

LNAFIN Oy PCB-PROTO-RF Design and Sales

Esa Tiiliharju

LNAFIN Oy
eti@LNAFIN.com

April 5, 2017

Contents of the Presentation

LNAFIN Oy– Executive Summary

PCB Layout Design

Supported CAD

Printed Circuit Boards

PCB Assembly – PCBA

Electronics R&D / Wirebonding

RF Design / MMIC / 3D FEM

How to Contact Us ?

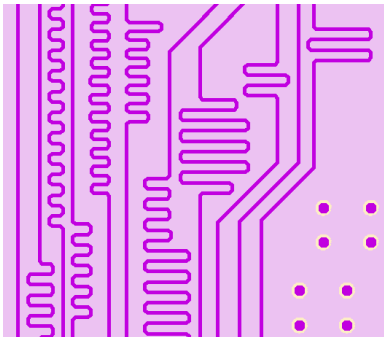
Blog page

- ▶ LNAFIN Oy offers Research & Design services and products for Printed Circuit Boards (PCB), Prototypes and RF.



- ▶ More specifically we offer:
 - ▶ Printed Circuit Board (PCB) Layout Design.
 - ▶ Printed Circuit Boards (proto & series).
 - ▶ PCB assembly – PCBA (proto & series, paste stencils)
 - ▶ R&D services:
 - ▶ Wirebonding special components to PCB.
 - ▶ RF, Microwave and MMIC Design.
 - ▶ Modeling (FEM/ 3D / EM-simulation).
 - ▶ Electronics Integration (smaller footprint parts, ASIC Design).
- ▶ More: <https://www.LNAFIN.com/products>

- ▶ Lots of experience with different printed circuit boards:
 - ▶ Multi-layer FPGA applications.
 - ▶ RF designs.
 - ▶ Large current motor control.



Instructions

For a successful design we need:

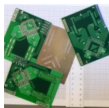
- ▶ Schematics (pdf ok too).
- ▶ Planned PCB dimensions.
- ▶ Design time.

Please inform us of design details such as high currents, 50- Ω tracks etc.

Printed Circuit Boards

LNAFIN Oy is a professional supplier of printed circuit boards.

<https://www.LNAFIN.com/PCB/>



Professional PCB Supplier

- Advanced Circuits such as Power PCB or RF/Microwave PCB solutions
- Flexible PCB solutions
- Standard FR4 PCB solutions

We have great experience from standard FR4 to difficult to realize and special boards such as [Rogers](#) multilayer PCBs with 3.5mil minimum track width/track separation. More information on different PCB types, design rules and minimum order quantities can be found below.

ORDER / ENQUIRY

DESIGN RULES

Advanced Circuit Boards



High currents, dense BGA packages and high frequencies often demand a lot on the PCB implementation. For example, we know RF and microwave PCB special challenges very well due to our past Ultrawideband radio, microwave direct-conversion modulator and LNA projects. The latter ended with one [US patent](#).

Case: RF-PCB with Rogers 4350 on top of FR4

Picture shows a 4-layer PCB, which has been manufactured by laminating a thin Rogers high-frequency slice onto a thicker FR4 plate. This combination gives a good 50-Ω match at microwave frequencies with sufficiently narrow tracks. At the same time, use of an FR4 laminate has decreased cost. Narrow microstrips have been necessary to access all 80-pins of the BGA package.

High Current PCB Solutions

- High current power PCBs require special thick copper layers to carry the currents without excessive heat.
- Another key tool is high-Tg board materials, and these can be supplied as multilayer solutions. Stackups with 210um (60Z) copper with a Tg170 FR4 board material are available, when min. track width and track separation rules are met. Rough guide is to set these at 0.35mm and the minimum via should be 0.5mm.

Flexible PCB

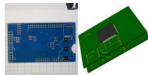
Flexible PCBs increase 3D possibilities

There are many situations when a flexible part between rigid board sections is the ultimate solution. Such cases might be wearable electronics, efficient use of product 3D-space etc.

When the wiring is implemented onto a flexible polyamide section, it will be more dependable and it will use less space. A flex-rigid board will not be a victim of bad assembly of separate wires. Thus decreased overall cost and increase product reliability can be achieved with this technology.

We can supply you with suitable flex-rigid solutions at the right price. Different color overlays and Legend texts can also be leveraged to increase the final product marketability.

Standard FR4 2L-4L-ML PCBs



The pictures here stand for the plethora standard high-quality 100% E-tested circuit boards we have delivered to our customers over the years. Our price-quality ratio is very good and the **ordering process is easy**. To get a quotation or to order a FR4 PCBs use the order-link at the top of the page and fill in the required data.

Please mention any special structures such as use of blind or buried vias. To give an accurate quotation, we also need to know minimum track width, minimum track separation and minimum via sizes.

We need gerber and drill files to make a binding offer (please pack as .zip, .tgz, .tar.gz and attach). Additionally, we can accept other data formats too (Eagle, KiCad, PADS, OrCad, designspark etc.).

Common PCB surface finishes

Common choices for track surface finish are ROHS HASL or ENIG. The HASL stands for Sn finish according to ROHS regulations, while ENIG is a gold track finish. The latter is a combination of a thicker Nickel layer covered with a thinner gold layer deposited on the Cu tracks. The gold finish makes for good solderability, neat products and longevity. For wirebondable surface we recommend ENEPIG gold finish.

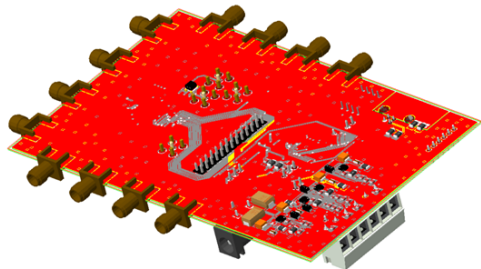
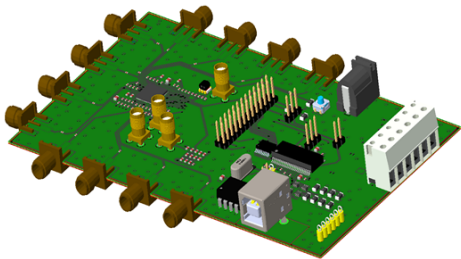
Solder mask colors we have experience with include: green, blue, red, black and white. These can be combined with different color component prints (silk, legend) to make dramatic good-looking PCBs. For example ENIG tracks, white solder masks and black texts, or ENIG with red solder masks and white legend prints might make a striking effect.

We treat all customer data as confidential.

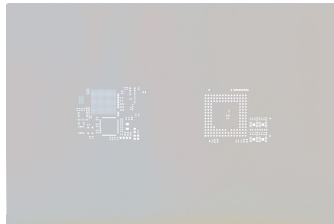
We have no minimum order amount, but for prototyping purposes we recommend min. three PCBs.

Supported PCB Data Formats include Gerber 274X, PADS, OrCad, Eagle, kiCad, DXF, PDF, expressPCB etc. . . **We can deliver PCBs from almost any data!**





LNAFIN Oy is an experienced supplier of electronics assembly (PCBA).

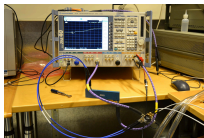
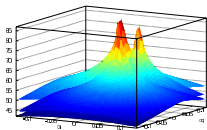


Laser-cut paste stencils support demanding electronics assembly.

Customer comment: *Your proto quality is better than Germany, and price is cheaper than China... how can you do this ?*

Good quality and friendly competent service does this.

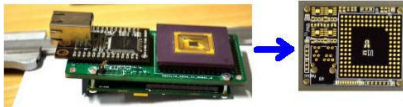
Electronics R&D



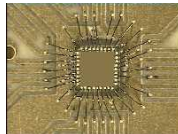
- ▶ We have a lot of prototype electronics R&D experience.
- ▶ The pictures depict some R&D activities: matlab system performance modeling (upper left), and RF amplifier measurements (upper right).

SMT-THT conversions and other miniaturization tasks for

prototypes can result in much smaller size, simpler structure and higher performance.

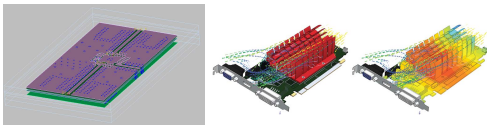


Wirebonding **New PCBA-service!**



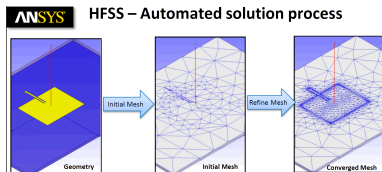
- ▶ Wirebonding is needed for connecting naked integrated circuits to PCB. We support both ASIC and RFIC with this service.
- ▶ The picture shows one wirebonding example delivered by us. In the picture 25- μm Aluminium wires are used to connect to the Electroless Nickel Immersion Gold (ENIG) surfaced Rogers PCB.
- ▶ LNAFIN Oy has also delivered the Rogers PCB shown in the wirebonding picture. This is a rather demanding special material board with 100 μm min. track width/track separation.
- ▶ Wirebonding is also needed, when single-layer capacitors (SLC) are used. These special elements are the fastest possible by-pass capacitance type available off-chip.

RF Design and 2.5D EM-modeling



- ▶ We are very experienced in EM-modeling and testing planar RF circuit structures such as the RF-PCB shown (upper left).
- ▶ Thermal analysis of planar structures is available too. Picture shows PADS flotherm tool simulation example (upper right).

3D FEM Modeling with Best Tools



MMIC reference: LNAFIN Oy is an ESA supplier.



Q-BAND LNA Q-BAND WIDEBAND LNA FOR GROUND SEGMENT



ARTES PROGRAMME	STATUS	LAST UPDATED
GROUND SEGMENT, ADVANCED TECHNOLOGY	ONGOING	24 FEBRUARY 2015

OBJECTIVES

The objective of the activity is the design, manufacture, and test of a prototype of a commercially viable 40-GHz LNA for gateway application. The LNA is based on European monolithic microwave integrated circuit (MMIC) technology.

CHALLENGES

In this project low Noise Figure, high gain and very good matching are demanded over a significant fraction of the Q-band. LNAFIN Oy leverages its MMIC and waveguide know-how to meet these challenges with an internally redundant WR-22 packaged LNA unit.

BENEFITS

This product is the first WR-22 packaged LNA to enter the marketplace which has high gain, NF at ca. 2.5 dB with simultaneous input and output port RL values exceeding 18 dB from 35 to 45 GHz.



How to Contact Us ?

To get in touch, please fill and send our contact form.

Or you can contact us via E-mail or by phone.

<https://www.LNAFIN.com/contact-us/>

@Contact Us

To contact us either fill and send the form below, or click [Email to us](#). We will respond as soon as possible.
[Thank you for your interest in our products.](#)

Your Name (required)

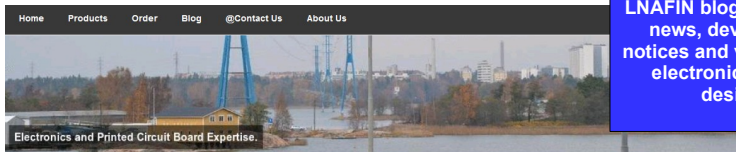
Your Email (required)

Subject

Your Message

+358 50 432 0746
info@LNAFIN.com

<https://www.LNAFIN.com/blog/>



LNAFIN blog pages have news, development notices and videos about electronics and RF design.

484-lead Xilinx Spartan6 FPGA PCB Routing

September 19, 2013

PCB routing for a 484-lead Xilinx Spartan6 Design



The picture shows TOP view of a 10-layer (10L) Spartan6 board recently routed at LNAFIN.

The printed circuit board (PCB) has the FPGA chip with 484 BGA-balls, memory in a 144-ball VBGA package, a separate TCP-communication IC, an RJ-45 jack, etc. plus customer ASIC circuit (144-leads) on the backside.

Economical yet High-performance PCB Routing Solution

The design has one intact ground layer, and two inner ground layers with only a couple of tracks each. Good, solid grounding is a must-have to ensure properly functioning finished circuitry. Three ground layers strikes a perfect balance between cost vs. performance for this design.

Tiny PCB Area Challenge

The PCB area specs was 4.8 x 6.2 cm (1.90x2.45 inch).



- To get in touch click [@Contact Us](#).
- To order to get the price click [Order / Enquiry](#).

Recent Posts

- LNAFIN Oy at Alihankinta 2016 September 2, 2016
- LNAFIN Oy Trademark (TM) Registered August 10, 2016
- LNAFIN Oy company presentation update 2016! February 8, 2016

Categories

Select Category ▼

Address:

LNAFIN Oy
Orioninkatu 4
00550 Helsinki
Finland

Contact:

Email: info@LNAFIN.com
WWW: <https://www.LNAFIN.com>
Tel: +358 50 432 0746
Fax: +358 9 424 51907

Other facts:

- ▶ LNAFIN Oy was established in June 2011 as a Limited Liability Company.
- ▶ Exports to 7 countries so far.
- ▶ Founder E.Tiiliharju has 2 patents (US7978007, FI121447).

EU VAT number: FI 24118599

