

LPKF - Unique RF/MW, Ceramic, LTCC and Flex Material Suppliers

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To: Steven F Nagle <sfnagle@mit.edu>

 2 attachments (2 MB)

ProtoLaser H4, S4, U4 and R4 Application Comparison Details 2023.pdf; ProtoMat and ProtoLaser H4, S4, U4, R4 Substrate Capabilities Guide 2023.pdf;

Hi Steven,

Below I have included a list of contacts to source flex PCB Polyimide and PET/Mylar materials, various laminated RF/MW materials, Thin Film metallization, Direct Bond Copper (DBC) or Thick Film metallization on Alumina/fired ceramics, as well as fired or unfired LTCC and LTCC Carbon Tape materials for ProtoLaser operations.

- Nearly any laminated RF substrates from Rogers Corporation, Taconic, Panasonic and FR4 can be processed with the LPKF patented laser hatch & delamination feature on the ProtoLaser H4, S4, U4 and R4 systems allowing rapid Cu/metal removal. Please see attached for application comparison details and general substrates guide.
- DuPont Pyralux TK, TFH and AG flex materials can also be processed with hatch & delamination and materials can be sourced through Insulectro. Datex Instruments also provides flex polyimide substrates that can be processed with the ProtoLaser S4, U4 and R4 models with hatch & delamination removal or by direct laser ablation with the ProtoLaser U4 or R4; ablation removal is dependent on the material and metallization thickness.
- Thin film Cu/Ni/Au fired ceramics (Al₂O₃, AlN) or green/unfired ceramics can be sourced through Rogers Curamik, Steller Industries, Compex Corp or DuPont - Microcircuit Materials which are all listed below. They each have contacts or a vendor which would apply thin film, thick film or DBC copper to their materials and may offer TiW, TaN, W/Ni, W/Ni/Au metallization, etc. Specific metallization and materials can be requested based on the customer needs.

Rogers Corporation:

Dale Doyle

Rogers Corporation

Application Development Manager | Advanced Electronics Solutions

100 S. Roosevelt Ave

Chandler, AZ 85226

Mobile: 619-855-0999

Direct: (480) 982-1657

dale.doyle@rogerscorp.com

<https://www.rogerscorp.com>

*Dayle may provide you with a local representative for materials purchases. Sample materials can also be requested by Universities through the following link:

https://rogerscorp.secure.force.com/samples/samples_public

Advanced Connectivity Solutions

(480) 961-1382

<http://www.rogerscorp.com/acs/contact/sales.aspx>

Taconic:

Larry Driscoll

Technical Sales Manager - Western Region

Taconic

136 Coonbrook Rd.

Petersburgh, NY 12138

larryd@4taconic.com

Mobile: (818) 451-0583
Toll free: (800) 833-1805
www.4taconic.com

Flex PCBs; Polyimide and PET/Mylar Material Suppliers:

DuPont Flex Materials Options

Various Polyimide Substrates can be purchased through Insulectro including DuPont Pyralux TK 125012R, 127512R, 1210012R or similar TK flex polyimide substrates for ProtoLaser S4, U4 and R4 processing with LPKF patented hatch & delamination removal. Direct ablation removal is also possible with the ProtoLaser U4 and R4 models on Pyralux AP, AC and AG materials down to 1 mil thickness with the R4:

Insulectro Material

Theresa Raisdana
949-587-3390 (Pacific Time)
TRaisdana@insulectro.com
www.insulectro.com

"PumaFast™" Inventory available on FR4, low loss high speed digital, RF and flex material options in stock
Typically the minimum order for these is 20 pcs 18x24 or 24 sq.ft. for flex
<https://insulectro.com/products/pyralux-tk/>

Jonathan A. Weldon
RF Applications Engineer
DuPont CPM
14 TW Alexander Drive
RTP, NC 27709
Work: (919) 248-5088
Mobile: (505) 835-3693
Jonathan.andrew.weldon@dupont.com
<http://www.dupont.com/products-and-services/electronic-electrical-materials/flexible-rigidflex-circuit-materials/brands/pyralux-flexible-circuit/products/pyralux-tk.html>

Trey Adams
Midwest and Northwest Region Manager
Insulectro
(630) 237-3002
WA
tadams@insulectro.com
<http://www.insulectro.com>

Datex Instruments, Inc.

Microclad™ flex PCB (PI and PET) materials for processing on the ProtoLaser S4, U4 and R4 processing with LPKF patented hatch & delamination Cu removal. Direct ablation removal is also possible depending on the metal and substrate thickness with the ProtoLaser U4 and R4 models with adjustable laser power, travel speed, pulse frequency and repetitions.

Datex Instruments, Inc.
Bud Asher
President
15115 Ramona Blvd,
Baldwin Park, CA 91706
(626) 960-4839
bud@datexusa.com
<http://www.datexusa.com/templates/flexcircuits.html>

KREMPPEL GMBH; AKAFLEX Polyimide

Krempel Group
(Laser etching up to 9µm of Cu from flex KCL-9/25 material has proven possible with the ProtoLaser S, U3 and U4 models):
Papierfabrikstrasse 4
D-71665 Vaihingen/Enz

Germany
Tel. (+49) 7042 915-0
Fax (+49) 7042 15985
e-mail: info@krempel-group.com
www.krempel-group.com
<http://www.krempel-group.com/englisch/home/products/base-materials/base-laminate-akaflex-for-flexible-printed-circuits.html>

Lamart PET and Polyimide Materials (A-35N is used for RFID samples with the ProtoLaser S; 5um Al removal on 1 or 2 mil PET):

Lamart Corporation
16 Richmond Street
Clifton, NJ 07015
Contact
Phone: 973-772-6262
Fax: 973-772-3673
<http://www.lamartcorp.com>
<http://www.lamartcorp.com/index.php/browse-our-products>

LTCC Ceramic Material Contacts:

(The LPKF ProtoLaser U4 can drill, cut and depth engrave fired or unfired LTCC as well as perform surface metal etching; ProtoLaser S4 can also remove surface metal and cut unfired LTCC but the U4 offers smaller feature capabilities, lower risk of micro fractures and greater control for depth of cut, rate of metal removal and an extremely low HAZ with gold surfaces)

DuPont Electronic Technologies
14 T.W. Alexander Drive
Research Triangle Park, NC 27709
<http://www.dupont.com/products-and-services/electronic-electrical-materials/low-temperature-co-fire-ceramic-materials/brands/greentape-ceramic-circuit/products/green-tape-9k7-ltcc-material-system.html>

Thick Film Technologies, Inc. (LTCC material supplier and coating capabilities)
Kirk Goldenberger
(425) 347-0919
3101 111TH ST SW
STE R
Everett, WA 98204
kirk@thickfilmtech.com
<http://www.thickfilmtech.com>

C12 Advanced Technologies, LLC (LTCC Carbon Tapes and Ink used for LTCC Microfluidic Channels)
Luke Ferguson - (Create specialized LTCC materials and Carbon Tape or Carbon Pastes)
(206) 795-8925
3101 111th Street SW, Unit R
STE R
Everett, WA 98204
info@c12materials.com
C12 LTCC Carbon Tape material cuts very well on the ProtoLaser U3

Ceramic Suppliers for ProtoLaser Applications:

Rogers Corporation, Curamik Division (DBC and Thin Film Ceramics)
Andreas Utz-Kistner Curamik Materials Engineer Rogers Corporation, Curamik Div.
(214) 912-1008
3770 Arapaho Road
Addison, TX 75001
Andreas.Utz-Kistner@rogerscorporation.com

Stellar Industries
Ron Visser | President (Thick Cu on fired ceramics; multilayer ceramic application services)
50 Howe Avenue
Millbury, MA 01527
(508) 865-1668
adrift@stellarind.com

www.stellarind.com | <http://www.stellarind.com/products/ceramics/alumina.html>

DuPont - Microcircuit Materials
John Crumpton
(919) 248-5314
14 T.W. Alexander Drive,
P.O. Box 13999
Research Triangle Park, NC 27709
John.C.Crumpton@usa.dupont.com
<http://www.dupont.com/industries/electronics.html>

Compex Corp - General Manager
Andrew Gordon (Operates LPKF NIR ProtoLaser S for surface metal etching; provides laser etching services and they offer ceramic based substrates)
(856) 335-2277
439 Commerce Lane
West Berlin, NJ 08091
agordon@compexcorp.com
<http://www.compexcorp.com>

LPKF offers galvanic copper plating with our Contact S4 system and conductive silver through-hole plating with our ProConduct through-hole plating option but we do not offer an electroless process for copper, nickel and gold growth on PCB materials.

Contact details for Uyemura and MacDermid are included below as they specialize in various electroless plating materials.

UYEMURA Corporate Headquarters:
3990 Concourse, #425
Ontario, CA 91764
ph: (909) 466-5635
<http://www.uyemura.com>

MacDermid
[Electroless Nickel](#) | [Immersion Gold](#) | [MacDermid Enthone Products](#)

I hope this information proves helpful and as always, feel free to call or email if I can answer any questions on a specific material or application.

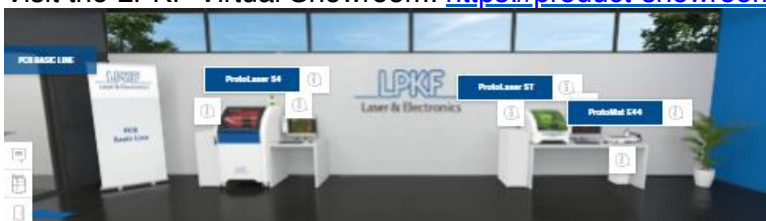
Best regards,

Rory Grondin | *Sales Manager – Prototyping Systems Division*
LPKF Laser & Electronics - North America
[12555 SW Leveton Drive](#)
[Tualatin, OR 97062](#)

Direct: [+1 \(503\) 454-4210](tel:+15034544210) | Mobile: [+1 \(503\) 341-3020](tel:+15033413020) | Fax: [+1 \(503\) 682-7151](tel:+15036827151)
rgrondin@lpkfusa.com | www.lpkfusa.com
GSA Contractor #GS-06F-0054S

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Visit the LPKF Virtual Showroom: <https://product-showroom-dg.lpkf.com>



Watch the new LPKF [ARRALYZE](#) system push the envelope in cellomics and our latest rapid PCB direct laser etching option with the benchtop [ProtoLaser ST](#).

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