PWB FABRICATION NOTES (Rev. D, SPP_TEL EM FAB 02/28/14) CALTECH/SPACE RADIATION LABORATORY

- 1. ALL SECTIONS AND SUBSECTIONS REFERRED TO IN THIS DOCUMENT ARE PER JPL SPECIFICATION D-8208 Rev. K
- 2. THIS DOCUMENT AND RELATED ARTWORK ARE COMPUTER GENERATED CHANGES ARE TO BE PERFORMED ON THE ORIGINAL DATABASE ON FILE AT CALTECH
- FABRICATE PRINTED WIRING BOARD PER JPL SPECIFICATION D-8208 SECTION 3.6 AND IAW IPC-6012, CLASS 3 FABRICATE RIGID-FLEX PER IPC-6013, CLASS 2
- BOARD DETAILS: FAB DRAWING NAME: SPP_TEL_500201A NUMBER OF LAYERS: 10 LAYER CONTRUCTION DRAWING NAME: LAYERSTACK_SPP_TEL_500201A_20140228.pdf X-DIMENSION: 17.5cm Y-DIMENSION: 13.5cm BOARD THICKNESS: 0.062" INCH +/- 0.005 INCH 8 MIL TRACE AND 8 MIL SPACE MINIMUM ON ALL LAYERS* * 5 mil spacing for short distances at connector and device fanout

5. MATERIALS:

MATERIALS USED SHALL BE TRACEABLE TO THE MANUFACTURER'S LOT. CERTIFICATION SHALL BE SUPPLIED WITH ALL TEST DATA

LAMINATE AND PRE-PREGS: POLYIMIDE IAW IPC-4101 FINAL COPPER WEIGHT: EXTERNAL 1 OZ. INTERNAL 0.5 OZ.

- 6. SEPARATION BETWEEN ADJACENT CONDUCTOR LAYERS SHALL BE A MINIMUM OF 0.0035 INCHES AND CONSIST OF A MINIMUM TWO PLIES OF PRE-PREG
- 7. BOW AND TWIST SHALL NOT EXCEED 0.50%

ETCHBACK: NEGATIVE ETCHBACK SHALL BE PROHIBITTED POSITIVE ETCHBACK SHALL BE 0.0002-0.002 INCH; 0.0005 INCH IS PREFERRED PLASMA DESMEAR/ETCHBACK IS THE PREFERRED METHOD

- 9. ANNULAR RING: EXTERNAL ANNULAR RING SHALL BE AT LEAST 0.002 INCH INTERNAL ANNULAR RING SHALL BE AT LEAST 0.001 INCH
 - HOLES: HOLE SIZES AND PLATING SHALL BE PER DRILL TABLE HOLE SIZES APPLY AFTER PLATING AND FINAL CONDUCTOR FINISH HOLE SIZE TOLERANCE +/- 0.003 INCH COPPER PLATING IN HOLES SHALL BE 0.0015 INCH NOMINAL THICKNESS WITH NO READING LESS THAN 0.001 INCH
- 11. HOLE FILLING:

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COMPONENT MOUNTING THROUGH HOLES SHALL NOT BE FILLED PLATED VIA HOLES LESS THAN 0.012 INCH CAN BE SOLDER FILLED UNLESS OTHERWISE SPECIFIED

- 12. SELECTIVE OUTER METALIZATION FINISH: HOT AIR SOLDER LEVEL (HASL) IAW IPC-6012, CLASS 3 UNLESS OTHERWISE SPECIFIED
 - A. FOR DURABLE GOLD (E.G. BETAPHASE EDGE CONNECTORS): ELECTROLYTIC NICKEL PER SAE-AMS-QQ-N290, CLASS 2, 200 MICROINCHES THICKNESS FOLLOWED BY ELECTROLYTIC GOLD PER ASTM B488-01, TYPE 1, MINIMUM 50 MICROINCHES THICK
 - B. FOR GOLD WIREBOND PADS: ELECTROLYTIC NICKEL PER SAE-AMS-QQ-N290, CLASS 2, 150 MICROINCHES THICKNESS FOLLOWED BY ELECTROLYTIC GOLD PER ASTM B488-01, TYPE 3, CODE A, 75-100 MICROINCHES THICK. GOLD SHALL BE 99.97% MINIMUM PURITY
 - C. FOR IMMERSION GOLD FINISH: ELECTROLESS NICKEL IMMERSION GOLD (ENIG) IAW IPC-4552 ELECTROLESS NICKEL MINIMUM 3 MICROINCHES THICK FOLLOWED BY IMMERSION GOLD MINIMUM 0.05 MICROINCHES THICK
- 13. IONIC CONTAMINATION SHALL BE MEASURED ON ONE BOARD PER LOT AND SHALL NOT EXCEED 10 MICROGRAMS PER SQUARE INCH. TEST DOCUMENTATION SHALL BE DELIVERED WITH THE BOARD. THE BOARD USED FOR IONIC CONTAMINATION TESTING SHALL BE BAKED AT 125F FOR 20 MINUTES PRIOR TO APPLICATION OF SOLDERMASK
- 14. SOLDER MASK:

LPI (GREEN) PER IPC-SM-840 TYPE H LAYERS: TOP AND BOTTOM LAYERS OVER BARE COPPER UNLESS OTHERWISE SPECIFIED COMPONENT PADS TO BE FREE FROM BLEEDING OR MISREGISTRATION LPI SOLDERMASK SHALL BE UV BUMPED PRIOR TO FINAL CURE DO NOT TENT VIAS

15. SILKSCREEN: MARKINGS ON BOTH SIDES SHALL BE MADE USING NON-CONDUCTIVE WHITE EPOXY INK

16. TEST COUPONS: REPRESENTATIVE TEST COUPONS SHALL BE MADE PER IPC-2221 AND IPC-6012 AND SHALL BE DELIVERED WITH THE FINISHED PWB

17. ELECTRICAL TESTING:

CONTINUITY AND SHORTS TESTING SHALL BE PERFORMED ON EACH PWB AT 100% SHORTS TESTING SHALL BE AT A MINIMUM OF 200V DC TESTING DOCUMENTATION SHALL BE DELIVERED WITH THE FINISHED PWB

18. FLEX-CIRCUIT:

FILLET AT FLEX TO RIGID TRANSITIONS WITH URALANE 5753 FILLET SHOULD NOT EXTEND ONTO FLEX IN EXCESS OF 90 MIL