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# CONTRACT MANUFACTURING OPPORTUNITIES IN PRINTED ELECTRONICS

***2013 Edition***

**A Comprehensive Study on the Worldwide Market for  
Contract Manufacturing of Printed Electronics**

## Report Highlights

- **Printed Electronics Technology Analysis**
  - ◆ **Printer Manufacturing Equipment Market Size**
  - ◆ **Electronic Material and Thin Film Market Size**
- **Worldwide Printed Electronics Market Analysis, 2012**
  - ◆ **Leading Products and Applications**
  - ◆ **Analysis by 10 Industry Segments**
  - ◆ **Functional Commercial Products**
- **Worldwide Printed Electronics Market Forecasts, 2012–2017**
  - ◆ **10 Industry Segments**
  - ◆ **40 Leading Market Applications**
- **Company Profiles (185 Printed Electronics Firms)**
  - ◆ **Equipment Companies/Suppliers**
  - ◆ **Materials Companies/Suppliers**
  - ◆ **Solution/Integration Companies/Suppliers**

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# Contract Manufacturing Opportunities in Printed Electronics - 2013

## Synopsis

The worldwide **printed electronics (PE)** market has been over-hyped and inaccurately forecast for over a decade. Yet PE still holds much potential and is now starting to show promise and commercialization. **New Venture Research (NVR)** has been following this emerging market for the last five years and the contract electronic manufacturing services market for more than 20 years. As a result of our extensive industry contacts and recent field interviews in PE, **NVR** is in a position to put a realistic stake in the ground with regard to the leading PE market applications and their potential for future growth.

This latest report - ***Contract Manufacturing Opportunities in Printed Electronics - 2013 Edition*** — is a comprehensive market analysis of emerging PE technologies and applications, and leverages our in-depth database of contract electronics manufacturing services (EMS) suppliers and markets built up over the past two decades. EMS suppliers are the best positioned to capitalize on the most promising PE opportunities, of which we have identified over 40 leading application areas. This report analyzes the highest potential products by end customer that stand to win out over traditional semiconductor and material technologies. This is because PE is creating a standalone market of its own as well as displacing some traditional semiconductor electronics. Certain market applications have clear economic and commercial advantages over the next five years (the only period that can be reasonably forecast).

**Chapter 3** begins with a technical analysis of the most popular material technologies including organic and inorganic thin film transistors and other forms of printable circuits. The chapter moves on to discuss the various kinds of equipment that are used to print and layer these thin films, especially ink jet and screen printer technology which are used for the majority of PE applications today. A summary of the total equipment market by revenue is provided for 2012. The section concludes with an examination of substrates and the field of e-paper and related displays.

**Chapter 4** explores and analyzes the PE market for conductive inks and thin films. Currently, the vast majority of conductive materials are composed of silver flake along with corresponding dielectrics for insulation. Other materials such as carbon/graphene, copper, gold, platinum, and carbon nanotube/silver/copper nanowire are explored. A table of all the worldwide conductive inks is summarized in terms of revenue for 2012 along with a table of conductive inks by industry segment.

**Chapter 5** identifies and explores the leading product applications for PE products among ten industry segments and in context with the entire contract manufacturing market. Leading product applications are analyzed for both traditional electronics assembly and advanced PE manufacturing production.

**Chapter 6** forecasts the future for PE products for 40 different product applications, contrasting the highest potential PE products against traditional semiconductor electronics. All PE product applications are summarized in the final chapter, including a ranking of the strongest markets in descending order of growth. The highest growth markets are projected to expand over 125% CAGR, while others are as low as only 5% CAGR, from 2012-2017. Overall, the market for PE products will triple over the next five years, reaching nearly \$10 billion in assembly revenue value by 2017.

**Chapter 7** analyzes the leading PE companies and suppliers in three ways — equipment manufacturers, advanced materials/thin film providers, and solution/integration companies that develop technical solutions or can successfully integrate one or more PE technologies. In all, 185 PE companies are profiled in this report and are organized according to category.

***Contract Manufacturing Opportunities in Printed Electronics - 2013 Edition*** is the product of hundreds of hours of research and sells for \$2495 with a single-user license (additional licenses are \$250, corporate licensing is \$1000). This report is available in PDF format only and is delivered by email. An Excel spreadsheet of all data and tables is available for an additional \$750.

## About the Author

**Randall Sherman** is the principal analyst and president of New Venture Research Corp., a technology market research and business consulting firm focused on the EMS and OEM electronics manufacturing industries. Mr. Sherman has more than 25 years' experience in technology and business research. He began his career as a telecom network design engineer and he holds an undergraduate degree in Astrophysics. He also holds two master's degrees — an MSEE from the University of Colorado and an MBA from the Edinburgh School of Business. Before NVR, he held senior positions at various market research firms including Creative Strategies, Frost and Sullivan, and BIS Strategic Decisions.

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# Contract Manufacturing Opportunities in Printed Electronics- 2013

## List of PE Companies Profiled

### Equipment Companies

Agfa-Gevaert  
AIXTRON AG  
Applied Materials  
Canon  
CERADROP  
Conductive Inkjet Tech.  
Dainippon Screen Printing  
DEK Printing Machines  
Dialog Semiconductor  
FUJIFILM Dimatix  
Fuji Xerox Co.  
Goss International Americas  
Haiku Tech  
Hewlett Packard  
Hisense  
Johnson Laminating & Coat  
Kammann Machines  
KIWO  
Konica Minolta  
Landa Corporation  
MacDermid Printing  
MAN Roland  
Mark Andy, Inc.  
Merck Millipore  
Midori Mark Co., Ltd.  
MuTracx  
NovaCentrix  
NXT PLC  
Ohio Gravure Technologies  
PixDro BV  
Preco, Inc.  
Printcolor Screen Ltd.  
Printtechnologies  
Roth & Rau  
Schreiner PrinTronics  
Seiko Epson  
SiPix Imaging, Inc.  
SonoPlot  
Speedline Technologies  
ST Microelectronics  
Sung An Machinery  
Taiyo Ink Mfg. Co., Ltd.  
Thieme GmbH & Co.  
Tokyo Electron, Ltd.  
Toppa Printing Co.  
UniJet  
Universal Display Corporation  
Veeco Instruments  
Xaar  
Xerox Corporation

### Materials Companies

3M  
Advanced Nano Products  
Agfa-Orgacon  
Applied Nanotech  
Asahi Glass Co.  
Asahi Kasei  
BASF  
Beneq  
Blue Nano  
Cabot  
Cambrios  
Carestream Advanced  
Materials  
Cima Nanotech  
Corning  
Creative Materials  
Dai Nippon Printing  
DayStar Technologies  
Delta Optoelectronics  
Dow Chemical  
DuPont Microcircuit Mat.  
Eastman Kodak  
Electric Vinyl, Inc.  
Electronic Paper and Tech.  
elumin8  
Ercon  
Ferro Corp.  
FUJIFILM Holdings Corp.  
Fujikura  
Gwent Group  
H. C. Starck  
Heliatek GmbH  
Henkel  
Heraeus  
Hitachi Chemical  
Indium Corporation  
Infineon Technologies  
Inktec  
Int'l Solar Elect. Tech.  
Intrinsiq Materials  
Kimoto  
Konarka Technologies  
Kovio  
LG Philips LCD Co., Ltd.  
Liquid X Printed Metals  
Litrex  
Luminous Media, Ltd.  
MEMC Electronic Materials

### Materials Companies (cont.)

Microvision, Inc.  
Mirwec Films  
Nanogap  
NanoInk, Inc.  
NanoMas Technology  
Nissan Chemical Ind.  
Novaled AG  
Novalia  
Optomec  
ORFID  
OrganicID  
Ormecon GmbH  
OSRAM GmbH  
Plextronics  
PolyIC GmbH & Co. KG  
Poly-Ink  
QUALCOMM MEMS  
Samsung Electronics  
Soligie  
SouthWest  
NanoTechnologies  
Sumitomo Chemical  
Sun Chemical  
Toshiba Mobile Display  
ToyoChem  
ULANO  
Unidym, Inc.  
Vitrex Polymer  
Vorbeck Materials

### Solution/Integration Companies

Add-Vision  
Ascend Solar  
AVANCIS  
Aveso  
Blue Spark  
Bosch Solar  
Calyxo  
Cambridge Display  
Canadian Solar  
China Sunenergy  
Cymbet  
Durel

### Solution/Integration Companies (cont.)

E Ink  
eMagin  
Energy Conversion Devices  
Enfucell  
EV Group  
Evonik  
Excellatron  
First Solar  
Flexcell  
Front Edge  
Frontier Industrial Technology  
Fuji Electric  
G24 Innovations  
Global Solar Energy  
GSI Technologies  
Imprint Energy  
Infinite Power Solutions  
Innovalight  
ISORG  
Kaneka  
KSW Microtec  
Liquavista  
Memtron Input Components  
Nanosolar  
NRG Solar  
Ormet Circuits, Inc.  
PARC  
Parelec  
PChem  
Plastic Logic  
Power Paper, Ltd.  
PragmatIC Printing  
ReneSola, Ltd.  
Semprius  
Sensormatic  
Sharp Corporation  
Si-Cal  
SMARTRAC  
Solarmer  
Solar Frontier  
Solexant  
Solicores  
Sontor GmbH  
Sumation Co., Ltd.  
T-Ink, Inc.  
Terepac  
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