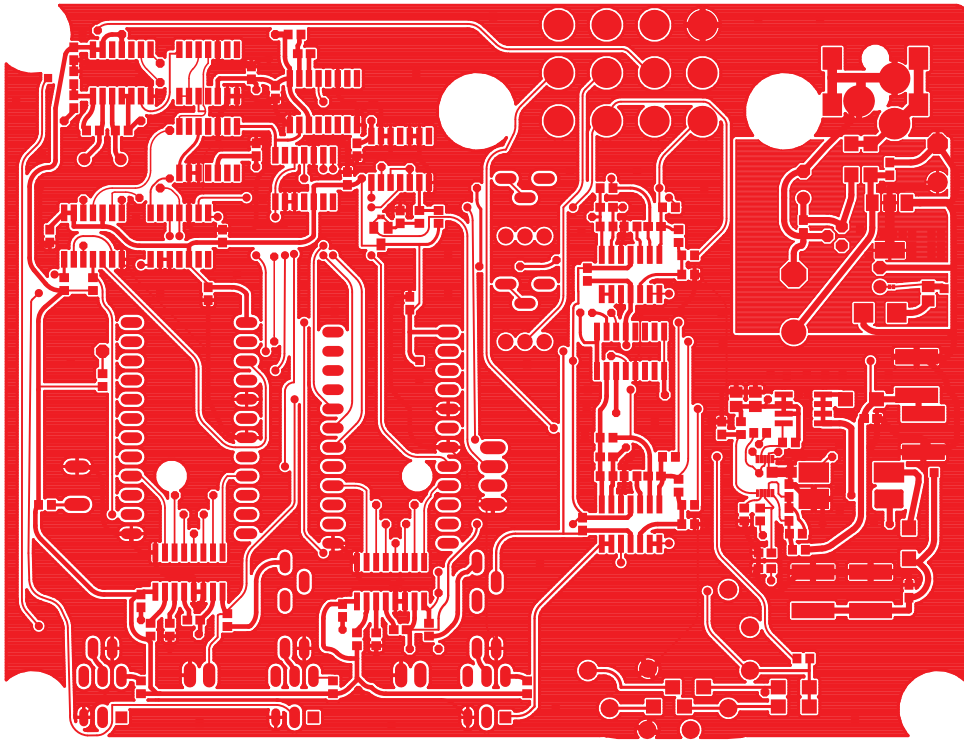


Copyright 2012 by Zittware@hotmail.com ALL RIGHTS RESERVED!  
 Licensed under TAPR / NCL license  
<http://www.Pinball-Mods.com>

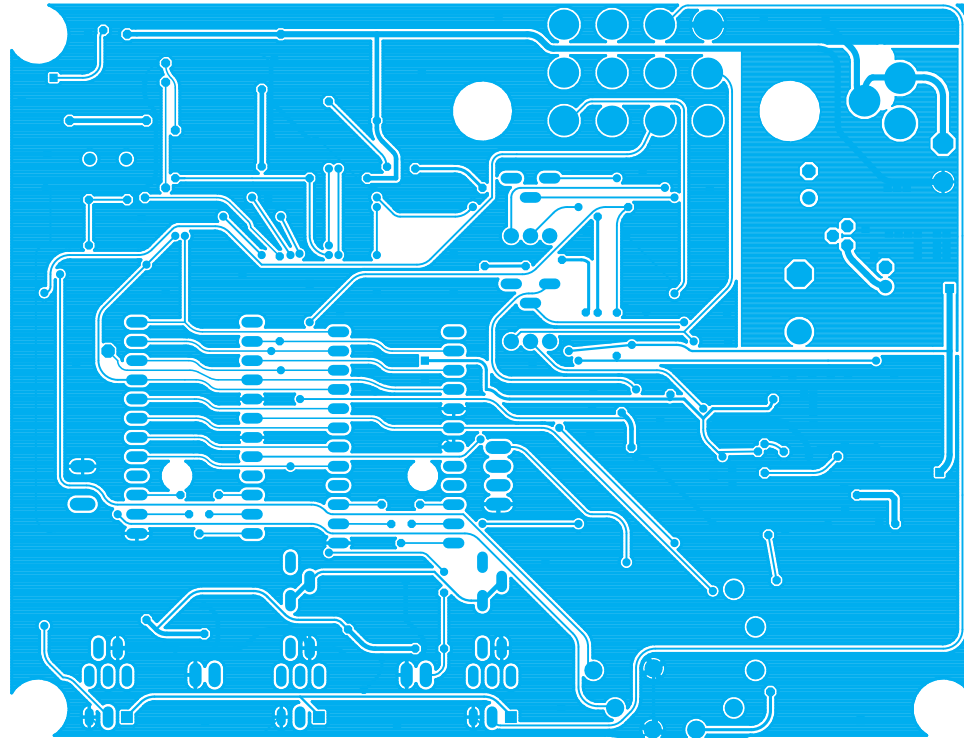
TITLE: XYPatternFabB

Document Number: REV: B

Date: 8/16/2012 11:56:59 PM Sheet: 2/2

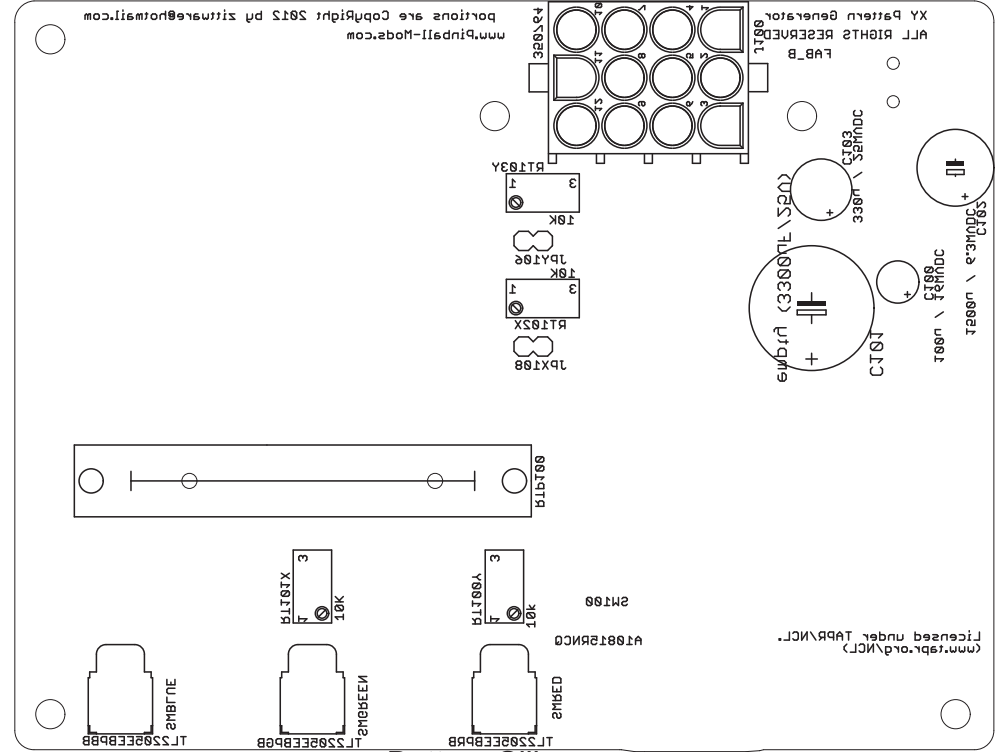


TOP Copper



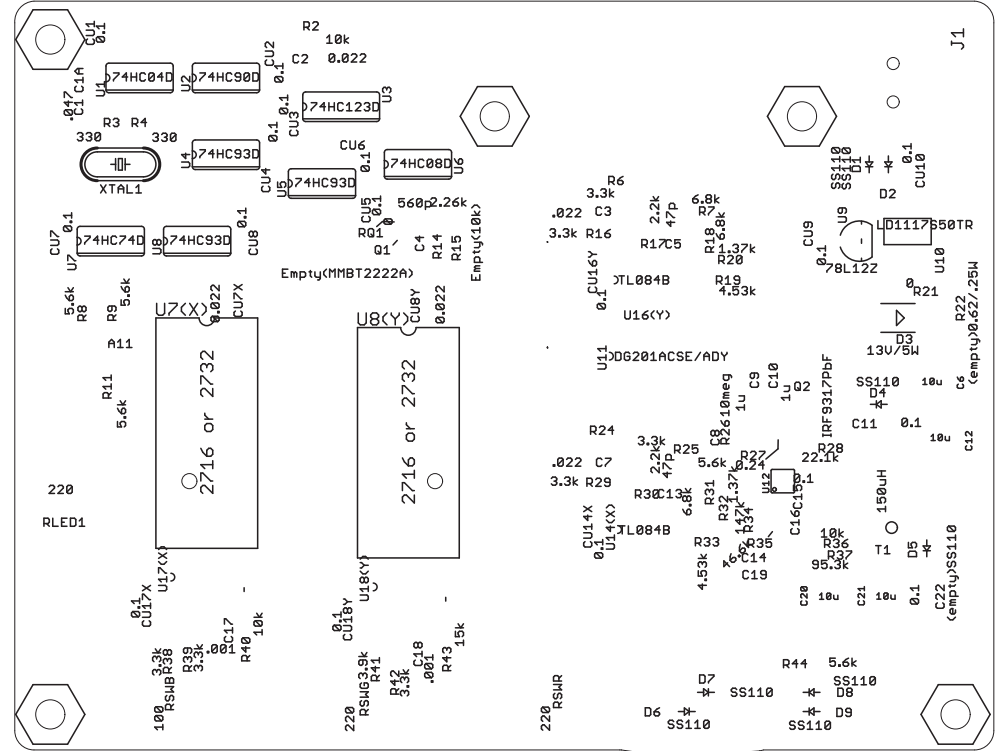
Bottom Copper

Copyright 2012 by Zittware@hotmail.com



Bottom Silkscreen

Licensed under TAPR/NCL ([www.tapr.org/NCL](http://www.tapr.org/NCL))



Top Silkscreen

XYPattern Fab B by Zittware@hotmail.com (licensed under TAPR / NCL)

Qty	DIGIKEY PN	RefDez	Value	Device	Description
17	311-1344-1-ND	C11, C15, C22, CU1, CU2, CU3, CU4, CU5, CU6, CU7, CU8, CU9, CU10, CU14X, CU16Y, CU17X, CU18Y		0.1 C-USC0603	CAPACITOR, American symbol
7	SS110-TPCT-ND	D1, D2, D4, D6, D7, D8, D9	SS110	SCHOTTKY-DIODESMA/DO-214AC	Schottky Diode
7	311-3.3KGRCT-ND	R6, R16, R24, R29, R38, R39, R42	3.3k	R-US_R0603	RESISTOR, American symbol
5	709-1163-1-ND	C2, C3, C7, CU7X, CU8Y		0.022 C-USC0603	CAPACITOR, American symbol
5	311-5.6KGRCT-ND	R8, R9, R11, R25, R44	5.6k	R-US_R0603	RESISTOR, American symbol
4	445-6119-1-ND	C6, C12, C20, C21	10u	C-USC2220K	CAPACITOR, American symbol
4	CT94EY103-ND	RT100Y, RT101X, RT102X, RT103Y	10K	TRIM_US-S64Y	POTENTIOMETER
4	568-2754-5-ND	U2, U4, U5, U8	74HC93D	74LS93D	Decade, divide by twelve and binary COUNTER
3	311-10.0KHRCT-ND	R2, R36, R40	10k	R-US_R0603	RESISTOR, American symbol
3	311-6.8KGRCT-ND	R7, R18, R31	6.8k	R-US_R0603	RESISTOR, American symbol
3	311-220GRCT-ND	RLED1, RSWG, RSWR		220 R-US_R0603	RESISTOR, American symbol
2	709-1159-1-ND	C17, C18		0.001 C-USC0603	CAPACITOR, American symbol
2	PCC151ACVCT-ND	C1A, C14	150p	C-USC0603	CAPACITOR, American symbol
2	709-1145-1-ND	C5, C13	47p	C-USC0603	CAPACITOR, American symbol
2	445-1587-1-ND	C9, C10	1u	C-USC0805	CAPACITOR, American symbol
2	609-3461-ND	JPX108, JPY106	JUMPER-3PTH	JUMPER-3PTH	
2	S9341-ND	PPX108, PPY106	JUMPER		
2	311-2.2KGRCT-ND	R17, R30	2.2k	R-US_R0603	RESISTOR, American symbol
2	311-1.2KGRCT-ND	R19, R32	1.37k	R-US_R0603	RESISTOR, American symbol
2	RMCF0603FT4K53CT-ND	R20, R33	4.53k	R-US_R0603	RESISTOR, American symbol
2	311-330GRCT-ND	R3, R4		330 R-US_R0603	RESISTOR, American symbol
2	A30884-ND	TPX, TPY		PINHD-1X2/90	PIN HEADER
2	296-1285-1-ND	U14(X), U16(Y)	TL084B	4AMP_P4+11D	OP AMP
2	DAC08CSZ-ND	U17(X), U18(Y)		DAC08S	
1	311-1373-1-ND	C1		0.047 C-USC0603	CAPACITOR, American symbol
1	338-1692-ND	C100	100u / 16WVDC	CPOL-USE2.5-6	POLARIZED CAPACITOR, American symbol
1	565-1489-ND	C102	1500u / 6.3WVDC	CPOL-USE5-10.5	POLARIZED CAPACITOR, American symbol
1	P5154-ND	C103	330u / 25WVDC	CPOL-USE3.5-8	POLARIZED CAPACITOR, American symbol
1	399-1057-1-ND	C16	56p	C-USC0603	CAPACITOR, American symbol
1	311-1379-1-ND	C19	68n	C-USC0603	CAPACITOR, American symbol
1	311-1079-1-ND	C4	560p	C-USC0603	CAPACITOR, American symbol
1	709-1164-1-ND	C8	470p	C-USC0603	CAPACITOR, American symbol
1	SMBJ5350B-TPMSCT-ND	D3	13V/5W	ZENER-DIODESMB	Z-Diode
1	CP-202A-ND	J1	CP-202A-ND	POWER JACKCOMBO	Power Jack
1	A1200-ND	J100		350764	350764
1	IRF9317TRPBFCT-ND	Q2	IRF9317PbF	P-MOSFET-SO8	P-Channel MOSFET
1	311-2.26KHRCT-ND	R14	2.26k	R-US_R0603	RESISTOR, American symbol
1	P0.0GCT-ND	R26	0 (was 10meg)	R-US_R0603	RESISTOR, American symbol
1	P.22AJCT-ND	R27		0.24 R-US_R0603	RESISTOR, American symbol
1	311-22.1KHRCT-ND	R28	22.1k	R-US_R0603	RESISTOR, American symbol
1	311-147KHRCT-ND	R34	147k	R-US_R0603	RESISTOR, American symbol
1	RMCF0603FT47K0CT-ND	R35	46.6k	R-US_R0603	RESISTOR, American symbol
1	311-95.3KHRCT-ND	R37	95.3k	R-US_R0603	RESISTOR, American symbol
1	311-3.9KGRCT-ND	R41	3.9k	R-US_R0603	RESISTOR, American symbol
1	311-15KGRCT-ND	R43	15k	R-US_R0603	RESISTOR, American symbol
1	311-100GRCT-ND	RSWB		100 R-US_R0603	RESISTOR, American symbol
1	987-1404-ND	RTP100		PSXXL45MM	
1	CKN9824-ND	SW100	A10815RNCQ	SP8T	
1	EG4855-ND	SWBLUE	TL2205EEBPBB	TL2205	
1	EG4857-ND	SWGREEN	TL2205EEBPGB	TL2205	
1	EG4859-ND	SWRED	TL2205EEBPRB	TL2205	
1	732-2331-1-ND	T1	150uH	XFMR_2COIL	
1	296-1189-5-ND	U1	74HC04D	7404D	Hex INVERTER
1	497-6447-1-ND	U10	LD1117S50TR	REG1117	800mA and 1A Low Dropout (LDO) Positive Regulator
1	ADG201AKRZ-ND	U11	DG201ACSE/ADY	DG201ACSE/ADY	
1	MAX1846EUB+-ND	U12	MAX1846EUB+	MAX1846	
1	568-1390-1-ND	U3	74HC123D	74123D	Retriggerable monostable MULTIVIBRATOR
1	568-1386-1-ND	U6	74HC08D	74S08D	Quad 2-input AND gate
1	74HC74DR2GOSCT-ND	U7	74HC74D	74S74D	Dual D type positive edge triggered FLIP FLOP, preset and clear
1	MC78L12ABPGOS-ND	U9	78L12Z	78L12Z	Positive VOLTAGE REGULATOR
1	CTX1013-ND	XTAL1	3.579MHz	CRYSTALHC49S	CRYSTAL
0		C101	empty (3300uF/25V)	CPOL-USE7.5-16	POLARIZED CAPACITOR, American symbol
0	SS110-TPCT-ND	D5	(empty)SS110	SCHOTTKY-DIODESMA/DO-214AC	Schottky Diode
0	MMBT2222ALT3GOSCT-ND	Q1	Empty(MMBT2222A)	MMBT2222ALT1-NPN-SOT23-BEC	NPN Transistor
0	311-10.0KHRCT-ND	R15	Empty(10k)	R-US_R0603	RESISTOR, American symbol
0	RHM.62MCT-ND	R22	(empty)0.62/.25W	R-US_R0805	RESISTOR, American symbol
0		U2	74HC90D	7490D	Decade, divide by twelve and binary COUNTER
				<b>Digikey.com BOM Cost</b>	<b>~\$75.51 as of 8/18/2012</b>
2	U7(X), U8(Y)	2732/16		2732 MEMORY	
				<b>Google.com BOM Cost</b>	<b>~\$5.00 as of 8/18/2012</b>
1	PCB	<a href="http://www.batchpcb.com/product_info.php?products_id=91905">http://www.batchpcb.com/product_info.php?products_id=91905</a>			
				<b>BatchPCB.com PCB Cost</b>	<b>~\$62.36 as of 8/18/2012</b>

# The TAPR Open Hardware License

Version 1.0 (May 25, 2007)

Copyright 2007 TAPR – <http://www.tapr.org/OHL>

## PREAMBLE

Open Hardware is a thing – a physical artifact, either electrical or mechanical – whose design information is available to, and usable by, the public in a way that allows anyone to make, modify, distribute, and use that thing. In this preface, design information is called “documentation” and things created from it are called “products.”

The TAPR Open Hardware License (“OHL”) agreement provides a legal framework for Open Hardware projects. It may be used for any kind of product, be it a hammer or a computer motherboard, and is TAPR's contribution to the community; anyone may use the OHL for their Open Hardware project. You are free to copy and use this document provided only that you do not change it.

Like the GNU General Public License, the OHL is designed to guarantee your freedom to share and to create. It forbids anyone who receives rights under the OHL to deny any other licensee those same rights to copy, modify, and distribute documentation, and to make, use and distribute products based on that documentation.

Unlike the GPL, the OHL is not primarily a copyright license. While copyright protects documentation from unauthorized copying, modification, and distribution, it has little to do with your right to make, distribute, or use a product based on that documentation. For better or worse, patents play a significant role in those activities. Although it does not prohibit anyone from patenting inventions embodied in an Open Hardware design, and of course cannot prevent a third party from enforcing their patent rights, those who benefit from an OHL design may not bring lawsuits claiming that design infringes their patents or other intellectual property.

The OHL addresses unique issues involved in the creation of tangible, physical things, but does not cover software, firmware, or code loaded into programmable devices. A copyright-oriented license such as the GPL better suits these creations.

How can you use the OHL, or a design based upon it? While the terms and conditions below take precedence over this preamble, here is a summary:

- You may modify the documentation and make products based upon it.
- You may use products for any legal purpose without limitation.
- You may distribute unmodified documentation, but you must include the complete package as you received it.
- You may distribute products you make to third parties, if you either include the documentation on which the product is based, or make it available without charge for at least three years to anyone who requests it.
- You may distribute modified documentation or products based on it, if you:
  - License your modifications under the OHL.
  - Include those modifications, following the requirements stated below.

- Attempt to send the modified documentation by email to any of the developers who have provided their email address. This is a good faith obligation – if the email fails, you need do nothing more and may go on with your distribution.
- If you create a design that you want to license under the OHL, you should:
  - Include this document in a file named LICENSE (with the appropriate extension) that is included in the documentation package.
  - If the file format allows, include a notice like “Licensed under the TAPR Open Hardware License (www.tapr.org/OHL)” in each documentation file. While not required, you should also include this notice on printed circuit board artwork and the product itself; if space is limited the notice can be shortened or abbreviated.
  - Include a copyright notice in each file and on printed circuit board artwork.
  - If you wish to be notified of modifications that others may make, include your email address in a file named “CONTRIB.TXT” or something similar.
- Any time the OHL requires you to make documentation available to others, you must include all the materials you received from the upstream licensors. In addition, if you have modified the documentation:
  - You must identify the modifications in a text file (preferably named “CHANGES.TXT”) that you include with the documentation. That file must also include a statement like “These modifications are licensed under the TAPR Open Hardware License.”
  - You must include any new files you created, including any manufacturing files (such as Gerber files) you create in the course of making products.
  - You must include both “before” and “after” versions of all files you modified.
  - You may include files in proprietary formats, but you must also include open format versions (such as Gerber, ASCII, Postscript, or PDF) if your tools can create them.

## TERMS AND CONDITIONS

### **1. Introduction**

1.1 This Agreement governs how you may use, copy, modify, and distribute Documentation, and how you may make, have made, and distribute Products based on that Documentation. As used in this Agreement, to “distribute” Documentation means to directly or indirectly make copies available to a third party, and to “distribute” Products means to directly or indirectly give, loan, sell or otherwise transfer them to a third party.

1.2 “Documentation” includes:

- (a) schematic diagrams;
- (b) circuit or circuit board layouts, including Gerber and other data files used for manufacture;
- (c) mechanical drawings, including CAD, CAM, and other data files used for manufacture;
- (d) flow charts and descriptive text; and
- (e) other explanatory material.

Documentation may be in any tangible or intangible form of expression, including but not limited to computer files in open or proprietary formats and representations on paper, film, or other media.

1.3 “Products” include:

- (a) circuit boards, mechanical assemblies, and other physical parts and components;
- (b) assembled or partially assembled units (including components and subassemblies); and
- (c) parts and components combined into kits intended for assembly by others;

which are based in whole or in part on the Documentation.

1.4 This Agreement applies to any Documentation which contains a notice stating it is subject to the TAPR Open Hardware License, and to all Products based in whole or in part on that Documentation. If Documentation is distributed in an archive (such as a “zip” file) which includes this document, all files in that archive are subject to this Agreement unless they are specifically excluded. Each person who contributes content to the Documentation is referred to in this Agreement as a “Licensor.”

1.5 By (a) using, copying, modifying, or distributing the Documentation, or (b) making or having Products made or distributing them, you accept this Agreement, agree to comply with its terms, and become a “Licensee.” Any activity inconsistent with this Agreement will automatically terminate your rights under it (including the immunities from suit granted in Section 2), but the rights of others who have received Documentation, or have obtained Products, directly or indirectly from you will not be affected so long as they fully comply with it themselves.

1.6 This Agreement does not apply to software, firmware, or code loaded into programmable devices which may be used in conjunction with Documentation or Products. Such software is subject to the license terms established by its copyright holder(s).

## **2. Patents**

2.1 Each Licensor grants you, every other Licensee, and every possessor or user of Products a perpetual, worldwide, and royalty-free immunity from suit under any patent, patent application, or other intellectual property right which he or she controls, to the extent necessary to make, have made, possess, use, and distribute Products. This immunity does not extend to infringement arising from modifications subsequently made by others.

2.2 If you make or have Products made, or distribute Documentation that you have modified, you grant every Licensor, every other Licensee, and every possessor or user of Products a perpetual, worldwide, and royalty-free immunity from suit under any patent, patent application, or other intellectual property right which you control, to the extent necessary to make, have made, possess, use, and distribute Products. This immunity does not extend to infringement arising from modifications subsequently made by others.

2.3 To avoid doubt, providing Documentation to a third party for the sole purpose of having that party make Products on your behalf is not considered “distribution,” and a third party's act of making Products solely on your behalf does not cause that party to grant the immunity described in the preceding paragraph.

2.4 These grants of immunity are a material part of this Agreement, and form a portion of the consideration given by each party to the other. If any court judgment or legal agreement prevents you from granting the immunity required by this Section, your rights under this Agreement will terminate and you may no longer use, copy, modify or distribute the Documentation, or make, have made, or distribute Products.

## **3. Modifications**

You may modify the Documentation, and those modifications will become part of the Documentation. They are subject to this Agreement, as are Products based in whole or in part on them. If you distribute the modified Documentation, or Products based in whole or in part upon it, you must email the modified Documentation in a form compliant with Section 4 to each Licensor who has provided an email address with the Documentation. Attempting to send the email completes your obligations under this Section and you need take no further action if any address fails.

## **4. Distributing Documentation**

4.1 You may distribute unmodified copies of the Documentation in its entirety in any medium, provided that you retain all copyright and other notices (including references to this Agreement) included by each Licensor, and include an unaltered copy of this Agreement.

4.2 You may distribute modified copies of the Documentation if you comply with all the requirements of the preceding paragraph and:

(a) include a prominent notice in an ASCII or other open format file identifying those elements of the Documentation that you changed, and stating that the modifications are licensed under the terms of this Agreement;

(b) include all new documentation files that you create, as well as both the original and modified versions of each file you change (files may be in your development tool's native file format, but if reasonably possible, you must also include open format, such as Gerber, ASCII, Postscript, or PDF, versions);



(c) do not change the terms of this Agreement with respect to subsequent licensees; and

(d) if you make or have Products made, include in the Documentation all elements reasonably required to permit others to make Products, including Gerber, CAD/CAM and other files used for manufacture.

## **5. Making Products**

5.1 You may use the Documentation to make or have Products made, provided that each Product retains any notices included by the Licensor (including, but not limited to, copyright notices on circuit boards).

5.2 You may distribute Products you make or have made, provided that you include with each unit a copy of the Documentation in a form consistent with Section 4. Alternatively, you may include either (i) an offer valid for at least three years to provide that Documentation, at no charge other than the reasonable cost of media and postage, to any person who requests it; or (ii) a URL where that Documentation may be downloaded, available for at least three years after you last distribute the Product.

## **6. NEW LICENSE VERSIONS**

TAPR may publish updated versions of the OHL which retain the same general provisions as the present version, but differ in detail to address new problems or concerns, and carry a distinguishing version number. If the Documentation specifies a version number which applies to it and “any later version”, you may choose either that version or any later version published by TAPR. If the Documentation does not specify a version number, you may choose any version ever published by TAPR. TAPR owns the copyright to the OHL, but grants permission to any person to copy, distribute, and use it in unmodified form.

## **7. WARRANTY AND LIABILITY LIMITATIONS**

7.1 THE DOCUMENTATION IS PROVIDED ON AN “AS-IS” BASIS WITHOUT WARRANTY OF ANY KIND, TO THE EXTENT PERMITTED BY APPLICABLE LAW. ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND TITLE, ARE HEREBY EXPRESSLY DISCLAIMED.

7.2 IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW WILL ANY LICENSOR BE LIABLE TO YOU OR ANY THIRD PARTY FOR ANY DIRECT, INDIRECT, INCIDENTAL, CONSEQUENTIAL, PUNITIVE, OR EXEMPLARY DAMAGES ARISING OUT OF THE USE OF, OR INABILITY TO USE, THE DOCUMENTATION OR PRODUCTS, INCLUDING BUT NOT LIMITED TO CLAIMS OF INTELLECTUAL PROPERTY INFRINGEMENT OR LOSS OF DATA, EVEN IF THAT PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

7.3 You agree that the foregoing limitations are reasonable due to the non-financial nature of the transaction represented by this Agreement, and acknowledge that were it not for these limitations, the Licensor(s) would not be willing to make the Documentation available to you.

7.4 You agree to defend, indemnify, and hold each Licensor harmless from any claim brought by a third party alleging any defect in the design, manufacture, or operation of any Product which you make, have made, or distribute pursuant to this Agreement.