PROPRIETARY NOTICE:
THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION OF ALTERA CORP. NEITHER THE DOCUMENT NOR SAID PROPRIETARY INFORMATION SHALL BE PUBLISHED, REPRODUCED, COPIED, DISCLOSED OR USED FOR ANY PURPOSE OTHER THAN CONSIDERATION OF THIS DOCUMENT WITHOUT THE EXPRESS WRITTEN PERMISSION OF A DULY AUTHORIZED REPRESENTATIVE OF ALTERA CORPORATION

DWG NO. 140-0320605-C1 REV C

REVISIONS

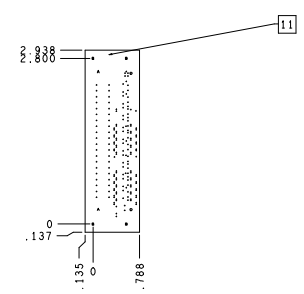
REV	DESCRIPTION	DATE	APPROVED

NOTES UNLESS OTHERWISE SPECIFIED:

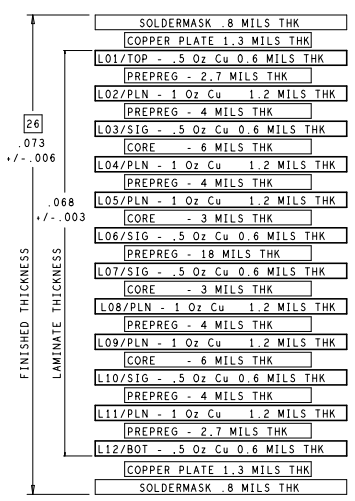
1. PCB VENDOR MUST NOTIFY RESPONSIBLE ALTERA PCB CONTACT OF ANY DISCREPANCIES FOUND BETWEEN FABRICATION DATA AND FABRICATION DRAWING NOTES.
2. THIS DRAWING IS VIEWED FROM THE PRIMARY OR TOP SIDE OF THE PCB.
3. [3] FABRICATION OF THIS PCB SHALL BE IN CONFORMANCE WITH THE FOLLOWING SPECIFICATIONS: IPC-6011 CLASS 2 (GENERIC).
4. ALL MATERIALS USED MUST BE RoHS COMPLIANT.
5. FABRICATION OF THIS PCB TO BE ACCEPTABLE TO IPC-A-600 CLASS 2 (LATEST REVISION).
6. ALL DIMENSIONAL LIMITS APPLY AFTER PLATING OR PROCESSING.
7. TOLERANCES OF DATUM HOLE TO: BOARD EDGE LOCATIONS +/- 0.010.
   DRILLED HOLE LOCATIONS +/- 0.003.
   V-SCORE LOCATIONS +/- 0.010
8. [8] BASE MATERIAL: FR4 GLASS EPOXY (ISOLA 370HR), MIN. Tg OF 170 DEGREES C.
9. FLAME CLASS: UL 94V-0 & MUST MEET REQUIREMENTS OF UL796.
10. MANUFACTURER MUST BE UL RECOGNIZED TO PRODUCE THIS PRODUCT SUCH THAT IT MEETS 130 DEGREES CELSIUS MAXIMUM OPERATING TEMPERATURE (MOT).
11. [11] THE FOLLOWING MUST BE MARKED OR ETCHED ON SECONDARY SIDE OF PCB IN AREA SHOWN:
    a) DATE CODE.
    b) UL RECOGNIZED VENDOR ID, UL TYPE DESIGNATION AND/OR MARKINGS WHICH REFLECT THE SPECIFIED FLAME CLASS AND MAXIMUM OPERATING TEMPERATURE RATINGS.
12. PCB VENDOR TO ENSURE ALL UNCONNECTED (NON-FUNCTIONAL) INTERNAL SIGNAL LAYER PADS AND VIAS ARE REMOVED.
13. HOLE/SLOT PLATING + 0.001 MIN. AVERAGE / 0.0008 ABSOLUTE MIN. PLATING. HOLE/SLOT DIAMETERS ARE SPECIFIED AFTER PLATING (SEE HOLE SCHEDULE).
14. [14] A. SOLDERMASK VIA PLUG AND CAP/TENT FROM TOP SIDE.
15. AFTER REVIEWING FABRICATION DATA, PCB VENDOR MUST DISCUSS WHETHER COPPER THIEVING IS NECESSARY WITH THE RESPONSIBLE ALTERA PCB CONTACT. WHEN DETERMINED NECESSARY, A SPACING OF 100 MILS FROM ANY OTHER COPPER FEATURE ON THE BOARD MUST BE MAINTAINED.
16. SMEAR REMOVAL SHALL NOT ETCHBACK GREATER THAN 0.001.
17. FINISHED CONDUCTOR WIDTH NOT TO BE REDUCED MORE THAN 20% OF MINIMUM WIDTH FROM ARTWORK SUPPLIED. FINISHED CONDUCTOR SPACING NOT TO BE REDUCED MORE THAN 20% OF MINIMUM SPACING FROM ARTWORK SUPPLIED.
18. INTERNAL ANNULAR RING 0.001 MINIMUM. EXTERNAL ANNULAR RING 0.002 MINIMUM. BOTH ARE MEASURED AT LINE TO PAD ENTRY. TEAR DROPPING OF TRACE TO PAD JUNCTION IS PERMITTED PROVIDED MINIMUM METAL-TO-METAL ARTWORK SPACINGS ARE NOT COMPROMISED.
19. [19] SOLDER MASK IS LIQUID PHOTO IMAGEABLE AND IN ACCORDANCE WITH IPC-SM-840C CLASS T. FINISH MUST BE GREEN AND GLOSSY. REGISTRATION TO BE WITHIN +/- 0.003 OF ITS RESPECTIVE OUTER CIRCUIT LAYERS. VENDOR MAY ADJUST SOLDERMASK WHEREVER SOLDERMASK PADS ARE THE SAME SIZE (1:1) TO PROVIDE UP TO .003 MAXIMUM CLEARANCE FROM MASK TO PAD PROVIDED NO ADJACENT COPPER IS EXPOSED AND NO CONFLICT IS PRODUCED WITH ANY STATED "VIA TENTING/PLUGGING" REQUIREMENTS.
20. PCB VENDOR TO ENSURE ALL VIAS ARE COMPLETELY FREE OF SOLDERMASK ON BOTTOM SIDE OF PCB.
21. [21] FINISH BOTH SIDES WITH 150 MICRO INCHES MINIMUM ELECTROLESS NICKEL (Ni) FOLLOWED BY 3-8 MICRO INCHES IMMERSION GOLD (Au).
22. REMOVE ALL SHARP EDGES AND BURRS 0.003" MAXIMUM.
23. [23] SILKSCREEN USING WHITE NONCONDUCTIVE INK, NO INK TO APPEAR ON EXPOSED COPPER SUCH AS PLATED THROUGH HOLE PADS AND SURFACE MOUNT LANDS. INK ON SOLDER MASK COVERED PADS IS PERMISSIBLE. CLIPPING OF SILKSCREEN 0.008 MAX. FROM PADS IS PERMITTED.
24. BOW & TWIST SHALL BE DETERMINED BY PHYSICAL MEASUREMENT AND PERCENTAGE CALCULATION IN ACCORDANCE WITH IPC-TM-650, METHOD 2.4.22. BOW AND TWIST MAY NOT EXCEED 0.7%
25. 100% CONTINUITY AND ISOLATION ELECTRICAL TESTING PER CURRENT IPC TEST METHODS REQUIRED FOR EVERY PCB. FINAL PCB TEST DATA MUST BE CROSS-REFERENCED TO IPC-D-356 FILE, NEUTRAL FILE OR NETLIST PROVIDED.
26. [26] CONTROLLED IMPEDANCE TRACES ARE AS FOLLOWS:
    a) TOLERANCE ON ALL LINES, UNLESS OTHERWISE SPECIFIED +/- 10%.
    b) SINGLE ENDED TRACES (.00425 & .0045) LYR 1-12 TO BE 50 OHMS.
27. PCB VENDOR TO PROVIDE ONE TEST COUPON AND ONE CROSS SECTION PER LOT WITH SHIPMENT.
28. PCB VENDOR TO PROVIDE 2 SOLDER SAMPLES WITH FIRST SHIPMENT.
29. DETAILS NOT SPECIFIED ARE AT MANUFACTURER'S OPTION, HOWEVER FINAL APPROVAL MUST BE OBTAINED.

DRILL CHART: TOP to BOTTOM
ALL UNITS ARE IN MILS

	FIGURE	SIZE	PLATED	QTY
14-A	•	10.0	PLATED	185
	•	40.0	PLATED	2
	•	125.0	PLATED	4
	•	40.0	NON-PLATED	2



PRIMARY SIDE SHOWN



DETAIL A
SCALE: NONE
(CROSS SECTION)

.	XX-XXX-XXXX		MATL	8
DASH	NEXT ASSY	USED ON	SPEC	3
APPLICATION			FNSH	19 21 23

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES IN ACCORDANCE WITH ANSI Y14.5.
DRILL TOLERANCES ARE PER 10387

TOLERANCES:
DEC .X ± .1
DEC .XX ± .01
DEC .XXX ± .005
FRACTIONS ± 1/64
ANGLES ± 1°

DWN P. Serino 08-May-07
CHKR
DSGN ENGR
RELEASE
CONTRACT NO. XXXXXXXX

ALTERA
(c) 2007 Altera Corporation
9330 SCRANTON RD., #400
SAN DIEGO, CA 92121

TITLE
PCB FABRICATION
HSMC DEBUG HEADER
BREAKOUT BOARD

SIZE	CAGE CODE	DWG NO.	REV
D	N/A	140-0320605-C1	C

SCALE: 1/1 SHEET 1 OF 1

REV C DWG NO. 140-0320605-C1