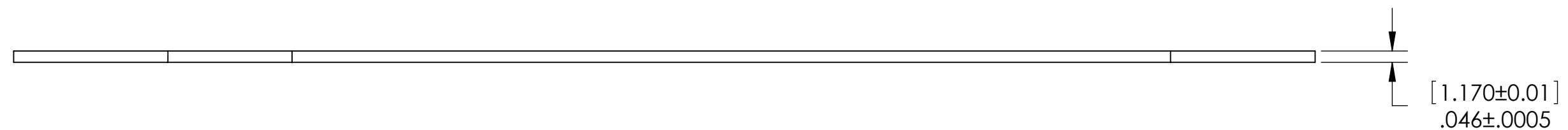
REV.	DATE	DCN #	DRAWING TREE #
A	28 MAR 2008	E080113-00	-
B	17 APR 2008	E080169-00	-
C	24 APR 2008	E080179-00	-
v1	03 AUG 2009	E0900226	-
v2	28 JUL 2010	E1000255	E080191
v3	11 OCT 2010	E1000575	E080191



← MATERIAL GRAIN DIRECTION →

INTERNAL LIGO NOTES:

1. EXCEL SPREADSHEET REF T1000353-v3
2. SHAPE FACTOR FOR LOWER BLADE = 1.48 AND YOUNGS MODULUS USED IS 1.86e11 Pa.
3. LOAD ON LOWER BLADE (FLAT) = 6.0875 kg AND UNCOUPLED LOAD = 3.0525 kg.
4. PREDICTED UNCOUPLED SUSPENSION FREQUENCY = 2.78 Hz.
5. PREDICTED FIRST BLADE INTERNAL FREQUENCY = 306 Hz.
6. MAXIMUM STRESS = 982 MPa
7. EXCEL SPREADSHEET VALUES OF A MID TO MID DISTANCE OF 64.1 mm AND A RADIUS OF CURVATURE OF 99.3 mm GIVES A FLAT BLADE ON LOADING FROM THE EXCEL EQUATIONS. ANSYS PREDICTS WITH THESE MID-TO MID AND ROC VALUES A DEFLECTION OF 58.1 mm, HENCE 6 mm ABOVE FLAT WHEN LOADED.
8. FOR A MID TO MID DISTANCE OF 59.92 mm AND A RADIUS OF CURVATURE 107.8 mm, ANSYS PREDICTS A DEFLECTION OF 59.53 mm. i.e. VERY CLOSE TO FLAT.
9. THE CURRENT BLADE IS DESIGNED WITH A MID TO MID DISTANCE OF 62.01 AND RADIUS OF CURVATURE OF 103.15 mm, ANSYS PREDICTS A DEFLECTION OF 59.2 mm. THIS MID TO MID DISTANCE OF 62.01 mm IS HALF WAY BETWEEN THE EXCEL VALUE (64.1 MM) AND THE ANSYS VALUE (59.92 mm) FOR WHICH THE TWO DIFFERENT METHODS PREDICT A FLAT BLADE WHEN LOADED, AND IS A COMPROMISE DESIGN.
10. LENGTH IS 120 mm (135 mm INCLUDING CLAMPING LENGTH), THICKNESS IS 1.17 mm AND WIDTH IS 32 mm.
11. IN THE CURVED SKETCH IN SW PART ADD MID TO MID DEFLECTION AND ADJUST RADIUS UNTIL DESIRED LENGTH IS ATTAINED.
12. IN SW PART, BLADE IS DRAWN WITH SHEET METAL AND EXTRUDED VERTICALLY DOWNWARDS.
13. ON SW DRAWING, SOLIDWORKS RADIUS VALUE IS THE VALUE MEASURED DIRECT FROM SW USING THE DIMENSION TOOL.



VIEWS PRIOR TO FORMING

NOTES AND TOLERANCES: (UNLESS OTHERWISE SPECIFIED)

DIMENSIONS ARE IN INCHES [MM]

TOLERANCES:
 .XX ± .01
 .XXX ± .005

ANGULAR ± 0.5°

MATERIAL

MARAGING STEEL C250

FINISH

32 μinch

LIGO CALIFORNIA INSTITUTE OF TECHNOLOGY
 MASSACHUSETTS INSTITUTE OF TECHNOLOGY

SYSTEM

ADVANCED LIGO

SUB-SYSTEM

SUS

NEXT ASSY

HLTS UPPER MASS ASSY

PART NAME

HLTS LOWER BLADE

DESIGNER

B. KIRSNER

DRAFTER

CIT

CHECKER

JUL 2008

APPROVAL

SIZE

c

DWG. NO.

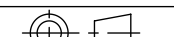
D020615

REV.

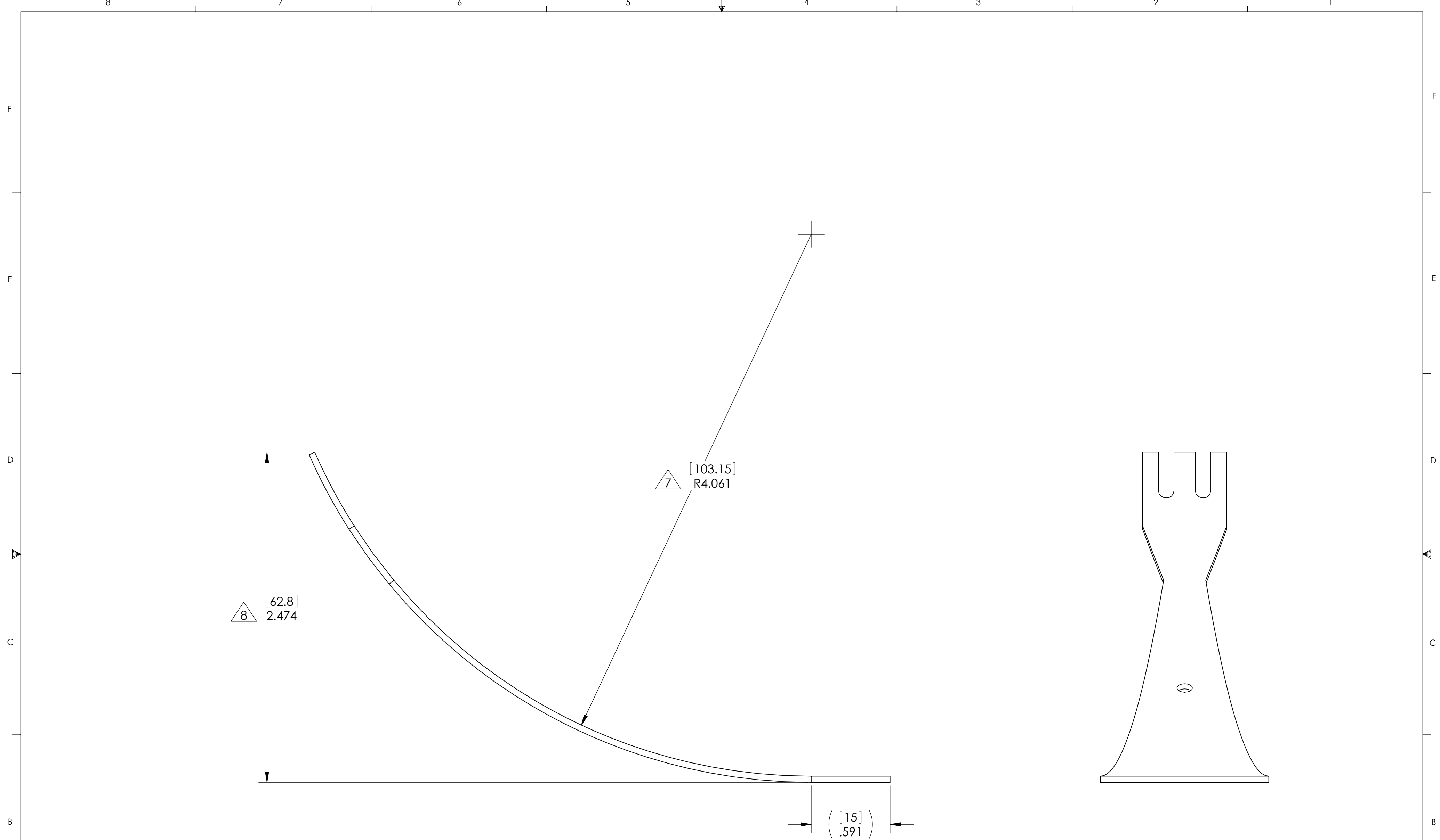
v3

SCALE: 2:1



PROJECTION:





SHEET 1 OF 2



VIEWS AFTER FORMING AND HEAT TREATMENT

-  THE RADIUS OF THE CURVATURE IS THE INSIDE RADIUS
-  THE OVERALL DEFLECTION IS MEASURED FROM THE BOTTOM OF THE BASE POINT TO THE HIGHEST POINT ON THE TIP

 CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY		
SIZE C	DWG. NO. D020615	REV. V3
SCALE: 2:1	PROJECTION: 	SHEET 2 OF 2