

Information

August 1999

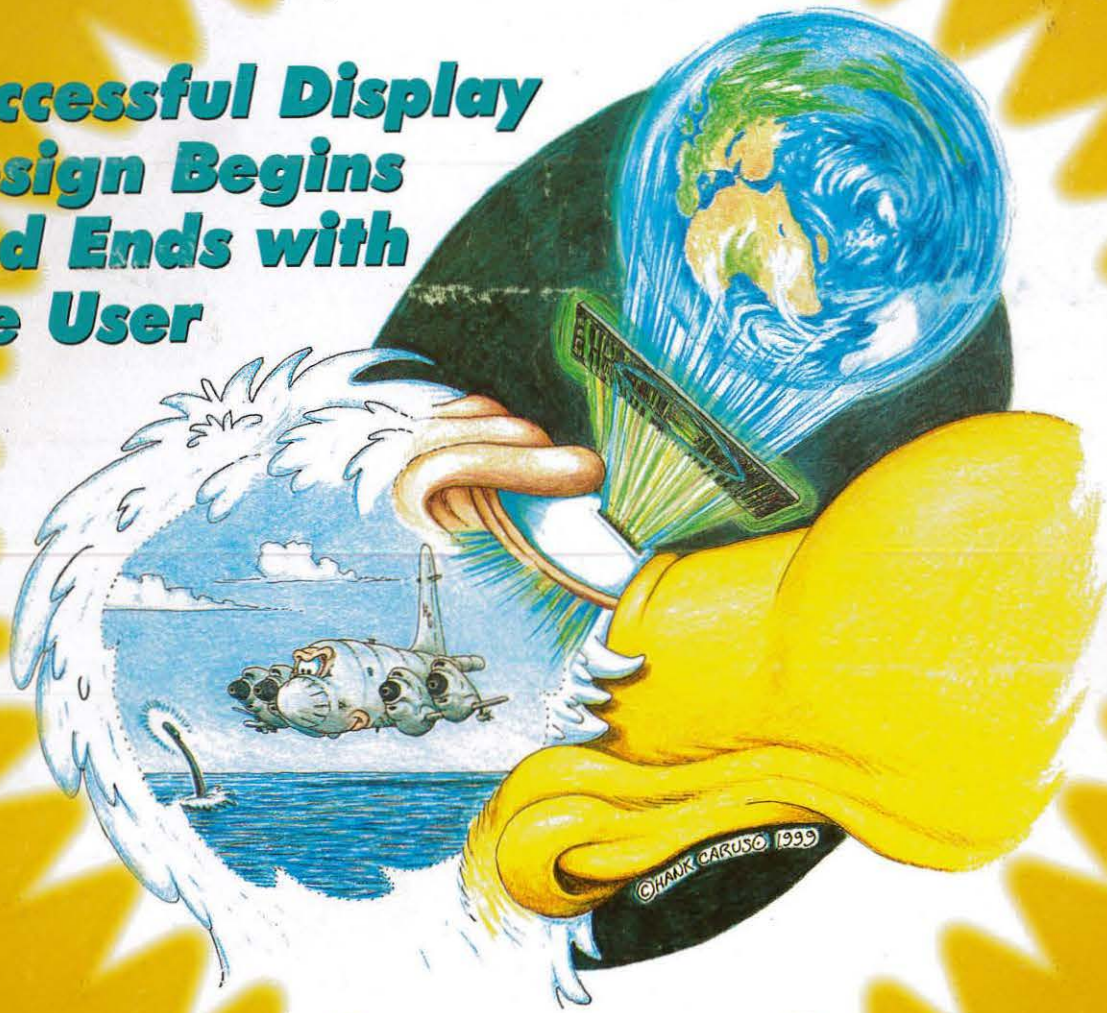
Vol. 15, No. 8

DISPLAY

STD

Official Monthly Publication of the Society for Information Display

**Successful Display
Design Begins
and Ends with
the User**



- **Directory of Display Industry**
- **The Pokémon Incident**
- **Display Usability**
- **Military-Aircraft Projection Displays**
- **CeBIT '99 Review**

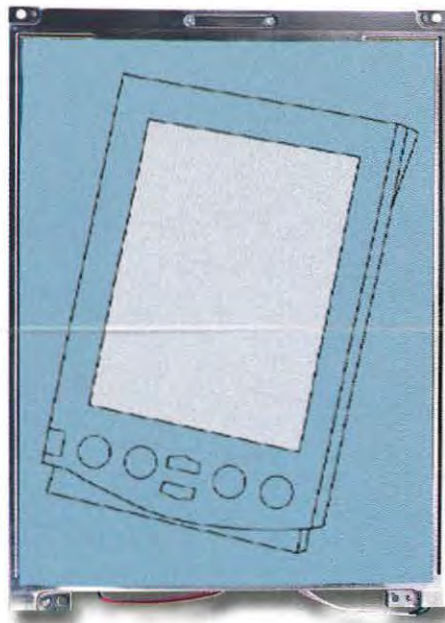
At Optrex, We Can Put Any Bright Idea On Display.



Dot Matrix
Character Module



Color Graphics
LCD Module



Monochrome
Graphics LCD
Module



Custom
LCD Module



OPTREX
AMERICA, INC.

Whatever your LCD needs – standard or custom – Optrex can offer an effective, cost-efficient solution. For over 30 years, manufacturers have relied upon Optrex for technologically-advanced character, monochrome, color and custom LCD configurations. Founded as a joint venture between Asahi Glass Co. LTD. and Mitsubishi Electric Corp., Optrex provides technical design and support through our own sales organization, and through more than 100 sales and distribution offices worldwide. For more information call Optrex, or see your electronics distributor today.

COVER: To the user, the display is not just a window to the system, it is the system. So the display is often blamed for deficiencies in system design and display integration, whether the system is a consumer digital camera or a sophisticated weapons system. Usability engineering creates happier users and increases sales. See the article beginning on page 12. (Cover drawing copyright by Hank Caruso, used with permission.)



For more on what's coming in *Information Display*, and for other news on information-display technology, check the SID Web site on the World Wide Web: <http://www.sid.org>.

**Next Month in
*Information Display***

- SID '99 Review Issue
- Overview
 - Microdisplays
 - LCDs
 - CRTs
 - Emissive Displays
 - Manufacturing

INFORMATION DISPLAY (ISSN 0362-0972) is published eleven times a year for the Society for Information Display by Palisades Institute for Research Services, Inc., 411 Lafayette Street, 2nd Floor, New York, NY 10003; Leonard H. Klein, President and CEO. EDITORIAL AND BUSINESS OFFICES: Jay Morreale, Managing Editor, Palisades Institute for Research Services, Inc., 411 Lafayette Street, 2nd Floor, New York, NY 10003; telephone 212/460-9700. Send manuscripts to the attention of the Editor, ID, Director of Sales: Michele Klein, Palisades Institute for Research Services, Inc., 411 Lafayette Street, 2nd Floor, New York, NY 10003; 212/460-9700. SID HEADQUARTERS, for correspondence on subscriptions and membership: Society for Information Display, 31 East Julian Street, San Jose, CA 95112; telephone 408/977-1013, fax -1531. SUBSCRIPTIONS: Information Display is distributed without charge to those qualified and to SID members as a benefit of membership (annual dues \$55.00). Subscriptions to others: U.S. & Canada: \$36.00 one year, \$7.50 single copy; elsewhere: \$72.00 one year, \$7.50 single copy. PRINTED by Sheridan Printing Company, Alpha, NJ 08865. Third-class postage paid at Easton, PA. PERMISSIONS: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limits of the U.S. copyright law for private use of patrons, providing a fee of \$2.00 per article is paid to the Copyright Clearance Center, 21 Congress Street, Salem, MA 01970 (reference serial code 0362-0972/99/\$1.00 + \$0.00). Instructors are permitted to photocopy isolated articles for noncommercial classroom use without fee. This permission does not apply to any special reports or lists published in this magazine. For other copying, reprint or republication permission, write to Society for Information Display, 31 East Julian Street, San Jose, CA 95112. Copyright © 1999 Society for Information Display. All rights reserved.

Information DISPLAY

AUGUST 1999
VOL. 15, NO. 8

- 2 Editorial**
Picvue: Working with 3Com
Ken Werner
- 4 The Display Continuum**
She Said It Better ...
Aris Silzars
- 12 Usability: The Value-Added Characteristic**
Successful display design begins and ends with the end-user's needs.
Thomas E. Fleischman and Kenneth E. Sola
- 16 Projection Displays in Military Aircraft**
Small projectors may be the answer for low-volume production of high-performance displays.
Donald Wilkins
- 20 Monitors, Monitors Everywhere at CeBIT '99**
CeBIT is now so large that this year's admission ticket provided free public transport over the entire Greater Hannover area.
Bryan Norris
- 26 The Pokémon Incident**
Content-dependent VDT hazards are real, but what happened in Japan in 1997 is now understood and solutions are at hand.
Masahide Nomura and Takeo Takahashi
- 33 Directory of the Display Industry**
ID's thirteenth annual directory of the display industry.
The Editorial Staff
- 86 Calendar of Display-Related Events**
- 92 Index to Advertisers**
- 92 Sustaining Members**



Picvue: Working with 3Com

This spring, I visited Picvue Electronics' LCD Operation in the Hsin-Fung section of Hsinchu, Taiwan. The visit was arranged by Prof. Han-Ping Shieh of National Chiao Tung University in Hsinchu and Dr. Jacob Lin, Head of Picvue's LCD Division. I was greeted by Mr. Hong, V.P. of the division, and Dr. Jan Bos, then manager of the LCD Module Division, but soon to become Director of the R&D Center.

Dr. Bos is also the successful manager of Picvue's 3Com Palm account, which may make him the only employee of a major display company to simultaneously hold a sales and an R&D position. His dual responsibility allowed him to share some unique insights about the new displays in the 3Com Palm IIIx™ and Palm V™ "connected organizers," whose improved display characteristics are being energetically promoted by 3Com. (See the June 1999 editorial in *ID*.)

The Palm IIIx and V computers use STN-LCDs with 160 × 160 pixels, as do the older Palm Pilot and Palm III models. Picvue produces a much brighter display for the Palm IIIx by adding a transfective display film made by 3M and a 3M reflective back polarizer instead of the traditional transmissive one, said Bos. The contrast ratio remains unchanged at about 10:1, but the enhanced brightness makes for a much more legible display.

To these enhancements the Palm V adds drivers for multi-line addressing (MLA), and the display is thinner. The result is a display black that is even blacker than on the IIIx display and a contrast ratio of about 15:1. Dr. Bos has installed this Palm V display in his own Palm III organizer. The results appear impressive, and Bos says he rarely needs to turn on the backlight in his new display.

These new displays are a significant product for Picvue. The company completed a second STN line in November 1998, and the company's sales growth, impressive since 1991, continued through the generally lean year of 1998 thanks to the Palm displays, which accounted for 25% of the division's sales revenues. (So far, Picvue has sold 1.3 million displays to 3Com.) Picvue is supplying similar displays to Handspring, the hot Silicon Valley start-up created by one of Palm's founders. (Among Picvue's other customers are Motorola, Sony, Nortel, Acatel, Sagem, Trimble, Abbott, LG, Samsung, and Qualcomm - for the PDQ phone that incorporates an organizer using the Palm OS.)

Mr. Hong proudly showed me the second STN line, which was implemented in a no-nonsense in-line layout. Interestingly, the workers on this line work 12-hour shifts, 2 days on and 2 days off.

Picvue isn't stopping there. The company is planning a third STN line devoted to displays with color filters, since some process parameters optimize differently for such displays. And, subject to approval of senior management, a plant for polysilicon TFT-LCDs will be installed for production starting in 2002. With this strategy, said Bos, Picvue would skip amorphous-silicon displays entirely, jumping directly from STN to polysilicon.

The attraction of such an approach is obvious. For small MLA displays like the one Picvue makes for 3Com, half of the module cost is in the drivers. It would be very nice to get those drivers for essentially no cost.

To save weight and thickness in wireless phone and palmtop displays, Picvue's customers want to go to 0.4-mm glass, which is even more fragile than

continued on page 85

Editor: Kenneth I. Werner
Managing Editor: Jay Morreale
Administrative Editor: Ralph Nadell
Assistant Editor: Dian Mecca
Contributing Editors: Aris Silzars, Bryan Norris, Chuck McLaughlin, Joe Hallett, Alfred Poor
Advertising Manager: Jay Morreale
Sales Manager: Tracy Leibowitz

Regional Associate Editors

Allan Kmetz (**Americas**)
Lucent Technologies
Liberty Corner, New Jersey

Shigeo Mikoshiba (**Asia**)
University of Electro-Communications
Tokyo, Japan

Alan Mosley (**Europe**)
Central Research Laboratories
Hayes, Middlesex, U.K.

Advisory Editors

Carl Machover
Machover Associates
White Plains, New York

Alan Sobel
Consultant
Evanston, Illinois








Webster E. Howard
FED Corp.
Hopewell Junction, New York

The opinions expressed in editorials, columns, and feature articles do not necessarily reflect the opinions of the editor or publisher of *Information Display Magazine*, nor do they necessarily reflect the position of the Society for Information Display.

Powerful New Video Generators. The Smart Choices.

STANDALONE

ASTRO VG-851/854

-  Dot Clock to 400 MHz
-  Horizontal Scan to 300KHz
-  Extremely easy operation from front panel or PC
-  Highest Available Performance
-  256 Levels at all Frequencies
-  Fully compatible with all HDTV-formats-even 1080p
-  Accepts Bitmap-Files



Standalone Units from **\$2950**

400 MHz for true 2K x 2K resolutions; Storage of more than 1000 Timing/Pattern Programs in Flash Memory and EEPROM; Fully PC-compatible with "Bitmap" capability; direct access to any parameter from front panel or through PC-programs. And any of the (E)EPROM you used in earlier units can still be used.

That's what we call High Performance, Flexibility and Ease of Operation!

PC-BASED

Team VG-530pc UNI VG-D300pc

-  PC-based Performance
-  Dot Clock to 300MHz
-  Horizontal Scan to 250KHz
-  Fully Programmable Patterns
-  Fully DDC Compatible
-  Accepts Bitmap-Files
-  UNI VG-D300pc Units with Win 95 & Win NT 4.0



PC-Based Units from **\$2500**





300 MHz gives you ample margin if you work with Display Systems up to a 1600x1280 resolution. Its full "DDC" capability is an increasingly important asset in service and manufacturing applications.

Both PC-based units allow VESA-D.P.M.S. testing and the ability to import preset .pcx data files from other sources as "test patterns".

The user interface is DOS- and Win 95 & Win NT 4.0 respectively.

DIGITAL

ASTRO VG-826A

-  True "Digital" Video Generator
-  Dot Clock to 75MHz / 150 MHz
-  Operated directly from a PC or with "Remote" Frontpanels
-  Very Compact & Lightweight
-  8 Bits resolution/pixel/ color



Digital Units from **\$5950**

Service, repair, evaluate or engineer FPDs? The Astro VG-826A is the Digital Generator for you.

It's small and light, yet has the performance to drive any single or multiplexed Flat Panel Device with a resolution of 24 bits per pixel up to a multiplexed frequency of 150MHz.

It can be programmed/operated from a PC, the RB-646A "Remote". Frontpanel or the RB-614C Controller.

Make the *Smart Choice*... Contact Team Systems

Call us: **1-800-338-1981** Visit us: **www.team-systems.com**



She Said It Better ...

by Aris Silzars

One of the great pleasures I get from writing this column is that on occasion some of you make the extra effort to respond. That is not as trivial as it sounds. I know from my own behavior that there is at least a several-orders-of-magnitude difference between the *intent* to write a response and then carrying out this intent by *actually doing it*. How many times have I read something and had that "yes, right on!" kind of reaction - or maybe the opposite? And how many of those times have I had that momentary desire to do something pro-active, such as respond with a letter or e-mail, but by the time I had finished perusing the rest of the publication the urge had conveniently receded, so that any real action could be postponed and eventually forgotten altogether?

Last September, I discussed the rapidly growing need for accurate color reproduction as some of our larger and more established industries, such as printing and textile fabrication, begin to integrate computer-aided-design (CAD) into their business operations. I concluded that, to date, the display community has provided a meager response in helping these folks with their problems of accurate color matching and reproduction.

Please take a moment to do the following: Make a copy of a CIE diagram and plot on it the coordinates of television phosphors and/or currently available LCD filters. Now take a look at how much of the total color space they cover. Is it much more than about half of the total area? So how do we in the display community tell someone who is designing a new textile pattern to represent a pigment or fabric dye that is *outside* the space encompassed by the CRT phosphors or LCD filters? (Remember that the CRT phosphors in all "state-of-the-art" computer monitors were created over 30 years ago to provide pleasing flesh tones and an adequately bright image for home television sets.) And, by the way, how do you match a color presented on an LCD monitor to one displayed on a CRT? Or on an even more basic level, how do you tell someone to match one CRT to another?

I think you can begin to understand the source of my concern. Furthermore, most people in the printing, advertising, fashion-design, and related industries have no idea how phosphors or LCD color filters (in combination with backlights) work, and are usually greatly surprised and quite dismayed to hear that a significant part of the color space is not even available to them on their CAD workstations. (On the other hand, sometimes they are relieved to learn that the problems they have been having are not of their making.)

Among the readers of the September column was Mr. Bruce Butterfield of Coombs Associates, who works with people using color in medical instrumentation. While his customers are usually chiefly interested in utilizing different colors (which, of course, we display engineers know how to do quite well), his daughter Amy is an artist and operator of a graphical system for a company that produces "print-ready" copy for a variety of customers.

Through the magic of e-mail, father communicated with daughter and daughter responded. From what I can tell, this father and this daughter have one great relationship! The response, which Mr. Butterfield was kind enough to pass on to me, captures a real-life perspective of what we display engineers still need to

continued on page 81

SID Executive Committee

President: A. C. Lowe
President Elect: A. Silzars
Regional VP, Americas: R. Donofrio
Regional VP, Asia: A. Iwamoto
Regional VP, Europe: B. Needham
Treasurer: A. R. Kmetz
Secretary: R. L. Wisnieff
Past President: W. E. Howard

Directors

Bay Area: H. Sherman
Beijing: S. Ding
Belarus: A. Smirnov
Canada: T. Schmidt
Delaware Valley: J. W. Parker III
France: F. Maurice
Greater Dayton: R. Holmes
Hong Kong: C. C. Chang
Japan: A. Iwamoto
Korea: M. Oh
Los Angeles: P. Baron
Metropolitan Detroit: V. Cannella
Mid-Atlantic: D. Ketchum
Mid-Europe: R. Mauch
Minneapolis/St. Paul: V. Born
New England: W. Hamilton
Pacific Northwest: J. Rupp
Russia: M. Tomilin
San Diego: R. Ruff
Southwest: R. Seery
Taipei: F. C. Luo
Texas: Z. Yaniv
U.K. & Ireland: A. Mosley
Ukraine: V. Nazarenko

Committee Chairs

Academic: C. J. Summers
Archives/Historian: R. C. Knepper
Bylaws: C. Infante
Chapter Formation: H. Uchiike
Communications: J. Rupp
Convention: P. M. Heyman
Definitions & Standards: R. Miller
Honors & Awards: A. I. Lakatos
Long-Range Planning: J.-N. Perbet
Membership: J. W. Parker
Nominations: W. E. Howard
Publications: A. Silzars

Chapter Chairs

Bay Area: N. Balram
Beijing: H. C. Hu
Belarus: E. Kaloshkin
Canada: A. Kitai
Delaware Valley: L. Bryner
France: H. Brettel
Greater Dayton: J. Byrd
Hong Kong: H. S. Kwok
Japan: M. Maeda
Korea: M. Han
Los Angeles: M. Kesselman
Metropolitan Detroit: S. Pala
Mid-Atlantic: M. Anandan
Mid-Europe: D. Theis
Minneapolis/St. Paul: H. Holec
New England: S. Atwood
Pacific Northwest: T. Yuzuriha
Russia: S. Darevsky
San Diego: R. Ditzik
Southwest: J. O'Donnell
Taipei: H.-P. D. Shieh
Texas: R. Fink
U.K. & Ireland: C. Williams
Ukraine: V. Sorokin

Office Administration

Executive Director: Dee Dumont
Executive Assistant: Jenny Needham

Society for Information Display

31 East Julian Street
San Jose, CA 95112
408/977-1013, fax -1531
e-mail: office@sid.org
http://www.sid.org



Red So Real It's Dangerous.

There's an old saying, "If you mess with the bull, you get the horns." Well, Toshiba has learned that if you mess with perfection, you get something even better. After bringing superior brightness and higher contrast to its advanced Microfilter technology, Toshiba has set its sights on adding realism and color purity to its display images. Introducing Microfilter 99 CRT. By improving the red color filter and red phosphor, Toshiba has extended the color range by 5%, resulting in brighter colors and glowing red hues that add dimension to its images. No other CRT can match this realistic color. Microfilter 99. Reds so bright, you might just say Olé.

microfilter^{CRT} 99



In Touch with Tomorrow
TOSHIBA

<http://www.toshiba.com/taec>

Toshiba America Electronic Components, Inc., Electron Tube and Device Division, One Pkwy., North, Suite 500, Deerfield, IL60015 Tel:1-800-879-4963

Circle no. 3



A Half Century of Extraordinary Focus

The past 50 years have brought about dynamic technological changes in the CRT display field, eliminating most competitive manufacturers through the transitions. Syntronic, however, has continued to step-up and meet those challenges time and time again - where others could not. This is the reason why everywhere one turns in the electromagnetic component market, Syntronic's name and expertise is ever present.



Syntronic 100 Industrial Rd. • Addison, IL 60101 • Phone: 630-543-6444 • FAX: 630-543-0287
E-MAIL: sales@syntronicinst.com • WEB SITE: www.syntronicinst.com

EASTERN REGIONAL OFFICE : 30 TWO BRIDGES ROAD, STE 330 • FAIRFIELD, NJ 07004 • PHONE: 973-808-6676 • FAX: 973-808-6860
WESTERN REGIONAL OFFICE: 28202 CABOT RD., STE 250 • LAGUNA NIGUEL, CA 92677 • PHONE: 949-365-1337 • FAX: 949-365-1341

RESIST THE DIM SIDE



A short time ago in a galaxy not so far, far away... there was no such thing as Diffuse Reflective Polarizer Film from 3M. Thankfully, here and now, it exists. Increasing the brightness of displays throughout the universe by 45%. Ideal for large screen applications such as LCD monitors and complementing wide viewing angle technologies—making them light years better. So resist the dim side. Use the force of the phone and call 1-800-553-9215 to speak with a representative today.

3M™ Optical Enhancement Films
Brighter, wider, better.

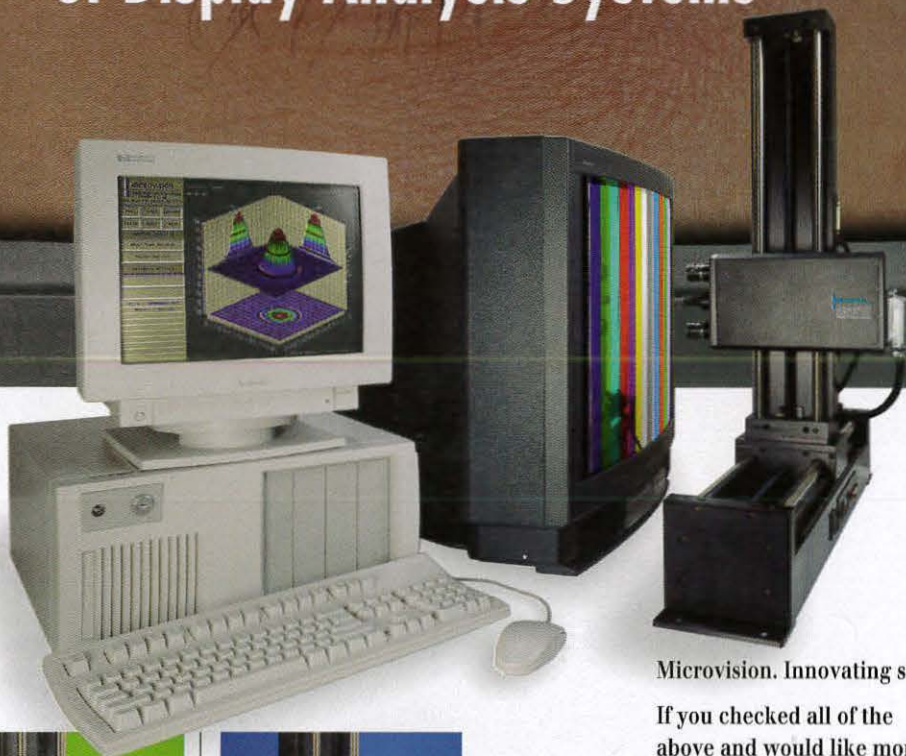
Circle no. 5

3M Innovation

Check what you need in your display analysis system:

- ✓ flat panel tests
- ✓ CRT tests
- ✓ easy upgrades (hardware and software)
- ✓ standard for ISO, NIDL, and VESA testing
- ✓ optimized for fast, accurate, and automatic testing with many packaged test suites

If you checked all of the above,
you have chosen the **Microvision SS200 Family**
of Display Analysis Systems



With the SS200 family, you can precisely, automatically, and completely measure display performance—and that includes flat panels.



SS200

Complete turnkey system with computer, 6-axis positioner, monitor, software, and SS200 camera system. Automatically performs spatial and luminance measurements.



SS210

You can easily field upgrade to the more powerful SS210 package, which provides all SS200 functions, plus an integrated spectrometer for spectral analysis and color measurements. Includes response time measurement capability.



SS220

For flat panel testing, a field upgrade to the SS220 is easy. The SS220 provides spectrometer-based off-axis measurement, color analysis, color shift and luminance testing. Coupled with the SS210, this is the most comprehensive test system ever offered—at a fraction of the cost of individual test instruments. All tests are performed at NIST-traceable accuracy.

Microvision. Innovating since 1983.

If you checked all of the above and would like more information, call Microvision at (800) 931-3188.

MICROVISION

Dedicated to the Needs of the Display Industry

550 High St., Suite 108 / Auburn, CA 95603
Tel: (530) 888-8344 / Fax: (530) 888-8349
Toll Free: 1 (800) 931-3188
Email: microvsn.com
Web site: <http://www.microvsn.com>

International Reps:
Japan - ARGO CORP., 06 359 5566
Taiwan - SUPERLINK TECH., 02 705 7090
Korea - B & P INT'L, 02 546 1457

Narrow Monitors. Broad Possibilities.

FOR ANY SIZE OR APPLICATION DATA MODUL HAS YOUR LCD MONITORS

Discover the industry's most well-rounded selection of flat LCD monitors from 3.0" up to 20.1"—the widest range available anywhere. A leader in customization, Data Modul high performance active matrix TFT monitors, with razor sharp images, zero emissions and extremely low power consumption, deliver an array of advantages that are easy to see.

Consider our high resolution glass. Or take a look at our state-of-the-art, high-bright technology, providing exceptional luminance and increased service life.

To make sure our narrow profile monitors meet the broadest requirements, we offer custom solutions at off-the-shelf prices. Along with innovative engineering design support, wireless remote control and universal mountings for wall or ceiling, Data Modul industrial-strength LCD monitors can be modified for specific customer applications including kiosks, panel/rack and wall mounts.

Ideal for space-hungry environments, our application ready, ISO and CE-certified standard monitors come with a three-year warranty. Contact us to find out how our flat monitors can add a whole new dimension to any application.



DATA MODUL



Industries' leading source for custom designed and manufactured illumination



Precision made in the U.S.A.

For over 15 years LCD Lighting has been fulfilling our customers' most demanding illumination needs with custom designed and precision manufactured lamps. From copiers, to UV dermatological, to machine vision, avionics display backlighting and more — LCDL lamps are lighting up industries throughout the world.

Complete capabilities

- ◆ Shape: no matter what, we can bend it
- ◆ Size: 2.0mm to 20mm O.D. custom lamps, plus T-5, T-8 diameters to any length
- ◆ Color: full spectrum to choose from plus tri-band phosphors and high color rendering index
- ◆ Engineering: built to meet environmental extremes (MIL Std. 810)

- ◆ Lifetime: 20,000 hours average life with superior dependability
- ◆ Power: high output, yet dimmable
- ◆ Precision: custom cut laser apertures
- ◆ Assemblies: harnesses, special bases, sockets, connectors and heater wiring

Trust LCDL's advanced technologies and experience to quickly solve your illumination challenges. Contact us with your needs today.

LCD Lighting, Inc.

For more information go to: www.LCDL.com
 Phone: 203 795-1520 • Fax: 203 795-2874
 37 Robinson Blvd. • Orange, CT 06477 U.S.A.

TDK DC to AC Inverters

B O U N D L E S S



QUALITY AND SELECTION BEYOND YOUR EXPECTATIONS

Expect more from the #1 supplier of DC to AC inverters. TDK DC to AC inverters are:

- Compatible with LCDs from all major manufacturers
- Cost efficient due to high volume production
- Compactly designed
- Available in custom designs to meet specific power supply requirements



TDK CORPORATION OF AMERICA
1600 Feehanville Dr., Mt. Prospect, IL 60056
(847) 390-4478 Fax (847) 390-4498

ENGINEERED FOR EXCELLENCE.

TDK offers one of the industry's most complete range of DC/AC inverters. Fact is, so vast are our inventories that five TDK factories are dedicated to producing more than one million DC/AC inverters per month.

Choose from encapsulated or non-encapsulated, PC mounts or connectors, dimming or non-dimming, models in 2 through 20 Watts output power range driving 1 to 4 lamps standard (8 or more available). All highly recommended by top display manufacturers.

What's more, you'll find TDK DC/AC inverters have some of the highest efficiency ratings in the industry.

For more information, give us a call or e-mail us at power@tdktca.com.

WWW.COMPONENT.TDK.COM

Usability: The Value-Added Characteristic

Successful display design begins and ends with the end-user's needs.

by Thomas E. Fleischman and Kenneth E. Sola

USABILITY IS THE CHARACTERISTIC of a system that makes it easy to get what the end user wants from the system, as opposed to what the design engineer *thinks* is wanted. Failure to provide adequate usability at the user interface in a product can be a costly mistake: costly to the user and costly to the market potential of the product. On the other hand, paying attention to usability engineering from the start can add value to products.

As display technologies continue to improve in quality, size, and affordability, more and more consumer and military products rely on high-tech displays. It is not enough simply to use the latest and greatest technology, however. Do these displays make the product or systems easier to learn and use, more error-tolerant, more efficient, and more economical? Do they increase flexibility, portability, and expandability? Do they improve productivity? In short, do they give the users what they want?

While these may be tough questions to answer, they are not asked often enough during product design and development. The level of display usability can play an important part in the success or failure of a product

Thomas E. Fleischman is Manager, Crew Systems/Usability Engineering business unit, SEMCOR, Inc., 46621 Corporate Dr., Lexington Park, MD 20653; telephone 301/862-2900, fax 301/862-5098, e-mail: tfleisch@semcor.com. Kenneth E. Sola is an engineering psychologist in the Crew-Systems Engineering Division at the Naval Air Warfare Center, Aircraft Division, Bldg. 2187, Suite 2280, Unit 5, 48110 Shaw Road, Patuxent River, MD 20670; telephone 301/342-9261, fax -9305, e-mail: SolaKE@navair.navy.mil.

in the marketplace. If designers include usability as a primary concern from the start of development, then it can be engineered into the product from the beginning. Usability should be a vital part – perhaps the most important part – of the product designer's systems-engineering process.

The systems-engineering approach evaluates each component of the design to determine its effects on the performance of other

system components, as well as the overall system. For example, when determining which display technology is best suited to the product or system, the design engineer must go beyond form, fit, and function. Reliability, ease of maintenance, affordability, and – of course – usability must also be considered. Usability should include such things as power consumption, environmental conditions (sunlight readability), user interfaces (display-for-



Tom Fleischman

Fig. 1: The display design of an ATM includes its positioning; placing the display in direct sunlight can greatly reduce usability.

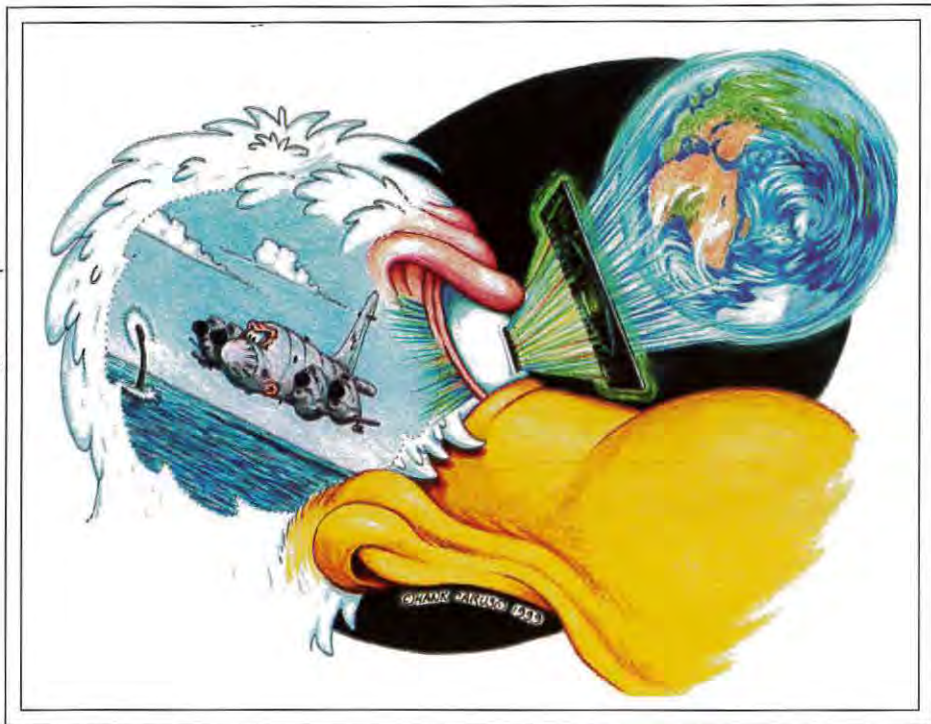


Fig. 2: "To the operator, the system is the display." (Copyright by Hank Caruso, used with permission.)

mat capability), and physical layout (viewing angles, display locations). The design team *must* include input from end users to help determine the when, where, how, and frequency of the intended use.

Usability engineering, then, is the systematic approach to product development that incorporates end-user input throughout the product life cycle. This approach produces real benefits: increased productivity; customer appeal, leading to increased sales and revenues; decreased training and support costs; reduced redevelopment time and costs; and reduced maintenance costs. These factors can make or break the profitability of a project.

The Technology Push

New display technologies are being "pushed" into products simply because they are available and make the product exciting. This is risky business because it can result in a poor match between technology and need, creating a product that is perceived by the end user as "too hard to use." At that point, the product will quickly assume the role of a cobweb anchor point in the home or workplace, and eventually in the warehouse. As a result,

everybody loses: the product developer, the marketer, the user, and the display provider. The digital camera is a case in point.

Digital cameras have shown steady improvement in the last few years as new CCDs offer higher resolution, upgrades in software provide greater image file compression and portability, and image-processing and desktop-publishing programs have become more capable and flexible. The increased competition gives consumers myriad choices and prices to meet their specific needs.

So what's the problem? The fact is that digital cameras just aren't very convenient to use compared to a standard point-and-shoot, drop-off-film-and-pick-up-pictures-from-the-drugstore camera. The usability problems are not limited to the computer connections and downloading process either. They start from the moment the user shoots a picture.

For instance, a user expecting a digital camera to have the same response speed as that of a film camera will be disappointed. Pressing the shutter button will produce a blurry picture or an off-target picture unless the user learns to stay on target longer than one would when using a film camera.

Another usability problem can occur with cameras that have a 2-in. AMLCD viewfinder. If it is the only viewfinder, the user must learn new techniques to frame a shot. If the user has "old man's eyes" (presbyopia), as some of us do, and hates wearing glasses except for reading, his arms may not be long enough to focus on the display.

Some camera designers have acknowledged that the LCD alone is not enough, so they also provide a standard viewfinder in their design. This gives the user a familiar method for framing pictures, and the LCD allows him or her to review the shot immediately after taking it. The point here is that replacing the viewfinder with the LCD panel doesn't necessarily increase overall usability, and adding the LCD to the design with the standard viewfinder may be better than either one alone. The process of framing the shot remains simple, and one gains the ability to review it to judge whether the result is exactly what was desired. The choice of options also benefits a wider spectrum of users.

Another concern with the CCD and LCD improvements from the user's point of view is their increased power consumption, which decreases battery life. Replacing standard AA or AAA batteries is not difficult, but it can be cumbersome to make sure that one has plenty on hand. Integrated rechargeable batteries are not necessarily the solution for a camera's power requirements either. The higher power usage will probably cause the consumer to purchase spare batteries and possibly a separate recharging unit to guard against downtime when away from a power source. This increases the walk-away price, as well as potential consumer frustration. This is an example of a display-technology choice that changes other system-component requirements. The systems-engineering approach might have been able to improve the situation.

Digital cameras represent a large market for display technology. The demonstrated lack of effective usability engineering in some of these cameras forces the purchaser to relearn ingrained habit patterns for the simple task of taking a picture.

Another example of good display technologies being poorly integrated into systems or products is the ubiquitous automatic teller machine (ATM). ATMs are intended to be convenient and time-saving devices, but they have been plagued with reliability, sunlight-readability, user-interface, and software-logic problems from their inception (Fig. 1). These ATM products are getting better, but had they

display-system design

been engineered for greater usability, they could have been better – and more popular and profitable – sooner. The display industry has a vested interest in the success of these products. Parts are not just parts anymore!

Becoming Part of the Solution

As display developers, how do we become a part of the solution? Our industry must promote usability to product manufacturers and help the OEM suppliers deal with usability issues. This vendor/product-developer partnership already exists for display hardware interfaces in many cases, so why can't we expand it to include usability? Display engineers should work shoulder to shoulder with the OEM's systems engineers – and end users – as they design their products. All phases of a systems-engineering approach to design can benefit from usability engineering.

Usability in Requirements Definition

When defining a new system or product, one must first identify the user's requirements for essential end functions. Ease of operation, level of complexity, interactive logic, time required *versus* time available, error tolerance, display distractions, and selective automation are but a few of the usability elements that must be considered.

We have seen some beautiful-looking workstations (both civilian and military) that have taken advantage of state-of-the-art display technologies, but have failed – or at least have not been used to full potential – because the operator was not considered until the final stages of development. In almost all of these cases, the design failed because the product was later perceived to be too hard to use. The "too hard" label can be caused by illogical control and display positions, confusing labels, lack of functional grouping, and other usability shortcomings. The system designers simply did not understand the task and the task environment from the operator's perspective. Therefore, their product did not meet user requirements.

Display suppliers often catch the brunt of criticisms that are, in fact, system related. Clement Urban ["The Human Factor," *U.S. Naval Institute Proceedings*, 58-64 (October 1988)] gives the best explanation for this phenomenon when he states, "To the operator, the system *is* the display" (Fig. 2). He offers pointed advice to display suppliers and system integrators: "Designers should not continue to regard displays as just another rectangle on a



U.S. Navy photo

Fig. 3: A side-by-side comparison of CRT (left) and LCD (right) technologies can result in display products with better usability.

system block diagram." The display is the focal point (no pun intended) of user satisfaction – or frustration – with a product. Therefore, display suppliers should take a more proactive stance on how their components are integrated into systems.

Usability in Preliminary Design

Once the system requirements have been well defined, the next step is to explore the available technologies that can fulfill those requirements. The distribution of end-system functions among interdependent lower-tier system elements includes the assignments of performance "budgets" and associated usability tolerances, such as the allocation of functions between the user and the machine. Multi-level trade-off studies balancing cost, reliability, maintainability, and portability are needed to evaluate the possible solutions. The display-component supplier is well advised to provide clear and cost-effective suggestions for the integration and use of the display to the system integrator – remember the case of the digital camera. This "end-goal partnership" approach offers payoffs in both original sales orders and in repeat sales.

Usability in Detailed Design

In the detailed design phase, the designer must allocate the functions into logical groupings, so that they may be transformed into specific subsystems and components. Design synthesis

and a systems-integration process can result in specific solutions – architecture and interfaces – that achieve the desired level of usability. This is also the time to study alternative design approaches in greater detail, using technology trade-off studies to compare two or more technologies against the previously established usability-requirements definition.

Three recent examples show how this comparative approach can work to improve usability in the detailed design stage. First, in one military comparison between CRT and LCD technology for military-systems displays, LCDs were selected to replace the traditional CRTs. Second, in an ongoing comparison for the U.S. Navy V-22 aircraft program, an LCD is being considered for replacement of beam-index CRT cockpit displays (Fig. 3).

Perhaps the best example of a comparative display-technology evaluation approach is the Display Technology Showcase exhibit, conducted at the Society for Information Display (SID) International Symposium. In that showcase, about 30 displays of various technologies and sizes were optimally driven and presented for the viewer's comparison. The showcase was roundly applauded by SID attendees, and is definitely an approach that can sell displays.

Usability in Recurring Engineering

Once the first prototype or production units have been completed, usability design continues to play an important role. End-user test-

ing and feedback in actual or simulated working conditions must be analyzed and used for next-generation systems. Product developers and marketers make a common mistake at this point, taking a passive approach to gathering feedback. Posting an address, toll-free number, or comment section on a Web page is generally not sufficient. Active approaches such as telephone, e-mail, or workplace surveys yield more useful results. The lessons learned are valuable in upgrading and keeping designs usable.

The Bottom Line

People are funny creatures. They hate to be frustrated, confused, or perplexed. They want to be productive. They want to take advantage of better ways to complete their tasks and achieve better results. They also want the tool-use experience to be enjoyable. Their tools must be easy to learn, easy to use, easy to remember, error-tolerant, and subjectively pleasing. In short, they want their tools to have usability. Given a choice, people tend to buy products that are more usable. Engineering usability into our products from the start will make us all winners. Usability is truly a value-adding characteristic. ■

8

99

NOVEMBER

Fifth International Conference on the Science and Technology of Display Phosphors

SAN DIEGO, CALIFORNIA
NOVEMBER 8-10, 1999

- An international conference on the future prospects of phosphors for:
 - OLEDs - ELDs - FEDs
 - CRTs - Plasma Displays
 - PL Devices - LC Backlights

Please send new product releases or news items to Information Display, c/o Palisades Institute for Research Services, Inc., 411 Lafayette Street, 2nd Floor, New York, NY 10003.

Let us
enhance
your
display!

The Polar Vision Advantage

- Engineering Excellence
- Versatility
- Customization
- Convenience

Polar Vision is a leading manufacturer of optical filters for contrast enhancement, sunlight readability, viewing angle control, vandal resistance, anti-glare, EMI/RFI shielding, and anti-reflection — for CRT's, ATM's, touch screens, and flat panel displays. In addition we manufacture a full range of custom linear and circular polarized films and retardation films for use in information display products. Our facilities offer class 100 Clean Room optical lamination capabilities for rigid to rigid, flexible to rigid and flexible to flexible materials.

As a full-production facility with a uniquely qualified engineering staff, Polar Vision is your ideal outsource alternative.



POLAR VISION INC.

625 Alaska Ave. • Torrance CA 90503
800.269.8801 • FAX 310.320.9357
sales@polarvision.com
www.polarvision.com

Circle no. 10

The Smart Choice in Digital Video Generators

ASTRO VG-826

True "Digital" Video Generator

Dot Clock to 60MHz / 120 MHz

Operated directly from a PC or with "Remote" Frontpanels

Very Compact & Lightweight

8 Bits resolution/ pixel/ color



If you service, repair, evaluate or engineer modern Flat Panel Devices, the Astro VG-826 is the Digital Generator for you.

It's small and light enough to fit in your briefcase, yet has the performance to drive any single or multiplexed Flat Panel Device with a resolution of 24 bits per pixel up to a multiplexed frequency of 120MHz.

It can be programmed and operated from a PC or with the RB-646 "Remote" frontpanel or operated only with the RB-614C Controller.

Make the *Smart Choice*...

Contact TEAM.

Call 1-800-338-1981 or visit us at <http://www.team-systems.com>

TEAM
systems

"Test And Measurement Technology"

Circle no. 11

Projection Displays in Military Aircraft

Small projectors may be the answer for low-volume production of high-performance displays.

by Donald Wilkins

WHEN IN COMMAND OF a 55,000-lb. F/A-18 Hornet jet fighter moving at 1.5 times the speed of sound 7 miles above the Earth, one wants quick access to essential information in order to bring the crew and the air vehicle safely back to the ground. Conditions such as these make the selection of effective and reliable display technology more than an academic exercise. Fortunately, avionics engineers are working to take full advantage of new technologies to create better cockpit displays.

The crew stations in military aircraft rely on one or more of three different display configurations. Head-down displays (HDDs) use a viewing surface located in the instrument panel. Head-up displays (HUDs) provide an optical-combiner viewing surface that superimposes sensor inputs and/or symbols over the outside world scene. Helmet-mounted displays (HMDs), in which the operator wears the display surface, are recent additions to the crew station. Each of the three displays has its own optical requirements (Table 1).

Military aircraft in general – and fighters with bubble canopies in particular – present challenging environments for the delivery of visual information. Aircraft displays must provide formats that can be easily read by the operator in lighting conditions ranging from the depths of night to direct sunlight above the clouds at 60,000 ft. Color-based information – such as electronic maps – pose special problems because color must be maintained over a

brightness range of 4000:1, yet retain compatibility with night-vision goggles, which are sensitive to certain red frequencies.

Crew-station geometry imposes additional mechanical constraints on the display designer's options. The first – and most

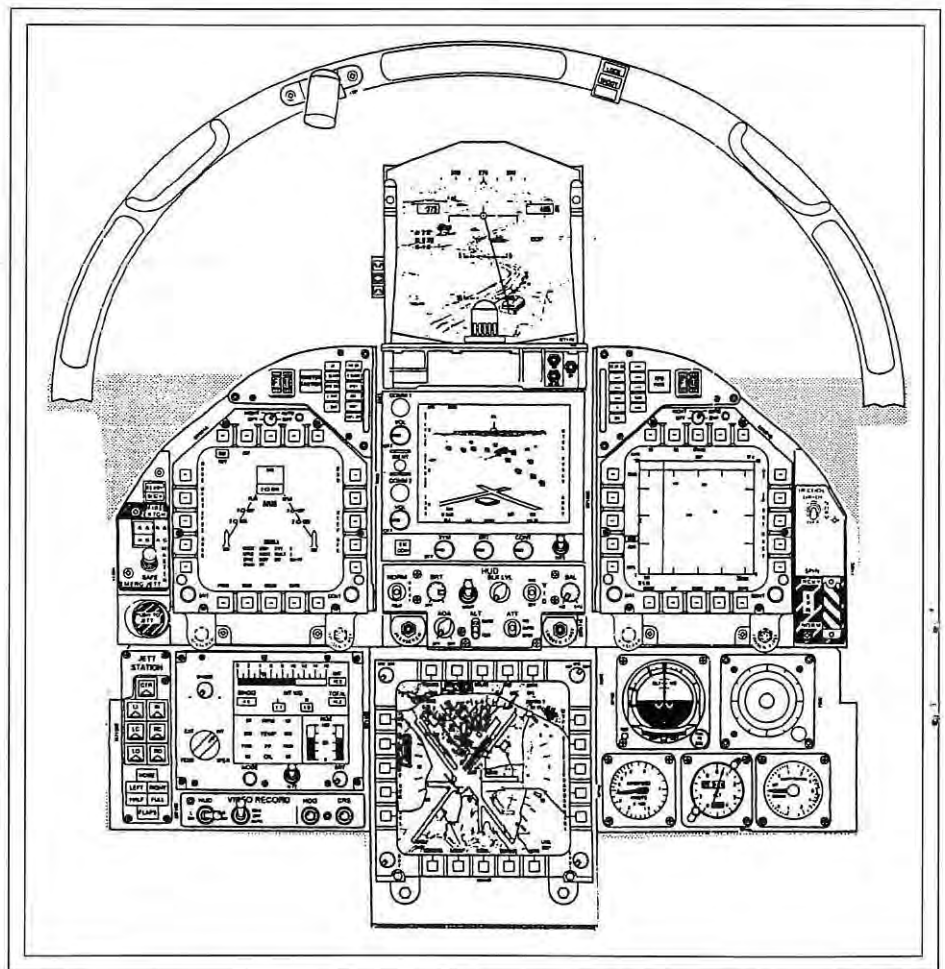


Fig. 1: The crew-station display systems of the F/A-18 E/F Super Hornet aircraft rely on different technologies. (Courtesy of Boeing.)

Donald Wilkins is a Technical Leader with Boeing, 627 Foxtail Dr., Florissant, MO 63034; telephone 314/233-6249, fax 314/233-9043, e-mail: donald.Wilkins@MW.Boeing.com.

Table 1: HDD, HUD, and HMD Optical Requirements

Head-Down Display	Head-Up Display	Helmet-Mounted Display
Contrast Ratio		
Green 5.6:1	1.2:1	1.2:1
Red 3.5:1	-	-
Blue 2.5:1	-	-
White 8.0:1	-	-
Brightness Uniformity		
<30%	<30%	<30%
Ambient Transmission		
-	90%	25%

important - factor is the "ejection envelope," a line that defines the arc traced out when the crew member is ejected from the aircraft. Any display that protrudes significantly into the ejection envelope could result in serious injury to the crew member.

The HUD presents additional constraints. This display is located at the top of the instrument panel as close to the operator as possible. While this positioning increases the perceived size of the display, it imposes limitations on the location and size of the displays below the HUD. The operator must have an unrestricted line of sight to the displays, so there are limits to how low the HUD may extend in the field of vision; crew members need to be able to see information strapped to their legs, and they need an unobstructed view of the control stick if it is mounted in the center of the cockpit. The HUD also must not obstruct access to push buttons located around the peripheries of all displays.

Limitations of CRTs

Until recently, all three display types were based on cathode-ray tubes (CRTs). Active-matrix liquid-crystal displays (AMLCDs) have begun to penetrate HDD designs, as in the new F/A-18 E/F Super Hornet (Fig. 1), which includes an HMD worn by the air-crew member.

Continued use of traditional CRT displays poses serious problems. The supply of military-grade CRTs has declined, particularly in the square formats that are preferred by crew-station designers. A CRT and its associated high-voltage power supply (HVPS) are low-reliability items, and production yields can be extremely low. CRT designs, particularly

shadow-mask tubes, are driven very hard in cockpit installations to provide the necessary brightness, which in turn leads to reduced lifetimes for CRTs and drive circuitry. The depth of CRTs also requires significant space behind the display, making it difficult or impossible to place displays in the most desirable locations.

Advantages and Disadvantages of AMLCDs

Direct-view AMLCDs were introduced into the avionics suite to resolve some of these problems. A technology under active commercial development, AMLCDs enjoy significant investment in research and production facilities, which could help avoid the obsolete-parts problems afflicting CRT designs.

AMLCDs do provide improved optical performance compared to CRTs. They are able to provide high contrast in 10,000-fL environments without high voltages or high currents. Analysis of AMLCD reliability shows that the technology offers longer life and less expensive repairs compared to CRT displays.

But AMLCDs have not turned out to be the perfect answer for crew-station displays for a number of reasons. Finding reliable sources of supply for AMLCDs has proved as difficult - if not more difficult - than for CRT sources. The primary problem is display size: AMLCD suppliers are producing thousands of substrates a month, but the majority of these are 3:4 aspect displays 6 x 8 in. or larger. Large-scale producers do not want to interrupt their manufacturing lines to make just a few score displays with unusual requirements compared to their normal commercial products.

Operating temperatures pose another set of problems. Commercial AMLCDs are designed for a much more benign thermal environment than is required for military-aircraft applications. Crew stations in aircraft with highly transparent bubble canopies can be exposed to high solar inputs, and when aircraft are parked on desert runways, temperatures can exceed 90°C. Prolonged exposure to such high temperatures can cause irreversible damage to AMLCD polarizers and liquid-crystal material. Processes have been developed that can protect the military-grade AMLCD from extreme temperatures, but this only increases the separation between the commercial and military displays, making it more difficult to establish reliable supply sources.

Direct-view AMLCDs are not suitable for all crew-station display applications, so CRTs continue to be used in HUD and HMD applications. With both AMLCD and CRT technologies present, interface design and support become more complicated. A single display technology that could meet all display requirements would simplify these matters.

The Supply Problem

Compared with production for commercial products, the military market needs low quantities of unique display sizes, usually with an aspect ratio of 1:1. Production runs measured in the tens per month would be considered a large order. This is generally not sufficient economic inducement for commercial suppliers to interrupt their production lines to build the few displays needed by the military market. One solution is to purchase a minimum quantity - usually 1000 displays - from the commercial supplier. This quantity could be a lifetime buy for a typical low-volume requirement, leaving the program with several million dollars' worth of inventory to maintain for a number of years.

Another factor is the display-manufacturing location. Concerned about depending upon overseas sources, the United States Government funded a U.S. company to build military-grade AMLCDs. The plan was for the company to start up by making commercial displays, and then, when its processes were mature, it would convert to supplying the military market. For a number of technical and financial reasons, this attempt failed.

A number of U.S. companies that either produced military-grade AMLCDs - or had the potential to produce them - have stopped building product in recent years (Table 2). One U.S. company has begun manufacturing AMLCDs for the military market and is limiting its business to those sizes for which it can forecast an adequate rate of financial return. Another approach is buying commercial AMLCDs and then "ruggedizing" the item by

Table 2: Defunct Direct-View LCD Suppliers

GE sold operations to Sextant (1988).
Alphasil became FED, Inc. (closed 1989).
Image Quest (closed 1996).
Panel Vision sold to Litton of Canada (closed 1997).
Ovonic became OIS (closed 1998).

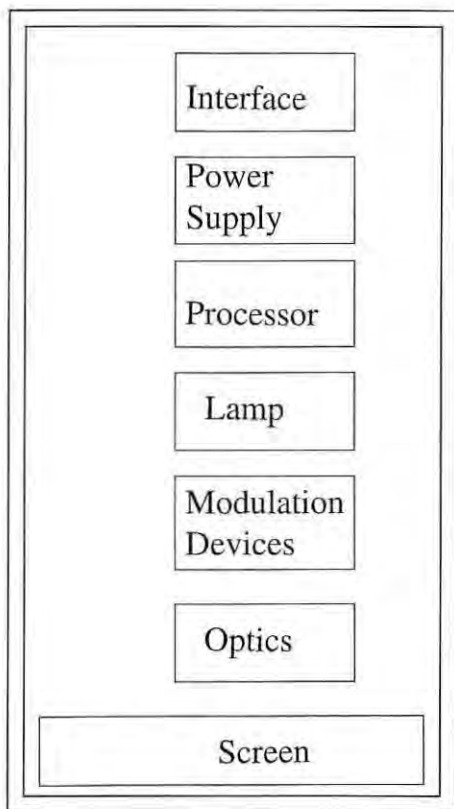


Fig. 2: This block diagram of a projection display indicates the system's basic components.

adding mechanical barriers to harsh thermal and dynamic environments. While both approaches can meet immediate needs, neither supports unusual – in terms of commercial products – display sizes for current aircraft or the very large display formats proposed for future aircraft.

Projection Potential

Projection displays offer an opportunity to provide relatively inexpensive displays of the sizes and shapes required by military aircraft (Fig. 2). A variety of technologies can be used to modulate the light, including AMLCDs and microelectromechanical systems (MEMS). Projection displays provide a Lambertian light distribution, eliminating the off-axis viewing problems encountered with many AMLCDs. The ideal design must balance cost, reliability, and optical performance. The packaging must provide sufficient “throw” depth so that the light from the lamp can reach the edges of the display.

Contrast ratio can be generally computed as a function of display and ambient brightness, where contrast decreases as the ambient brightness increases. For a head-down projection display, the brightness is determined by the brightness of the lamp, screen and filter transmissivities, and display-device efficiency. The ambient brightness is increased by the reflectivity of the projection screen.

For HUD and HMD applications of projection displays, the screen transmissivity is replaced by the reflectance of the combiner, and the combiner reflectivity replaces screen reflectivity in the calculations.

Commercial lamps available today can provide the necessary brightness for HDD designs. Required brightness and duty cycle are typically estimated as 75% of the time at 75% maximum brightness, and the remainder at minimum brightness. Initial lamp costs and lamp reliability should exceed current CRT life-cycle costs and match those of AMLCD backlights.

A family of displays could be built using an identical projection engine. If sufficient throw distance were provided, 5 × 5-in. HDDs could share many components with 9 × 9-in. displays.

HUDs provide a special challenge because they require higher brightness levels. Several technologies have the potential to provide adequate illumination, but questions of reliability and – in the case of lasers – safety must be addressed before these can be implemented.

If these illumination problems could be solved, a HUD based on projection technology would offer a unique opportunity. The front surface of the HUD is an ideal display area because it is high in the crew station and positioned close to the operator. However, the position of the final reflecting mirror limits the volume available for a display. In the past, this area has been limited to simple segmented displays. AMLCDs, thinner than standard CRTs, can provide video formats on this surface, but the dimensions of this viewing surface do not conform to a standard display size, and sources are limited. If an optical switch were used at the final folding-mirror location, it should be possible for a single projection engine to provide both the HUD and HDD formats. This architecture should cost less and be more reliable than a system using two separate displays.

HMDs have different optical-design requirements than HUDs. The operator could change the visor – the “combining area” for

the HMD – from a clear one for night operations to a dark one for daylight operations. This reduces the effects of the combiner transmissivity in the display contrast calculations, and may enable standard lighting sources to be used in such applications.

Another HMD approach could make use of lamps available today. The projection engine and lamp could be located off the head; the light would be funneled through a fiber-optic link to the visor. As an added benefit, this design reduces the amount of weight on the crew member's head, increasing safety and diminishing operator fatigue.

Remaining Challenges

Before the projection engine can replace CRTs and AMLCDs in the fighter crew station, three issues must be addressed. The projection-display design must be rugged enough to withstand the environments of the military aircraft, particularly the effects of vibration on optics alignment.

Lamps are another potentially weak link. Commercial lamps are seldom exposed to the intense thermal and mechanical environments of a fighter aircraft. They must be thoroughly tested to determine what improvements may be required to achieve reliability suitable for use in the military environment.

In order to respond to varying lighting conditions, the brightness of crew-station displays must be continuously adjustable from essentially off to full brightness, a range of 4000:1. Appropriate lighting controls for AMLCDs required considerable development activity, and similar research and development will likely be required for the projection displays.

These remaining hurdles can be regarded as moderate technical risks that can be conquered. Projection displays offer the opportunity to insulate crew-station display designs from the uncertainties of the commercial market, and the reward is worth the challenge. ■

Please send new product releases or news items to Information Display, c/o Palisades Institute for Research Services, Inc., 411 Lafayette Street, 2nd Floor, New York, NY 10003.

The Industry Leader

AD-VANCE MAGNETICS, INC.

Ad-Vance engineers have solved a variety of magnetic shielding problems. In addition, substantial cuts in shielding costs are possible by using our existing tooling. From simple components to complex systems, we offer:

- Design and consultation
- AD-MU shielding alloys
- In-house toolroom for manufacturing magnetic shields
- Custom fabricated CRT shields
- Heat treating for optimum magnetic shielding characteristics

Give Ad-Vance Magnetics a call today!



AD-VANCE MAGNETICS, INC.

P.O. Box 69 • 625 Monroe Street • Rochester, Indiana 46975
 (219) 223-3158 • FAX (219) 223-2524
 E-Mail: sales@advancemag.com
 Web Home Page: <http://www.advancemag.com>

Circle no. 12

VIDEO REFERENCE IMAGE GENERATOR

The V.I. Model 875A gives you the picture!

- Programmed as **you** need from your p.c. using the V.I. Image Master library.
- Stores up to 16 reference images - one pattern at 16 different rates, or 16 patterns at one rate, or any combination in between.
- Monochrome and RGB color video.
- External synchronizing pulses.
- Small, light, portable.

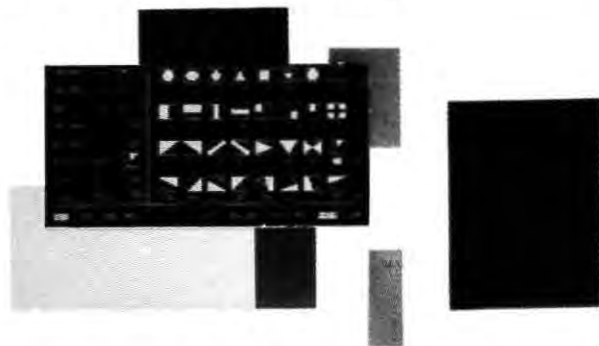
Affordable
\$1,695.00

V.I.
 VIDEO INSTRUMENTS

2155 Bellbrook Avenue • Xenia, OH 45385-4043
 Ph.: 800-962-8905 • 937-376-4361 • Fax: 937-376-2802
 E-mail: sales@videoinstruments.com
 Visit our Web Site: www.videoinstruments.com
 Visa • Mastercard • American Express

Circle no. 13

*When things are critical,
 does your display glare at you?*



The single most important quality of a light emitting display is *readability*. The quantitative measure of readability is called the Discrimination Index (DI). The principal contributor to the DI is the *contrast* between an "on" pixel and its background—both luminance contrast and chrominance contrast.

The Circular Polarizer improves the DI of displays more than any other optical device. It does this by:

- *Almost totally blocking internal specular reflection*
- *Acting as a neutral filter on non-specular reflection*
- *Preserving chrominance contrast.*

The Circular Polarizer By American Polarizers makes your display as good as it can be.

API

AMERICAN POLARIZERS, INC.
 141 South Seventh Street • Reading, PA 19602
 Telephone (610) 373-5177 • FAX (610) 373-2229

Circle no. 14

Monitors, Monitors Everywhere at CeBIT '99

CeBIT is now so large that this year's admission ticket provided free public transport over the entire Greater Hannover area – but there was no shuttle service to the conference's more than 90 monitor suppliers.

by Bryan Norris

CeBIT '99, the world's largest information-technology (IT) exhibition, was held at the Hannover Messe, March 18-24, 1999. With close to 400,000 m² of display space spread over 27 different exhibition halls, the show's organizers, Deutsche Messe, justifiably claimed that CeBIT Hannover is the "biggest trade show of any kind, anywhere in the world." So it's just as well that this year's innovation was an entrance pass that was also valid on public transport in the Greater Hannover area.

This year there were 7341 exhibitors. By far the largest group of foreign exhibitors were the 509 Taiwanese companies. The China External Trade Development Council (CETRA) was also present to promote Taiwan's vital role in the global IT industry. CETRA reported that "procurement of Taiwanese high-tech goods by the ten largest U.S. buyers, including Compaq, Dell, and HP, surged over 45% in 1998 compared to the previous year, while procurement from Europe's top five buyers, such as Actebis, Philips, and Siemens, jumped 75.3% for the same period."

Bryan Norris is the Senior Partner and founder of Bryan Norris Associates, Consultants in Electronics, 7 Biddenham Turn, Biddenham, Bedford MK40 4AT, U.K.; telephone +44-(0)-1234-26-7988, fax +44-(0)-1234-26-2345, e-mail: bnorris@kbnnet.co.uk. The company specializes in all aspects of VDU markets in Europe and provides the highly respected VDU Vision market-analysis service. Mr. Norris is a contributing editor to Information Display Magazine.

Visitors exceeded 700,000 – up from 678,560 in 1998. Of these visitors, 126,000 were from outside Germany, with the greatest increase in attendees from Eastern Europe – 19,400 compared to 15,400 last year.

LCD Monitors: Feast and Famine

Over 90 monitor suppliers had stands at the show, where they were displaying their latest products. So CeBIT was awash in TFT-LCD monitors – mostly 15-in. models, but also an amazing number of 18-in. models. Even larger TFT screen sizes – 19s and more 20s – were promised in the near future.

CeBIT had plenty of LCDs to go around, but the same could not be said of the European marketplace itself. Nearly all the suppliers reported that the demand for their LCD units, whatever the size, was far exceeding the supply – a shortage. The panel shortage that is responsible for this situation is expected to continue throughout 1999. One German PC assembler grumbled that if there were no problems, he would be able to sell about one-quarter of his PC systems with a 15-in. LCD.

This may be why LG chose to talk about its LCD production at CeBIT. LG boasted that its TFT-LCD plant in Kumi will reach a monthly production rate of 9000 panels this year. So LG's StudioWorks 880LC may not experience shortages upon its arrival in Germany, which was scheduled for the end of March.

Now and Future TFT-LCDs

Most suppliers were able to steer clear of today's difficult supply issues by talking about the future, which will see the introduc-

tion of more larger-sized LCD monitors. At least 38 suppliers were promoting 18-in. LCD units at the show, although some of these may not be commercially available until the third quarter of 1999.

ViewSonic launched a new digital version of its 18-in. model, the VPD180 View Panel[®], at CeBIT '99 (Fig. 1). This model is designed to support standards developed by the Digital Flat Panel Initiative (DFPI) to promote a swift transition from analog to digital technology.

Hitachi had a second-generation in-plane-switching (IPS) 18-in. panel, which is thinner, lighter, and has lower power consumption than its predecessor. (This will be made to an 18.1-in. format that is now a *de facto* standard.) *Nokia* was showing off its 18-in. 800XA, which features a 170° viewing angle (VA) and dual analog inputs for simultaneous connection of two PCs.

Other models that featured impressive 170° viewing angles were the *iiyama* Pro Lite 46a and the *Fujitsu* x180f. The Fujitsu x180f (launched in January) and the 15-in. x150f use Fujitsu's multi-domain vertical alignment (MVA) methodology, which provides wide viewing angles. (This is the technology that won SID/Information Display's 1998 Silver Display of the Year Award.) *Philips* was showing its new Brilliance 181AS (scheduled for release in June), which was advertised as having "the smallest footprint of any 18-in. flat-panel monitor."

Of course, not all of the 18-in. models on the show floor were new to European buyers; suppliers such as Eizo, NEC, Nokia, and Compaq already have significant sales under

their belts. In fact, with its L66, *Eizo* sold the largest number of 18-in. LCD monitors in Western Europe during 1998.

But if we're talking really futuristic, then the spotlight must be turned on *IBM*. Its Display Business Unit's Technology Group was exhibiting a particularly impressive prototype TFT-LCD monitor, the 16.3-in. Röntgen display (Fig. 2). This has a phenomenal resolution of 2560×2048 pixels, equating to nearly 200 dpi - "the first paper-quality display!" Magnifying glasses were provided so you could see for yourself just how small those pixels are.

More immediate offerings making a stir were the new 20-in. TFT-LCD monitors. *Eye-Q* launched its Eye-Q 500, with a contrast ratio (CR) of 150:1, a luminance of 180 cd/m^2 , and a 3-year/24-hour on-site guarantee. And *Sharp* exhibited its 20-in. LCD video monitor, which it aims to formally introduce later this year. The unit has a luminance of 400 cd/m^2 and a maximum power consumption of 61 W.

Several newly introduced TFT-LCD monitors use Samsung's new 17-in. panel, including those offered by *Samsung* (naturally), *MultiQ*, and *Taxan*.

But what if 17 in. is too small and 20 in. too large? How does 19 in. sound? *Panasonic*'s 19-in. TFT-LCD monitor, the pivot-to-portrait LC90S, is likely to have a European release in November, and *ViewSonic* was exhibiting a prototype 19-in. (using a Matsushita panel), the VP190, which it aims to release in Q3 '99.

The Big 15 Dominates

We may drool over 20-in. LCD monitors with multi-thousand-dollar price tags, but the volume market (relatively speaking) belongs to the host of new 15-in. LCD monitors that were being promoted by the vast majority of suppliers. Here the recent trend towards offering a choice of analog and digital models was particularly noticeable.

NEC's current digital 15, the LCD1500M, is to be joined by three more digital LCD monitors: the 14-in. LCD1400M was scheduled for introduction in April, with the 15-in. LCD1525V and multimedia LCD1525M scheduled for release in July. *ViewSonic*'s digital version of its 15-in. VDA150, the multimedia VPD150, is promoted as supporting the new digital standard developed by the Digital Flat Panel (DFP) group. It comes bundled with a DFP-compliant digital graphics



Fig. 1: ViewSonic launched a new digital version of its 18-in. VPD180 View Panel® at CeBIT '99.

card - the ATI Xpert-LCD - with an estimated U.K. street price of £765 (US\$1250). *Princeton*'s DFP550 15-in. also supports the DFP interface and comes with an ATI graphics board.

Other suppliers introducing digital versions of their 15-in. analog LCD monitors included Hyundai, LiteOn, MAG, MAGiC from Wortmann Terra, Mitac, Siemens, and Acer.

CRTs? Yes, CRTs!

CeBIT '99 reflected the counterattack of CRT technology against the LCD, with numerous launches of new "flat-screen" and "short-

depth" CRT monitors, as well as new short tubes from Hitachi and NEC.

Mitsubishi's Natural Flat (NF) DiamondTron™ 19-in. Diamond Pro 900U and 22-in. 2020u monitors, along with *iiyama*'s NF 17-, 19-, and 22-in. models, were joined at CeBIT by other models employing Mitsubishi's NF tubes, notably models from *Eizo*, *Elsa*, *Eye-Q*, *Macrotron/Macom*, *NEC*, *Step*, and *ViewSonic*. Elsa describes the benefits of the NF technology as "no optical distortion of image across visible area, 50% less reflection than conventional CRTs, and a larger undistorted horizontal viewing angle - even the

international show report

outer corners of the image are 100% distortion-free when viewed from the side."

It is interesting to see *NEC* in the list of companies who have decided to harness the "Ultra-Flat Aperture Grille technology" from *Mitsubishi*. Its 19-in. MultiSync FP950 and 22-in. FP1350 have USB, OptiClear™ coating, and TCO '99, and were listed at DM1735 (US\$990) and DM3168 (US\$1800), respectively.

The little-known company *Eye-Q* introduced its 22-in. NF model, the 777, at CeBIT. The company's NF 19-in. 650 won best monitor award in *CHIP* magazine, which tested eleven 19-in. models in their April issue. Standard features for both models are automatic color correction, USB, TCO '99, and a 3-year on-site warranty. *ViewSonic*'s latest 19-in., the PT795, uses PerfectFlat™ screen technology and SonicTron® tubes with variable-aperture grille. The estimated street price is £549 (US\$885).

Joining the "flat brigade," *Panasonic* was promoting its forthcoming PerfectFlat™ monitors (scheduled for the end of Q3 '99). The 19-in. PanaFlat PF90 will use an NF tube driven by Matsushita electronics and will have a horizontal scan frequency (hsf) of 30-110 kHz and a maximum resolution of 1600 × 1200 at 85 Hz. The 21-in. PanaFlat PF110 will use a Matsushita PerfectFlat™ striped-mask FST tube and will have an hsf of 30-127 kHz and maximum resolution of 1600 × 1200 at 92 Hz.

LG showed off the second generation of its Flatron® model, the 17-in. 795FT Plus, which is due for release in April. This monitor uses a unique tube with flat-tension-mask technology - originally developed by Zenith and refined by LG - to achieve a perfectly flat surface on both sides of the glass. The monitor was priced at DM853 (US\$485).

Sony showed German buyers its 19-in. Multiscan F400 CRT monitor (Fig. 3). It is based on the company's Flat Display (FD) Trinitron® technology, and joins Sony's fully flat 21-in. F500. *Nokia* unveiled its first "Flat Screen Aperture Grille CRT" monitor at the fair, the 17-in. SuperFlat (30-96 kHz) 447PRO, which uses the Sony FD tube. *MAG* will also employ the FD Trinitron® tubes in its forthcoming ProVision range.

Introducing the Shortest Tubes

Panasonic (Matsushita) was showing its 17-in. SL70i, which uses the second-generation

17-in. Zentan 100° short-neck tube. But Matsushita isn't the only entrant in the "who's got the shortest tubes?" competition. Its tubes are joined by *Hitachi*'s Tanzen and *NEC*'s Cromaclear® 100° 17- and 19-in. CRTs. These tubes boast impressive focus, convergence, and white uniformity. *Hitachi* has added the 19-in. CM761ET model (available in April) to its Tanzen-tubed 17-in. CM650ET, both with TCO '99. *NEC*'s 17- and 19-in. short-neck Cromaclear® tubes are used in its Enterprise Line of monitors. The E750 was available at CeBIT for DM962 (US\$550); the E950 was scheduled for May availability for DM1352 (US\$770).

Philips' Xtra Space Design™ tube technology is used in its 17-in. 107B and 19-in. 109B monitors (introduced in January). Both offer TCO '99, USB upstream port, and Customax 4.0 monitor software control (via USB) as standard. A number of other suppliers,

including *Acer*, *ADI*, *LG*, and *Samsung*, introduced their first short-length monitors at CeBIT, choosing 19-in. versions.

Even Sumo Monitors Are Dieting

But if it's size one's after, one doesn't have to worry about the monitor's being short or otherwise. *Cornerstone* thinks so. The company's 21-in. p1700, a 31-130-kHz model supporting a resolution of 2048 × 1536, is heralded as the "highest performing monitor on the planet." But even with this boast, the model still takes care to have a space-saving short-depth cabinet with bevelled corners and right-angled cables. In the U.S.A., Cornerstone monitors come with a 5-year 1-year-on-site warranty as standard, and Cornerstone is aiming to provide this in Europe for an SRP of £1250 (US\$2040). *Hitachi*'s CM81 range of 21-in. monitors is also designed with a watchful eye on size.



IBM Technology Group

Fig. 2: IBM's impressive prototype 16.3-in. Röntgen TFT-LCD monitor has a phenomenal resolution of 2560 × 2048 pixels, equating to nearly 200 dpi.

Other 21-in. suppliers were busier concentrating on what the models can do. *Eizo's* prototype FlexScan F930 (scheduled for release in Q3 '99) has an hsf of 30-137 kHz and supports a maximum resolution of 2048 x 1536 at 85 Hz, with a recommended resolution of 1600 x 1200 at 108 Hz, which targets the model at high-end graphics use. *Princeton* was also showing a new 21-in. model, the EO2010, which has asset-management capabilities to reduce MIS set-up time per user.

Big-Screen Mamas

Really large-screen displays are now proving to be a real feature of CeBIT, and they no longer come in just the plasma variety. CRT units have entered the large-screen presentation market.

ADI presented its new 34-in. TM-33 TV monitor with "theatre-quality" broadband stereo speakers and a subwoofer at an RRP of DM2154 (US\$1230). *Elsa*, the "worldwide leader in 24-in. sales," showed off its 16:10 format Trinitron® 24H96. Other suppliers showing large-screen CRTs were *Acer*, *Chun*, *Fancy*, and *CA&G*.

Some suppliers, such as *NEC* and *Mitsubishi*, were exhibiting both large CRT displays and plasma screens. Mitsubishi showed its CRT Diamond Pro 37. NEC exhibited three of its presentation CRT monitors - the XV29plus, XM29plus, and the XM37plus.

NEC's 42-in. PlasmaSync 4200W plasma display with Capsulated Colour Filter (CCF) Technology made it into the *CeBIT News* magazine by winning a "1999 IF Product

Design Award." NEC planned to introduce its PlasmaSync 4205W in June. This 42-in. PDP will have an increased resolution of 1024 x 768 and an increased contrast ratio of 350:1.

Panasonic showed its 42-in. plasma display, the TC-42P1F (or TC-42P1 U.K. model), which "delivers the world's highest levels of brightness (550 cd/m²) and contrast (550:1)." Panasonic's "newly developed Asymmetrical Cell Structure Panel, Advanced Plasma AI (Advanced Brightness Intensifier) technology, and Dual Scanning Method have solved the picture-quality problems of conventional plasma panels."

Several more suppliers are hoping to enter the plasma-display market this year. Those exhibiting plasma displays for the first time included *Acer*, *Hitachi*, *MAG*, and *ViewSonic*. *Hitachi's* prototype 42-in. unit currently uses a Fujitsu panel. *MAG's* 25-in. InnoPlasma P500, which also uses a Fujitsu panel, is planned for the end of the year.

Please Touch

Touch-screen products were very much in evidence at CeBIT '99. *MicroTouch* and *Elo Touchsystems*, the two major U.S. companies developing and selling touch-screen technologies, had stands at the show. According to MicroTouch, the world's touch-screen market is projected to grow from \$510 million in 1998 to \$2 billion in 2004. Resistive technology currently dominates the worldwide touch-screen market with a 56% share, versus 25% for capacitive screens (*Electronic Times*, March 8, 1999, p. 24).

iiyama is using the ClearTek capacitive technology from MicroTouch for its new 15-, 17-, 19-, and 21-in. touch-screen CRT monitors and 15- and 18-in. LCD monitors. MicroTouch has also launched TouchTek4, a new line of "4-wire" resistive touch screens, offering "optical clarity and durability." And if that wasn't enough good news for MicroTouch, the company also reported it had just signed an agreement with LG Electronics allowing it to manufacture touch-screen versions of LG's monitors.

Fujitsu was showing its new Plîche PC, an all-in-one touch-screen PC targeted at the home user. Fujitsu believes that "ease of use and ease of interaction are the keys to reaching new users."

Marketeering Arrives at CeBIT '99

Many exhibiting companies seem to have decided that even though they're in the IT



Fig. 3: Sony showed German buyers its 19-in. Multiscan F400 CRT monitor, based on the company's Flat Display (FD) Trinitron® technology.

Sony

international show report



Fig. 4: Apple's colored iMacs seem to have started a trend. Philips' new 17-in. 107Sx, which is aimed at the SOHO market, sported an "Aqua" metallic-colored bezel with matching attachable speakers and USB Hub box.

industry, they can't just rely on spouting specifications. So, many products were no longer allowed to speak for themselves. In 1999, "marketteering" finally arrived at CeBIT.

ViewSonic launched a new "ViewSonic on Top - PC Sold Separately" campaign at the show, which "stresses the point that choosing the correct monitor is paramount and the choice of PC is a lesser concern." In addition, a dual-branding initiative is being adopted globally, with advertisements featuring ViewSonic working with partners such as Intel.

A "3-year-on-site" warranty was regarded by several of the suppliers as a major marketing tool for the German market. The companies particularly promoting their (upgraded) warranties included *iiyama*, *Samsung*, and *Targa*. Suppliers who are already operating 3-year-on-site warranties across their (CRT) monitor range in Europe's major markets include *ADI*, *Belinea*, *Hitachi*, *Smile*, and *ViewSonic*.

And Apple's colored iMacs seem to have started a trend. Philips' new "Aqua" and

"Silver" metallic-colored bezels for their 17-in. 107Sx were certainly eye-catching. Matching attachable speakers and USB Hub boxes are also provided with this "new-look" monitor, which is aimed at the SOHO market (Fig. 4).

When in Germany, Talk "Green"

But if one doesn't have an electric color or one of the natty catchphrases that abounded at CeBIT '99, all is not lost, because one can always impress the German market with "green" or health credentials. *iiyama Electric* (Feldkirchen, Germany) has joined forces with *Electrorecycling* (Goslar, Germany) to offer its customers a free recycling facility (for monitors bought after January 1, 1999). Companies already offering a recycling service in Germany include *ADI Kulkoni*, *NEC*, and *Sony*.

On the *Samsung* stand, there was an impressive demonstration of the anti-dust Fresh Bio CRT. The CRT funnel is coated with special ceramics which emit negative

ions, thereby reducing electrostatic charges and dust adsorption by 50%.

In NEC's booth, *Novis Technik + Design* (Stuttgart, Germany) was exhibiting an "Ergonomic Workspace Environment" designed according to ergonomic recommendations from eye specialists. The height-adjustable desk with integrated cable channelling featured a recessed tilt-adjustable NEC LCD1510 display (Fig. 5), a lowered keyboard shelf with hand-rest, and a cordless mouse from *Logitech*. Perhaps Novis has its eye on the fact that the guidelines of the "Bildschirmarbeitsplatzverordnung" (German Display Workstation Directive) will become law in Germany on December 31, 1999. The objectives are a safe and healthy working environment, and the directive covers ergonomic aspects of office equipment, hardware, and software.

Germany's concern for environmental and health issues is heavily reflected in its "home-grown" certifications, which have been introduced by the Cologne-based *TÜV Rheinland*. TÜV is one of the world's leading safety and inspection authorities and now has more than 80 offices worldwide.

The TÜV Rheinland Ergonomics Mark of Approval is issued to IT products certified under ISO 9241-3, ISO 9241-7, ISO 9241-8, and MPRII, in conjunction with a review of the user's manual. Its Eco Circle (Eco-Kreis) - "the most comprehensive green approval" - is awarded to IT products demonstrating compliance with requirements for electrical safety, electromagnetic compatibility, ergonomics, recyclability, energy efficiency, and pollutant reduction. (Manufacturers applying for ECO Circle approval must be ISO 9002- and ISO 14001-certified.)

CeBIT '99 Remembered

So, for what will CeBIT '99 be best remembered? In the flat-panel arena, the two product groups taking the limelight were definitely the 18-in. LCD monitors and the digital versions of 15-in. TFTs. In the CRT realm, short-length 19-in. models and flat-tubed 22/21-, 19-, and 17-in. units were the star exhibits.

But overall, the highlight of the show had to be the red press scooters. Anyone "lucky" enough to own a press badge was offered the use of a child's scooter - the kind one pushes along with one leg. Some enthusiastic press people obviously enjoyed recapturing their



Novis Technik + Design

Fig. 5: Novis's "Ergonomic Workspace Environment," shown at the NEC booth, incorporates a height-adjustable desk with a recessed tilt-adjustable NEC LCD1510 display.

childhood by scooting around the show, much to the merriment of others. But I just had too many bags to carry. Perhaps next year, if the scooters come equipped with front baskets or back trailers, one may catch me whizzing past as well!

Note

Display prices quoted in this article are recommended retail prices (RRP) excluding local tax (16% in Germany), unless otherwise stated. ■

8

99

NOVEMBER

Fifth International Conference on the Science and Technology of Display Phosphors

SAN DIEGO, CALIFORNIA
NOVEMBER 8-10, 1999

- An international conference on the future prospects of phosphors for:
 - OLEDs - ELDs - FEDs
 - CRTs - Plasma Displays
 - PL Devices - LC Backlights

16

99

NOVEMBER

7th Color Imaging Conference: Color Science, Engineering, Systems & Applications

SCOTTSDALE, ARIZONA
NOVEMBER 16-19, 1999

- An international multidisciplinary forum for dialogue on:
 - Creation and capture of Color Images
 - Color Image reproduction and interchange
 - Co-sponsored with IS&T



Touch Screens

The most powerful man-machine interface since advent of the keyboard and the mouse. Harness this power to your advantage; improve your products by making them easier to use.

It's that simple!

Get in touch with CyberTouch.



CyberTouch

Touch Screens • Touch Monitors • Touch Systems

805.499.5000 • Fax 805.499.5888

sales@cybertouchusa.com

www.cybertouchusa.com

The Pokémon Incident

Content-dependent VDT hazards are real, but what happened in Japan in 1997 is now understood and solutions are at hand.

by Masahide Nomura and Takeo Takahashi

ON December 16, 1997, 685 people (mostly children) in Japan were rushed to hospitals for the treatment of seizure symptoms. The youngsters had been watching the vastly popular animated TV cartoon show "Pocket Monsters," sometimes called "Pokémon" ("Computer Warrior Polygon, Pocket Monsters," TV Tokyo Network, Japan). Most sufferers reacted at about 6:50 p.m. while, or shortly after, watching a 4-sec flickering scene consisting of an alternating presentation of blue and deep red light at 12 Hz over almost the whole TV screen (Fig. 1).

Flicker over such a large portion of the TV screen caused great discomfort despite its brief duration. This surprised the display and television-production communities, along with the general population, but neurologists have known for more than 20 years that the

Masahide Nomura is Principal Researcher, Bioinformation, at NEC's Fundamental Research Laboratories, 34 Miyukigaoka, Tsukuba, Ibaraki 305-8501, Japan; telephone +81-298-50-1181, fax +81-298-56-6136, e-mail: nomura@frl.cl.nec.co.jp. Takeo Takahashi is the Director of the Yaotome Clinic in Sendai, Japan; telephone +81-22-374-3555, fax +81-22-375-2889, e-mail: tt@dd.ij4u.or.jp. This article was developed from the authors' "Adaptive Temporal Filters for All VDTs to Prevent Health Hazards That Can Be More Dangerous Than You Thought," presented at SID '99, San Jose, California, May 19, 1999. The paper appears in the SID Intl. Symp. Digest Tech. Papers, 338-342 (May 1999).

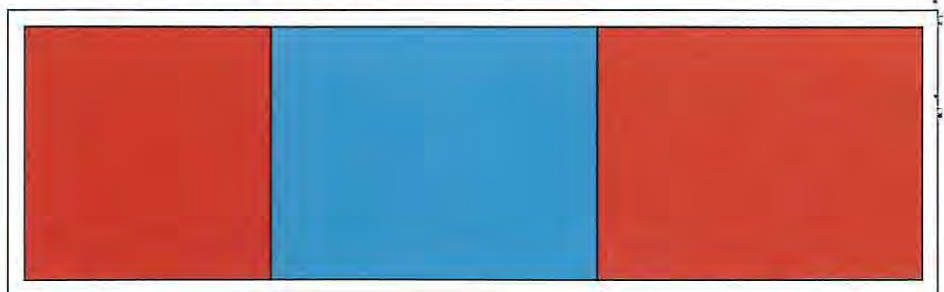
flickering of a deep red light can be instrumental in producing EEG abnormalities in patients with photosensitive epilepsy (PSE).^{1,2}

A follow-up national study collected valid answers to questionnaires from 9209 school-children 6-18 years old.³ It revealed that 0.75% of 4026 Pokémon viewers had convulsive seizures, and the affected population rose to 10.4% if various minor symptoms - ocular pain, headache, dizziness, nausea, *etc.* - are included. Many people in the group - 77% of affected viewers and 47% of the people who suffered convulsive seizures - had no history of similar experiences before the Pokémon incident. Susceptibility was lowest for 7-year-olds (2.8%) and highest for 18-year-olds (28%).

The Pokémon incident is a warning that many of us should be aware of the subclinical risk of video-display-terminal (VDT) hazards that depend upon the image - principally the

power of any flicker at 10-30 Hz. These content-dependent VDT hazards pose a direct threat to the brain, but the risk of such hazards can be reduced by removing dangerous flicker from images. The programming code in the U.K. and guidelines in Japan regulate scenes that might cause photosensitive seizures, but these regulations are mathematically ill-defined, and practical application is limited. The copyrights of visual-content creators also make regulations difficult to apply to all TV scenes, and Japanese viewers still watch many hazardous images - particularly in commercials.

This situation becomes more serious with larger TV screens, and we can also easily find images with hazardous flicker levels in video games and over the World Wide Web. Therefore, we must recognize that the risk of content-dependent hazards exists wherever VDTs exist.



Nutmeg Consultants

Fig. 1: The seizures and less-serious symptoms of the Pokémon incident were produced by deep red and blue fields approximately like the ones illustrated here, alternating somewhat irregularly with an average frequency of about 12 Hz. (We are not reproducing the actual image sequence because of copyright issues.)



Fig. 2: This trial model of a temporal filter effectively prevented PPRs in clinical tests. The authors are investigating the production of commercial versions.

A Hardware Solution

Flicker-triggered hazards can be understood in terms of the excitation of neurons of the cerebral cortex as they resonate in response to intermittent photic stimulation (IPS) at a temporal frequency of approximately 10–30 Hz. IPS at these frequencies maximizes the perceptual sensitivity (or visual cortical neural response). IPS at 15–20 Hz is the most effective in evoking photoparoxysmal response (PPR) in PSE patients.

With this understanding, the authors designed an inter-frame filter that reduces the power of temporal frequency components at 10 Hz or higher in the frame-to-frame intensity change of video images. Because the effectiveness of the filter is controlled adaptively, images remain unchanged if they do not include much flicker in the troublesome frequency region from the frame-to-frame intensity change, either because the area of the flicker or the RGB change is negligible.

The temporal filter is realized through a concatenated process using a frame-to-frame moving average of video images with frame-memory buffers. The brain's neural mechanism was studied, and a mathematical model of neural cell response was created to estimate the risk of hazards. The effectiveness of the temporal low-pass filter is adaptively modified to keep the risk index below an appropriate level.

Initially, the adaptive temporal filter was implemented with a software computer simulation, but a trial hardware model (Fig. 2) has now been developed which takes the original NTSC video signal as its input and produces the filtered NTSC video signal as its output. The device is connected between a TV monitor and any NTSC video-signal source: a TV tuner, VCR, laser-disc player, DVD player, video-game player, etc. Ideally, the filter will be built into display devices such as digital TVs, high-definition TVs, or computer displays.

Testing of the filter was conducted using a problematic 4-sec Pokémon scene with apparently milder images than the scene that had been broadcast. A filtered version of the scene was displayed on a 14-in. TV in ordinary room ambient. After 10 sec, the unfiltered version was shown. The paired stimuli were repeated twice. Any stimulus was terminated immediately when a PPR was elicited. The problematic Pokémon scene elicited generalized PPRs from seven PSE patients, but the filtered scene did not. The filtering technique effectively prevented Pokémon seizures.

This preventive technique may be used without violating visual-content-creators' copyrights, and it is easy to install on visual displays to reduce the risk of flicker-triggered photosensitive seizures and perhaps other less-

serious health hazards that could threaten many viewers. Since this technology offers an effective solution for the protection of both PSE sufferers and children worldwide, NEC expects to introduce products that will satisfy an anticipated strong demand in the marketplace.

References

- ¹T. Takahashi and Y. Tsukahara, "Influence of Color on the Photoconvulsive Response," *Electroencephalography and Clinical Neurophysiology* **41**, 124-136 (1976).
- ²G. F. A. Harding and P. M. Jeavons, *Photosensitive Epilepsy*, New Edition (MacKeith Press, London, 1994).
- ³T. Yamauchi *et al.*, "Clinical Studies on Photosensitive Seizures," *Ministry of Health and Welfare Science Special Research Report*, Japanese Ministry of Health and Welfare, (Tokyo, March 1998). ■

DISPLAYS CONSULTING GROUP

Design
Development
Production
Components
Measurements
Applications

Contact:
H. W. Grossbohl

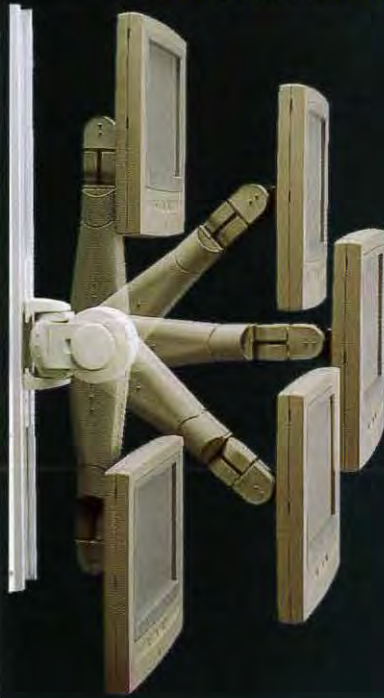
Phone 1-800-653-9857
Fax: 805/526-1145

Circle no. 15

Flat Panel Monitor ARMS™

Call: 1.800.888.8458

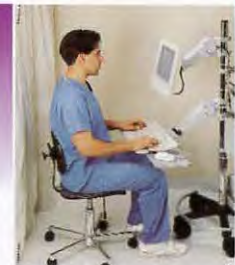
Ergonomically position your flat panel monitors, laptops and keyboards wherever you need them—with Ergotron's **Adjustable Rotating Mounting Solutions**



Mobile Solutions



Wall Mount Solutions



Custom Mount Solutions



Laptop Mounting Solutions



ERGOTRON®

1.800.888.8458 <http://www.ergotron.com>

Circle no. 16

For excellent quality modules, very competitive prices and short lead time you can depend on our LCD modules

We are excited to offer you the "DI Advantage":

- Local Engineering Support
- Shortest Lead Time in Industry
- Competitive Pricing
- Latest Technology Liquid Crystal Fluid
- Local Quality Control
- Full In-House Custom Design Process
- Local Value Added Services
- Extensive Board Integration Assembly

CHARACTER DISPLAYS

Char. x line	Model No.	Character Fonts	Module Size	View Area	Character Size	Dot Size
8x2	DV-0802	5 x 8	58.0x32.0x13.8	35.0x15.24	2.95x5.46	0.55x0.65
16x1	DV-16100	5 x 8	80.0x36.0x10.0	64.5x13.8	3.07x6.56	0.55x0.75
16x1	DV-16110	5 x 7 + cursor	122.0x33.0x10.0	99.0x13.0	4.84x8.06	0.92x1.10
16x2	DV-16210	5 x 7 + cursor	122.0x44.0x10.0	99.0x24.0	4.84x8.06	0.92x1.10
	DV-16230	5 x 8	85.0x29.5x10.0	62.5x16.1	2.78x4.89	0.55x0.50
	DV-16236	5 x 8	85.5x36.0x10.0	62.2x17.9	2.95x5.55	0.55x0.65
	DV-16244	5 x 8	84.0x44.0x10.0	62.2x17.9	2.95x5.55	0.55x0.65
	DV-16252	5 x 8	80.0x36.0x10.0	62.5x16.1	2.78x4.89	0.55x0.50
	DV-16257	5 x 8	85.0x32.6x10.0	62.2x17.9	2.95x5.55	0.55x0.65
16x4	DV-16400	5 x 8	87.0x60.0x10.0	61.4x25.0	2.95x4.75	0.55x0.55
20x2	DV-20200	5 x 8	116.0x36.0x10.0	83.0x18.8	3.20x5.55	0.60x0.65
	DV-20210	5 x 7 + cursor	180.0x40.0x10.0	149.0x23.0	6.00x9.66	1.12x1.12
	DV-20211	5 x 8	182.0x60.0x20.0	137.0x29.2	5.90x12.7	1.10x1.50
	DV-20220	5 x 8	108.0x39.0x10.0	83.0x18.8	3.20x5.55	0.60x0.65
20x4	DV-20400	5 x 8	98.0x60.0x10.0	76.0x25.2	2.95x4.75	0.55x0.55
	DV-20410	5 x 8	146.0x62.5x10.0	118.8x38.5	4.84x9.22	0.92x1.1
24x2	DV-24200	5 x 8	118.0x36.0x10.0	94.5x18.0	3.20x5.55	0.60x0.65
	DV-24210	5 x 8	208.0x40.0x10.0	178.0x23.0	6.00x9.66	1.12x1.12
40x2	DV-40200	5 x 8	182.0x33.5x10.0	154.0x16.5	3.20x5.55	0.60x0.65
40x4	DV-40400	5 x 8	190.0x54.0x10.5	147.0x29.5	3.54x4.89	0.50x0.55

GRAPHIC DISPLAYS

# of dots	Model No.	Model Size	View Area	Dot Size	Built-in
128x16	DG-12816	82.0x20.1x6.8	70.1x15.2	0.45x0.50	SED1520
122x32	DG-12232	84.0x44.0x10.0	60.5x18.5	0.40x0.45	SED1520
	DG-12232-01	65.1x27.1x5.3	60.5x18.5	0.40x0.45	SED1520
128x64	DG-12864	93.0x70.0x9.5	71.7x39.0	0.48x0.48	HD61202
	DG-12864-01	82.0x65.0x10.8	53.0x33.5	0.35x0.42	HD61202
	DG-12864-02	110.0x70.0x14.5	73.4x38.8	0.48x0.48	HD61202
	DG-12864-03	113.0x65.0x14.5	73.4x38.8	0.48x0.48	HD61202
128x128	DG-12128	72.4x69.9x10.0	49.0x49.0	0.32x0.32	HD61830
160x32	DG-16032	116.0x44.0x14.0	94.36x18.84	0.55x0.55	SED1521
160x80	DG-16080	100.0x54.0x11.0	72.3x37.8	0.39x0.39	HD61830
160x160	DG-16160	87.0x87.0x10.3	62.0x62.0	0.34x0.34	HD6204F
240x64	DG-24064	180.0x65.0x11.0	132.0x39.0	0.49x0.49	HD61830
	DG-24064-01	180.0x65.0x10.8	132.0x39.0	0.49x0.49	T6963C
	DG-24064-02	180.0x65.0x10.0	132.0x39.0	0.49x0.49	T6963C
240x128	DG-24128	144.0x104.0x12.5	114.0x64.0	0.40x0.40	HD66204
	DG-24128-01	170.0x104.0x14.0	132.0x76.0	0.47x0.47	T6963C
320x240	DG-32240	167.1x109.0x10.0	122.0x92.0	0.33x0.33	HD66204



DATA INTERNATIONAL CO., LTD.



DISPLAY INTERNATIONAL

2959 Alafaya Trail, Suite 121, Oviedo FL 32765 Tel: (407)366-7399 Fax: (407) 366-7403 E-Mail address: info@d-i-net.com Website: www.displayinternational.com

Circle no. 17

Align Your Displays To Deliver...

Peak Performance



Sencore's CP290 Portable Color Analyzer lets you quickly and accurately test and align these video displays to deliver unprecedented performance:

- **Digital Televisions**
- **High-Resolution Computer Monitors**
- **Home Theater Direct View & Projection Televisions**
- **Video Walls**
- **Medical Monitors**
- **Broadcast Monitors**

Visit us on the web at
www.sencore.com

Circle no. 18

To learn more about how you can align any video display to industry standards in just minutes, call 1-800-SENCORE today!

Make a Battery this Big , Last Like a Battery This Big



KENT ChLCD™ No Power DISPLAYS

DESIGNED FOR PORTABLE EQUIPMENT

Unlike conventional LCD units, Kent ChLCD (Cholesteric Liquid Crystal Display) use power only to generate images – not to update, or refresh images. In fact, ChLCD images can be displayed indefinitely – seconds, hours, weeks or even years – without consuming a millijoule of power. It makes these displays ideal for any type of portable equipment where increasing battery life is important.

EASIEST TO READ REFLECTIVE DISPLAY TECHNOLOGY

ChLCD displays also offer better viewing than conventional LCD displays – especially in direct sunlight. With a 360 degree viewing cone and very high contrast, ChLCD displays offer exceptional reflectivity, without back lighting.

GET THE FACTS

To learn more about this technology that enables you to do more, call us at **330-673-8784** or visit our website at www.kentdisplays.com/pd.

Circle no. 19



KENT DISPLAYS
INCORPORATED

A MANNING VENTURES BUSINESS UNIT

Kent Displays, Inc. • 343 Portage Boulevard • Kent, OH 44240 • Phone: 330.673.8784 • Fax: 330.673.4408
Internet: <http://www.kentdisplays.com> • E-mail: sales@kentdisplays.com

Products and technologies of Kent Displays, Inc. are protected by the following patents: United States: 5,837,811; 5,394,067; 5,251,048.
People's Republic of China: 92103952.2; Israel: 101,766; Taiwan: 801405631; PCT (EP, Canada, Korea, Japan and Norway): 9200394; 9209367. Other Patents Pending.

1/4 VGA "No Power" Display Modules



Kent Displays' 1/4 VGA ChLCD "No Power" design not only provides exceptional readability but also requires no power to maintain displayed images, only to change them. Because power isn't constantly used to retain the image, expect exceptionally long battery life. Ideally suited for portable battery-operated products, this unit is excellent for displays that must be readable at any angle, even in direct sunlight.

The 1/4 VGA format is ideal for portable communication devices, data collection products, global positioning systems and more. Available with or without an on-board controller, in 4 color combinations: yellow/black, yellow-green/black, green/black or blue/white. This display features an imaging area of 4.48 in. by 3.36 in. with a pixel resolution of 72 dots per inch.

KENT Displays, Inc., 330-673-8784
E-mail: sales@kentdisplays.com

Circle no. 20

1/8 VGA "No Power" Display Modules

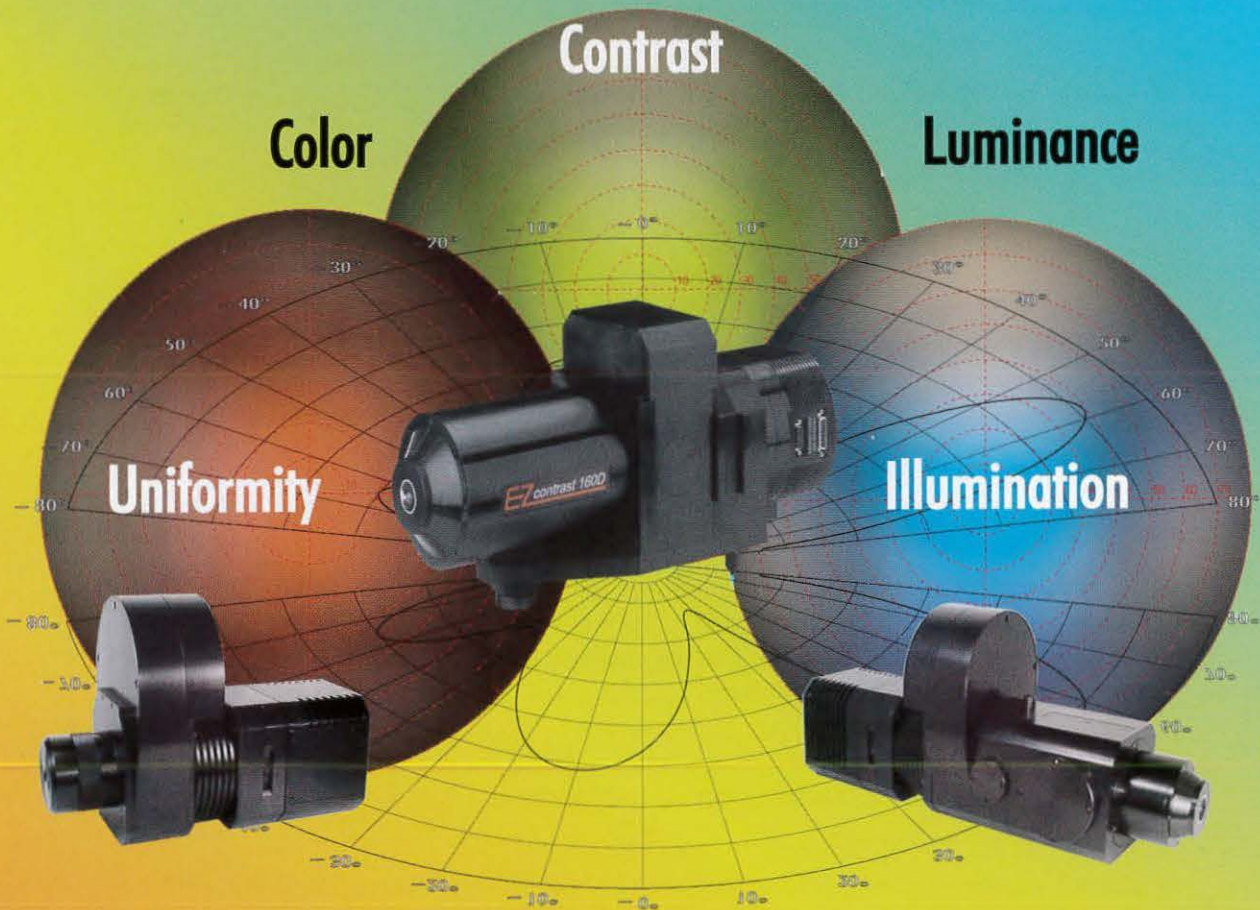


KENT 1/8 VGA display modules feature ChLCD technology for no power consumption except for image generation. This technology also provides high contrast and a wide viewing angle. They are available with a standard resolution of 100 dpi and an active viewing area of 40.6 mm by 61.0 mm (1.60 in. by 2.40 in). They're ideal for applications such as portable communications, data collection, global positioning systems and more.

KENT Displays, Inc., 330-673-8784
E-mail: sales@kentdisplays.com

Circle no. 21

Improve Development and Manufacturing Testing Throughput



For Reflective Display, Microdisplay,
Plasma, LCD, FED, Dashboard ...

For detailed specifications, contact us : sales@eldim.fr



ELDIM

ELECTRONICS FOR DISPLAYS
AND IMAGING DEVICES

ELDIM - 14200 Hérouville Saint Clair - France • Phone : + 33 2 31 94 76 00 - Fax : + 33 2 31 94 09 50
E-Mail : eldim@eldim.fr • Internet address : <http://www.eldim.fr>



Perform spectrally-based luminance and color measurements anywhere, anytime. With the battery-powered Photo Research® PR®-650 SpectraColorimeter.™ Whether you are testing displays, measuring skin color or tracking pollution, don't settle for an inaccurate filter colorimeter. Choose the only NIST-traceable spectroradiometer that is truly portable.

**FAST.
ACCURATE.
PORTABLE.**

Use the hand-held PR-650 in the field to measure spectral reflectance in seconds. Measure emissive sources like displays and projectors in the lab with user-friendly SpectraWin® software. Or automate your QC testing by controlling the PR-650 remotely from a PC over an RS-232 interface.



Backlit supertwist LCD display

Proven SpectraScan® diode-array technology captures the entire visible spectrum from 380 to 780 nm in one shot. The PR-650 also offers AutoSync™, a unique feature which automatically locks to the refresh frequency of CRTs and allows accurate testing of computer monitors.

Pritchard optics, on-board data storage, push-button operation, fast-charge Nicad batteries and a host of other features make the PR-650 the most versatile colorimeter on the market. Choose from a variety of optical accessories for specialized applications.

Call us and discover how affordable, fast and accurate light and color measurement can be.

**The PR-650
Light Measurement
on the Move**



PHOTO RESEARCH, INC.

9731 Topanga Canyon Place
Chatsworth, CA 91311-4135 U.S.A.
Phone: 818-341-5151 ■ FAX: 818-341-7070
<http://www.photoresearch.com>
e-mail: sales@photoresearch.com

Circle no. 23

Industry Directory

ID's thirteenth annual directory of the display industry.

COMPILED AND EDITED BY THE EDITORIAL STAFF

Part I, beginning on this page, is a listing of products and services relevant to the display industry. Part II, the company directory, begins on page 40.

Part I: Products and Services

ADHESIVES

□ Adhesives Research

ANTIREFLECTION COATINGS

See optical coatings

ANTIREFLECTION SCREENS

See filters

ANTISTATIC CHEMICALS AND DEVICES

□ ACL/Staticide □ Ernst W. Dorn Co.
□ Exxene □ Homalite □ Ion Systems
□ Lamination Technology □ OCLI □ SIMCO
□ Tech Spray □ Teknek Electronics □ 3M
Electronic Products □ 3M Product
Information

ASSOCIATIONS AND PROFESSIONAL SOCIETIES

□ ALCOM □ American Institute of Small
Business □ Display Works □ Human
Factors Society □ Instrument Society of
America □ Machover Associates □ National
Computer Graphics Associates □ SEMI
□ Society for Information Display □ SPIE
□ SPSE □ Univ. of Michigan □ USDC
□ VESA

BACKLIGHTS (for liquid-crystal displays)

□ AlliedSignal □ All American □ Avalex
□ Axonix □ Bi-Search □ BKL □ Breault
□ Briteview Technologies □ Craft Data Ltd.
□ Crystal Visions Solutions □ CTP Coil
□ D&T □ Data Modul □ Dolch Computer
□ Diamond Tech One □ Dimension
Technologies □ Display Engr. □ Earth
Computer □ Eldec □ EG&G Optoelectronics
□ ELtech □ Electro-Optics □ Endicott
□ Eurescan □ Flat Panel Display □ Fresnel
Optics □ General Electric □ Ginsbury □ High
Lumen Displays □ H-P □ Imaging &
Sensing □ ITO America □ Jaco Electronics
□ JKL Components □ Korry Electronics
□ Lamination Technology □ Landmark
Technology □ LCD Lighting □ UnFinity
□ Litton Systems □ L-3 Display Systems
□ Luminescent Systems □ Lumitex □ Man &
Machine □ Milgray Electronics □ Modutec

□ Multichip Assembly □ National
Semiconductor □ Physical Optics □ Pixelink
□ Planar Advance □ Planar Flat Candle
□ Poly-Optical Products □ Precision Lamp
□ Racal-Mesl □ Raytheon □ Reynolds
Industries □ Rikei Corp. □ Rockwell Collins
□ SAIC □ SAI Technology □ SI Diamond
□ I. I. Stanley □ Stanley Electric □ Swiss
Controls □ Taiyo Yuden USA □ TDK
□ Teledyne Lighting & Display □ Thomas
Electronics □ 3M Product Information
□ Ushio America □ Visus □ VL Electronics
□ Voltarc Technologies □ Wedglight
□ White Electronics □ Winsor □ WPI
Electronics □ Wyle Electronics

CATHODES AND COMPONENTS

□ Ceronix □ FEPET □ General Vacuum
□ Incom □ Intevac □ JACO Electronics
□ Kimball Physics □ Mshield □ OCLI
□ Philips Display Components □ Pixelink
□ Princeton Display □ SI Diamond □ UTI
Corp. □ VDC (Apex) □ VDC (Southwest
Vacuum)

CCD IMAGERS AND CAMERAS

□ American ELTEC □ Ball Aerospace
□ Burie Industries □ CID Technologies
□ Coreco □ CRL □ Data Plus □ DRS
Technologies □ DynaColor □ Eastman
Kodak □ EEV □ EEV Ltd. □ EG&G
Optoelectronics □ EG&G Reticon □ ELDIM
□ Electro-Optics □ Incom □ IPS Automation
□ JENOPTIK □ Kollmorgen □ Kontron
□ Lighting Sciences □ Loral Fairchild
□ MegaVision □ Mekel Engr. □ Milgray
Electronics □ Optical Radiation □ Philips
Components □ Pulnix America □ Raytheon
□ Sarnoff Corp. □ Schott Fiber Optics
□ Scientific Systems □ Security Defense
Systems □ Seiwa Optical □ Sony Display
Device Group □ Symco □ Telesensory
□ Thomson Components & Tubes □ Wyle
Electronics □ Xybion

CHARACTER RECOGNITION DEVICES

□ Coreco □ Eastman Kodak □ Poly-Optical
Products □ Sharp Digital Information
Products □ Telesensory □ Toray
Engineering □ Voice Connexion

CID IMAGERS AND CAMERAS

□ CID Technologies □ Digital Vision
□ Raytheon

CLEANING AGENTS

□ Applied Technology □ American
Polarizers □ Arizona LCD □ Borer Chemie
AG □ Ernst W. Dorn Co. □ Kisco □ OCLI
□ Silicon Valley Chemlabs □ Tech Spray
□ 3M Product Information □ Toray
Engineering □ Valtech

COLOR MATCHING SYSTEMS

□ AVT □ Barco Display □ Color Technology
Solutions □ Electronic Image Systems
□ Electro-Optics □ Klein Instruments
□ Minolta □ Photo Research □ T&M
Instruments □ 3M Product Information
□ Topcon □ Torrey Pines Research

COMPUTER VIDEO INTERFACES

□ All American □ Altinex
□ AVED □ Communications Specialties
□ Covid □ Data Plus □ Densitron □ Eaton
PSD □ Epson America □ Epson Electronics
America □ Extron □ Fakespace □ Genesis
Microchip □ Imagine Graphics □ Laversab
□ Luminary Technologies □ Milgray
Electronics □ Mintronix □ Pixelink
□ Pixelworks □ PsiTech □ Racal-Mesl
□ RGB Spectrum □ SAIC □ SI Diamond
□ Sirttech □ Teleline Canada □ 3M Product
Information □ Univision □ WACOM □ Wyle
Electronics

CONNECTORS AND SOCKETS

□ Applied Technology □ Thomas Betts
□ Canon Connector □ Display Components
□ Elform □ Eurescan □ Fujipoly America
□ General Atronics □ Hosiden America
□ HP Reid □ ITO America □ ITT Cannon
□ Jaco Electronics □ JAE Electronics
□ Kisco □ Molex □ Multichip Assembly
□ Pixelink □ Raytheon □ Reynolds
Industries □ Stan-Allen □ Stanley Palmer
□ Teledyne Kinetics □ 3M Electronic
Products □ 3M Product Information
□ Young Technology

CONSULTANTS

□ AGI □ ALCOM □ Applied Technology
□ ARD □ Arizona LCD □ ASM America
□ AZ LCD □ Leo Belsler □ Bozel Kamstra
□ Breault □ Carroll Consulting □ Color
Technology Solutions □ Consilium
□ CSERIAC □ Display Components
□ Display Device Components □ Display
Engineering □ Display Labs □ Displays
Consultant Group □ DisplaySearch
□ Display technology Consulting □ Eagle
Magnetics □ Electronic Image Systems
□ Epson Electronics America □ Ergonomics
□ Ergosyst Associates □ Flatscreen
Technologies □ H. L. Funk □ Future Focus
□ Jerold Gard □ Ginsbury □ GreenLight
□ H. W. Grossbohl □ Joe Hallett &

Associates □ Walter Hett & Associates
□ High Lumen Displays □ Home Theater
□ IDT □ IEE □ Imaging Display □ Infinite
Graphics □ InterLingua □ Ion Systems
□ ITO America □ Kahn Intl. □ Kenix
Industries □ Bernard J. Lechner
□ Machover Associates □ Man & Machine
□ Manx Research □ Matrix Components
□ McLaughlin Consulting Group □ Meissner
& Wurst □ MIRC □ Monterey Technologies
□ Multichip Assembly □ Nutmeg
Consultants □ Optis □ Optics 1 □ Pacific
Media Associates □ Pearson & Associates
□ Phosphor Technology □ Pixelink □ Pixel
Interconnect □ Rainbow Optics □ Scott
Redmond □ Louis Rudzinsky Associates
□ SCT Group □ Peter Seats □ Alan Sobel
□ Solomon Technology □ Sonera
Technologies □ SOPRA □ Stanford
Resources □ Stanley Palmer □ Stereomedia
□ Tannas Electronics □ Tech-Com □ Telic
Optics □ 3D Imagetek □ 3DTV □ Torrey
Pines Research □ Tyson Consulting Group
□ UCE □ Aron Vecht & Associates □ VDC
(HQ) □ Venture Development □ Visus
□ Westland Electronics

CONVERTERS, DIGITAL/ANALOG

□ Absopulse Electronics □ Altinex □ AVED
□ Best Power Technology □ Bi-Search
□ Calspan SRL □ Cardion Electronics
□ Colorado Video □ Data Modul □ Data
Translation □ Digital View □ Digital Vision
□ Extron □ Ginsbury □ Grass Valley Group
□ Infax □ Info-Lite □ Interaction Systems
□ Jaco Electronics □ Kollmorgen
□ Luminary Technologies □ Mekel Engr.
□ Multichip Assembly □ Omega Electronics
□ Pixelink □ Rantec □ Raytheon
□ Sumitomo Metals □ Touch Controls
□ Wyle Electronics □ Yamaha Systems
Technology

CONVERTERS, DIGITAL/VIDEO

□ AVED □ Best Power Technology □ Bi-
Search □ Calspan SRL □ Colorado Video
□ Communications Specialties □ Coreco
□ Data Modul □ Data Translation □ Digital
View □ Digital Vision □ DRS Military
Systems □ General Electric □ Genesis
Microchip □ Ginsbury □ Grass Valley Group
□ Hitachi Denshi America □ Imagine
Graphics □ Jaco Electronics □ Multichip
Assembly □ Pixelink □ Raytheon □ RGB
Spectrum □ Touch Controls □ Wyle
Electronics

CONVERTERS, POWER

□ Advanced Conversion Tech □ AHV □ All
American □ Best Power Technology
□ Display Components □ Del Global
Technologies □ Eldec □ Ginsbury

□ Hyacinth Technology □ Jaco Electronics
□ Landmark Technology □ Lorad Power
Systems □ Stanley Palmer □ Pixelink
□ Swiss Controls □ Taiyo Yuden USA □
TDK □ WPI Electronics

CRT DESIGN SERVICES

□ AVT □ Brimar □ Clinton Electronics
□ Display Components □ Display Labs
□ EMCO □ Frontline Systems □ Ginsbury
□ IDT □ Imaging Display □ IST □ Jaco
Electronics □ Kent Modular Electronics
□ Lexel Imaging Systems □ MII □ Milgray
Electronics □ Pixelink □ Princeton Display
□ Raytheon □ Sascal Displays □ Stanley
Palmer □ Teletel Canada □ Thomas
Electronics □ VDC (HQ) □ VDC (Teltron)
VDC (Z-Axis) □ XKD Corp. □ Zenith
Electronics

CRT DISPLAYS

See also large-screen displays,
projection displays, simulator displays,
3D display systems, touch interactive
displays, deflection yokes, electron
guns, focus coils, glass for CRTs

CRT monitors, color

□ ADT □ Advanced Innovative Marketing
□ Astronautics □ AVT □ Aydin Corp.
□ Barco □ Barco Chromatics □ Barco
Display □ Barco Video & Commun.
□ Bi-Search □ Burle Industries □ Canadian
Marconi □ Candescant Technologies
□ Capetronic □ Cardion Electronics □
Ceronix □ Clinton Electronics □ Craft Data,
Inc. □ Data Ray □ Digitran □ Display Labs
□ Dotronix □ Dynamic Displays □ Eaton IDT
□ EDL Displays □ Electronic Image
Systems □ Electro-Optics □ Elographics □
Elo TouchSystems □ EMCO □ Philips FIMI
□ General Electric □ Ginsbury □ Gritz's
Emporium □ Honeywell □ IBM □ IDT
□ Infodex □ Intecolor □ Interstate
Electronics □ Jaco Electronics □ Kent
Modular Electronics □ Kristel □ Lockheed
Sanders □ L-3 Display Systems □ Marshall
Industries □ Matsushita □ MicroTouch
Systems □ MII □ Milgray Electronics
□ Mitsubishi Electronics America
□ Monitem □ MTL Systems □ Nortech
Engineering □ Nortech Imaging □ Orwin
Associates □ Panasonic Communications &
Systems □ Panasonic Computer
Peripherals □ Panasonic Industrial
□ Pegasys Displays □ Philips Consumer
Electronics □ Philips Display Components
□ Philips FIMI □ Pixelink □ Planar Systems
□ Precision Imaging □ Rasterops
□ Raytheon □ Richardson Electronics
□ Sampo America □ Sarnoff Corp. □ Sascal
Displays □ Siemens AG □ Sony □ Sony
Display Device Group □ Sony Graphic
Display □ Symco □ Tatung □ Tektronix
□ Teletel Canada □ VDC (Teltron)
□ Thomson-CSF □ Thomson Tubes
Electronics □ Totoku Electric □ Touch
Controls □ Unigraf □ Teletel Canada
□ VDC (Teltron) □ VDC (Z-Axis) □ View
Magic □ Vidwall □ Vivitek □ Wells Gardner
□ Wyle Electronics □ XKD

CRT monitors, very high resolution (1600 x 1200 and higher)

□ AVT □ Barco Display □ Brimar □ Clinton
Electronics □ Display Labs □ Dynamic
displays □ Image Systems □ Imagine
Graphics □ Imaging Display □ IST
□ Nortech Imaging □ Touch Controls
□ Unigraf □ VDC (Teltron)

CRT monitors, high resolution (1024 x 768)

□ Advanced Innovative Marketing □ Apricot
Sigmex □ Aydin Corp. □ Barco □ Barco
Chromatics □ Barco Display □ Barco Video
& Commun. □ Bi-Search □ Brimar
□ Candescant Technologies □ Capetronic
□ Cardion Electronics □ Clinton Electronics
□ Cornerstone Technology □ Dage-MTI
□ Data Plus □ Data Ray □ Digitran
□ Display Components □ Display Labs
□ Display Tek □ Dotronix □ DRS
Technologies □ Dynamic Displays □ EDL
Displays □ Electronic Image Systems
□ Elographics □ Elo TouchSystems
□ EMCO □ Evans □ Sutherland Computer
□ Philips FIMI □ Ginsbury □ Honeywell
□ IBM □ IDT □ Image Systems □ Imagine
Graphics □ Imaging & Sensing □ Imaging
Display □ Infodex □ Intecolor □ Interstate
Electronics □ IST □ Jaco Electronics □ Kent
Modular Electronics □ Kristel □ Litton
Electron Devices □ Lockheed Sanders □ L-
3 Display Systems □ Mega Scan
□ MicroTouch Systems □ Milgray
Electronics □ Mitsubishi Electronics America
□ Monitem □ MTL Systems □ National
Semiconductor □ Nortech Engineering
□ Nortech Imaging □ Orwin Associates
□ Panasonic Computer Peripherals
□ Panasonic Industrial □ Pegasys Displays
□ Philips Consumer Electronics □ Philips
Display Components □ Philips FIMI
□ Precision Imaging □ Princeton Display
□ Rasterops □ Raytheon □ Richardson
Electronics □ Sampo America □ Sarnoff
Corp. □ Sascal Displays □ Siemens AG
□ Sony □ Sony Display Device Group
□ Sony Graphic Display □ Stanley Palmer
□ Tatung □ Tektronix □ Teletel Canada
□ Thomson-CSF □ Thomson Tubes
Electronics □ Totoku Electric □ Touch
Controls □ Unigraf □ VDC (Teltron) □ VDC
(Z-Axis) □ Whittaker □ XKD

CRT monitors, monochrome

□ ADT □ Advanced Innovative Marketing
□ Astronautics □ AVT □ Ball Aerospace □
Barco □ Barco Display □ Brimar □ Burle
Industries □ Calspan SRL □ Capetronic
□ Cardion Electronics □ Clinton Electronics
□ Cornerstone Technology □ CRT Scientific
□ Dage-MTI □ Data Plus □ Data Ray
□ Digitran □ Display Components □ Display
Labs □ Dotronix □ Dynamic Displays □ EDL
Displays □ Electronic Image Systems □ El-
Op Electrooptics Industries □ EMCO
□ General Electric □ Ginsbury □ Gritz's
Emporium □ Honeywell □ IBM □ IDT
□ Image Systems □ Imaging & Sensing
□ Imaging Display □ Infax □ Infodex
□ Interstate Electronics □ IST □ Kent
Modular Electronics □ Kristel □ Lockheed
Sanders □ L-3 Display Systems □ Mega
Scan □ MII □ Monitem □ National
Semiconductor □ Nortech Imaging
□ Opto-Cal □ Orwin Associates □ Palomar
Products □ Pegasys Displays □ Philips
Consumer Electronics □ Philips Display
Components □ Philips FIMI □ Precision
Imaging □ Princeton Display □ Rasterops
□ Raytheon □ Richardson Electronics
□ Sampo America □ SAMTEL USA
□ Sarnoff Corp. □ Sascal Displays
□ Siemens AG □ Sony Display Device
Group □ Stanley Palmer □ Symco □ Tatung
□ Tektronix □ Teletel Canada □ Thomson
Components & Tubes □ Thomson Tubes
Electronics □ Totoku Electric □ TSD
Display Products □ Unigraf □ VDC (Teltron)
□ VDC (Z-Axis) □ View Magic □ Wells
Gardner □ XKD

CRTs, beam-index

□ Digitran □ Display Components □ Display
Labs □ Electronic Image Systems
□ Ginsbury □ Honeywell □ IDT □ L-3
Display Systems □ Lexel Imaging Systems
□ Raytheon □ Sarnoff Corp. □ Sony Display
Device Group □ Stanley Palmer □ Thomas
Electronics □ Thomson Components &
Tubes □ Thomson Tubes Electroniques

CRTs, shadow mask/aperture grill

□ ADT □ Aydin Corp. □ Burle Industries
□ Canadian Marconi □ Cardion Electronics
□ CRT Scientific □ Digitran □ Display Labs
□ Dotronix □ EDL Displays □ EEV Ltd.
□ Electronic Image Systems □ General
Atronics □ General Electric □ Ginsbury
□ Gritz's Emporium □ Honeywell □ IDT
□ Imaging & Sensing □ Imaging Display
□ ISE Electronics □ Matsushita □ Micronic
Laser Systems □ MicroTouch Systems
□ Milgray Electronics □ Mitsubishi
Electronics Sales America □ Monitem
□ MTL Systems □ Pegasys Displays
□ Planar Systems □ Princeton Display
□ Raytheon □ Richardson Electronics
□ SAMTEL USA □ Sarnoff Corp. □ Sony
Display Device Group □ Tektronix
□ Thomson Components & Tubes
□ Thomson Tubes Electroniques □ Toshiba
America □ VDC (Chroma) □ VDC (Data
Display) □ VDC (Video Electronics)
□ Vidwall □ XKD □ Zenith Electronics

CRTs, flat

□ AVT □ Aydin Corp. □ Clinton Electronics
□ CRT Scientific □ Digitran □ Display Labs
□ Display Research Labs □ Dotronix □ DRS
Technologies □ EEV Ltd. □ Electronic
Image Systems □ Elo TouchSystems
□ FEPET □ Futaba □ Fulaba America
□ Ginsbury □ Honeywell Defense Avionics
□ IDT □ Imagine Graphics □ Imaging
Display □ Infodex □ Jaco Electronics
□ Lexel Imaging Systems □ Mega Scan
□ MicroTouch Systems □ MiTAC □ Motorola
FPD □ MTL Systems □ Milgray Electronics
□ Mitsubishi Electronics Sales America
□ Panasonic Communications & Systems
□ Panasonic Computer Peripherals
□ Raytheon □ Richardson Electronics
□ Samsung Semiconductor □ Sarnoff Corp.
□ SI Diamond □ Sony □ Sony Display
Device Group □ Thomas Electronics
□ Thomson Components & Tubes
□ Toshiba America □ Touch Controls
□ Wyle Electronics □ XKD □ Zenith
Electronics

CRTs, miniature

□ ADT □ Brimar □ Burle Industries □ CRT
Scientific □ Digitran □ Display Labs
□ Dotronix □ EEV Ltd. □ Electronic Image
Systems □ General Atronics □ Ginsbury
□ Gritz's Emporium □ Honeywell □ IDT
□ Imaging & Sensing □ Imaging Display
□ IST □ Lexel Imaging Systems □ Litton
Electron Devices □ MicroTouch Systems
□ Raytheon □ Richardson Electronics
□ Sarnoff Corp. □ Sony Display Device
Group □ Thomas Electronics □ Thomson
Components & Tubes □ Thomson Tubes
Electronics □ VDC (HQ) □ VDC (Teltron)
□ Vivitek

CRTs, multibeam

□ Digitran □ Display Labs □ General
Atronics □ Ginsbury □ Honeywell □ Infodex
□ Lexel Imaging Systems □ Litton Electron
Devices □ Raytheon □ Richardson
Electronics □ Sarnoff Corp. □ Sony Display
Device Group □ Thomas Electronics
□ Thomson-CSF □ Thomson Tubes
Electronics □ VDC (Teltron)

CRT MATERIALS

See individual listings for filters,
getters, glass, magnetic shielding,
materials, optical coatings, phosphors,
polarizers

CRT TESTING LABORATORIES

□ Display Labs □ DynaColor □ ELDIM
□ Ergonomics □ Klein Instruments
□ Lexel Imaging Systems □ MECC
□ Sonera Technologies □ TÜV Rheinland

DEFLECTION AMPLIFIERS

□ Brimar □ Celco Pacific □ Citronix
□ Display Labs □ Ginsbury □ Imaging
Display □ Infodex □ MECC □ M. S.
Kennedy □ National Semiconductor □ Orwin
Associates □ Wasalch High Voltage

DEFLECTION YOKES

□ Celco □ Display Components □ Display
Labs □ DynaColor □ EEV Ltd. □ Ginsbury
□ Infodex □ K & R Engrg. □ Panasonic
Industrial □ Philips Display Components
□ Sampo □ Sarnoff Corp. □ Sony Display
Device Group □ Stanley Palmer
□ Syntronic Instruments □ Toloku Electric
□ WinTron

DEPOSITION EQUIPMENT

□ Balzers AEG □ Balzers Thin Films
□ Balzers Thin Films GmbH □ BOC
Coating Technology □ BOC Edwards
□ Diamond Tech One □ Edwards □ FAS
Technologies □ General Vacuum □ Innotec
□ Intevac □ Kisco □ Kurdex □ Kurt J.
Lesker Co. □ Leybold □ Materials
Research Corp. □ Metavac □ Sheldahl □ SI
Diamond □ Spectrum Sciences □ Techni-
Met □ Temescal □ Torrey Pines Research
□ TSC □ ULVAC Technologies

DEPOSITION SERVICES

□ Balzers AEG □ Balzers Thin Films
□ Balzers Thin Films GmbH □ Edwards
□ General Vacuum □ Information Products
□ Intevac □ IST □ Kurdex □ Leybold
□ NeoVac □ Rexam Custom □ Spectrum
Sciences □ Superior MicroPowders □ Thin
Film Devices □ Thin Film Technology
□ Torrey Pines Research

DIGITAL FILM RECORDERS

□ Celco Pacific □ Eastman Kodak □ ECRM
Trust □ Ektron Applied Imaging □ Hybrid
Micrographics □ Imapro □ Lasergraphics
□ Management Graphics □ Mekel Engrg.
□ Polaroid □ Tartan Technical □ 3M Product
Information

DIGITAL VIDEO SYSTEMS

□ Astronautics □ Boland Communications □
Barco □ Burle Industries □ Colorado Video
□ Digital Vision □ DRS Technologies
□ Eastman Kodak □ Eltime Vision Systems
□ Grass Valley Group □ Honeywell □ Incom
□ Infodex □ Innovated Image □ Imagine
Graphics □ Mekel Engrg. □ Primagraphics
□ PsiTech □ Sarnoff Corp. □ SI Diamond
□ Simtech □ Texas Instruments □ 3M
Product Information □ Touch Controls
□ Univision □ VDC (Z-Axis) □ Virtual Vision

DIGITIZING TABLETS/DIGITIZERS

□ IBM □ Information Products □ Numonics
□ SMART Technologies □ WACOM

DISABLED DISPLAY USER AIDS

□ Enabling Technologies □ Telesensory

DISPENSER CATHODES

□ Electronics Sources □ Formosa Advanced Tech. □ Raytheon □ Sony Display Device Group

DISPLAY DRIVERS AND CONTROLLERS

□ Advanced Conversion Tech □ All American □ Anorad □ Arithmos □ Avalex □ AVED □ Babcock □ Barco □ Barco Chromatics □ Barco Display □ Chips & Technologies □ Chip Supply □ Citronix □ Cirrus Logic □ Communications Specialties □ Computer Dynamics □ Craft Data, Inc. □ Craft Data Ltd. □ Denziltron □ Diamond Tech One □ Digital View □ Digitran □ Display Labs □ Dolch Computer □ DRS Military Systems □ DRS Technologies □ Eaton FPD □ EG&G Power Systems □ **ELDIM** □ Epsom America □ F-P Electronics □ Genesis Microchip □ Gennum □ Honeywell □ Imagine Graphics □ Infodex □ International Micro □ Jaco Electronics □ Kent Modular Electronics □ Lockheed Sanders □ **Liquid Crystal Institute** □ Litton Systems □ L-3 Display Systems □ Luminary Technologies □ Luxell □ Marshall Industries □ MECC □ Metheus □ Milgray Electronics □ Moniterm □ M. S. Kennedy □ Multichip Assembly □ National Semiconductor □ Night Vision Corp. □ Omega Electronics □ Optotek □ Philips Flat Display Systems □ Photonics Systems □ Pixelworks □ Primagraphics □ PsiTech □ Racal-Mesl □ RGB Spectrum □ Sage □ SI Diamond □ Smart Alec □ S-MOS □ Supertex □ Tektronix □ Texas Instruments Japan □ Thomson-CSF Services □ Trident Microsystems □ **Unigraf** □ Univision □ Versatec □ Vidiwall □ ViewTEK □ Westar □ Wyle Electronics □ Yamaha Systems Technology

DISPLAY HOUSING, RUGGEDIZED

□ ADT □ All American □ Amuneal □ AVED □ Barco □ Barco Chromatics □ Burle Industries □ Calspan SRL □ Chief Manufacturing □ Craft Data, Inc. □ Crystal Visions Solutions □ D&T □ Digital View □ Digitran □ Dolch Computer □ DRS Military Systems □ Eaton FPD □ Eaton PSD □ EDL Displays □ El-Op Electrooptics □ Eurecran □ Ginsbury □ Honeywell □ Infodex □ Interface Products □ Jaco Electronics □ LCSP-Deeco □ Luxell □ L-3 Display Systems □ Marshall Industries □ Milgray Electronics □ Multichip Assembly □ Nortech Engineering □ Pegasys Displays □ Phoenix Group □ Photonics Systems □ Plessey Naval Systems □ **Polar Vision** □ Precision Imaging □ Raytheon □ Retroscon □ SAIC □ SAI Technology □ Sascal Displays □ **Silver Cloud Mfg.** □ Tektronix □ Teletelne Canada □ Thomson-CSF Services □ Touch Controls □ Ultra Electronics □ VDC (Data Display) □ ViewTEK □ Virtual Vision

DISPLAY SIMULATION AND MODELING SYSTEMS

□ ADT □ ALCOM □ Breault □ Coryphaeus □ CRL □ DRS Military Systems □ Eaton FPD □ EDL Displays □ Evans & Sutherland Computer □ Hitachi Denshi America □ Hughes LV Products □ Infodex □ Kisco □ Liberty Mirror □ **Liquid Crystal Institute** □ MicroPix □ Milgray Electronics □ MTL Systems □ Optis □ Sarnoff Corp. □ Shintech □ Sonera Technologies □ Tektronix □ Visus

DISPLAY SUBSYSTEMS

□ AED □ All American □ Arithmos □ Astronautics □ AVED □ AVT □ Babcock □ Balzars AEG □ Balzars Thin Films □ Balzars Thin Films GmbH □ Barco

□ Barco Chromatics □ Barco Display □ Calspan SRL □ **Celco Pacific** □ Clinton Electronics □ Computer Dynamics □ Craft Data, Inc. □ Craft Data Ltd. □ Crystaloid □ Crystal Visions Solutions □ D&T □ Denziltron □ Diamond Tech One □ Digital View □ Dimension Technologies □ Dolch Computer □ DRS Technologies □ Eaton FPD □ Eaton PSD □ EG&G Optoelectronics □ EEV □ Fakespace □ Genesis Microchip □ Ginsbury □ High Lumen Displays □ Honeywell □ Infinity Multimedia □ Jaco Electronics □ Kent Modular Electronics □ Korry Electronics □ **LCD Lighting** □ Lexel Imaging Systems □ Leybold □ **Liquid Crystal Institute** □ Litton Systems Canada □ Luxell □ Man & Machine □ Mark IV Industries □ Marshall Industries □ MicroOptical □ Milgray Electronics □ Multichip Assembly □ National Display Systems □ Night Vision Corp. □ Nortech Engineering □ OCLI □ Optical Devices □ Optical Radiation □ Optotek □ Palomar Products □ Peerless Industries □ Philips Flat Display Systems □ Phoenix Group □ Photonics Systems □ PixelVision □ Pixelworks □ Planar Flat Candle □ **Polar Vision** □ Poly-Optical Products □ PRP Optoelectronics □ Quantum Electronics □ Racal-Mesl □ Raytheon □ Retinal Displays □ RGB Spectrum □ Rockwell Collins □ Sage □ SAI Technology □ Sharp Microelectronics □ Silicon Light Machines □ Teledyne Lighting & Display □ Texas Instruments □ Thomson-CSF Services □ UCE □ Univision □ VDC (Teltron) □ **Video Instruments** □ Virtual Vision □ Vista Controls □ WACOM □ XKD

DISPLAY SYSTEM INTEGRATORS

□ All American □ Astronautics □ AVED □ AVT □ Barco Chromatics □ Calspan SRL □ Canadian Marconi □ **Carroll Touch** □ Computer Dynamics □ Craft Data, Inc. □ CRL □ Crystaloid □ DBI □ DCI □ Denziltron □ Digital View □ Digitran □ DRS Military Systems □ DRS Technologies □ Eastman Kodak □ Eaton FPD □ Eaton PSD □ Elographics □ El-Op Electrooptics Industries □ Eurecran □ Fakespace □ F-P Electronics □ Honeywell □ Hoya Electronics □ Interface Products □ Jaco Electronics □ Kent Modular Electronics □ Kollmorgen □ LCSP-Deeco □ Litton Systems Canada □ Lockheed Sanders □ L-3 Display Systems □ Man & Machine □ Mark IV Industries □ Marshall Industries □ MicroPix □ Milgray Electronics □ National Semiconductor □ Man & Machine □ Mark IV Industries □ Marshall Industries □ MicroPix □ Milgray Electronics □ National Semiconductor □ OCLI □ Pegasys Displays □ Photonics Systems □ Plessey Naval Systems □ Quantum Electronics □ Retroscon □ SAI Technology □ Sanders Associates □ SEOS Displays □ Sharp Microelectronics □ SI Diamond □ Smart Alec □ Tech-Com □ Thomson-CSF Services □ Ultra Electronics □ **Unigraf** □ Vidiwall □ ViewTEK □ Virtual Vision □ Vista Controls □ Whittaker

DISPLAYS

See listings under specific technology, i.e., CRT, plasma, electroluminescent

DISTORTION CORRECTION DEVICES

□ **Celco Pacific** □ Display Labs □ DynaColor □ Ginsbury □ Klein Instruments □ Intrinics □ K & R Engrg. □ Sonera Technologies □ Thomson-CSF

ELECTROCHROMIC DISPLAYS

□ Mito Fine Glass □ Polyvision □ Techni-Met □ 3M Product Information

ELECTROLUMINESCENT DISPLAYS

□ Barco □ Barco Chromatics □ Canadian Marconi □ Capetronic □ Craft Data Ltd. □ Denziltron □ Digitran □ Durel □ Earth Computer □ Eaton FPD □ Eaton IDT □ ELtech □ Electro-Optics □ Hoffman Engrg. □ Honeywell Defense Avionics □ Hoya Electronics □ Infodex □ Interface Products □ Interstate Electronics □ Jaco Electronics □ Kaiser Electronics □ **Liquid Crystal Institute** □ Lite Array □ Litton Systems □ Luxell □ Marshall Industries □ MicroOptical □ Milgray Electronics □ MITAC □ NeoVac □ Night Vision Corp. □ OCLI □ Phosphor Products □ Planar America □ Planar Intl. □ Planar Systems □ Poly-Optical Products □ PPM Photomask □ Quantex □ Racal-Mesl □ Rogers Corp. □ Sarnoff Corp. □ Sharp Digital Information Products □ Sharp Microelectronics □ **Spire** □ I. L. Stanley □ Stanley Electric □ Swiss Controls □ Techni-Met □ Thomson-CSF □ 3M Product Information □ UNIAX □ VDC (Teltron) □ WAMCO □ Westaim □ Wyle Electronics

ELECTROMECHANICAL DISPLAYS

□ Ametek Aerospace Products □ Applied Technology □ Denziltron □ Digitran □ Displays Inc. □ Earth Computer □ F-P Electronics □ Honeywell Defense Avionics □ Infax □ Interface Products □ Mark IV Industries □ Omega Electronics □ Sharp Digital Information Products □ Stan-Allen □ Thin Film Technology □ 3M Product Information

ELECTRON GUNS

□ Clinton Electronics □ General Atronics □ Innotec □ Kimball Physics □ Phillips Components □ Lexel Imaging Systems □ Princeton Display □ Raytheon □ Sarnoff Corp. □ SI Diamond □ Sony Display Device Group □ Thomson-CSF □ 3M Product Information □ VDC (Apex) □ VDC (Southwest Vacuum) □ VDC (Video Electronics) □ Zenith Components Group □ Zenith Electronics

ENCLOSURE DESIGN SYSTEMS

□ Chomerics □ Eaton PSD □ Info-Lite □ MicroTouch Systems □ Retroscon □ Tech-Com □ 3M Product Information □ Touch Controls

EYE AND HEAD MOVEMENT TRACKERS

□ Applied Science Labs □ El-Op Electrooptics Industries □ Fakespace □ Honeywell □ ISCAN □ Night Vision Corp. □ Poihemus □ Rediffusion Simulation □ Retinal Displays □ Reynolds Industries □ Sarnoff Corp. □ Virtual Vision

FACSIMILE COLOR

FIBER-OPTIC FACEPLATES

□ Digitran □ Future Focus □ General Atronics □ Incom □ Poly-Optical Products □ Raytheon □ Schott Fiber Optics □ 3M Electronic Products □ 3M Product Information □ Touch Controls

FIELD-EMITTER DISPLAYS

□ Candescant Technologies □ Diamond Tech One □ FED Corp. □ FEPET □ Futaba America □ Micron Display □ MRS Technology □ Night Vision Corp. □ PixTech □ SI Diamond □ **Spire**

FILTERS

□ **American Polarizers** □ Applied Vacuum Coating □ Astra Products □ ADT □ Balzars AEG □ Balzars Thin Films □ Balzars Thin Films GmbH □ Brewer Scientia □ Cando □ ColorLink □ Corning Optical Corp. □ D&T □ Denglas □ Denton Vacuum □ Donteck □ EMCO □ Eyesaver □ Flex Products □ Fosta-Tek □ Genesis Microchip □ Ginsbury □ Homalite □ Hoya Electronics □ Hoya Optics □ I.G.S. □ Information Products □ International Polarizers □ ITG □ Kaiser Optical □ Lamination Technology □ Leybold □ Liberty Mirror □ Man & Machine □ Melles Griot □ Metavac □ Milgray Electronics □ Mito Fine Glass □ NoRad □ O&S Research □ OCLI □ Optical Devices □ Panelgraphic □ Panelview □ Polaroid □ Precision Optical Filters □ Raytheon □ RMF Products □ Romag Glass □ Schott Glass □ **Silver Cloud Mfg.** □ Southwall Technologies □ **Thin Film Devices** □ Thin Film Technology □ 3M Product Information □ U.S. Precision Glass □ Viratec □ WAMCO

FLAT-PANEL DISPLAYS

See individual listings for backlights, electroluminescent displays, electro-mechanical displays, electrochromic displays, field-emitter displays large-screen displays, light-emitting diode displays, liquid-crystal displays, plasma displays, filters, projection displays, simulator displays, 3D displays, touch interactive displays, vacuum fluorescent displays

FLAT-PANEL MATERIALS

See individual listings for masks, filters, glass, magnetic shielding, materials, optical coatings, photolithography equipment, polarizers

FLEXIBLE CIRCUITS

□ L. E. Flex Circuits

FOCUS COILS

□ **Celco** □ Del Global Technologies □ Display Components □ Ginsbury □ K & R Engrg. □ Raytheon □ Sarnoff Corp. □ Stanley Palmer □ **Syntronic Instruments** □ WinTron

GETTERS

□ Andrews Glass □ NIMTEC □ Raytheon □ SAES Getters

GLASS FOR COMPONENTS

□ Andrews Glass □ Denton Vacuum □ Donnelly Applied Films □ Elform □ Eyesaver □ Feldman Technology □ Hoya Optics □ Information Products □ I.G.S. □ Kisco □ Lamination Technology □ **Liquid Crystal Institute** □ Nippon Electric Glass □ Optical Devices □ OSRAM Sylvania □ Phillips Components □ Pilkington LOF □ Precision Glass Technologies □ **Polar Vision** □ Princeton Display □ Raytheon □ Romag Glass □ Schott Corp. □ Schott Fiber Optics □ Schott Glass □ SEM-COM □ U.S. Precision Glass □ VDC (Data Display)

GLASS FOR CRTs

□ Corning Asahi □ Donnelly Applied Films □ Hoya Electronics □ Hoya Corp. □ I.G.S. □ Information Products □ Lamination Technology □ MicroTouch Systems □ Mito Fine Glass □ Nippon Electric Glass □ O&S Research □ Precision Electronic Glass

□ Raytheon □ Schott Corp. □ Schott Glass
□ SEM-COM □ Techneglas □ U.S. Precision
Glass □ VDC (Video Electronics)

GLASS FOR FLAT-PANEL DISPLAYS

□ Applied Technology □ Bilco Mfg.
□ Corning ADP □ Denglas □ Denton
Vacuum □ Donnelly Applied Films
□ EEV Ltd. □ Emerging Display
Technologies □ Flachglas AG □ Fujitsu
Microelectronics □ Glaverbel □ Hoya
Electronics □ Hoya Optics □ I.G.S.
□ Information Products □ Lamination
Technology □ Man & Machine □ Pilkington
LOF □ Pilkington Microtronics □ Polar Vision
□ Metavac □ MicroTouch Systems □ Mito
Fine Glass □ Nippon Electric Glass □ O&S
Research □ Optical Devices □ Pixelink
□ Romag Glass □ Rytak □ Saint-Gobain
□ Schott Corp. □ SEM-COM □ Three-Five
Systems □ U.S. Precision Glass □ VIOX

GRAPHICS BOARDS AND PROCESSORS

□ American ELTEC □ Applan Graphics
□ Avalex □ AVED □ Barco □ Barco
Chromatics □ Barco Display □ Calspan SRL
□ Chips & Technologies □ Coreco □ Data
Translation □ Densitron □ Ernst W. Dorn
Co. □ Evans & Sutherland Computer
□ General Electric □ Genesis Microchip
□ Honeywell □ Hybrid Micrographics □ IBM
□ Imagine Graphics □ Imagraph □ Imapro
□ Kollmorgen □ Lasergraphics □ L-3 Display
Systems □ Luminary Technologies □ Matrox
Electronic Systems □ Methaus □ National
Display Systems □ Ornicomp Graphics
□ Parallax □ Pixelworks □ Polaroid
□ Primagraphics □ PsiTECH □ Rascal-Mestl
□ Rasterops □ Richardson Electronics
□ Simtech □ Sony □ Sony Graphic Display
□ Sumitomo Metals □ Tatung □ Thomson-
CSF Services □ 3M Product Information
□ Trident Microsystems □ Unigraf
□ Univision □ ViewTEK □ Vivitek □ Yamaha
Systems Technology

GRAPHICS SUBSYSTEMS

□ American ELTEC □ Applan Graphics
□ Astronautics □ AVED □ Babcock □ Barco
□ Barco Chromatics □ Barco Display
□ Calspan SRL □ Densitron □ Ernst W.
Dorn Co. □ Genesis Microchip □ Imagine
Graphics □ RGB Spectrum □ Thomson-CSF
Services □ Unigraf □ Univision

GRAPHICS WORKSTATIONS

□ Aydin Corp. □ Barco □ Barco Chromatics
□ Barco Display □ Ernst W. Dorn □ Eaton
IDT □ Evans & Sutherland Computer
□ Grass Valley Group □ Hughes LV
Products □ IBM □ Laversab □ Lockheed
Sanders □ Management Graphics
□ NuVision Technologies □ Primagraphics
□ SAIC □ Sanders Associates □ Thomson-
CSF □ 3M Product Information □ Touch
Controls

HARD-COPY DEVICES

See individual listings for digital film
recorders, facsimile machines, plotters,
printers (impact, ink-jet, thermal-transfer,
electrophotographic, color graphic),
printer supplies, printheads

HOLOGRAPHIC LIGHT-SHAPING DIFFUSERS

□ CRL □ DuPont □ Physical Optics
□ Polaroid Optical Films

IMAGE COMPRESSION

□ Imagraph □ Pixelworks □ PsiTech
□ Schott Fiber Optic □ Sumitomo Metals
□ Symco □ 3M Product Information

IMAGE STORAGE

□ Colorado Video □ Stereomedia
□ Sumitomo Metals □ Symco □ 3M Product
Information □ VDC (Teltron)

IMAGE TUBES

□ Burle Industries □ EEV □ EEV Ltd.
□ Incom □ Kollmorgen □ Lexel Imaging
Systems □ Litton Electron Devices □ MII
□ Philips Components □ Sony Display
Device Group □ Thomson Tubes
Electroniques □ VDC (Teltron)

IMAGING BOARDS

□ American ELTEC □ Barco □ Barco
Display □ Coreco □ Data Plus □ Data
Translation □ DOME □ DynaColor
□ Eastman Kodak □ EPIX □ Genesis
Microchip □ IBM □ Imagraph □ Kollmorgen
□ Matrox Electronic Systems □ Methaus
□ Philips Components □ Primagraphics
□ PsiTECH □ Sharp Digital Information
Products □ Symco □ Univision

IMAGING WORKSTATIONS

□ Amerinex □ Decision Images □ DRS
Technologies □ IBM □ Image Analytics
□ Imagraph □ Kollmorgen □ Laversab
□ Management Graphics □ Mega Scan
□ MegaVision □ SAIC □ Sarnoff Corp.
□ Sharp Digital Information Products
□ 3M Product Information

JOYSTICKS

□ ADT □ Digitran □ White Electronics
□ WICO

KEYBOARDS

□ ADT □ Computer Keyboard Systems
□ Craft Data, Inc. □ Digitran □ Futaba □ IBM
□ Innovated Image □ Interface Products
□ Jaco Electronics □ Korry Electronics
□ Laversab □ Marshall Industries □ Poly-
Optical Products □ Phoenix Group
□ PROMED Keyboard Group □ Rascal-Mestl
□ Silver Cloud Mfg. □ Three-Five
Systems □ Two Technologies □ White
Electronics

LAMPS AND LIGHT SOURCES

□ BKL □ Data Display Products □ Dialight
□ Diamond Tech One □ EG&G
Optoelectronics □ EG&G Power Systems
□ EMCO □ Ginsbury □ Gordon Instruments
□ Hoffman Engrg. □ ILC Technology □ Info-
Lite □ ITO America □ JKL Components
□ LCD Lighting □ Luminescent Systems
□ Lumitex □ Man & Machine □ OAI □ Opto-
Cal □ ORC Electronic Products □ OSRAM
Sylvania □ SAIC □ Schiederwerk GmbH
□ Seiya Optical □ SI Diamond □ Silver
Cloud Mfg. □ Teledyne Lighting & Display
□ UCE □ Unigraf □ Ushio America □ Visus
□ WAMCO □ Welch Allyn

LARGE-SCREEN DISPLAYS, ALL TECHNOLOGIES

Balzars AEG □ Balzars Thin Films
□ Balzars Thin Films GmbH □ Barco
Display □ Barco Projection □ Barco Video &
Commun. □ Breault □ Capetronic □ Chief
Manufacturing □ Clarity Visual Systems
□ Comfuture □ Cornerstone Technology
□ Craft Data Ltd. □ Crystal Visions
Solutions □ Crystal Display □ Daktronics
□ Da-Lite Screen □ Davies □ Draper

□ Densitron □ Digital View □ Digitran
□ Display Labs □ Display Research Labs
□ Display Tech □ dnp Denmark □ Dolch
Computer □ Donteck □ Dotronix □ DRS
Technologies □ Eaton FPD □ EDL Displays
□ EEV Ltd. □ Electronic Image Systems
□ Epson America □ Eurecran □ Evans &
Sutherland Computer □ FEPET □ Flat
Panel Display □ F-P Electronics □ Fresnel
Optics □ Fujitsu □ General Electric
□ Ginsbury □ Hitachi America □ Hitachi
Denshi America □ Hudson Photographic
□ Hughes-JVC □ Hughes LV Products
□ Imagine Graphics □ Incline □ Incom
□ Infinity Multimedia □ Innovated Image
□ Jaco Electronics □ L-3 Display Systems
□ Lamination Technology □ Leybold
□ Liquid Crystal Institute □ Litton Systems
□ Man & Machine □ Micron □ MicroTouch
Systems □ Mito Fine Glass □ Mitsubishi
Electric Sales America □ Monitron □ MRS
Technology □ NEC Electronics □ Noritake
□ Nortech Imaging □ nView □ Omega
Electronics □ Optical Radiation □ ORC
Lighting □ Palomar Products □ Panelight
□ Physical Optics □ Plasmaco □ Poly-
Optical Products □ PPM Photomask
□ Prolux □ Proxima □ Quantum Electronics
□ Rasterops □ Raytheon □ Rediffusion
Simulation □ Retroscan □ SAI Technology
□ Samsung Semiconductor □ Sarnoff Corp.
□ SEOS Displays □ SI Diamond □ Silicon
Light Machines □ Smart Alec □ SMART
Technologies □ Sony □ Sony Display
Device Group □ Stereomedia □ Tatung
□ Tech-Com □ Techni-Met □ Tektronix
□ Telesensory □ Telex Communications
□ Texas Instruments □ Thomson-CSF
Services □ Thomson Tubes Electroniques
□ Touch Controls □ UCE □ Varitronix
□ VDC (Teltron) □ Ultra Electronics □ Video
Display Corp. □ Video Instruments
□ Vidwall □ Viratec □ XKD □ Zenith
Components Group

LIGHT-EMITTING DIODES AND LED DISPLAYS

□ Acculex □ Adaptive Micro Systems
□ autronic □ Breault □ Bivar □ Colorado
MicroDisplay □ Comfuture □ Craft Data Ltd.
□ Daktronics □ Data Display Products
□ Dialight □ Digitran □ Display Systems
□ Earth Computer □ EG&G Optoelectronics
□ Electro-Optics □ FED Corp. □ F-P
Electronics □ Future Focus □ General
Electric □ H-P □ IBM □ Incom □ Info-Lite
□ Interface Products □ ITO America □ Jaco
Electronics □ JKL Components □ Kisco
□ Litton Systems Canada □ Mark IV
Industries □ Marubeni □ Milgray Electronics
□ Modutec □ Morrison Electronics □ Nichia
America □ Night Vision Corp. □ Opto-Cal
□ Optotek □ Philips Flat Display Systems
□ PPM Photomask □ Poly-Optical Products
□ PRP Optoelectronics □ Quantum
Electronics □ Reflection Technology
□ Smart Alec □ I. J. Stanley □ Stanley
Electric □ Teledyne Lighting & Display
□ Three-Five Systems □ Univ. of Michigan
□ Varitronix □ WAMCO

LIGHT PENS/POINTING SYSTEMS

□ Digitran □ IBM □ Interactive Computer
Products □ Crystal Visions Solutions
□ MicroTouch Systems □ Rikei Corp.
□ SMART Technologies □ 3M Product
Information □ WACOM

LIQUID-CRYSTAL DISPLAYS, ACTIVE-MATRIX

□ Acculex □ Acme Portable Machines
□ ADT □ All American □ American Panel
□ Applied Technology □ Arithmos □ ASM
America □ Astronautics □ autronic □ AVT □

Barco □ Barco Display □ Bi-Search
□ Boland Communications □ Canadian
Marconi □ Casio LCD □ Clinton Electronics
□ Colorado MicroDisplay □ Computer
Dynamics □ Craft Data, Inc. □ Craft Data
Ltd. □ CRL □ Crystal Visions Solutions □
CTX Opto □ Data Modul □ Data Plus
□ Davies □ DBI □ Densitron □ Digitran
□ Dolch Computer □ dpiX □ DRS
Technologies □ Earth Computer □ Eaton
PSD □ EEV □ EEV Ltd. □ Electronic
Designs □ Electronic Image Systems
□ Epson America □ Epson Electronics
America □ Flat Panel Display □ Fujitsu
□ General Electric □ Ginsbury □ High
Lumen Displays □ Hitachi America
□ Honeywell Defense Avionics □ Honeywell
□ Hosiden America □ Hyundai Electronics
□ Image Systems □ Imaging Display
□ Incline □ Incom □ Innovated Image
□ Interface Products □ Interstate Electronics
□ Jaco Electronics □ Kent Modular
Electronics □ Kisco □ Kopin □ Korry
Electronics □ Kristel □ Laversab □ National
Display Systems □ Night Vision Corp.
□ Litton Systems □ Lockheed Sanders □ L-
3 Display Systems □ Matrix Components
□ Merck □ Micron □ Micro-Optics
□ MicroTouch Systems □ Milgray
Electronics □ Mintronix □ MiTAC
□ Mitsubishi Electric Sales America
□ Mitsubishi Electronics America □ Mitsui
Comtek □ Miwa □ Modutec □ MRS
Technology □ National Semiconductor
□ NEC □ NEC Electronics □ Nippon Electric
Glass □ nView □ n-Vision □ Omega
Electronics □ Palomar Products
□ Panasonic Computer Peripherals
□ Panasonic Industrial Co. □ Philips Flat
Display Systems □ Phoenix Group
□ Pixelink □ PixelVision □ Planar Advance
□ Poly-Optical Products □ Polytronix □ PPM
Photomask □ Proxima □ Rascal-Mestl □ RDI
Computer □ Richardson Electronics □ Rikei
Corp. □ Rockwell Collins □ SAIC
□ Samsung Semiconductor □ Sarif
□ Sarnoff Corp. □ Sharp Microelectronics
□ Shintech □ Siliscape □ Stereomedia
□ Technical Visions □ Tektronix □ Teline
Canada □ 3-D ImageTek □ 3M Product
Information □ Timeline □ Toshiba America
□ Touch Controls □ UCE □ Unipac □ Univ.
of Michigan □ Varitronix □ Vivid
Semiconductor □ ViewTEK □ VL Electronics
□ WAMCO □ Wyle Electronics □ XMR

LIQUID-CRYSTAL DISPLAYS, CHOLESTERIC

□ Kent displays □ Microtech

LIQUID-CRYSTAL DISPLAYS, COLOR

□ Acme Portable Machines □ Advanced
Display □ AEG □ ALCOM □ All American
□ American Panel □ Applied Technology
□ Arizona LCD □ autronic □ AVT □ Barco
□ Barco Display □ Boland Communications
□ Casio LCD □ Clinton Electronics □ Clover
Display □ Colorado MicroDisplay
□ Computer Dynamics □ Craft Data, Inc.
□ Craft Data Ltd. □ CRL □ Crystal Visions
Solutions □ CTX Opto □ Data Modul
□ Data International □ Data Plus □ DBI
□ Densitron □ Dolch Computer □ dpiX
□ DRS Technologies □ Earth Computer
□ Eaton PSD □ Electronic Image Systems
□ Electro-Optics □ EMCO □ Epson America
□ Epson Electronics America □ Flat Panel
Display □ FPD Technologies □ Fujitsu
□ Ginsbury □ Hantronix □ High Lumen
Displays □ Hitachi America □ Hosiden
America □ Hunet □ Image Systems
□ Incline □ Innovated Image □ Interface
Products □ Jaco Electronics □ Kisco
□ Kristel □ Kyocera □ Liquid Crystal
Institute □ Litton Systems □ Matrix

Components □ Merck □ Micron
 □ MicroOptical □ MicroPix □ MicroTouch
 Systems □ Milgray Electronics □ MITAC
 □ Mitsubishi Electronics America □ Mitsui
 Comtek □ National Display Systems
 □ National Semiconductor □ NEC
 Electronics □ Nippon Electric Glass □ Night
 Vision Corp. □ NuVision Technologies
 □ nView □ Optrex America □ Optrex/Satori
 □ Palomar Products □ Panasonic Computer
 Peripherals □ Panasonic Industrial Co.
 □ Phoenix Group □ Pixelink □ PixelVision
 □ Poly-Optical Products □ Polytronix
 □ Proxima □ Racal-Mesi □ RDI Computer
 □ Richardson Electronics □ Rikei Corp.
 □ SAIC □ Samsung Semiconductor □ Sharp
 Microelectronics □ Shintech □ Silscape
 □ Stanley Electric □ Stalaw □ I. I. Stanley
 □ 3-D ImageTek □ Teleline Canada
 □ Three-Five Systems □ Touch Controls
 □ UCE □ Varitronix □ ViewTEK □ Vivid
 Semiconductor □ Vivitek □ White
 Electronics □ Wyle Electronics □ VL
 Electronics

LIQUID-CRYSTAL DISPLAYS, FERROELECTRIC

□ ALCOM □ Arizona LCD □ AZ LCD
 □ Canon, Inc. □ Colorado MicroDisplay
 □ Crystop Display □ Digitran □ EEV Ltd.
 □ Electronic Image Systems □ Frontline
 Systems □ Eurecran □ Hornell Elektroptik
 □ Liquid Crystal Institute □ Micro-Optics
 □ MicroPix □ Night Vision Corp. □ Pixelink
 □ Poly-Optical Products □ PPM Photomask
 □ Shintech □ Varitronix

LIQUID-CRYSTAL DISPLAYS, PASSIVE

□ Acme Portable Machines □ ADT
 □ Advanced Display Systems □ Aerospace
 Display Systems □ ALCOM □ All American
 □ Ametek Aerospace Products □ Applied
 Technology □ Arithmos □ Arizona LCD
 □ autronic □ AZ LCD □ Batron □ Casio
 LCD □ Clover Display □ Craft Data, Inc.
 □ Craft Data Ltd. □ Crystaloid □ Crystal
 Visions Solutions □ Crystop Display □ Data
 International □ Data Modul □ Data Plus
 □ DBI □ DCI □ Densitron □ Digitran □ Earth
 Computer □ EEV □ EEV Ltd. □ EM
 Microelectronic □ Emerging Display
 Technologies □ Epson America □ Epson
 Electronics America □ Eurecran □ Excel
 Technology □ FPD Technologies □ General
 Electric □ Ginsbury □ Hantronix □ Hitachi
 America □ Hornell Elektroptik □ Hosiden
 America □ Incline □ In Focus Systems
 □ Interface Products □ Kent Displays
 □ Kisco □ Kristel □ Kyocera □ Liquid
 Crystal Institute □ Litton Systems □ LX
 □ Mark IV Industries □ Matrix Components
 □ Merck □ MicroTouch Systems □ Mito Fine
 Glass □ Mintronix □ Mitsubishi Electric
 Sales America □ Mitsui Comtek □ National
 Semiconductor □ Night Vision Corp.
 □ nView □ Ocular □ Omega Electronics
 □ Optrex America □ Optrex/Satori □ Planar
 Standish □ Planar Systems □ Pixelink
 □ Poly-Optical Products □ Polytronix
 □ Proxima □ Rikei Corp. □ SAIC □ Satori
 Electric □ Seiko Instruments □ Sharp
 Microelectronics □ Shintech □ S-MOS
 □ Solomon Technology □ Sony Display
 Device Group □ I. I. Stanley □ Stanley
 Electric □ Stereomedia □ Telex
 Communications □ Three-Five Systems
 □ Timeline □ UCE □ Varitronix □ VGI □ VL
 Electronics □ Wyle Electronics

LIQUID-CRYSTAL DISPLAYS PASSIVE, ACTIVE ADDRESSING

□ Aerospace Display Systems □ Arizona
 LCD □ autronic □ CRL □ Crystaloid
 □ Crystal Visions Solutions □ Data

International □ Data Modul □ Densitron
 □ Epson Electronics America □ Excel
 Technology □ Ginsbury □ Hantronix
 □ Hitachi America □ Hosiden America
 □ Incline □ Interface Products □ Liquid
 Crystal Institute □ Luminary Technologies
 □ LX □ Merck □ MicroTouch Systems
 □ Milgray Electronics □ Mintronix □ Mitsui
 Comtek □ Night Vision Corp. □ Optrex
 America □ Optrex/Satori □ Pixelink □ Poly-
 Optical Products □ Polytronix □ SAIC
 □ Seiko Instruments □ Sharp
 Microelectronics □ Shintech □ Stanley
 Electric □ Stalaw □ Stereomedia □ Three-
 Five Systems □ UCE □ Varitronix □ Vivid
 Semiconductor □ VL Electronics □ Wyle
 Electronics

MAGNETIC SHIELDING

□ Ad-Vance Magnetics □ Amuneal □ Barco
 □ Barco Display □ Chomerics □ Eagle
 Magnetics □ EDL Displays □ Elform
 □ Fosta-Tek □ General Atomics □ General
 Vacuum □ Gerome □ Ginsbury □ Homalite
 □ Hoya Electronics □ Information Products
 □ K & R Engrg. □ Lindgren RF Enclosures
 □ Liberty Mirror □ Magnetic Radiation Labs
 □ Magnetic Shield □ Mushield □ NoRad
 □ Pixelink □ Raytheon □ Silver Cloud Mfg.
 □ 3M Product Information
 □ Vacuumschmelze □ Viratec

MANUFACTURING EQUIPMENT

□ Acme Portable Machines □ Accudyne
 □ AeroTech □ Anotech □ Applied
 Technology □ ASM America □ Aydin Corp.
 □ AZ LCD □ Best Power Technology
 □ Bilco Mfg. □ BOC Coating Technology
 □ Brooks Automation □ CFM Technologies
 □ Dark Field Technologies □ Donnelly
 Applied Films □ Ernst W. Dorn Co.
 □ DynaColor □ Eaton Corp. □ Eaton FP
 Equipment □ Eaton IDT □ EFOS □ Fairchild
 Convac □ FAS Technologies □ FEPET
 □ Genmark □ Gerber Systems □ Glen
 Technologies □ Holographic Lithography □
 Holtronix □ Hornell Automation □ Hornell
 Engrg. □ H-Square □ Hybrid Micrographics
 □ Image Processing Systems □ Innotec
 □ International Micro □ Interserv □ Intevac
 □ IPS Automation □ ITO America □ Kenix
 Industries □ Kisco □ Kurdex □ Lambda
 Physik □ Laversab □ Lighting Sciences
 □ Materials Research Corp. □ Micron
 □ Miwa □ MRS Technology □ Nalpak Sales
 □ Nanometrics □ Nikon Precision □ Nippon
 Seiko K.K. □ OAI □ Optical Radiation
 □ Orbotech □ ORC Electronic Products
 □ Palomar Products □ Plasma-Therm □ PRI
 Automation □ PTG □ Radiant technology
 □ Schott Corp. □ Semiconductor Systems
 □ Semitool □ Sonera Technologies □ Sony
 □ Spire □ Tamarack Scientific □ Teknek
 Electronics □ Teletrac □ Temescal
 □ 3M Electronic Products □ 3M Product
 Information □ Toddco America □ Toray
 Engineering □ Torrey Pines Research
 □ Ultra t □ ULVAC Technologies □ VDC
 (Apex) □ VDC (HQ) □ Villa Precision
 □ Viratec □ Watkins-Johnson □ Wande
 □ XMR □ Young Technology

MARKET RESEARCHERS/PUBLISHERS

□ AGI □ American Institute of Small
 Business □ Dempa □ Display Research
 Labs □ DisplaySearch □ Display
 Technology Library □ Electronic Information
 Displays □ Electronic Trend □ Ergosyst
 Associates □ Joe Hallett & Associates
 □ Walter Hett & Associates □ L. A. Holt &
 Assoc. □ Home Theater □ InterLingua
 □ Kahn Intl. □ Machover Associates □ MIRC
 □ Multimedia and Videodisc Monitor
 □ Nutmeg Publishing Consultants □ Pacific

Media Associates □ Photonics Spectra
 □ Pixel Interconnect □ SEMI-FPD
 □ Stanford Resources □ Tyson Consulting
 Group □ Venture Development

MASKS

□ Advance Reproductions □ Applied Image
 □ Brewer Science □ Electrographics
 □ Eurecran □ Holtronix □ Hoya Electronics
 □ IMT □ Infinite Graphics □ Liquid Crystal
 Institute □ Micronics Laser Systems
 □ Microphase Labs □ MRS Technology
 □ Photonics □ Photonics-Colorado □ PPM
 Photomask □ Process Technologies
 □ Terapixel □ 3M Product Information

MATERIALS

electrochromic displays

□ Adhesives Research □ Applied
 Technology □ Donnelly Applied Films
 □ General Vacuum □ Glaverbel SA □ IDM
 □ I.G.S. □ Indium America □ Lamination
 Technology □ Merck □ Photonics
 □ Pilkington LOF □ Polaroid Optical Films
 □ Sheldahl □ Target Materials □ Techni-Met
 □ Terapixel □ Thin Film Devices □ 3M
 Electronic Products □ 3M Product
 Information □ U.S. Precision Glass
 □ Vacuum Engineering

electroluminescent displays

□ Adhesives Research □ Applied
 Technology □ Arconium □ Astra Products
 □ Atomergic Chemetals □ BKL □ Brewer
 Science □ CPFilms □ D&T □ Donnelly
 Applied Films □ Dontech □ DuPont □ Durel
 □ ELtech □ General Vacuum □ Glaverbel
 SA □ IDM □ I.G.S. □ Indium America
 □ Kisco □ Lamination Technology □ Liquid
 Crystal Institute □ Luxell □ Marubeni
 □ NeoVac □ Nichia America □ NIMTEC
 □ Photonics □ Pilkington LOF □ Pilkington
 Micronics □ Polaroid Optical Films
 □ Sheldahl □ Stan-Allan □ Superior
 MicroPowders □ Target Materials □ Techni-
 Met □ Tekra □ Terapixel □ Thin Film
 Devices □ 3M Electronic Products □ UCE
 □ U.S. Precision Glass □ Vacuum
 Engineering □ VisPro □ WAMCO

electromechanical displays

□ F-P Electronics □ IDM □ I.G.S. Industries
 □ Mushield □ Photonics □ Polaroid Optical
 Films □ Spire □ Terapixel □ 3M Electronic
 Products □ U.S. Precision Glass □ Vacuum
 Engineering

large-screen displays

□ Adhesives Research □ Adaptive Micro
 Systems □ Advance Reproductions
 □ Applied Technology □ Barco Video &
 Commun. □ CPFilms □ Crystal Visions
 Solutions □ Da-Lite Screen □ Dana
 Enterprises □ Draper □ Donnelly Applied
 Films □ Dontech □ Eyesaver □ Feldman
 Technology □ FEPET □ Fresnel Optics
 □ General Vacuum □ Glaverbel SA
 □ Physical Optics □ Hyacinth Technology
 □ I.G.S. □ Incom □ Indium America □ Infinite
 Graphics □ IDM □ Kaiser Optical □ Kisco
 □ Lamination Technology □ Optical
 Radiation □ Photonics □ Pilkington LOF
 □ Pilkington Micronics □ Plasmaterials
 □ Polaroid Optical Films □ Rantec
 □ Retroscan □ SI Diamond □ Superior
 MicroPowders □ Target Materials □ Tech-
 Com □ Techni-Met □ Teledyne Lighting &
 Display □ Terapixel □ 3M Optical Systems
 □ Tosoh SMD □ Unigraf □ U.S. Precision
 Glass □ Vacuum Engineering □ VIOX
 □ Viratec □ Visus

light-emitting diode displays

□ Adaptive Micro Systems □ Adhesives
 Research □ Arconium □ Astra Products
 □ Data Display Products □ DuPont
 □ Feldman Technology □ F-P Electronics
 □ H-P □ IDM □ I.G.S. □ Indium America □
 ITO America □ Kisco □ Marubeni □ Nichia
 America □ Optotek □ Phosphor Technology
 □ Pilkington Micronics □ Photonics
 □ Plasmaterials □ Quantum Electronics
 □ Stanley Electric □ Techni-Met □ Tekra
 □ Teledyne Lighting & Display □ Terapixel
 □ Tosoh SMD □ U.S. Precision Glass
 □ Vacuum Engineering □ VisPro □ WAMCO

light pens/pointing systems

□ CPFilms □ I.G.S. □ Photonics
 □ Plasmaterials □ U.S. Precision Glass
 □ Vacuum Engineering

liquid-crystal displays

□ Adhesives Research □ Advance
 Reproductions □ ALCOM □ AlliedSignal
 □ Applied Technology □ Arconium
 □ Arithmos □ Arizona LCD □ Astra Products
 □ AZ LCD □ Bi-Search □ Brewer Science
 □ CPFilms □ CRL □ Crystal Visions
 Solutions □ Dainippon Ink & Chemicals
 □ D&T □ Dana Enterprises □ Donnelly
 Applied Films □ Dontech □ DuPont □ Earth
 Computer □ Emerging Display
 Technologies □ EM Industries □ Exxene
 □ Eyesaver □ Feldman Technology □ F-P
 Electronics □ General Vacuum □ Glaverbel
 SA □ I.G.S. □ Incom □ Indium America
 □ Kaiser Optical □ Kenix Industries □ Kisco
 □ Lamination Technology □ Liquid Crystal
 Institute □ Mark IV Industries □ Marubeni
 □ Merck □ MicroPix □ Multichip Assembly
 □ Nagase California □ NeoVac □ NIMTEC
 □ Optrex/Satori □ Photon Dynamics
 □ Photonics □ Pilkington LOF □ Pilkington
 Micronics □ Polaroid Holographic
 □ Polaroid Optical Films □ Poly-Optical
 Products □ ROLIC Technologies - Sanritz
 □ Sekisui Chemical Co. □ Sheldahl □ Silcon
 Valley Chamblab □ Solomon Technology
 □ Target Materials □ Techni-Met □ Tekra
 □ Teledyne Lighting & Display □ Terapixel
 □ Thin Film Devices □ 3-D ImageTek □ 3M
 Optical Systems □ 3M Product Information
 □ Toshiba America □ Tosoh SMD □ UCE
 □ Univ. of Michigan □ U.S. Precision Glass
 □ Vacuum Engineering □ VIOX □ Visus
 □ WAMCO

plasma displays, ac

□ Adhesives Research □ Advance
 Reproductions □ Applied Technology
 □ Astra Products □ Babcock □ Data Modul
 □ Donnelly Applied Films □ DuPont
 □ Eyesaver □ Feldman Technology
 □ Glaverbel SA □ IBM Canada □ IDM
 □ I.G.S. □ ITO America □ Kisco □ Marubeni
 □ Mitsubishi Electronics America □ Nichia
 America □ Panasonic Industrial Co.
 □ Photonics □ Pilkington LOF □ Pilkington
 Micronics □ Polaroid Optical Films □ Polar
 Vision □ Saint-Gobain □ SEM-COM
 □ Superior MicroPowders □ Target
 Materials □ Tekra □ Terapixel □ Touch
 Controls □ U.S. Precision Glass □ Vacuum
 Engineering □ VIOX □ Viratec □ WAMCO

plasma displays, dc

□ Adhesives Research □ Applied
 Technology □ Astra Products □ Data Modul
 □ Displays □ Donnelly Applied Films □
 DuPont □ Feldman Technology □ Glaverbel
 SA □ IDM □ Kisco □ Marubeni □ Micron
 □ Nichia America □ Noritake □ Photonics
 □ Polar Vision □ Quantum Electronics

□ Target Materials □ Tekra □ Terapixel
□ U.S. Precision Glass □ Vacuum
Engineering □ VIOX □ Viratec □ WAMCO

spacers

□ Adhesives Research □ Applied
Technology □ Bivar □ Dana Enterprises
□ Kenix Industries □ Kisco □ **Liquid Crystal
Institute** □ Marubeni □ Photonics □ Saint-
Gobain □ Schott Fiber Optics □ Sekisui
Chemical Co. □ SEM-COM □ Superior
MicroPowders □ U.S. Precision Glass
□ Vacuum Engineering

thin films

□ Adhesives Research □ Advance
Reproductions □ Applied Technology
□ Atomergic Chemetals □ Balzars AEG
□ Balzars Thin Films □ CPFilms □ Dotech
□ DSM □ Edwards □ Feldman Technology
□ General Vacuum □ I.G.S. □ Indium
America □ Information Products □ Kaiser
Optical □ Kisco □ Lamination Technology
□ Kurt J. Lesker Co. □ Leybold □ **Liquid
Crystal Institute** □ Marubeni □ Multichip
Assembly □ NeoVac □ NIMTEC □ Phosphor
Technology □ Photon Dynamics
□ Photonics □ Polaroid Optical Films
□ **Polar Vision** □ Sheldahl □ Silicon Valley
Chemicals □ Specialty Coating Systems
□ **Spire** □ Stan-Allen □ Superior
MicroPowders □ Target Materials □ Techni-
Met □ 3M Product Information □ Tosoh
SMD □ U.S. Precision Glass □ Viratec

touch screens

□ Adhesives Research □ Applied Vacuum
Coating □ Astra Products □ AVED □ **Carroll
Touch** □ CPFilms □ Crystal Visions
Solutions □ D&T □ DSM □ Feldman
Technology □ General Vacuum □ Glaverbel
SA □ I.G.S. □ Information Products □ ITO
America □ Kisco □ Lamination Technology
□ MicroTouch Systems □ Multichip
Assembly □ NeoVac □ NIMTEC
□ Photonics □ Pilkington LOF □ Polaroid
Optical Films □ **Polar Vision** □ Racal-Mesl
□ Saint-Gobain □ Sheldahl □ Target
Materials □ Techni-Met □ Tekra □ **Thin Film
Devices** □ U.S. Precision Glass

MATERIALS HANDLING

□ Accudyne □ Applied Technology □ Dover
Coating □ Kisco □ ITO America □ Kisco
□ Kurdex □ Orbotech □ Progressive System
Technologies □ Rorze Automation
□ Tamarack Scientific

MEDICAL DISPLAYS

□ Dynamic Displays □ Excel Technology
□ Image Systems □ Imaging Display □ Kent
Modular Electronics □ MII □ Noritake
□ Pixelink □ Planar Systems □ Teeline
Canada

MICE AND OTHER POINTING DEVICES

□ Digitran □ Hosiden America □ IBM
□ Innovated Image □ Proxima □ SMART
Technologies □ WACOM

MICROCHANNEL PLATES

□ Galileo □ Intervac □ Phillips Components
□ Schott Corp. □ Schott Fiber Optics

MICRODISPLAYS

□ LCoS
□ Colorado MicroDisplay □ Photon
Dynamics □ **Liquid Crystal Institute**

MEMS

□ Silicon Light Machines

Single Crystal

□ **Liquid Crystal Institute**

MONITOR MOUNTING DEVICES

□ Ergotron

OPTICAL COATINGS

See also filters, polarizers

□ Adhesives Research □ ADT □ AlliedSignal
□ **American Polarizers** □ Applied Science
Labs □ Applied Vacuum Coating □ ASM
America □ Balzars AEG □ Balzars Thin
Films □ Balzars Thin Films GmbH
□ Bi-Search □ Brewer Science □ Cando
□ Colorado MicroDisplay □ Corning Optical
Corp. □ CPFilms □ CTP Coil □ D&T
□ Denglas □ Denton Vacuum □ Donnelly
Applied Films □ Dotech □ Draper □ DRS
Technologies □ DSM □ Exxene □ Eyesaver
□ Flex Products □ Fosta-Tek □ Galileo
□ General Vacuum □ Ginsbury □ Hoechst
Celanese □ Homalite □ Hoya Electronics
□ Hoya Optics □ IBM Canada □ I.G.S.
□ Incline □ Information Products
□ Kollmorgen □ Kurdex □ Leybold □ Liberty
Mirror □ **Liquid Crystal Institute** □ Man &
Machine □ Marubeni □ Melles Griot □
Metavac □ MicroTouch Systems □ Mito
Fine Glass □ O&S Research □ OCLI
□ Optical Devices □ Opto Sigma
□ Panelgraphic □ Pilkington LOF
□ Plasmaterials □ Plasma-Therm □ Polaroid
□ Polaroid Optical Films □ **Polar Vision**
□ PPM Photomask □ Precision Glass
Technologies □ Racal-Mesl □ Rexam
Custom □ Romag Glass □ Sheldahl □
Silver Cloud Mfg. □ Southwall
Technologies □ Tech-Com □ **Thin Film
Devices** □ Thin Film Technology □ 3M
Product Information □ TSP □ U.S. Precision
Glass □ Viratec □ WAMCO

OPTICAL COMPONENTS

□ Adhesives Research □ AlliedSignal
□ Atomergic Chemetals □ Balzars AEG
□ Balzars Thin Films □ Balzars Thin Films
GmbH □ ColorLink □ Corning Optical Corp.
□ CRL □ CTP Coil □ DRS Technologies
□ DuPont □ **ELDIM** □ Fresnel Optics
□ Hoffman Engr. □ Hoya Corp. □ Hudson
Photographic □ I.G.S. □ Incom □ Korry
Electronics □ Leybold □ **Liquid Crystal
Institute** □ Melles Griot □ Metavac □ OCLI
□ Opto Sigma □ Opto-Mechanics □ **Polar
Vision** □ Poly-Optical Products □ Precision
Glass Technologies □ Rainbow Optics
□ Retinal Displays □ Rorze Automation
□ Schott Fiber Optics □ Seiwa Optical
□ Tekra □ Teledyne Lighting & Display
□ Thomson Components & Tubes □ 3M
Product Information □ U.S. Precision Glass
□ Viratec □ Visus □ WAMCO □ Carl Zeiss

OPTICAL DESIGN SERVICES

□ Breault □ CTP Coil □ DRS Technologies
□ Future Focus □ Kaiser Optical □ Man &
Machine □ Night Vision Corp. □ OCLI
□ Optis □ Opto Sigma □ ORC Lighting
□ Physical Optics □ Pixel Interconnect
□ Poly-Optical Products □ Rainbow Optics
□ Retinal Displays □ Schott Fiber Optics
□ Seiwa Optical □ Shintech □ Tech-Com
□ Teledyne Lighting & Display □ Visus

OPTICAL DISCS AND SYSTEMS

□ Canon, Inc. □ Eastman Kodak
□ Honeywell □ IBM □ Kisco □ Mito Fine
Glass □ Pentax Technologies □ Sony Display
Device Group □ 3M Product Information

OPTICAL SEMICONDUCTOR DEVICES

□ Electron Tubes □ Melles Griot □ 3M
Product Information □ Seiwa Optical

PC-BASED TEST EQUIPMENT

□ Anorad □ Dark Field Technologies □ Data
Plus □ Display Labs □ **ELDIM** □ Image
Processing Systems □ Integral Vision □ IPS
Automation □ Laversab □ Pixel Interconnect
□ SAIC □ Sonera Technologies □ **Team
Systems** □ 3M Product Information
□ Torrey Pines Research □ TRICOR
Systems □ Unigraf □ **Video Instruments**

PHOSPHORS

□ Atomergic Chemetals □ EEV Ltd.
□ General Atronic □ Hoya Electronics
□ Intevac □ ITO America □ Marubeni
□ Nichia America □ ORSAM Sylvania
□ Phosphor Products □ Phosphor
Technology □ Quantex □ Raytheon
□ Sarnoff Corp. □ Sony Display Device
Group □ **Spire** □ Superior MicroPowders
□ Zenith Electronics

PHOTOLITHOGRAPHY CHEMICALS

□ Brewer Science □ Clariant □ Hoechst
Celanese □ Hoechst Celanese AZ □ 3M
Product Information □ Silicon Valley
Chemicals

PHOTOLITHOGRAPHY EQUIPMENT

□ Applied Technology □ Canon USA
□ Dover Instrument □ Fairchild Convac
□ Gerber Systems □ Holographic
Lithography □ Holtronic □ Interserv □ Kisco
□ Lambda Physik □ Micronic Laser Systems
□ MRS Technology □ Nikon Precision □ OAI
□ ORC Electronic Products □ Steag
MicroTech □ Karl Suss □ Tamarack
Scientific □ 3M Product Information □ Ultra T

PHOTOLITHOGRAPHY SERVICES

□ Advance Reproductions □ Brewer
Science □ Holographic Lithography □ IMT
□ Infinite Graphics □ Process Technologies
□ Technical Visions □ Thin Film Technology
□ 3M Product Information

PHOTOMASKS

See masks

□ Advance Reproductions □ IMT □ Infinite
Graphics □ **Liquid Crystal Institute**
□ Micronic Laser Systems □ Photonics
□ Photonics-Colorado □ Process
Technologies □ Terapixel □ 3M Product
Information

PLASMA DISPLAYS, AC

□ AVT □ Clarity Visual Systems □ Densitron
□ Donnelly Applied Films □ Eaton FPD
□ Eaton PSD □ Electro-Optics □ Electro
Plasma □ Fujitsu Microelectronics
□ General Electric □ Ginsbury □ Imagine
Graphics □ Incline □ Interstate Electronics
□ Litton Systems □ Micron □ Milgray
Electronics □ Mito Fine Glass □ NEC
Electronics □ Peerless Industries □ Philips
FIMI □ Phosphor Technology □ Photonics
Systems □ Pioneer New Media □ Plasmaco
□ SAIC □ Thomson-CSF □ Thomson Tubes
Electroniques □ Viratec □ Whittaker

PLASMA DISPLAYS, DC

□ Babcock □ Cherry Electrical □ Dale
Electronics □ Densitron □ Displays
□ Donnelly Applied Films □ Eaton FPD
□ General Electric □ Micron □ Milgray
Electronics □ Mito Fine Glass □ Phosphor
Technology □ Quantum Electronics □ SAIC
□ Viratec

PLASTIC MOLDINGS

□ Astra Products □ CTP Coil □ Fresnel
Optics □ RMF Products

PLOTTERS

□ John Fluke Mfg. □ Gerber Systems □ IBM
□ Infinite Graphics □ Micronic Laser
Systems □ Orbotech □ Versatec □ Xerox
Engr. Systems

POLARIZERS

□ ADT □ Advanced Display Systems
□ **American Polarizers** □ Applied
Technology □ Balzars AEG □ Balzars Thin
Films □ Balzars Thin Films GmbH
□ ColorLink □ D&T □ Dana Enterprises
□ Dotech □ EMCO □ Fosta-Tek □ Hoya
Electronics □ Hoya Corp. □ Image Analytics
□ Incline □ International Polarizer □ Kisco
□ Leybold □ **Liquid Crystal Institute** □ Man
& Machine □ Marubeni □ Melles Griot
□ Metavac □ MicroTouch Systems □ Nitto
Denko □ Optical Devices □ Opto Sigma
□ Panelview □ Polaroid □ Polaroid Optical
Films □ **Polar Vision** □ Precision Optical
Filters □ Reel 3-D □ Romag Glass □ Sanritz
□ **Silver Cloud Mfg.** □ **3M Optical
Systems** □ 3M Product Information □ UCE

POLYMER FILMS

□ Adhesives Research □ AlliedSignal
□ Brewer Science □ DuPont □ Kisco
□ Lamination Technology □ **Liquid Crystal
Institute** □ Rexam Custom □ Sheldahl □ SI
Diamond □ Specialty Coating Systems
□ Stanley Palmer □ Tekra □ 3M Product
Information

POWER SUPPLIES, HIGH VOLTAGE

□ Absopulse Electronics □ Advanced
Conversion □ AHV □ All American
□ American High Voltage □ Applied
Concepts □ B&K Precision □ Best Power
Technology □ Burle Industries □ Cherry
Electrical □ Data Plus □ Data Translation
□ Del Global Technologies □ Digitran
□ Display Components □ Display Labs □ E
and M Electronics □ EEV Ltd. □ EG&G
Optoelectronics □ Eldec □ Electron Tubes
□ Endicott □ John Fluke Mfg. □ Ginsbury
□ Honeywell □ Hyacinth Technology
□ Innotec □ K and M Electronics □ K & R
Engr. □ Kisco □ Lorad Power Systems
□ National Semiconductor □ OAI □ ORC
Lighting □ Racal-Mesl □ Rantec □ Reynolds
Industries □ Sampo America □ Sanders
Associates □ Schiederwerk GmbH □ Schott
High Voltage □ Stanley Palmer □ T&M
Instruments □ TDK □ Voltage Multipliers
□ Wasatch High Voltage □ WinTron □ WPI
Electronics

PRINTERS, COLOR GRAPHIC

□ Data Plus □ IRIS Graphics
□ Lasergraphics □ Lasertechnics □ Polaroid
□ QMS □ Tartan Technical □ Texas
Instruments □ 3M Product Information
□ Torrey Pines Research

PRINTERS, ELECTROPHOTOGRAPHIC (LASER AND LED)

□ Canon, Inc. □ Harris Corp. □ IBM
□ Lasertechnics □ NBS Southern □ Pentax
Technologies □ QMS □ Raytheon □ Tartan
Technical □ Torrey Pines Research

PRINTERS, IMPACT

□ Advanced Innovative Marketing □ Axiohm
□ IBM □ NBS Southern □ SAIC □ Torrey
Pines Research

PRINTERS, INK-JET

□ Canon, Inc. □ Howtek □ IRIS Graphics
□ Phoenix Group □ Tartan Technical
□ Torrey Pines Research

PRINTERS, THERMAL-TRANSFER AND DYE-SUBLIMATION

□ Acculex □ Axiohm □ Craft Data Ltd.
□ Data Modul □ Data Plus □ Eastman Kodak □ IBM □ Lasergraphics
□ Lasertechnics □ Phoenix Group □ QMS
□ Raytheon □ Seiko Micro Printer □ Tartan Technical □ Team Systems □ Torrey Pines Research □ Toyo Spectrum □ Versatec
□ Xerox Engrg. Systems

PRINTHEADS

□ Axiohm □ Craft Data Ltd. □ Ernst W. Dorn Co. □ Optotek □ Stanley Electric □ Torrey Pines Research

PROJECTION DISPLAYS

Liquid-crystal projectors

□ Clarity Visual Systems □ CRL □ CTX Opto □ Electronic Image Systems □ Epson America □ Fujitsu □ Hitachi America □ Innovated Image □ Iristal □ Liquid Crystal Institute □ Man & Machine □ MicroOptical □ Palomar Products □ Panasonic Industrial Co. □ Physical Optics □ Prolux □ Stalaw □ Symco □ Tartan Technical □ Vivitek

Liquid-crystal light-valve projectors

□ Barco Projection □ Davis A/S □ Donteck □ Electrohome □ Electronic Image Systems □ Excel Technology □ Eucran □ Evans & Sutherland Computer □ Flat Panel Display □ General Electric □ Hitachi America □ Hosiden America □ Hughes LV Products □ Incom □ Lamination Technology □ Liquid Crystal Institute □ Micron □ Micro-Optics □ nView □ Panasonic Communications & Systems □ Panelight □ Polytronix □ PPM Photomask □ Proxima □ Retroscan □ Sarnoff Corp. □ Sony Display Device Group □ Tech-Com □ Telex Communications □ 3M Product Information □ UCE

DLP/DMD

□ Digital Projection

Projection CRTs

□ Barco Projection □ Calspan SRL
□ Citronix □ Clinton Electronics □ Digitran
□ Display Labs □ Donteck □ EEV Ltd. □ El-Op Electrooptics □ Electrohome
□ Electronic Image Systems □ Evans & Sutherland Computer □ General Atomics
□ Ginsbury □ Gritz's Emporium □ Hitachi Denshi America □ Incom □ IST □ MI
□ Mitsubishi Electric Sales America
□ Panasonic Industrial Co. □ Princeton Display □ Raytheon □ Rediffusion Simulation □ Retroscan □ Sarnoff Corp.
□ Sony Display Device Group
□ Stereomedia □ Symco □ Tech-Com
□ Thomas Electronics □ Thomson-CSF
□ Thomson Tubes Electroniques □ 3M Product Information □ VDC (Novatron)
□ VDC (Teltron) □ Vidwall □ Zenith Electronics

PROJECTION SCREENS

Front

□ CRL □ Da-Lite Screen □ Draper □ Fresnel Optics □ ITG □ MicroPix □ Physical Optics

Rear

□ CRL □ Da-Lite Screen □ Display Components □ Draper □ Fresnel Optics □ I.G.S. □ Iristal □ Liquid Crystal Institute □ MicroPix □ Stanley Palmer □ Physical Optics

REPAIR AND MAINTENANCE

of computer systems

□ Hitech Intl. □ IBM □ Man & Machine
□ Matrix Components □ Pix Electronics □ VDC (Data Display) □ Video Instruments
□ Xyratex

of display systems

□ AVT □ Babcock □ D&T □ Display Labs
□ DRS Technologies □ General Electric
□ IBM □ Man & Machine □ Matrix Components □ Micron □ Midwest Computer
□ Miwa □ Multichip Assembly □ Nortech Imaging □ Incline □ Photon Dynamics
□ Photonics Systems □ Pix Electronics
□ Quantum Electronics □ Raytheon
□ Signatone □ Sonera Technologies □ T&M Instruments □ Team Systems □ Tech-Com
□ Teleline Canada □ Teletrac □ Toddco
□ TNP □ VDC (Data Display) □ VDC (Teltron) □ Video Instruments □ XKD
□ Xyratex

of high-voltage power supplies

□ Advanced Conversion □ American High Voltage □ B&K Precision □ Best Power Technology □ Display Labs □ F-P Electronics □ Hyacinth Technology □ Pix Electronics □ Reynolds Industries □ T&M Instruments

SCAN CONVERTER TUBES

□ Raytheon

SCANNERS, DOCUMENT AND FILM (GRAPHICS)

□ Advance Reproductions □ Data Plus
□ Digital Vision □ Eastman Kodak □ ECRM
□ Howtek □ IBM □ Imapro □ Mega Scan
□ Mekel Engrg. □ Mitsubishi Electric Sales America □ Pentax Technologies □ SEOS Displays □ Tartan Technical □ Telesensory
□ Torrey Pines Research □ Versatec
□ Wasatch High Voltage

SCANNERS, DOCUMENT (TEXT)

□ Eastman Kodak □ IBM □ Pentax Technologies

SCOREBOARDS

□ Adaptive Micro Systems □ Clarity Visual Systems □ Daktronics □ EEV Ltd. □ F-P Electronics □ Hughes LV Products □ Mark IV Industries □ Quantum Electronics □ SI Diamond

SCRIBERS

□ Applied Technology □ Kenix Industries
□ Kisco □ TNP □ Villa Precision

SEALANTS

□ Applied Technology □ Dainippon Ink & Chemicals □ ITO America □ Kisco
□ Marubeni □ Tech Spray □ 3M Product Information

SEMICONDUCTORS

□ All American □ Applied Technology □ Arithmos □ Atomergic Chemetals □ Chips & Technologies □ Display Labs □ Display Research Labs □ Eaton Corp. □ EM Microelectronic □ Genesis Microchip □ H-P □ HP Reid □ Intevac □ International Micro
□ Jaco Electronics □ Kenix Industries
□ LinFinity □ Pixelworks □ Samsung Semiconductor □ Spire □ Sumitomo Metals
□ 3M Electronic Products □ 3M Product Information □ Vivid Semiconductor
□ Voltage Multipliers

SIMULATOR DISPLAYS

□ American Panel □ Applied Science Labs
□ Barco □ Barco Chromatics □ Barco Video & Commun. □ Coryphaeus □ CRL □ CTP Coil □ Donteck □ DRS Military Systems
□ Dynamic Displays □ EDL Displays
□ Electronic Image Systems □ El-Op Electrooptics Industries □ Evans & Sutherland Computer □ Fakespace □ Kristel
□ High Lumen Displays □ Hughes LV Products □ Night Vision Corp. □ n-Vision
□ Optical Radiation □ Palomar Products
□ Pegasys Displays □ Photonics Systems
□ Precision Imaging □ Primagraphics
□ Rediffusion Simulation □ Sanders Associates □ SEOS Displays □ Shintech
□ Ship Analytics □ Siicon Light Machines
□ Simtech □ Tech-Com □ Teline Canada
□ XKD

SOFTWARE FOR DISPLAYS

design & optimization software

□ ADT □ American Institute Small Business
□ Arithmos □ autronic □ Brealut □ Cardion Electronics □ Colorado MicroDisplay
□ Contec CAE □ Coryphaeus □ CTP Coil
□ CSERIAC □ Display Labs □ DRS Military Systems □ El-Op Electrooptics Industries
□ Honeywell Defense Avionics □ IBM
□ Infinite Graphics □ Kisco □ Klein Instruments □ Kollmorgen □ Ligature Software □ Lighting Sciences □ n&k Technology □ Optis □ Philips Flat Display Systems □ Photon Dynamics □ Pixelworks
□ Sarnoff Corp. □ Shintech □ Sonera Technologies □ Stereomedia □ Video Instruments

graphics systems software

□ ADT □ Barco Chromatics □ Brealut
□ Calspan SRL □ Cardion Electronics
□ Coryphaeus □ Dalim Computer □ Data Translation □ Honeywell Defense Avionics
□ IBM □ Infax □ Infinity Multimedia
□ Kollmorgen □ L-3 Display Systems
□ Pixelworks □ Polaroid □ Primagraphics
□ Racal-Mesl □ Rediffusion Simulation
□ Sarnoff Corp. □ Ship Analytics □ Sonera Technologies □ Thomson-CSF Services
□ 3M Product Information □ Trident Microsystems □ Univision

image processing software

□ ADT □ Amerinex □ Applied Science Labs
□ Cardion Electronics □ Coreco □ Dalim Computer Graphic Systems □ Data Translation □ Decision Images □ DOME
□ DRS Military Systems □ DynaColor
□ Eastman Kodak □ El-Op Electrooptics Industries □ Eltime Vision Systems □ EPIX
□ Global Imaging □ Honeywell Defense Avionics □ Howtek □ IBM □ Integral Vision
□ Kaiser Optical □ Kollmorgen □ L-3 Display Systems □ MegaVision □ Orbotech
□ Photon Dynamics □ Pixelworks □ Portrait Displays □ Rediffusion Simulation □ Sarnoff Corp. □ Security Defense Systems □ Sharp Digital Information Products □ 3M Product Information □ Torrey Pines Research
□ Univision □ Versatec □ Videotek Systems
□ Vidwall □ Carl Zeiss

optical analysis software

□ ADT □ Applied Science Labs □ Brealut
□ CTP Coil □ Eldim □ El-Op Electrooptics Industries □ Eltime Vision Systems □ Global Imaging □ IBM □ Honeywell □ Kisco □ Klein Instruments □ Kollmorgen □ Kontron
□ Lighting Sciences □ Contec CAE □ n&k Technology □ Optis □ Orbotech □ Sarnoff Corp. □ Sensor Products □ Shintech □ Telic Optics □ Carl Zeiss

signal processing software

□ Arithmos □ Aydin Corp. □ Calspan SRL
□ Cardion Electronics □ Colorado MicroDisplay □ Data Translation □ DRS Military Systems □ DRS Technologies
□ DynaColor □ Honeywell Defense Avionics
□ IBM □ Kaiser Optical □ Kollmorgen
□ Pixelworks □ Racal-Mesl □ Sarnoff Corp.

SPEECH INPUT/OUTPUT DEVICES

□ ADT □ Crystal Visions Solutions □ IBM
□ Stalaw □ Touch Controls

TEST AND MEASUREMENT EQUIPMENT

automatic convergence systems

□ Barco Projection □ Sonera Technologies
□ Display Labs □ DynaColor □ EeRise
□ Electro-Optics □ General Electric □ Image Processing Systems □ Meylan □ Minolta
□ Photo Research □ Scientific Systems
□ T&M Instruments □ Telesensory □ 3M Product Information □ Torrey Pines Research

automated test equipment

□ AeroTech □ Anorad □ Applied Technology
□ AST Products □ B&K Precision □ Calspan SRL □ Chroma ATE □ Coreco □ Cybeq
□ Crystop Display □ Dark Field Technologies □ Data Plus □ Data Translation □ DIS □ Display Labs □ Dover Instrument □ DynaColor □ EeRise □ ELDIM
□ Extron □ Eltime Vision Systems
□ Ergonomics □ John Fluke Mfg. □ GenRad
□ Hoffman Engrg. □ Integral Vision □ ITO America □ Kenix Industries □ Image Processing Systems □ Inter-Logic □ KLA Acrotec □ KLA Instruments □ Kontop Products □ Lasertec □ Laversab □ Lighting Sciences □ MECC □ Micromanipulator Co.
□ Microvision □ Miwa □ MTL Systems
□ Nanometrics □ Nippon Seiko K.K.
□ Olympus □ Opto-Mechanics □ Orbotech
□ Photon Dynamics □ Photo Research
□ Pixel Interconnect □ SAIC □ Scientific Systems □ Sencore □ Signatone □ SOPRA
□ Spectron Engineering □ Sleag MicroTech
□ T&M Instruments □ Team Systems
□ Teletrac □ Tencor Instruments □ 3M Electronic Products □ 3M Product Information □ TNP Instruments □ Toray Engineering □ TRICOR Systems □ Unigraf
□ Veeco Process Metrology □ Video Instruments □ Wande □ Westar □ Carl Zeiss

colorimeters

□ Chroma ATE □ Data Plus □ DynaColor
□ ELDIM □ Electro-Optics □ Gamma Scientific □ Hoffman Engrg. □ Image Processing Systems □ Institute for Photometry & Radiometry □ Instrument Systems □ Klein Instruments □ Labsphere
□ Lighting Sciences □ LMT □ Microvision
□ Minolta □ n&k Technology □ Opto-Cal
□ Photo Research □ Protelevision
□ Sencore □ T&M Instruments □ Topcon America □ UDT Instruments

convergence gauges

□ Chroma ATE □ Display Labs □ DynaColor
□ Ginsbury □ Klein Instruments
□ Microvision □ Photo Research □ T&M Instruments

gonioreflectometers

□ ELDIM □ Hoffman Engrg. □ Lighting Sciences □ Microvision □ n&k Technology
□ Photo Research □ Westar □ J. A. Woollam

hot stages

□ ELDIM □ Micromanipulator Co. □ Palomar Products □ TNP □ Carl Zeiss

microscopes

□ Celco □ Inter-Logic □ Klein Instruments □ Lasertec □ Leica □ Micromanipulator Co. □ Nikon Precision □ Olympus America □ Optro-Mechanics □ Seiva Optical □ T&M Instruments □ TNP □ Carl Zeiss

photometers

□ autronic □ Gamma Scientific □ ELDIM □ Electro-Optics □ Hoffman Engr. □ Institute for Photometry & Radiometry □ Instrument Systems □ Labsphere □ Lighting Sciences □ LMT □ Microvision □ OAI □ Opto-Cal □ Optronics Labs □ Photo Research □ Spectron Engineering □ Tektronix □ T&M Instruments □ Topcon America □ TRICOR Systems □ UDT Instruments □ Unigraf □ Carl Zeiss

radiometers

□ Electro-Optics □ Ergonomics □ Gamma Scientific □ Hoffman Engr. □ Institute for Photometry & Radiometry □ Instrument Systems □ Labsphere □ Minolta □ OAI □ Opto-Cal □ Optronics Labs □ Photo Research □ Spectron Engineering □ T&M Instruments □ Tektronix □ Topcon America □ UDT Instruments

spectrometers

□ autronic □ Gamma Scientific □ Instrument Systems □ Labsphere □ Laversab □ Microvision □ MKS Instruments □ n&k Technology □ Nanometrics □ Opto-Cal □ Optronics Labs □ Photo Research □ Spectron Engineering □ T&M Instruments □ TNP Instruments □ J. A. Woollam □ Carl Zeiss

video generators

□ Aydin Corp. □ B&K Precision □ Barco Chromatics □ Chroma ATE □ Colorado Video □ Data Plus □ DRS Military Systems □ DRS Technologies □ DynaColor □ ELDIM □ Extron □ John Fluke Mfg. □ Ginsbury □ Klein Instruments □ Image Processing Systems □ Leader Instruments □ MECC □ MTL Systems □ Optro-Mechanics □ Princeton Display □ Quantum Data □ Sencore □ Sonera Technologies □ T&M Instruments □ Team Systems □ Unigraf □ Video Instruments

video oscilloscopes

□ B&K Precision □ Colorado Video □ General Electric □ Laversab □ Leader Instruments □ Photon □ Photo Research □ Sencore □ T&M Instruments

THIN FILMS

□ Applied Films □ Applied Technology □ Atomergic Chemetals □ Balzers AEG □ Balzers Process Systems □ Balzers Thin Films □ Balzers Thin Films GmbH □ Corning Optical Corp. □ Dontech □ DRS Technologies □ Dynapro □ Eaton FP Equipment □ Edwards □ Feldman Technology □ FEPET □ General Vacuum □ Ginsbury □ Hoya Corp. □ I.G.S. □ Information Products □ Innotec □ Intevac □ ITG □ Kaiser Optical □ Kisco □ Kurdex □ Lamination Technology □ Kurt J. Lesker Co. □ Leybold □ Liquid Crystal Institute □ Materials Research Corp. □ Melles Griot □ Nanometrics □ NeoVac □ OCLI □ Opto Sigma □ Polaroid Optical Films □ Polar Vision □ Rexam Custom □ Sheldahl □ Silver Cloud Mfg. □ SOPRA □ Specialty

Coating Systems □ Spire □ Stan-Allen □ Technical Visions □ Techni-Met □ Thin Film Devices □ Thin Film Technology □ 3M Product Information □ TNP □ Torrey Pines Research □ Viratec

3-D DISPLAY SYSTEMS

□ Breault □ Coryphaeus □ Dimension Technologies □ Dontech □ EDL Displays □ Electronic Image Systems □ Evans & Sutherland Computer □ Fakespace □ Flat Panel Display □ General Electric □ Ginsbury □ I.G.S. □ Infinity Multimedia □ Liquid Crystal Institute □ Matrox Electronic Systems □ Minolta □ MicroOptical □ Night Vision Corp. □ NuVision Technologies □ n-Vision □ Polhemus □ Reel 3-D □ Sarnoff Corp. □ Security Defense Systems □ StereoGraphics □ StereoMedia □ Tektronix □ 3-D ImageTek □ 3DTV □ UCE □ Visonics Labs

TOUCH-INTERACTIVE DISPLAYS

□ Applied Technology □ AVED □ Barco Chromatics □ Craft Data Ltd. □ Crystal Visions Solutions □ Cybertouch □ D&T □ Data Modul □ Densitron □ Digitran □ Dolch Computer □ Dynamic Displays □ Dontech □ Eaton FPD □ Eaton PSD □ Eaton IDT □ Electro Mechanical Systems □ Electro Plasma □ Elographics □ Elo TouchSystems □ Flat Panel Display □ IBM □ Image Systems □ Information Products □ Intecolor □ Interaction Systems □ Jaco Electronics □ Kristel □ Laversab □ Litton Systems □ Lockheed Sanders □ MicroTouch Systems □ NeoVac □ Nortech Engineering □ OI Direct □ Palomar Products □ Phoenix Group □ Phosphor Products □ Photonics Systems □ Poly-Optical Products □ Polar Vision □ Racal-Mesi □ RGB Dynamics □ Sharp Microelectronics □ SMART Technologies □ I. I. Stanley □ Techni-Met □ Thomson Tubes Electronics □ Touch Controls □ Ultra Electronics □ Varitronix □ View Magic □ XKD □ WACOM

TOUCH SCREENS

□ Acme Portable Machines □ ADT □ All American □ Applied Technology □ autronic □ AVT □ Aydin Corp. □ Bergquist □ CAM Graphics □ Carroll Touch □ Craft Data Ltd. □ Crystaloid □ Crystal Visions Solutions □ CTX Opto □ Cybertouch □ D&T □ Dale Electronics □ Data Modul □ DBI □ Densitron □ Dolch Computer □ Dontech □ Dynapro □ Earth Computer □ Eaton FPD □ EDL Displays □ Electro Mechanical Systems □ Elform □ Elographics □ Elo TouchSystems □ Epson America □ Feldman Technology □ John Fluke Mfg. □ Ginsbury □ IBM □ I.G.S. □ Image Systems □ Imagine Graphics □ Information Products □ Intecolor □ Interaction Systems □ ITO America □ Jaco Electronics □ Kent Modular Electronics □ Kisco □ Lamination Technology □ Laversab □ Litton Systems □ Man & Machine □ MicroTouch Systems □ Mintronix □ Mitsubishi Electronics America □ National Display Systems □ NeoVac □ O&S Research □ Optical Devices □ Phoenix Group □ Phosphor Products □ Photonics Systems □ Poly-Optical Products □ Racal-Mesi □ RGB Dynamics □ Richardson Electronics □ SMART Technologies □ Techni-Met □ Teleline Canada □ Telesensory □ Thin Film Technology □ Touch Controls □ Varitronix □ View Magic □ ViewTEK □ WACOM □ White Electronics

TOUCH TABLETS

□ ADT □ Carroll Touch □ Crystal Visions Solutions □ Information Products □ Phoenix Group □ SMART Technologies □ WACOM

TRACKBALLS

□ Computer Keyboard Systems □ Digitran □ Intecolor □ Polhemus

VACUUM EQUIPMENT

□ AeroTech □ Anorad □ Applied Films □ ASM America □ Balzers AEG □ Balzers Process Systems □ Balzers Thin Films □ Balzers Thin Films GmbH □ BOC Coating Technology □ BOC Edwards □ Brooks Automation □ Edwards □ FEPET □ General Vacuum □ Innotec □ Intevac □ Kimball Physics □ Kisco □ Kontoy Products □ Kurdex □ Leybold □ Materials Research Corp. □ MDC Vacuum Products □ MKS Instruments □ SAES Getters □ Temescal □ TSC □ ULVAC Technologies □ VAT □ Viratec

VACUUM FLUORESCENT DISPLAYS

□ Babcock □ Display Research Labs □ Futaba America □ ISE Electronics □ Kent Modular Electronics □ LCSP-Deeco □ Kurt J. Lesker Co. □ Noritake □ Morrison Electronics

VIDEO AMPLIFIERS

□ Communications Specialties □ Extron □ Imaging Display □ Kollmorgen □ MECC □ National Semiconductor □ T&M Instruments

VIDEO AND DISPLAY STANDARDS

□ Color Technology Solutions □ DynaColor □ M. S. Kennedy □ SAIC □ Sonera Technologies □ T&M Instruments □ Team Systems □ 3M Product Information □ VESA □ Video Instruments

VIDEO CUBES

□ Clarity Visual Systems □ Unigraf □ ViewTEK

VIDEO WALLS

□ Clarity Visual Systems □ Daktronics □ Da-Lite Screen □ Display Components □ Display Labs □ Draper □ FEPET □ Stanley Palmer □ Pioneer New Media □ Unigraf

VIEWING SCREENS

□ Barco Display □ CRL □ Draper □ Liquid Crystal Institute □ Physical Optics □ Poly-Optical Products □ Tech-Com □ Viratec

VIRTUAL IMAGING

□ Future Focus □ MicroOptical □ Multichip Assembly □ Reflection Technology □ Reel 3-D □ Retinal Displays □ Silscape □ StereoMedia □ Virtual Vision

VIRTUAL-REALITY DISPLAYS

□ Breault □ Display Research Labs □ Fakespace □ FED Corp. □ Future Focus □ Griz's Emporium □ Incom □ Liquid Crystal Institute □ MicroOptical □ Multichip Assembly □ Night Vision Corp. □ n-Vision □ Reflection Technology □ Reel 3-D □ Silscape □ StereoMedia □ Tech-Com □ 3-D ImageTek □ 3DTV □ 01 Products

X-RAY IMAGE STORAGE SCREENS

□ Incom □ Levy Hill □ Quantex □ Security Defense Systems □ T&M Instruments

X-RAY IMAGING

□ Clinton Electronics □ CR Technology □ EEV □ Nortech Imaging □ T&M Instruments □ Thomson Components & Tubes □ VDC (Teltron) WIRE □ Caton Connector □ Daburn □ Display Components □ ORSAM Sylvania □ Stanley Palmer

Part II: Companies

Listings are in strict alphabetical order. Punctuation, spaces, and the initial definite article "The" are ignored. Numbers (3D, 3M, 01), symbols (&), and abbreviations (Co., Corp., Inc., Ltd.) are listed as though fully spelled out. Companies bearing the name of an individual are usually listed under his last name.

ABSPULSE ELECTRONICS, LTD., 110 Walgreen Rd., Carp, Ontario, Canada K0A 1L0

Designers and manufacturers of a complete line of custom and standard dc-input dimmable backlight inverters. Output power from 1 to 200 W, open circuit up to 3000 Vrms, and dimming ratios of 2000:1 and wider.
Nanno Habets, Mktg. Mgr.
613/836-3511, fax: 613/836-7488
e-mail: absopulse@absopulse.com
www.absopulse.com

ACCUDYNE CORP., 1415 Foundation Park Blvd., S.E., Palm Bay, FL 32909

Manufacturers of flat-panel-display mid-line processing equipment: rubbing, cleaning, spacer applicators, spacer counters, assembly, filling, laser-based glass separation, and in-line material handling. All equipment is clean-room compatible and operator friendly.
Jim Lawson, Pres.
407/724-6500, fax: 407/727-1632

ACCULEX CORP., 440 Myles Standish Blvd., Taunton, MA 02780

Manufacturers/distributors of industrial process monitoring and display products. Surface-mount technology designs; rugged digital panel meters (LCD and LED) for measuring temperature, pressure, voltage current, etc.
Richard Mullen, Prod. Mktg. Mgr.
508/880-3660, fax: 508/880-0179

ACL, INC./STATICIDE, 1960 E. Devon Ave., Elk Grove Village, IL 60007

Manufacturers of STATICIDE topical anti-static solution, a highly effective method for long-term static control, which is non-toxic, non-flammable, non-staining, and completely biodegradable. Available in general-purpose and heavy-duty sprays or wipes for use on CRT screens.
Tony Banks, V.P. Sls./Mktg.
708/981-9212, 1-800-782-8420,
fax: 708/981-9278

ACME PORTABLE MACHINES, INC., 14140 Live Oak Ave., Unit D, Baldwin Park, CA 91706

Manufacturers of ruggedized portable flat-panel and VGA technologies for field environments. The Acme Lunchbox computers are adaptable platforms for

industrialized multitask operations: medical, networking, teleconferencing, diagnostic testing, and more.

Jimmy Chang, Sls. Mgr.
626/814-0516 fax: 626/814-0323
www.acneportable.com

ADAPTIVE MICRO SYSTEMS, INC., 7840 N. 86th St., Milwaukee, WI 53224

Manufacturers of high-quality indoor and outdoor color LED message displays, including PowerView, Beta-Brite, and indoor and outdoor Alpha lines and custom modules for OEM products. Single- and multi-line signs with characters from 1.5 to 7.2 in. high for displaying text, graphics, and logos.
Curt Lillie, V.P. Alpha Sls.
414/357-2020 x223, 1-800-558-7022
fax: 414/357-2029

ADAPTIVE MICRO SYSTEMS, INC., SMART ALEC, 7840 N. 86th St., Milwaukee, WI 53224

Developers of intelligent messaging software that automatically messages real-time and scheduled information to PowerView LED message displays, e-mail, intranets, pagers, voice mail, PA systems, and more. Acquires information from virtually any source using DDE, serial, ASCII delimited files, MAPI compliant e-mail, or custom interface.
Mike Rinrodt, Smart Alec Sls. Mgr.
414/357-2020, 1-800-558-7022
fax: 414/357-2029

ADHESIVES RESEARCH, INC., 400 Seaks Run Rd., P.O. Box 100, Glen Rock, PA 17327

Manufacturers of custom optically clear pressure-sensitive adhesive- and hard-coated films in touch screens, large/small LCDs, and flat-panel displays. Also, pressure-sensitive adhesives tapes for electronics assembly, low outgassing, shielding, static control, grounding, and electrical interconnections. ISO 9001 certified.

Dave Williams, Sls. Mgr.
717/227-3265, 1-800-445-6240

ADVANCED CONVERSION TECHNOLOGY, INC. (ACT), 2001 Fulling Mill Rd., P.O. Box 70, Middletown, PA 17057

Designers/manufacturers of military and commercial standard and custom CRTs and flat-panel-display power supplies, ranging from submissive helmet-mounted units (7.5 kV) to very high-power color units, AMLCDs and FED drivers. Also, low-voltage system supplies.
Mike Endy, Sales
717/939-2300, fax: 717/939-7170
e-mail: mail@actpower.com
www.actpower.com

ADVANCED DISPLAY SYSTEMS, INC., 10901 Airport Blvd., No. 1, Amarillo, TX 79111

Manufacturers of fast-response multistable LCDs (FMLCDs), offering long-term memory, gray scale, ultra-low power consumption, wide viewing angles, video-rate speed, and high resolution. Full-color plastic displays are in development.
Ken Richardson, Mktg. Dir.
806/335-2255, fax: 806/335-3322
e-mail: richardson@advanceddisplay.com
www.advanceddisplay.com

ADVANCED VIDEO PRODUCTS, 2 Robbins Rd., Westford, MA 01886

Designers/manufacturers of ultra-high-resolution monitors and display stations. Resolutions range from 2048 x 2560 gray scale to 4096 x 3300 single bit. Monitors can be configured for a variety of platforms including AT and MicroChannel.
Henry Kunicki, V.P. Display Sls.
508/692-2020, fax: 508/486-8488

ADVANCED VIDEO TECHNOLOGIES, INC. (AVT), INC., 34 Simarano Dr., Marlborough, MA 01752

Specializing in the sales, service, and engineering of high-resolution monitors and displays. Customization for special applications, including rackmounts, kiosks, touch screen, OEM, re-design, NEMA, and hemisphere conversion. Ideal for military, industrial, aerospace, or pre-press/CAD.
Leisha Stevens, V.P. Sales
508/485-3380, fax: 508/485-3509
E-mail: leishas@avt.com
www.avt.com

AD-VANCE MAGNETICS, INC., 625 Monroe St., P.O. Box 69, Rochester, IN 46975

Designers/manufacturers of magnetic shields for computer monitors, floppy discs, CRTs, photomultipliers, etc. Also, magnetic shielding foils and sheet stock in full-annealed or millannealed states available from stock.
Kay Nixon, V.P. Sls.
219/223-3158, fax: 219/223-2524
e-mail: sales@advancemag.com
www.advancemag.com

ADVANCE REPRODUCTIONS CORP., 100 Flagship Dr., North Andover, MA 01845

Photolithography services specializing in imaging of large-area photomasks up to 24 in. square on SL, LE, or QZ glass. The photomasks can be used by all display technologies including CRTs and flat panels, makers of bump masks, lead frames, MCMs, and sensors. Also offering CAD and photoplotting services up to 1/16-mil-resolution laser photoplots.
Steve Alaimo, Sls. Mgr.
978/685-2911, fax: 978/687-7278
e-mail: stevea@advancerepro.com
www.advancerepro.com

AEROSPACE DISPLAY SYSTEMS, INC., 2321 Topaz Dr., Hatfield, PA 19440

Manufacturers of custom LCDs, LCD modules, and subsystems for the aerospace industry. Also, dichroic, FMTN, Heilmeyer, and reverse-contrast multiplexed LCD products, in addition to developing display ruggedization capabilities.
Denise Dietrich-Bokum, Dir., Sls. & Mktg.
215/822-6090, fax: 215/822-7974
e-mail: ddbokum@aerospacedisplay.com

AEROTECH, INC., 101 Zeta Dr., Pittsburgh, PA 15238

Manufacturers of air bearing and linear-motor-based positioning systems featuring submicron accuracy and extremely tight velocity control for manufacturing and inspection of FPDs. Custom and standard designs for OEMs and end-users available. Cleanroom and high-vacuum applications.
Steve A. Botos, Mktg. Mgr.
412/963-7470, fax: 412/963-7459

AGI (ABBIE GREGG, INC.), 1130 E. University Dr., Ste. 105, Tempe, AZ 85281

Engineering and consulting firm serving the flat-panel display, semiconductor, and other microelectronics industries. Services include start-up consulting, process improvements, industrial engineering, and high-tech operations.
Richard Baron, Dir. Bus. Dev.
802/446-0056 x105, fax: 602/446-8001
www.abbiegregg.com

ALCOM, Liquid Crystal Institute, Kent State University, Kent OH 44242

National research center for liquid-crystal devices, performing basic research and technology development. Educational services for liquid crystals and related technologies at all levels available. Staff includes liquid-crystal professionals from technicians to Ph.Ds. Characterization and modeling of LCDs also available.
John L. West, Assoc. Dir.
216/672-2581, fax: 216/672-2796

ALL AMERICAN, 230 Devcon Dr., San Jose, CA 95112

Integrator/distributor representing LG, Samsung, Mitsubishi TFT-LCDs, and Kyocera passive LCDs; AVED and Digital View digital and analog controller-based LCD solutions. Standard and custom LCD products from complete kits to integrated open frame, rack-mount, and tabletop LCD assemblies with touch screen optional.
John Schlatter, Corp. Mktg. Mgr.-Displays
408/441-1300, 1-800-222-6001
fax: 408/437-4351
e-mail: schlatter@allamerican.com
www.allamerican.com

ALLIEDSIGNAL, INC., MicroOptic Devices, 101 Albright Way, Los Gatos, CA 95030

Manufacturers of SpectraVue™ products that dramatically improve color and gray-scale performance over wide viewing angles for both active and passive LCDs. Products consist of a thin, highly collimating backlight and a new low-scattering diffusing screen.
Thelma Ramm, Mktg. Comm.
408/341-3004, fax: 408/341-3001

ALTINEX, INC., 592 Apollo St., Brea, CA 92821

Providers of signal management solutions for presentation systems, offering a complete line of computer video interfaces, distribution amplifiers, switches, matrix switchers, converters, cabling, and related accessories.
Mikhail Gershfeld, V.P.
714/990-2300, 1-800-ALTINEX
fax: 714/990-3303
e-mail: sales@altinex.com
www.altinex.com

AMERICAN ELTEC, 101 College Rd. East, Princeton, PA 08540

Manufacturers of board-level computers (VMEbus and PCibus based), as well as designers of software, for industrial image processing and machine-vision applications. Products include ICC imaging computer, Eurocom 27 general-purpose VMEbus CPU, PCImagine, and the HiPerCam 1 PowerPC camera with built-in image processing computer.
Charles Birkhead
215/348-1010, fax: 215/348-1050

AMERICAN HIGH VOLTAGE (AHV), 1957-A Friendship Dr., El Cajon, CA 92020

Manufacturers of high-voltage power supplies using state-of-the-art patented

technologies. Specializing in custom designs.

Paul E. Garvin, Dir. Sls. & Mktg.
619/258-5804, fax: 619/258-6816
www.AHV@AHV.com

AMERICAN INSTITUTE OF SMALL BUSINESS, 7515 Wayzata Blvd., Minneapolis, MN 55426

Publishers of software, books, and videos on small-business operation and start-up, business-plan writing, the Internet, Windows 95, advertising, and public relations.
Max Falek, Dir.
612/545-7001, 1-800-328-2906
fax: 612/545-7020

AMERICAN PANEL CORP., 6675 Shiloh Rd. East, Alpharetta, GA 30005

Manufacturers of ruggedized displays for both commercial and military avionics and ground-based applications in sizes ranging from 3.4 to 22 in.
Greg Ethols, Gen. Mgr.
770/205-9546, fax -9548
e-mail: geethols@american-panel.com
www.american-panel.com

AMERICAN POLARIZERS, INC., 141 S. Seventh St., Reading, PA 19602

Manufacturers of circular polarizers, and contrast-enhancement and image-quality filters for electronic displays. Features include diffusion coatings to eliminate external glare, hard coats for abrasion and chemical resistance, EMI/RFI shielding, silkscreening, machining, and adhesives for ready-to-assemble parts.
Mary E. Dybalski, Mktg. Mgr.
610/373-5177, 1-800-736-9031
fax: 610/373-2229
e-mail: polarizers@aol.com
www.apioptics.com

AMERINEX APPLIED IMAGING (AAI), 409 Main St., Amherst, MA 01002

Developers of image-processing software for Windows 95, NT, and UNIX. Also, image-processing turn-key systems, including hardware and software. Providers of engineering services and development of applications in computer vision.
Bruno Lay, V.P. Mktg. & Sls.
413/256-8941, fax: 413/253-4203
www.aai.com

AMETEK AEROSPACE PRODUCTS, Sellersville, PA 18960

Manufacturers of a complete line of LED and dichroic LCD displays and cockpit instrumentation for a wide range of aerospace applications.
Jerry Anderer, Sales Mgr.
215/257-6531, fax: 215/257-1888

AMUNEAL MANUFACTURING CORP., 4737 Darrah St., Philadelphia, PA 19124

Manufacturers of magnetic-shielding components and assemblies. Supplier of magnetic-shielding materials including foil and sheets from stock. In-house design, engineering, and heat-treat facilities.
Adam Kamens, V.P. Sls. & Mktg.
215/535-3000, 1-800-755-9843
fax: 215/743-1715
e-mail: shields@amuneal.com
www.amuneal.com

ANDREWS GLASS CO., 410 S. Fourth St., Vineland, NJ 08360

Custom manufacturers of glass and quartz components for the opto-electronics

industry; envelopes, getters, plasma tubes, etc. Precision forming, grinding, polishing, glass-to-metal, and graded seals available. Dennis Courtney, Pres. 609/692-4435, 1-800-845-0026 fax: 609/692-5357

ANGEWANDTE DISPLAY TECHNOLOGIE (ADT) GmbH, Allmandring 3/4, D-70569 Stuttgart, Germany

Manufacturers of standard and custom-designed active-matrix display and modules for automotive applications and mobile communications.

Peter M. Knoll, Gen. Mgr. +49-711-67962-20, fax: +49-711-67962-90

ANORAD, 110 Oser Ave., Hauppauge, NY 11788

Manufacturers of high-accuracy FP-720 positioning system for manufacturing and inspection of flat-panel displays; chip-on-glass (COG) and TAB-on-glass bonding and assembly machines; linear positioning stages; vision inspection systems; linear servo motors; and motion-control components for submicron positioning in clean room and vacuum.

Kevin Purdy, Sls. Mgr. 516/231-1995, fax: 516/435-1612

ANOTECH (An ANORAD Company), 135 Ricefield Lane, Hauppauge, NY 11788

Developers/marketers of assembly systems based on Anorad motion and processing technology. Product line includes fully automated TAB-on-glass assembly cell, high-accuracy die bonders for CSP and MCM applications, and a general-purpose precision assembly system for focal-plane arrays, printer heads, and flat panels.

Tomas Rincon, Dir. Sls. & Mktg. 516/231-1990 x110, 1-888-772-6672 fax: 516/232-1407 e-mail: anotech@anorad.com www.anotech.com

APPIAN GRAPHICS, 18047 N.E. 68th St., Ste. B-100, Redmond, WA 98052

Manufacturers of multiple-monitor graphics cards. The Jeronimo® and Duet® cards are the fastest and most reliable. Patented HydraVision® display-management software enables users to better manage their multiple-monitor desktop.

Derek Hayes, Channel Sls. Mgr. 425/882-2020, 1-800-727-7426 fax: 425/882-8618

e-mail: sales@appiangraphics.com www.appiangraphics.com

APPLIED CONCEPTS, INC., 397 Rt. 281, P.O. Box 453, Tully, NY 13159

Designers/manufacturers of specialty dc-to-ac inverters for multiple CCFL and high-power display backlights used in sunlight readable, vehicular, military, and industrial display systems. Inverters are compact and low profile, and are factory firmware programmable for maximum control function flexibility.

Suzanne Thomas, Dir. Sls./Mktg. 315/696-6676, fax: 315/696-6019 e-mail: appcon@worldnet.att.net

APPLIED FILMS CORP., 9586 I-25 E. Frontage Rd., Longmont, CO 80504

Manufacturers of thin-film coatings and sputtering systems. In-line sputtering systems that meet the high-throughput and stringent particulate requirements of the plasma and LCD industries. SiO₂/ITO-

coated glass substrates supplied to the LCD industry worldwide.

Ping Wu, Sls. Rep. 303/774-3200, fax: 303/678-9275

APPLIED IMAGE, INC., 1653 E. Main St., Rochester, NY 14609

Manufacturers of large glass photomasks with linewidth resolution of 0.0002 in. and accuracy of ± 0.00020 in. made of high-grade chromium-coated glass for flat-panel, automotive, EL, and plasma displays or any other precision image application. Eduardo J. Navarro, V.P. Sls./Mktg. 716/482-0300, fax: 716/288-5989

APPLIED SCIENCE LABS, 175 Middlesex Tpke., Bedford, MA 01730

Manufacturers of a full range of eye-tracking and pupillometry equipment, ranging from low-cost limbus tracker to complex TV-based eyehead systems. All necessary operating and analysis software is included, along with contract research services for all products. John M. Flannery, V.P. 617/275-4000, fax: 617/275-3388

APPLIED SIMULATION TECHNOLOGY, 2188 Bering Dr., San Jose, CA 95131

Providers of software solutions for the modeling and simulation of high-speed digital and analog circuits and systems. Products suited for signal integrity and EMI simulation and can be integrated into industry-standard CAD environments. Fred Balistrieri, Tech. Sls. Mgr. 408/434-0967 x102, 1-800-955-0967 fax: 408/434-1003

APPLIED TECHNOLOGY, 70 W. Red Oak Lane, White Plains, NY 10604

Distributors of a comprehensive line of manufacturing equipment and materials, including alignment layer printing and rubbing, epoxy screen-printing, polyimide, seal epoxy, and ITO. Also, FPD driver bonding equipment including COG, TAB, ACF; heat-seal connector prototypes; LCD and PCB contract manufacturing; and touch screens.

David Roseman, Sls. Mgr. 914/682-0424, fax: 914/682-0431 e-mail: droseman@appliedtechnology.com

APPLIED VACUUM COATING TECHNOLOGIES, 2 F1, No. 7-1 Industrial East 9th Rd., Science Based Industrial Park, Hsin-chu, Taiwan, R.O.C.

Manufacturers of vacuum coater of ITO glass and plastics. AR-coated glass and plastics. Coated polarizers and tubes. Dennis Scott, Agent 408/629-1678, fax: 408/629-1884 e-mail: pmlscott@earthlink.com www.avc-tech.com

APRICOT SIGMEX LTD., Sigma House, N. Heath La., Horsham, West Sussex, U.K. RH12 4UZ

Manufacturers of a range of high-resolution high-reliability full-color monitors, including FST versions, designed for end users, systems integrators, and OEM markets. Custom ruggedized monitors. Configurable between 32 and 65 kHz. Tony Greatbatch, Sales Mgr. +44-40-350-445, fax: +44-40-341-121

ARCONIUM, 50 Sims Ave., Providence, RI 02909

Manufacturers of ITO and ITO sputtering targets, including planar, rotatable, and custom designs. Fully integrated approach

from indium refining and oxide manufacturing capability to localized bonding in U.S., England, and Hong Kong; available in all custom and standard geometries.

Brian O'Neill, Prod. Mgr.-PVD Materials 401/456-0800, 1-800-343-0282, fax: 401/421-2419 www.arconium.com

ARD CORP., 9151 Rumsey Rd., Columbia, MD 21045

Consulting services dedicated to workplace improvement through the integration of technology and the human element. Services include advanced software development, human-factors engineering, product design and evaluation, and usability testing.

Tamara K. Fuller, Bus. Dev. Coord. 301/997-5600, 1-800-969-ARD1 fax: 301/997-3902

ARITHMOS, INC., 2730 San Tomas Expwy., Ste. 210, Santa Clara, CA 95051-0952

Manufacturers of the Arithmos ADE2000 series Display Engines™ that integrates compelling features, image-quality advances, and a high-performance architecture for flat-panel monitors into a single-chip device. Tomi Kratz, Sls. Acct. Mgr. 408/982-4490 x226, fax: 408/982-4481 e-mail: info@arithmos.com www.arithmos.com

ARIZONA LCD, INC., (AZ-LCD), 3738 W. Commonwealth Ave., Suite 14, Chandler, AZ 85226

Designers/manufacturers of LCD and LCD-related technology equipment for research, development, and production applications. Consulting and program management services offered. Suppliers of refurbished and reconditioned high-technology equipment. Wing Li, Pres. 602/899-6830, fax: 602/345-9338

ASM AMERICA, 4302 E. Broadway, Phoenix, AZ 85040

Manufacturers of LPCVD equipment for silicon and oxide films used to fabricate TFT networks that drive active-matrix LCDs. Ray Schott 602/437-1405, fax: 602/437-1403

ASSOCIATION EXHIBITIONS, 6 Foldyard Close, Sutton, Goldfield, Birmingham, West Midlands, U.K. B76 1QZ

Trade show/conference organizers of Electronic Information Displays (EID), successfully relaunched as a new series in 1993 in London, England. The 1994 and 1995 shows were highly successful, and the event, sponsored by SID, is now Europe's major display event. Next show: Oct. 1-3, 1996.

Terry C. Brandon, Event Director 44-121-313-0750, fax: 44-121-313-2423

AST PRODUCTS, INC., 9 Linnell Circle, Billerica, MA 01821-3902

Manufacturers of a Video Contact Angle Surface Analysis System for FPD manufacturing. These systems are used for detecting surface contamination during processing. Also, supplier of plasma cleaning systems for surface cleaning without residue and web chemical disposal. Rob Layman, Sls. Mgr. 978/667-4500, 1-877-667-4500 fax: 978/667-9778 e-mail: rob@astp.com www.astp.com

ASTRA PRODUCTS, INC., P.O. Box 479, Baldwin, NY 11510

Manufacturers of high-performance precision Clarex® acrylic optical filters for ambient, backlight, and edgelit displays; reflective, transmissive/reflective, diffusing, and light-guide panels; optical-quality non-glare filters with scratch-resistant, EMI, ITO, and other coatings (weatherable); new high-scatter panels for improved brightness. Mark Bogin, Pres. 516/223-7500, 1-800-827-0500 fax: 516/868-2371

ASTRONAUTICS C.A. LTD, ISRAEL #23 Hayarkon St., Bnei-Brak, Israel 51261

Manufacturers of mission and display processors that are widely used in state-of-the-art modular military computers, graphics engines, video I/O, and interfaces. Also, military CRT and LCD-based displays. "Smart" displays in various shapes and sizes (from 3- to 12-in. color LCDs). Menachem Donner, Bus. Dev. Mgr. +972-3-979-1555, fax: +972-3-570-4406 e-mail: menachem@astro.co.il www.astronautics.com

ASTRONAUTICS CORP. OF AMERICA, 4115 N. Teutonia Ave., Milwaukee, WI 53209-6731

Manufacturers of AMLCD-based displays in 1:1 and 4:3 aspect ratios. Sizes range from 4 to 6-in. screen diagonals in 1:1 and from 6.3 to 12.1-in. screen diagonals in 4:3. Different sizes available upon request. Also, display processors and high-reliability electromechanical flight instrumentation to support existing platforms as well as retrofits.

Robert Herman, Sr. Applic. Engr. 414/447-8200 x427, fax: 414/447-8231 www.astronautics.com

ASTROSYSTEMS, INC., 6 Nevada Drive, Lake Success, NY 11042

Manufacturers of high-voltage power supplies for CRT displays. Cecilia Marcus, Sales Admin. 516/328-1600, 1-800-645-8454 fax: 516/328-1658

ATOHAAS NORTH AMERICA, INC., 100 Independence Mall West, Philadelphia, PA 19106-2399

Manufacturers of film and sheet from Plexiglas® brand "L"-type resin specified for increased efficiency in LCD backlights and avionic displays. Rear-projection screens of Plexiglas® "L" that perform like optical screens at one-half the cost. William Rindosh, Mktg. Mgr. 215/592-3520, fax: 215/592-2218

ATOMERGIC CHEMETALS CORP., 222 Sherwood Ave., Farmingdale, NY 11735-1718

Manufacturers of birefringent IR-window, nonlinear, photochromic, and UV-window materials, laser crystals, and rods. Also, optical coating and polishing services. Gary Newman, Product Mgr. 516/694-9000, fax: 516/694-9177

AUTRONIC-MELCHERS GmbH, An der Rossweid 18, Karlsruhe D-76229, Germany

Manufacturers of LCD measurement and modeling instrumentation. Also, a distributor of LCDs. Frank Reichard, Managing Dir. +49-721-962-6480, fax: +49-721-962-6480 e-mail: reichard@autronic.melchers.de

AVALEX TECHNOLOGIES CORP., 5825 Glenridge Dr., Ste. 1-124, Atlanta, GA 30328
Designers/manufacturers of embedded graphical processors, video processors, and flat-panel-display controllers offering a RS-232 interface, digital or analog inputs, operating with digital or analog panels.
Tad Ihns, Pres.
404/256-3010, fax: 404/256-1023
e-mail: tihns@avalex.com
www.avalex.com

AVED DISPLAY TECHNOLOGIES, 14192 Chambers Rd., Tustin, CA 92780
Manufacturers of ISA, PCI, and analog flat-panel controllers with a wide range of price/performance options. State-of-the-art board and IC technology combined with world-class manufacturing and customer technical support.
Lisa Kern, Sales
714/573-5035, fax: 714/573-5039
e-mail: sales@aveddisplay.com

AXONIX CORP., 844 South, 200 East, Salt Lake City, UT 84111
Manufacturers of portable peripherals for laptop computers and a backlighting retrofit for laptops with non-backlit LCDs.
David L. Cox, V.P. Mktg.
801/521-9797, fax: 801/521-9798

AYDIN COMPUTER AND MONITOR DIV., 700 Dresher Rd., Horsham, PA 19044
Manufacturers of Command & Control military display processors, ruggedized monitors, and color workstations, large-screen displays, air-traffic-control equipment and systems, satellite modems, and signal-processing equipment.
Cathy DeWolf, Mktg. Admin.
215/657-8600 fax: 215/657-5470

AYDIN CORP. EAST, 414 Commerce Dr., Fort Washington, PA 19034
Designers/manufacturers of a comprehensive line of commercial and industrial autosync color monitors, and special OEM monitors ranging in size from 10 to 28 in. Configurations include open frame, metal cabinet, low-profile, rack-mount, console-mount, or special orders.
David Smith, V.P. Sales
215/542-7800, fax: 215/542-8447

BABCOCK DISPLAY DIVISION, INC., 14930 E. Alondra Blvd., La Mirada, CA 90638-5752
Manufacturers of high-quality segmented dot-matrix alphanumeric and graphic displays in standard and customer-specific designs with exceptional viewability and brightness for instrumentation arcade games, industrial controls, point-of-sale, audio, and security systems. Lifetimes of 100,000 hours.
Tom A. Pierce, Natl. Sls. Mgr.
714/994-6500, fax: 714/994-3013
e-mail: tapierce@babcockinc.com
www.babcockinc.com

DAVID BALDAUF, 15 S. Hinterland Dr., Rhinebeck, NY 12572
Consulting services specializing in display requirement and tradeoff studies. Particular competence in the visual attributes of the various technologies, including CRT, gas panel, and liquid crystal.
David Baldauf
914/876-2153

BALL AEROSPACE & COMMUNICATIONS GROUP, 9675 W. 108th Circle, Broomfield, CO 80021
Manufacturers of militarized CRT displays, ruggedized and militarized CCDs, and intensified CCD cameras.
Robert M. Baker, Mktg. Mgr.
303/460-5869, 1-800-428-7145
fax: 303/460-5888

BALZERS AKTIENGESELLSCHAFT, Thin Films, P.O. Box 1000, FL-9496 Balzers, Principality of Liechtenstein
OEM production capabilities go beyond optical coating, including substrate fabrication and subassembly manufacture. Routinely fabricate mirrors, filters, beamsplitters, prisms, lenses, and other components from a variety of materials. Also, assembly of coated optical elements into opto-mechanical and/or opto-electronic assemblies.
Hagen Poehnert, V.P. Mktg. & Sls.
+423-388-4789
fax: +423-388-5405
e-mail: poh@btf.balzers.net
www.btf.balzers.com

BALZERS PROCESS SYSTEMS (BPS), 25 Sagamore Park Rd., Hudson, NH 03051
OEM production capabilities go beyond optical coating, including substrate fabrication and subassembly manufacture. Routinely fabricate mirrors, filters, beamsplitters, prisms, lenses, and other components from a variety of materials. Also, assembly of coated optical elements into opto-mechanical and/or opto-electronic assemblies.
Tony Sisca, Sls. Engr.
603/594-1536, fax: 603/594-1538
e-mail: tonys@bpsinc.mv.com
www.bps-it.com

BALZERS THIN FILMS GmbH, Marienthaler Strasse 2, D-65366 Geisenheim, Germany
OEM production capabilities go beyond optical coating, including substrate fabrication and subassembly manufacture. Routinely fabricate mirrors, filters, beamsplitters, prisms, lenses, and other components from a variety of materials. Also, assembly of coated optical elements into opto-mechanical and/or opto-electronic assemblies.
Peter Enders
+49-6722-9930; fax: +49-6722-99-3161
e-mail: king@btf.balzers.net
www.btf.balzers.com

BALZERS THIN FILMS, INC., 16080 Table Mountain Pkwy., Ste. 100, Golden, CO 80403
OEM production capabilities go beyond optical coating, including substrate fabrication and subassembly manufacture. Routinely fabricate mirrors, filters, beamsplitters, prisms, lenses, and other components from a variety of materials. Also, assembly of coated optical elements into opto-mechanical and/or opto-electronic assemblies.
Paul A. Golata, Natl. Sls. Mgr.
303/273-9700, fax: 303/273-2995
e-mail: PAG@btf-us.balzers.com
www.btf.balzers.com

B&K PRECISION, 1031 Segovia Circle, Placentia, CA 92870-7137
Manufacturers of ac and dc power supplies; handheld and benchtop multimeters; high-performance spectrum analyzers; function and signal generators;

oscilloscopes and EPROM programmers; probes and testers; and multifunction counters.
Mark Albert, Dir. Mktg.
714/237-9220, fax: 714/237-9214
www.bkprecision.com

BANGS LABORATORIES, INC., 979 Keystone Way, Carmel, IN 46032
Distributors of microparticles of different sizes, colors, and surface chemistries. Now providing polymeric and silica microspheres for use as spacers in FPDs.
Thomas Petro, Sales Mgr.
317/844-7176, fax: 317/575-8801

BARCO, INC., 1000 Cobb Place Blvd., Bldg. 100, Kennesaw, GA 30144
U.S. subsidiary of Belgian-based BARCO. Distributors of large-screen video/ data/graphics projectors (including LCDs), broadcast monitors, video and data presentation monitors, high-resolution imaging displays, and color-critical displays with calibration software.
George Walter, Prod. Mgr.
404/590-7900, fax: 404/590-8836

BARCO, INC., DISPLAY SYSTEMS, 3059 Premiere Pkwy., Duluth, GA 30097
Manufacturers of high-resolution color and monochrome CRT and flat-panel displays for rugged, commercial, medical, avionics, publishing, and industrial environments. Also, high-performance graphics controllers, medical-imaging boards, and video mixers.
Peggy Grimm, Mgr. Mktg. Commun.
678/475-8000, fax: 678/475-8100
www.barco.com/display

BARCO, INC., DISPLAY SYSTEMS, 2558 Mountain Industrial Blvd., Tucker, GA 30084
Designers/manufacturers of a full range of high-resolution commercial, rugged, and avionics displays, and high-performance graphics and video mixer controllers and subsystems. Targeted markets include medical, industrial, process control, vessel and air-traffic control, C4I, avionics, and pre-press applications.
Ken Mullany, Dir. Sls.
770/493-7000, fax: 770/492-5101
www.bcx.BARCO.com

BARCO nv, DISPLAY SYSTEMS, Th. Sevenslaan 106, B-8500 Kortrijk, Belgium
Designers/manufacturers of high-resolution monitors and display subsystems for highly demanding niche markets such as C4I, avionics, vessel and air traffic control, industrial process control, medical imaging, and pre-press applications.
Dan Sergeant, Mgr., Rugged/Ind. Displays
+32-56-233-211, fax: +32-56-233-462
www.barco.com/display

BARCO nv, PROJECTION SYSTEMS, Noordlaan 5, B-8520 Kuurne, Belgium
Designers/manufacturers of front and rear projectors for video, data, graphics, and HDTV projection. LCD light-valve projector using three active-matrix LCD panels (5.8-in. diagonal) and offering an overall resolution of more than 1.2 million pixels with an equivalent CRT peak white of over 5000 lumens.
Sjoerd De Clerck, Mktg. Mgr.
+32-56-368-378, fax: +32-56-368-354

BARCO nv, VIDEO & COMMUNICATIONS, Th. Sevenslaan 106, B-8500 Kortrijk, Belgium
Designers/manufacturers of color video monitors for broadcast (viewing, control, measurement, or HDTV); color monitors for video, data, or graphics presentation; high-resolution imaging displays; and color-critical displays with color-calibration software.
Piet Candeel, Sales Mgr.
+32-56-233-242, fax: +32-56-233-374

BATRON GmbH, Landsberger Str. 320, Munchen, 8000, Germany
Large-character alphanumeric and graphic LCD modules in STN technology with extended temperature range. Control boards for graphic LCD modules.
Axel Schaefer
+49-560-17-292, fax: +49-560-17-295

LEO DEISER INC., 151-77 20th Ave., Flushing, NY 11354
Consultancy specializing in image and data laser scanning and recording subsystems. Advancing speeds and resolutions for printing, graphic arts, quality and defect inspection, microscopy, triangulation, and display. Expert witness and litigation research and guidance.
Leo Beiser, Pres.
718/353-7298, fax: 718/353-7098

BERGQUIST COMPANY, 301 Washington St., Cannon Falls, MN 55009
Manufacturers of four- and five-wire resistive analog touch screens featuring clarity, brilliant colors, sharper images, and crisper words.
Travis Flint, Sls. Mgr.
1-800-949-4021 x331, 507/263-5085
e-mail: travisf@bergquistcompany.com
www.bergquistcompany.com

BEST POWER TECHNOLOGY, INC., P.O. Box 280, Necedah, WI 54646
Manufacturers of uninterruptible power supplies ranging from 500 VA to 18 kVA. Trade names are FERRUPS and MICRO-FERRUPS. Protects sensitive electronic equipment from power problems.
Don Soe
608/565-7200, 1-800-356-5794
fax: 608/565-2221

BETA PRODUCTS, INC., P.O. Box 38, Millwood, VA 22646
Consultant and manufacturer's representative for color FPDs and monitors.
Norman M. Fine, Pres.
703/837-1436, fax: 703/837-3063

BILCO MANUFACTURING, 100 Grandview Blvd., Zelienople, PA 16063
Manufacturers of glass cleaning equipment for critically clean applications. Machines may be chosen from a standard line or engineered for specific requirements.
Bob Long, Sales Mgr.
412/452-7390, fax: 412/452-0217

BI-SEARCH INTERNATIONAL, INC., 3002 Dow Ave., Ste. 410, Tustin, CA 92780
Authorized Lucky Goldstar (LG) VAD (value-added distributor) and TFT-LCD distributor. Providers of total solutions, which include TFT-LCDs, A-D cards, inverters, and peripherals.
Jin Kang, Sls. Mgr.
714-508-0016, fax: 714/508-0039
www.bisearch.com

BIVAR, INC., 4 Thomas, Irvine, CA 92718

Manufacturers of PCB packaging products; LED mounts, holders, and assemblies; permanent mounts and spacers; assembly hardware; and wash-away spacers providing solutions at the design-in level while answering existing on-line production and quality problems. Rod Magsanide, V.P. Sls. & Mktg. 714/951-8808, fax: 714-951-3974 www.bivar.com

BKL, INC., 421 Feheley Dr., King of Prussia, PA 19406

Manufacturers of EL lamps for back-lighting LCDs, instrumentation, watches/clocks, portable devices, membrane switches, etc. K Series screen-printed lamps for small lit areas, and continuous-roll lamps for medium-to-large square/rectangular lit areas. Lamps available with either magnetic resonating transformer inverters or IC chip inverters. Rick Mental, Tech. Sls. Mgr. 610/277-2910, fax: 610/277-2956

BOC COATING TECHNOLOGY
2700 Maxwell Way, P.O. Box 2529,
Fairfield, CA 94533-0252

In a strategic alliance with Viratec Thin Films, manufacturers of high-capacity in-line vacuum systems that sputter thin films directly onto CRTs. These include an extensive range of anti-reflective, electrostatic shielding (ARES) coatings including Optium™ thin films. Richard E. Keough, Sls. & Mktg. Mgr., Optical 707/423-2100, fax: 707/425-6071 e-mail: glass.sales@ct.boc.com www.boc.com/vacuum/coating

BOC EDWARDS VACUUM TECHNOLOGY
301 Ballardvale St., Wilmington, MA 01887

Manufacturers of high-vacuum equipment for the display industry, include mechanical pumps, oil-free pumps, turbomolecular pumps, instrumentation, valves, coupling components, and the Auto306 thin film deposition systems. 1-800-848-9800, fax: 978/658-7969 e-mail: info@edwards.boc.com www.bocedwards.com

BOLAND COMMUNICATIONS, P.O. Box
4728, Mission Viejo, CA 92690-4728

Manufacturers of a full line of active-matrix TFT-LCD monitors, from 2 to 20 in., for computer, professional video, or both. Applications include audio-visual, aircraft, and broadcast film production. Kjarla Pearl, Sls. Mgr. 714/367-9911, 1-800-918-9090 fax: 714/367-9944 www.bolandcom.com

BORER CHEMIE AG, Gewerbestrasse 13,
Zuchwil, Solothurn CH-4528, Switzerland

Manufacturers of high-performance aqueous cleaning concentrates for all manufacturing phases of LCD production. ISO 9001 certified. René Gasser, Mktg. Dir. +41-(0)32-686-56-00, fax: +41-(0)32-686-56-90

BREault RESEARCH ORGANIZATION,
INC., 6400 E. Grant Rd., Ste. 350, Tucson,
AZ 85715

Developers of illumination software for backlight displays, complex dichroics for projectors, as well as polarization and scattering effects. ASAP evaluates photometric performance anywhere in the

model. Bi-directional CAD translator and IGES import/export utility.

Kathleen Perkins, V.P. Sls. & Mktg. 520/721-0500, 1-800-882-5085 fax: 520/721-9630 e-mail: info@breault.com www.breault.com

BREWER SCIENCE, INC., 2401 Brewer
Dr., Rolla, MO 65401

Manufacturers of materials for flat-panel-display color filters. Products include color resins, color filters on glass, Nissan alignment layers and hard coats. Additional services include custom coating and resin formulation. Melinda Cochran, Customer Svc. Mgr. 573/364-0300, fax: 573/368-3318 e-mail: omdcustserv@brewerscience.com www.brewerscience.com

BRIMAR, INC., 25358 Avenue Stanford,
Valencia, CA 91355-1214

Development, manufacture, sales, and support of high-performance CRTs and drive electronics for defense, commercial, and leisure applications. Iwan Dodd, Pres. & CEO 661/295-5770, fax: 661/295-5087 e-mail: brimarinc@compuserve.com

BRIMAR LTD., Greenside Way, Middleton,
Manchester M24 1SN, U.K.

Manufacturers of high-performance special-purpose CRTs for defense, commercial, and leisure applications. David P. Eldridge, Sls. & Mktg. Dir. +44 161-681-7072, fax: +44 161-682-3818 e-mail: 101513,2341@compuserve.com

BRITEVIEW TECHNOLOGIES, INC.

1810 Eber Rd., Unit C, Holland, OH 43528
Manufacturers of flat-collimator-based backlighting systems, including a highly collimated backlighting system, an extremely high-brightness backlighting system using stacked light-pipe technology, and a dual-mode (day/night vision) backlighting system. Chen-Yu Tai, Pres. 419/868-7290, fax: 419/868-7291

BROOKS AUTOMATION, INC.,
15 Elizabeth Dr., Chelmsford, MA 01824

Manufacturers of cluster-tool platforms and other automation products that increase FPD production yields and decrease defects. James T. Jensen, FPD Prod. Mgr. 508/262-2430 fax: 508/262-2500

BURLE INDUSTRIES, INC., Security and
Tube Products, 1000 New Holland Ave.,
Lancaster, PA 17601-5688

Manufacturers of CCD cameras, alarm products, surveillance kits, monitors, video recorders, lenses, pan/tilts, scanners, indoor/outdoor housings, mounts, video switchers, video signal equipment, gates and turnstiles. Tubes, including power, photomultiplier, image, and display products. Security: Rob Drob, Mgr. Sales 717/295-6123, 1-800-326-3270 fax: 717/295-6097 Tube: Luis Vera, Mgr. Tube Prod. Sls. 717/295-6031, 1-800-366-2875 fax: 717/295-6096

CALCOMP INC., P.O. Box 3250, Anaheim,
CA 92803

Manufacturers of graphics subsystems that include boards and terminals using both raster-scan and vector-refresh technol-

ogies; computer graphics products include digitizers, plotters, and plotter/printers. Debbie Corwin, Adv. Mgr. 714/821-2142, 1-800-CALCOMP, fax: 714/821-2901

CALSPAN SRL, 2800 Indian Ripple Rd.,
Dayton, OH 45440

Manufacturers of a line of ruggedized/militarized avionics displays. Producers of avionics graphics processors for symbology generation and video mixing. Day/night HMDs for special mission applications. Steve Nelson, Dir. Bus. Dev. 513/427-7364, fax: 513/427-7459

CAM GRAPHICS CO., INC., 15 Ranick Dr.
W., Amityville, NY 11701

Manufacturers of state-of-the-art custom-designed membrane switches, value-added membrane switches, resistive analog and digital touch-view screens, front panels, and overlays. All touch screens can be customized to work with many FPDs including LED, LCD, EL and CRT displays. Manny Cardinale, Pres. 516/842-3200, fax: 516/842-1005

CANADIAN MARCONI, Avionics Div.,
415 Legget Dr., P.O. Box 13330, Kanata,
Ontario, Canada K2K 2B2

Manufacturers/integrators of avionics products including control display units and multifunction display systems using thin-film EL displays, color CRT displays, and segmented LCDs. Display systems using active-matrix LCDs are available. Al Lecher, Mktg. Mgr. 613/592-7454, fax: 613/592-7427

CANDESANT TECHNOLOGIES,

6580 Via Del Oro, San Jose, CA 95119
Manufacturers of thin CRTs, a new class of flat-panel display that delivers full-motion true-color video-image quality in a low-power low-cost FPD, viewable in bright ambient light and from any viewing angle. It features instant turn-on from -20° to +70°C. Stewart Hough, Mktg. Mgr. 408/360-2658, fax: 408/229-0664

CANDO CORPORATION, 3rd Fl. #8, Li-
Hsin Rd., Hsin-chu Science Industrial Park,
Hsin-chu, Taiwan, R.O.C.

Manufacturers of ITO glass and color filters. Harry Ling, Gen. Mgr. +886-3-579-7420, fax: +886-3-579-7462 e-mail: comdolin@ms23.hinet.net

CANON, INC., 30-2, Shimomaruko
3-Chome, Ohta-ku, Tokyo 146, Japan

Manufacturers of cameras, videos, copiers, facsimile machines, word processors, desktop publishing systems, printers (LBP, BJ), ferroelectric LCDs, medical equipment, and semiconductor production equipment, including LCD production equipment. Kazuo Minoura, Gen. Mgr. +81-3-5482-8117, fax: +81-3-5482-5145

CANON U.S.A., INC., 3200 Regent Blvd.,
Irving, TX 75063

Manufacturers of the MPA-5000 mask aligner that can expose nine 12.1-in. LCD panels on an 830 x 650-mm substrate without stitching. It features a high-throughput all-reflective step-and-scan optical system with a resolution of 3 µm and overlay accuracy of 3σ ≤ 1.0 µm. Phillip M. Ware, Dir. Tech. Mktg., Semiconductor Equip. Div. 972/830-9696 x2800, fax: 972/556-1620

CAPETRONIC COMPUTER USA,
140 Knowles Dr., Los Gatos, CA 95030

OEM supplier of displays. Products include 14-21 in., FS, Trinitron, conventional radius, or flat panel; microcontroller, multiscanning, or fixed-frequency displays. Products address PC, workstation, x-windows, terminal, and multimedia markets. Richard Maslana 408/364-2222, fax: 408/364-0395

GARDION ELECTRONICS, Long Island
Expwy., Woodbury, NY 11797

Manufacturers of air-traffic-control indicators, shipboard radar graphics indicators, shipboard indicators, miniature airborne TV cameras, solid-state digital scan converters, BRANDS, air-traffic-control display systems, and high-resolution circunmilitarized monochrome and color CRT displays. Francis Garella, V.P. Bus. Dev. 516/921-7300, fax: 516/921-7330

CARROLL CONSULTING CO., 20930
Panorama Dr., Los Gatos, CA 95030

Consulting and design services for all types of CRT monitors and video systems, especially high-resolution color multisync. Maintains a fully-equipped laboratory for accomplishing turnkey new product development projects, including fabrication of prototypes. Gus Carroll, Pres. 408/353-5114, fax: 408/353-1203

CARROLL TOUCH, 2800 Oakmont Dr.,
Pflugerville, TX 78660

Manufacturers of infrared touch systems offering durability, high optical clarity, and the ability to use any stylus. Infrared is also the only technology that is easily integrated onto 42-in. gas plasma displays. Mike O'Brien, Inside Sls. Supervisor 512/388-5678, 1-800-386-8241 fax: 512/244-7040

CASIO LCD SALES (Div. of Kanematsu
USA, Inc.), 543 W. Algonquin Rd., Arlington
Hts., IL 60005

Manufacturers of LCDs/modules; passive- and active-matrix monochrome and color TFTs. Standard product offerings range from small character displays to large graphic modules. Technologies include chip-on-glass, plastic-film LCDs, thin backlighting, and touch-panel integration. David Ross, Natl. Sls. Mgr. 708/981-5621, fax: 708/981-6764

CATON CONNECTOR CORP., 26 Wapping
Rd., Kingston, MA 02364

Manufacturers of high-voltage connectors and cable assemblies for operation up to 60 kV. Single- and multi-conductor configurations. Standard designs are stocked, while custom designs are dependent on complexity. James Tantillo, Sls. Mgr. 617/585-4315, fax: 617/585-2973

CELCO (CONSTANTINE ENGINEERING
LABORATORIES CO.), 70 Constantine Dr.,
Mahwah, NJ 07430

Combined product lines of CELCO and DISCOM high-performance deflection yokes, focus coils, astigmatism, and pincushion correctors for military, medical and industrial precision CRT displays. Applications include flight simulators, medical monitors, and cockpit/HUD displays. Art Weirgin, Sls. Engr. 201/327-1123, fax: 201/327-7047 e-mail: info@celco-nj.com www.celco.com

CELCO (CONSTANTINE ENGINEERING LABORATORIES CO.), Pacific Division, 10291A Trademark St., Rancho Cucamonga, CA 91730

Manufacturers of the Extreme "Nitro" and "MPX" series of digital color film recorders for the motion-picture industry. Precision CRT systems for simulation, scanning, and recording applications. A wide range of X-Y deflection amplifiers, video amplifiers, and distortion correctors.
Jim Darby, Sls. Mgr.
909/481-4648, fax: 909/481-6899
E-mail: jim@celco.com
www.celco.com

CENTRAL RESEARCH LABORATORIES (CRL), Dawley Rd., Hayes, Middlesex, UB3 1HH, U.K.

Manufacturers of state-of-the-art miniature displays to high-speed shutters. Liquid Sun range of miniature displays/modulators use transmissive TFT active-matrix polysilicon technology. Applications include integration into projection and viewing systems for use in holography, imaging, HUD, HMD, and optical systems.
Ms. Ruppel Joshi, Mktg. Mgr.
+44-181-848-6421, fax: +44-181-848-6653
e-mail: rjoshi@crl.co.uk
www.crl.co.uk

CERONIX, INC., 12265 Locksley Lane, Auburn, CA 95602-2055

Manufacturers of color video display monitors for the gaming, bowling, and medical markets. Product line includes CGA to SVGA and 9—27 in. monitors.
Don Whitaker, Principal
530/888-1044, fax: 530/888-1065
e-mail: don@ceronix.com
www.ceronix.com

CFM TECHNOLOGIES, INC., 1336 Enterprise Dr., West Chester, PA 19380

Manufacturers of the FPD Full-Flow™ system that executes cleaning, etching, stripping, and drying of various-sized FPDs. The patented Direct-Displace™ processing and drying method uses a totally enclosed processing vessel for high performance.
Peter Hauser, V.P., FPD Equipment
610/696-8300, fax: 610/696-8309

CHERRY ELECTRICAL PRODUCTS, 3600 Sunset Ave., Waukegan, IL 60087

Manufacturers of segmented bargraphs and dot-matrix dc plasma displays and display systems. PLASMA DOT™ display systems offered with high-voltage drivers, dc-dc converters, and display refresh controllers with parallel and serial interface. Also, keyboards, switches, and automotive products.
Brad Taylor, Product Mktg. Mgr.
708/360-3434, fax: 708/360-3566

CHIEF MANUFACTURING, INC., 14310 Ewing Ave. S., Burnsville, MN 55306

Manufacturers of a complete line of electric and stationary ceiling mounts for LCD, DLP, and data projectors, plasma display support systems, electric furniture lifts, equipment lift mechanisms, and slide projector stands.
Jodi Volker, Sr. Sls. Rep.
612/894-6280, 1-800-582-6480
fax: 1-877-894-6918
e-mail: chief@chiefmfg.com
www.chiefmfg.com

CHIPS AND TECHNOLOGIES, INC., 2950 Zanker Rd., San Jose, CA 95134

Manufacturers of flat-panel graphics/video accelerators for portable display systems.

The HiQVideo™ family provides high-performance graphics, full-motion video, and other advanced display capabilities. New products include the HiQVideo 69000, incorporating 2 MB of proprietary synchronous DRAM.
Mike Endris, Dir. Distribution Sls.
408/434-0600, fax: 408/894-2085
www.chips.com

CHIP SUPPLY, INC., 7725 N. Orange Blossom Trail, Orlando, FL 32810

Providers of a single-source solution for display driver ICs including tape carrier package (TCP) design assembly and test. Drivers from Vivid Semiconductor, TI, Motorola, Superflex, SMOS, National Semiconductor, and more.
Deanne Frye, Sls. Rep.
407/296-5606, fax: 407/290-0164
e-mail: dfrye@chipsupply.com
www.chipsupply.com

CHOMERICS (Division of Parker Hannifin Corp.), 77 Dragon Ct., Woburn, MA 01888

Manufacturers of a wide selection of performance-tested glass and plastic windows for visual displays requiring EMI radiation or susceptibility shielding. Windows have been designed into commercial and military equipment to provide highly effective electromagnetic shielding while providing exceptional optical clarity and image resolution.
Joe Butler, Mktg. Mgr.
781/935-4850, fax: 781/933-4318
e-mail: mailbox@chomerics.com
www.chomerics.com

CHROMA ATE, INC., 43 Wu-Chuan Rd., Wu-Ku Industrial Park, Wu-Ku, Taipei Hsien, Taiwan, R.O.C.

Manufacturers of programmable video pattern generators for monitor and LCD testing; CRT color analyzers; and monitor auto-alignment systems.
Jack Hsu, Mktg. Mgr.
+886-2-2983855, fax: +886-2-2983596

CID Technologies, Inc., 101 Commerce Blvd., Liverpool, NY 13088

Manufacturers of a complete line of charge injection device (CID) cameras for use in demanding applications. All cameras are inherently UV through NIR (185-1100 nm), radiation-hardened, and anti-blooming.
Tony Chapman, Tech. Mktg. Mgr.
315/451-9410, 1-800-888-8761
fax: 315/451-9421
www.cidtec.com

CIRCON ACMI CORP., 460 Ward Dr., Santa Barbara, CA 93111

Manufacturers of the Endo Video-V™ CCD camera. Featuring over 400 lines of horizontal resolution, this camera is ideal for all endoscopy applications.
David Calvin, Mktg. Mgr.
805/967-0404

CIRRUS LOGIC, INC., 1463 Centre Pointe Dr., Milpitas, CA 95035

Manufacturers of graphics controller semiconductors for CRT and LCD displays, providing full VGA (including mode 13), EGA, CGA, MDA and HGC computability.
William Caparelli
408/945-8300, fax: 408/263-5682

CITRONIX, INC., 5342 Halsted Ave., Carmichael, CA 95608

Designers/manufacturers of magnetic deflection amplifiers for CRT projection systems. Deflection amplifiers are linear

feedback type used for calligraphic and raster-mode applications.
Alfred Pletz, V.P.
916/489-9858, fax: 916/481-0288
e-mail: citronix@aol.com

CLARIANT CORPORATION, AZ Electronic Materials, 70 Meister Ave., Somerville, NJ 08876

Manufacturers of photoresists, developers, and ancillary chemicals for imaging of flat-panel displays. The TFP-600 series photoresist is for spin coat/extrusion coat, and the RFP-210K series is for roller coat.
Andy Romano, Product Mgr.
908/595-3856, 1-800-259-9160 x3856
fax: 908/429-3631
e-mail: andrew.romano@clariant.com
www.azresist.com

CLARITY VISUAL SYSTEMS, INC., 9025 S.W. Hillman Ct., #3122, Wilsonville, OR 97070

Manufacturers of large-screen digital display systems for retail, entertainment, and business applications. Product lines include the Videowall, VideoBanner®, SignPost™, and Just Add Pictures™ series. Display technologies include LCD and DLP™ rear-projection and gas plasma.
Kevin C. Cornelius, V.P. Sls. & Mktg.
503/570-0700, fax: 503/682-9441
e-mail: kccclarity@aol.com
www.clarityvisual.com

CLINTON ELECTRONICS CORP., Cathode-Ray Tubes, 6701 Clinton Rd., Loves Park, IL 61111-3895

Manufacturers of 3—24-in. high-resolution monochrome CRTs for display, medical, and photographic applications. Projection CRTs for commercial applications. Extensive selection of phosphors and anti-glare treatments for customizing optical performance.
David Salomone, Dir. Sls. & Mktg.
815/633-1444, fax: 815/633-8712
e-mail: cecdisplays@compuserve.com
www.cec-displays.com

CLINTON ELECTRONICS CORP., Contract Assembly Div., 6701 Clinton Rd., Loves Park, IL 61111-3895

Consignment to build full turnkey color and monochrome CRT and flat-panel products. Design service and follow-through engineering support, including agency packaging and direct-to-customer distribution.
David Salomone, Dir. Sls. & Mktg.
815/633-1444, fax: 815/633-8712
e-mail: cecdisplays@compuserve.com
www.cec-displays.com

CLINTON ELECTRONICS CORP., Monitor Div., 6701 Clinton Rd., Loves Park, IL 61111-3895

Design center for advanced displays at our Owin Associates subsidiary, complementing the design and manufacturing of medical and commercial displays at Clinton. Full-featured digital control and multi-frequency operation product line from 1 to 5 megapixels.
David Salomone, Dir. Sls. & Mktg.
815/633-1444, fax: 815/633-8712
e-mail: cecdisplays@compuserve.com
www.cec-displays.com

CLOVER DISPLAY, LTD., 166 Wai Yip St., 9/F, Kwun Tong, Hong Kong 5AR, China
Manufacturers of LCD panels and modules for both custom design or standard applications.
Clara Leung, Sls. & Mktg. Mgr.
+852-276-33-181, fax: +852-235-74-237
e-mail: cldsale1@cloverlcd.com
www.cloverlcd.com

COLORADO MICRODISPLAY (CMD), INC., 80301 2477 55th St., Ste. 201, Boulder, CO

Providers of a variety of chipset solutions. One, the SVGA microdisplay, features 800 × 600 resolution, a refresh rate of 75—90 Hz (per color), 24-bit color depth, and low power (<45 mW power). The microdisplay is fabricated using CMD's DNLCOSS technology and supports a full range of content from text to full-motion video, enabling applications in mobile computing, entertainment, medical, and industrial devices.
Rainer Kuhn, Dir. Product Mktg.
303/546-9700, 1-888-456-4742
fax: 303/546-9800
e-mail: rkuhn@comicro.com
www.comicro.com

COLORADO VIDEO, INC., 6235 Lookout Rd., Ste. G, Boulder, CO 80301

Manufacturers of a line of specialized video instruments, including test and measurement, image analysis, unique frame stores, and slow-scan TV communications equipment.
Larry McClelland, Pres.
303/530-9580, fax: 303/530-9569

COLORLINK, INC., 2425 55th St., Ste. 250, Boulder, CO 80301

Manufacturers of color-separation components for projection-display systems. Products include the ColorSwitch™, a no-noise solid-state alternative to conventional color wheels. Additional patented technology is used to colorize a variety of non-sequential display products.
Leo Bannon, V.P. Bus. Dev.
303/545-5843, fax: 303/545-5802
e-mail: colorlink@colorlink.com
www.colorlink.com

COLOR TECHNOLOGY SOLUTIONS, 2894 NW 127th Ave., Suite 101, Portland, OR 97229

Consulting services in color technology and applications for electronic imaging systems, color displays, television/video, multimedia, printing, instrumentation, and color-management systems. Technology/product evaluations, benchmarking, application of color standards, market research, and color quality assurance.
Joann M. Taylor, Pres. & Chief Consultant
503/645-5129, fax: 503/645-5129

COMFUTURE LTD., 7 Habonim St., Ramat Gan, Israel 25251

Manufacturers of alphanumeric or graphic displays and sunlight-visible color graphic displays, with animation of 24 frames/second. All products driven by PC compatibles.
Elion Ginsburg, CEO
+972-3-751-0940, fax: +972-3-752-2935

COMMUNICATIONS SPECIALTIES, INC., 55 Cabot Ct., Hauppauge, NY 11788

Manufacturers of the Scan Do® family of scan converters, including Scan Do Pro/D which converts high-resolution computer video to serial digital video. The Deuce™

video scaler, distribution amplifiers, and fiber-optic transmission.
Paul Seiden, Dir. Sls.
516/273-0404, fax: 516/273-1638
e-mail: info@commspecial.com
www.commspecial.com

COMPUTER DYNAMICS, 7640 Pelham Rd., Greenville, SC 29615
Manufacturers of a broad line of complete flat-panel display systems and flat-panel CRT replacements, both with optional touch screens and enclosures for OEM and end-user operator interface applications.
864/627-8800, fax: 864/675-0106
www.cdynamics.com

COMPUTER KEYBOARD SYSTEMS, 3250 Ocean Park Blvd., Ste. 370 Santa Monica, CA 90405
Manufacturers of standard and custom sealed keyboard systems, illuminated, stainless-steel, and rack-mounted keyboards, and individual trackpads and tracker balls. Full line of 42, 96, 128, and 168 key configurations.
Laura Lim, Mktg. Commun.
310/664-9272, fax: 310/664-1072

COMPUTER PERIPHERALS, INC., 667 Rancho Conejo Blvd., Newbury Park, CA 91320
Manufacturers of font cartridges and expandable memory for the HP LaserJet printer and enhancement board products for IBMs, PC/XT/AT/XT286/PS2, and true compatibles.
Susan Humpting, Mgr. Inside Sls.
805/499-5751, 1-800-854-7600
fax: 805/498-8848

CONRAC DISPLAY PRODUCTS, INC., 1724 S. Mountain Ave., Duarte, CA 91010-2746
Manufacturers of color and monochrome monitors for computer graphics, process control, medical, broadcast, ruggedized products for hostile environments, simulator systems, and other custom applications.
Monitor screen sizes range from 9 to 27 in.
Ali Hussein, Dir. Mktg. & Sls.
818/303-0095, fax: 818/303-5484

CONSILIUM, INC., 485 Clyde Ave., Mountain View, CA 94043
Provider of automated factory control software and services to the electronics and semiconductor industries with its WorkStream DFS product family.
Daniel Latrimurti, FPD Mktg. Mgr.
505/899-5016, 1-800-745-5745
fax: 650/691-6130
www.consilium.com

CONSTELLATION, P.O. Box 117, West Olive, MI 49460
Consultancy specializing in the design, installation, and turn-on of high-volume LCD and FPD production lines, including TN, STN, active-matrix, and PBCT. Upgrading of existing production lines available. Specialist in ITO deposition.
Jerry Garies, Managing Dir.
616/786-9988, fax: 616/786-9160

CONTEC CAE, 2188 Bering Dr., San Jose, CA 95131
Providers of a software system which can be used as a tool to facilitate the design and optimization of flat-panel displays using AMLCD technology. The system provides tools for simulation and

modeling of all the components of the electronic modules in an FPD.
Fred Balistreri, Sls. Mgr.
408/434-6767 x120, 1-800-888-8884
fax: 408/434-6884

CONVAC-APT, 24 Third Ave., Burlington, MA 01803
Manufacturers of photolithographic process equipment for the automatic processing of large glass substrates 200 x 200 mm (8 x 8 in.) up to 400 x 400 mm (16 x 16 in.).
Mark Mason, Dir., Eastern Reg.
617/229-7772, 1-800-622-8060
fax: 617/272-8079

CORECO, INC., 6969 Trans Canada Hwy., Ste. 113, St. Laurent, Quebec, Canada H4T 1V8
Designers/manufacturers of board level frame grabbers and digitizers compatible with the IBM PC bus taking any video input for vision related applications, including machine vision, robotics, factory automation, scientific, medical, security and desktop publishing.
Patrick Urbain
514/333-1301, 1-800-361-4914
fax: 514/333-1388

CORNERSTONE IMAGING, INC., 1990 Concourse Dr., San Jose, CA 95131
Designers/manufacturers of large-screen high-resolution (1600 x 1280) display controllers and subsystems for PC/AT and microchannel architecture, specifically for document image processing and publishing applications.
Ken Westrick, V.P. Sls.
408/435-8900, fax: 408/435-8998

CORNING ASAHI VIDEO PRODUCTS, 2 East Denisen Parkway, Corning, NY 14831
Manufacturers of a complete line of CRT panels, funnels, bulbs, and TV glass components.
Alan G. Herklotz,
607/974-7791, fax: 607/974-7731

CORNING INCORPORATED, Advanced Display Products, MP VX-1-3, Corning, NY 14831
Manufacturers of 7059F and 1737F glass substrates for advanced technology flat-panel displays.
Ben J. Garbowski, Mgr./N.A. Sls.
607/974-4308, fax: 607/974-7097

CORYPHAEUS SOFTWARE, INC., 985 University Ave., Ste. 31, Los Gatos, CA 95030
Software developers of a comprehensive line of real-time visual-simulation products, including Designer's Workbench™ (DWB), a 3D modeling and editing environment; Easy™, a terrain-creation system; and EasyScene™, a real-time scene-display system.
Bill Oliver, Dir. Sls./Mktg.
408/395-4537, fax: 408/395-6351

COVID, INC., 1725 W. 17th St., Tempe, AZ 85281
Manufacturers of high-resolution 100-MHz computer-video interfaces, distribution amplifiers, switches, and umbilical cables. Interfaces link PCs, terminals, and graphics workstations to RGB data projectors and monitors for viewing on large displays.
Suzanne Jones
602/966-2221, 1-800-638-6104
fax: 602/966-6728

CPFILMS, INC. (formerly Courtauld Performance Films), 21034 Osborne St., Canoga Park CA 91304
Operators of two manufacturing sites that produce vacuum sputter coated films for use in membrane switches, touch panels, pen pads, anti-reflective screens, and backlighting of displays. Both sites are ISO 9001 certified.
Bunny R. Buckley, Sls. Mgr.
818/882-5744, fax: 818/882-6519

CPFILMS, INC. (formerly Courtauld Performance Films), SR 683/Whitby Acres, Fieldale, VA 24089
Manufacturers of specialty sputter-coated film products and developers of deep dyeing film technology. Incorporates hardcoats, optical adhesives, silicon release, etc., onto a variety of film products. ISO 9001 certified, and offers sales and technical support worldwide.
Skip Cox, New Bus. Dev.
540/627-3526, 1-800-746-8661
fax: 540/627-3539
e-mail: indprods@cpfilms.com
www.cplindusprod.com

CRAFT DATA, INC., 27022 Cordero La., Mission Viejo, CA 92691
Value-added distributor for Planar and Panasonic. Distributor for Casio LCD. Manufacturer of CD650 controller for flat-panel displays. Modules assembled with/without touch panels to customer specifications.
Fred W. Holstein, Jr., Pres.
714/582-8284, fax: 714/248-2390

CRAFT DATA LTD, 92 Broad St., Chesham, Buckinghamshire, HP5 3ED, U.K.
Distributors of monochrome and graphic LCDs with a custom design service; TFT and DSTN color LCDs in sizes from 1.8 to 18.1 in., terminals. Also, touch systems to match most current displays, thermal printheads, mechanisms, and standalone printers.
David J. Tagg, Sls. Mgr.
+44-(0)-1494-778-235,
fax: +44-(0)-1494-773-645
e-mail: craftdata-ltd@compuserve.com
www.ourworld.compuserve.com/homepages/craftdata-ltd

CREW SYSTEM ERGONOMICS INFORMATION ANALYSIS CENTER, AL/CFH/CSEIRIAC, 2255 H Street, Bldg. 248, Wright-Patterson AFB, OH 45433-7022
Information and technology distributor of a variety of products and services to help incorporate ergonomic principles in the design and development of visual display systems. Provides technical summary and analysis support for human-factors-related inquiries.
Kathy Reineke, Sls. Mgr.
513/255-4842

CR TECHNOLOGY, INC., 27752 El Lazo Rd., Laguna Niguel, CA 92672
Manufacturers of real-time x-ray and automated PCB inspection systems. The RTI-6500 is an automated PCB inspection system that verifies component presence, correct part, orientation, polarity, and solder defects. The x-ray system offers high-resolution inspection for PCBs and components. The XRV combo system

integrates both systems into one.
Don Miller, V.P., Sls.
949/448-0443, fax: 949/448-0445
e-mail: sales.crtech@crtechnology.com
www.crtechnology.com

CRT INTERNATIONAL CORP., 429 N Street S.W., #S-106, Washington, DC 20024
Distributors of CRTs for photorecording, special-application CRTs, e-guns, and various flat-panel displays.
Boris L. Chervinsky, Pres.
202/863-0539, fax: 202/863-0539

CRT SCIENTIFIC CORP., 14746 Rayermer St., Van Nuys, CA 91405
Manufacturers of a wide range of monochrome CRTs from 0.5 in. to 25V.
Ken Keller, Pres.
818/989-4510, fax: 818/989-4617

CRYSTALOID, 5282 Hudson Dr., Hudson, OH 44236
Manufacturers of passive LCDs for industrial, commercial, avionics, and military applications. Custom designed LCDs use TN, STN, dichroic, and touch-screen display technologies. Also, displays that use hybrid technology, such as Heilmeyer, first minima types, and reverse-contrast twisted-nematic™ (RCTN™) production runs from 100 to 100,000.
Charles E. Holland, Sls. Mgr.
330/655-2429 x240, 1-888-BEST-LCD
fax: 330/655-2176
e-mail: ce.holland@crystaloid.com
www.crystaloid.com

CRYSTAL VISION, INC., P.O. Box 3960, Rolling Hills Est., CA 90274
Manufacturers of video LCD controller board that digitizes real-time "video-in-a-window" (NTSC, PAL, SECAM, or S-Video). Such a 32,768 color video is overlaid with VGA graphics and displayed on two AMTFT color LCD panels and a VGA CRT simultaneously.
Richard Hopkins, Engrg. Mgr.
310/316-1770

CRYSTAL VISION SOLUTIONS, 1954 Placentia Ave., Ste. 205, Costa Mesa, CA 92627
Distributors of products for space-constrained and rugged applications including the Falcon, a Pentium workstation with integrated 12.1-in. LCD touch screen, compact computers, LCDs from 10.4 to 20 in., and high bright (500-1200 nits) backlight systems.
Chad Hendricks, V.P. Mktg.
714/642-4800, fax: 714/642-4865
www.crystalvisions.com

CRYSTOP DISPLAY GmbH, Hansastrasse 29 C, D-7500 Karlsruhe 21, Germany
Manufacturers of LCD modules and systems; pattern-recognition systems for automatic test of LCDs and systems. Development and prototyping.
Werner Pauls
+49-721-579-048, fax: +49-721-50-1116

CTP COIL, LTD., 200 Bath Rd., Slough, Berks, U.K. SL1 4DW
Custom designers of optical injection moulded plastic components that includes LCDs, keypads, instrumentation backlights and lightguides. Also, hard-coated display windows, IR data link lenses, and diffractive/refractive hybrid elements. Performance optimized by advanced

simulation software and moulded using precision optics.
Martin Forder, Bus. Mgr.-Telecoms
+44-1753-575-011, fax: +44-1753-811-359
e-mail: martin.forder@coil.co.uk

CTX OPTO-ELECTRONICS CORP., 3F,
No. 22 Industry E. Rd. 9, Science-Based
Industrial Park, Hsinchu, Taiwan 300,
R.O.C.

Manufacturers of passive- and active-
matrix LCD monitors, custom-made LCD
backlights, and LCD projection panels.
Wilson Chan, Dir.
+886-35-772-000, fax: +886-35-772-530

CTX OPTO, INC., 1178 Bordeaux Dr.,
Suite B, Sunnyvale, CA 94089

Manufacturers of LCD products including
portable image projectors and space-saving
flat-panel-display monitors.

Sean Liu, Sls. Mgr.
408/541-6060, 1-888-289-6786
fax: 408/541-6068
www.ctxopto.com

CYBEQ, 150 Independence Dr., Menlo
Park, CA 94025

Manufacturers of flat-panel-display
robotic handler.

Ali Darvish
415/688-8921, fax: 415/326-2446

CYBERTOUCH, 853 Lawrence Dr.,
Newbury Park, CA 91320

Designers/manufacturers of resistive
touch screens. Over 50 standard sizes for
digital, analog, and LCD panels.
Abraham Gohari
805/499-5000
e-mail: sales@cybertouchusa.com
www.cybertouchusa.com

DABURN ELECTRONICS & CABLE
CORP., 224 Pegasus Ave., Northvale,
NJ 07647

Manufacturers of electronic wire cable
and insulating tubing and sleeving,
including heat shrinking and cold shrinking
tape. Specializing in miniature ultra-flexible
wire and cable and high-voltage wire. Stock
many uncommon constructions.
Howard Danziger, Pres.
201/768-5400, fax: 201/768-9642
e-mail: daburn@daburn.com
www.daburn.com/~daburn/

DAGE-MTI, INC., 701 N. Roeske Ave.,
Michigan City, IN 46360

Manufacturers of high-performance
high-resolution b/w CCTV cameras and
monitors.
Paul Thomas, V.P. Sls./Mktg.
219/872-5514, fax: 219/872-5559

DAINIPPON INK & CHEMICALS, INC.,
Imaging and Reprographic Products Div.,
7-20, Nihonbashi 3 chome, Chuo-ku, Tokyo
102, Japan

Manufacturers of a variety of LC materi-
als for LCDs and related products such
as sealants and color filters.
T. Takahashi, Gen. Mgr.
+81-3-272-4511, fax: +81-3-272-1565

DAKTRONICS, INC., 331 32nd Ave.,
Brookings, SD 57006

Designers/manufacturers of computer-
programmable display systems. Offering
LED, incandescent, and reflective displays
for indoor and outdoor use. LED products
include ProStar™, VideoPlus, Galaxy™,
full-matrix, and DataTrac™ character-based
display technologies for broadcasting

messages to a wide viewing audience.

Pete Egart, Industrial Mkt. Mgr.
605/697-4467, 1-800-558-9526
fax: 605/697-4700
e-mail: sales@daktronics.com
www.daktronics.com

DALE ELECTRONICS, INC., 1122 23rd St.,
Columbus, NE 68601

Manufacturers of resistive products along
with plasma display panels and touch
screens. Products are ISO-9000 certified
for use in all display applications, including
industrial controllers, medical equipment,
aviation (including GPS), and gaming and
redemption equipment. Custom plasma or
touch-panel engineering support will adapt
technology to a wide range of applications.
Neal J. Kratochvil, Sls. Appl. Engr.
402/563-6308, fax: 402/563-6418

DALIM COMPUTER GRAPHIC SYSTEME
GmbH, Daimler - Str. 2, 7640 Keh-
l-Suntheim, Germany

Manufacturers of the Dalim Litho which
is both a graphic creation system as well
as a comprehensive retouching and image-
compositing system. Dalim Litho is targeted
specifically at repro houses, photolabora-
tories, and the packaging industry (i.e.,
all companies involved with the pre-press
production cycle.

Winard Suffrian
+49-7851-4021, fax: +49-7851-7737

DA-LITE SCREEN CO., INC., 3100 N.
Detroit St., Warsaw, IN 46580

Manufacturers of presentation products
including front- and rear-projection screens,
overhead projectors, communication
cabinets, lecterns, computer furniture,
easels, projection carts, stands, and
monitor mounts.

Blake Brubaker, Dir. Mktg.
219/267-8101, 1-800-622-3737
fax: 219/267-7804
e-mail: bbrubaker@da-lite.com
www.da-lite.com

DANA ENTERPRISES INTERNATIONAL,
INC., 1440 S. De Anza Blvd., San Jose, CA
95129

Distributors of polarizers manufactured by
Sanritz, Fujioka-City, Japan; spacers for
LCDs, manufactured by Sekisui Chemical,
Osaka, Japan; and equipment for LCD
manufacturing exported by Com-Tech Ltd.,
Tokyo, Japan. Offering precision polarizer
die-cutting services — no tooling needed.
David Nakamura, Pres.
408/257-6686, fax: 408/973-9620

DARK FIELD TECHNOLOGIES, INC.
110 Richards Ave., Ste. 100,
Norwalk, CT 06854

Manufacturers of laser-scanning and
CCD vision systems for 100% on-line real-
time automatic inspection of continuous
webs or sheets for visual defects. Systems
generate "windows" into manufacturing
processes to detect defects such as
scratches, coating voids, streaks,
contaminants, etc.

Timothy A. Potts, Pres.
203/853-2035, fax: 203/853-2350
e-mail: darkfield@msn.com
www.darkfield.com

DATA DISPLAY PRODUCTS, 445 South
Douglas St., El Segundo, CA 90245-4630

Manufacturers of standard and custom
lamp-based LEDs for incandescent

replacement, panel-mount, LEDs, and PC
board-level indicators.

Anthony Toniolo, Dir. Mktg.
310/640-0442, 1-800-421-6815
fax: 310/640-7639
e-mail: atoniolo@dpp-leds.com
www.dpp-leds.com

DATA INTERNATIONAL, 2959 Alafaya
Trail, Suite 121, Oviedo, FL 32765

Manufacturers of both standard and
custom alphanumeric and graphics dot-
matrix LCD modules offering superb
viewability and unsurpassed contrast ratios.
Backlighting options are offered to fit most
every need.

Tarik Choudhury, CEO
407/366-7399 x25, fax: 407/366-7408
e-mail: tarik@datainternational.com
www.datainternational.com

DATA MODUL, INC., 120 Commerce Dr.,
Hauppauge, NY 11788

Manufacturers of both standard and
custom LCD character and graphic
modules in character sizes ranging from 3
to 12 mm. Offering a complete line of TFT-
LCD monitors available in diagonal sizes
from 1.8 to 20.1 in. Resolutions include
1/4-VGA, VGA, SVGA, XGA, and SXGA;
NTSC and PAL also available. Also, a
complete line of POS printers and card
readers as well as 42-in. plasma multimedia
displays.
Denise Davis, Sls. Rep.
516/951-0800, 1-877-951-0800
fax: 516/951-2121
e-mail: ddavis@datamodul.com

DATA PLUS - CALIFORNIA, 2970
Bannister Ave., Gilroy, CA 95020

Distributors of a wide range of video and
imaging products from companies such as
TEAM Systems, Graseby Optronics,
Integral Technologies, Pacifitek, In-Line,
Hitachi, Multimedia, Radiographic Digital
Imaging, and Komax Technology.
Bill Nicklin, Pres
Phone/fax 408/842-9907

DATA RAY CORP., 12300 Pecos,
Westminster, CO 80234

Designers/manufacturers of high-
performance color and monochrome CRT
displays. OEM and system-integration
applications include medical and industrial
imaging, PACS and teleradiology,
simulation, and data display. ISO 9001
certified.
Ann Woodley, Dir. Sls./Mktg.
303/451-1300, 1-800-926-5556
fax: 303/451-1143

DATA TRANSLATION, INC., 100 Locke
Dr., Marlboro, MA 01752

Manufacturers of microcomputer analog
I/O systems, image-processing products,
and array-processing boards for the IBM
PC/PS2, MicroVax II/Q-bus and Unibus,
Mac II, VMEbus, Multibus, Multibus II.
Neil Cronin, Sls. Mgr.
508/481-3700, fax: 508/481-8620

DAVALCO, 15506 Commerce La.,
Huntington Beach, CA 92649

Manufacturers of high-voltage power
supplies for HUD/INV, target acquisition,
and radar.
David Neitberger, Sls. Mgr.
714/892-7631, fax: 714/897-1949

DAVIS A/S, P.O. Box 380, Drammen 3001,
Norway

Manufacturers of LCD projection panels,
LCD data and video projectors, and LCD

monitors. The projectors are based on DLP
technology.

Jon Rortveit, V.P. Mktg.
+47-3281-9500, fax: +47-3281-8115

DBI, INC., 4103 S.E. International Way,
Milwaukie, OR 97222

Manufacturers of rugged LCD monitors
and touch screens, and 10.4- and 12.1-in.
color AMLCDs less than 1.60 in. in depth.
Also, a VT220 terminal that uses a TFT
display for under \$2000.

Bill Finch
503/654-6216, 1-888-654-4052
fax: 503/654-6486

DCI, INC., 15301 W. 109th St., Lenexa,
KS 66019

Manufacturers of custom LCD modules
and displays. Offering product design and
manufacturing. Contract electronic
assembly specializing in product
miniaturization.

Tyson Hoffman, LCD Sls. Engr.
913/782-5672, fax: 913/782-5766
e-mail: tysonh@dcincorporated.com
www.dcincorporated.com

DECISION IMAGES, INC., 196 Tamarack
Circle, Skillman, NJ 08558

Manufacturers of color resource image-
processing software for image editing and
enhancement, transforms, 3D perspective,
and multispectral classification. Supports
selective video cameras, scanners, printers,
film recorders, and image boards.

Robert Mills, Pres.
609/683-0234, fax: 609/683-4068

DEL ELECTRONICS CORP.,
1 Commerce Park, Valhalla, NY 10595

Manufacturers of custom and standard
high-voltage power supplies and
transformers for the display industry.
Jeremy Simon, Mgr. Mktg./Sls.
914/686-3600, fax: 914/686-5424

DEMPA PUBLICATIONS, INC.,
275 Madison Ave., New York, NY 10016

Publishers of trade magazines (Display
Devices, JEE, JEI, OEP, AEU, EBG,
Almanac).
Soo Sonntag, Subscription Mgr.
212/682-4755, fax: 212/682-2730

DENGLAS DIVISION OF DENTON
VACUUM, INC., 8 Springdale Rd.,
Cherry Hill, NJ 08003

Manufacturers of antireflective coatings
for antiglare screens, projection windows
and instrument windows, clear and neutral
density glass, neutral and nonabsorbing
beam splitters, color-correction filters,
and hot and cold mirrors using soda-lime
or borosilicate glass for dichroics.
F. Lee Swillinger, Gen. Mgr.
609/424-1012, fax: 609/424-5105

DENSITRON, 10430-P Pioneer Blvd., Santa
Fe Springs, CA 90670

Manufacturers of standard and custom
LCD modules and integrated VGA flat-
panel subsystems. Products include
character and graphics LCD modules with
a wide range of options. Products combine
FPDs, single-board computers, graphics
controllers, and housings.
William Grunau, President/CEO
562/941-5000, fax: 562/941-5757

DENTON VACUUM, INC., 2 Pin Oak Ave.,
Cherry Hill, NJ 08003

Manufacturers of antiglare filters for
VDTs, broadband AR coatings on clear

and absorbing glasses, dichroic filters, and beamsplitters.

James Gavlas, Oprns. Mgr.
609/424-1012, fax: 609/424-5105

DH PRINT, Technical Research Park,
Riverton, WY 82501

Manufacturers of 40-column dot-matrix printers. Also manufactures the Cypher series of demand barcode label printers.
Howard Kingbury, Mgr.
307/856-4821, fax: 307/856-0412

DIAGNOSTIC/RETRIEVAL SYSTEMS, INC., 16 Thornton Rd., Oakland, NJ 07436

Designers/manufacturers of high-speed processing and display systems for target detection and analysis with military and industrial applications. Color high-resolution raster-based systems are multifunctional and capable of processing and displaying sonar, radar, ECM, infrared, and strategic and tactical C³I data.
P. Williamson, Asst. V.P./Corp. Comm.
201/337-3800, fax: 201/337-4775/3314

DIALIGHT CORPORATION, 1913 Atlantic Ave., Manasquan, NJ 08736

Manufacturers of LED circuit-board indicators; neon, incandescent, and LED panel-mount indicators; and illuminated switches. Also, LED surface-mount solutions and secondary optics products.
Gary Baker, Mktg. Mgr.
908/223-9400, fax: 908/223-8788

DIAMOND TECH ONE, INC., 12100 Technology Dr., Austin, TX 78727

Providers of engineering and fabrication services for microelectronics packaging, FPD electronics, materials deposition, and back-end semiconductor-wafer processing, supporting an accelerating industry demand for high-performance systems requiring higher interconnect density, such as flip-chip packaging.
Michael Feeley, V.P. Sls./Mktg.
512/331-6200 fax: 512/250-2730

DICRYSTAL IMAGES, 345 Industrial Blvd., McKinney, TX 75069

Manufacturers of high-tech dichroic and special TN displays.
Ken Richardson, Pres.
214/562-3140, fax: 214/548-9890

DIGITAL PROJECTION, INC., 55 Chastain Rd., Ste. 115, Kennesaw, GA 30144

Manufacturers of POWER display projection systems for large-venue imagery. Compatible with any video, motion data, or HDTV source. POWER displays feature ultra-bright light output and high resolution for crystal-clear displays.
Lynne Smith
770/420-1350, fax: 770/420-1360
e-mail: powerinfo@digitalprojection.com
www.digitalprojection.com

DIGITAL VIEW, 20/F Kam Chung Communication Bldg., 19-21 Hennessy Rd., Wanchai, Hong Kong

Manufacturers of interface controllers for flat panels, including active- and passive-matrix LCDs, color and monochrome, for connection to analog VGA to SXGA and PC bus.
James Henry
+852-2861-3615, fax: +852-2520-2987

DIGITAL VIEW, INC., 355 Woodview Ave., Bldg. 500, Morgan Hill, CA 95037

Manufacturers of controller products for high-performance FPD requirements.

Offering a complete line of controller-kit solutions for a broad range of FPD manufacturers and panel types, ranging from VGA to SXGA resolutions. Controller and display subassembly solutions add value to all forms of industry display applications through feature- and function-rich product designs.
Jon G. Lutter, Dir.
408/782-7773, fax: 408/782-7883
www.digitalview.com

DIGITAL VISION, INC., 270 Bridge St., Dedham, MA 02026

Manufacturers of Computer Eyes full-color and b/w video digitizers for PCs. Versions are available for IBM PC, Macintosh, Apple II, Atari, and Commodore computers.
Paul Terrio
617/329-5400, fax: 617/329-6286

DIGITRAN, Division of XCEL Corp., 4290 E. Brickell St., Ontario, CA 91761

Providers of display and data-input subsystem engineering, manufacturing, and integration services. Manufacturers of custom front-panel displays, keypads, and keyboards, and digital switch products including sunlight-readable, VIS-compatible, and secure-lighting displays.
Frank Ganz, Sr. Prod. Engr.
909/391-4321, fax: 909/391-4558

DIMENSION TECHNOLOGIES, INC., 315 Mt. Read Blvd., Rochester, NY 14611

Developers/manufacturers of advanced LCD performance-enhancement technologies, i.e., autostereoscopic, high-brightness, high-definition displays. The DTI 1100C Virtual Window™ is a 3D visualization display for viewing, without glasses, 3D computer-generated and video imagery.
Jeffrey J. Tokarz, Mktg./Sls. Mgr.
716/436-3530, fax: 716/436-3280

DIS (DISPLAY INSPECTION SYSTEMS), INC., 46992 Liberty Dr., Wixom, MI 48393-3693

Manufacturers of surface-analysis and in-line inspection machines combining high throughput and high sensitivity. The BB/FP 350 and BB/FP 700 offer in-line inspection of glass substrates for flat-panel manufacturers.
Jim Morgenstern, V.P. Marketing
810/669-7314, fax: 810/669-7310

DISPLAY COMPONENTS, LTD., Island Farm Ave., Molesey, Surrey, KT8 2UR

Distributors of special CRTs for military and other monochrome monitor requirements. Wound components and PDLC windows.
Rodger Wheeler, Director
+44-181-797-7254, fax: +44-181-941-6521
e-mail: autolec@aol.uk

DISPLAYS CONSULTANTS GROUP
1736 Erringer Rd. - 106, Simi Valley, CA 93065

A small group of consultants, each with different areas of information display expertise, who also network with other experts in the industry.
Howard Grossbohn, Pres
1-800-653-9857, fax 805/526-1145
e-mail: hbhohlin@webtv.net

DISPLAY DEVICE CONSULTANTS, 6170 Plymouth Rd., Ann Arbor, MI 48105

Consulting services in display manufacturing, phosphor-screen evaluation, and CRT exposure systems. Product sales

in Hg and Xe arc lamps, fixtures, power supplies, quartz optics, UV meters, defect detection systems, STN-LCD manufacturing equipment, and LCD materials.
Robert Donofrio, Pres.
734/665-4266, 1-877-DDC-4266
fax: 734/665-4211
e-mail: donofrio@displayconsultants.com
www.displayconsultants.com

DISPLAY ENGINEERING, INC., 972 Hamilton Ave., Palo Alto, CA 94301

Engineers flat-panel displays, especially LCDs, into end products. Develops related technologies for displays such as LCD backlighting systems. Specializes in optics (including holographic technologies), mechanics, and materials for displays. Substantial international experience.
Kevin J. Hathaway
415/329-0900, fax: 415/329-0912

DISPLAY LABORATORIES, INC., 6317 Arapahoe Rd., Ste. 2-C, Boulder, CO 80303-1436

Manufacturers specializing in CRT monitors, convergence and geometry control ICs, high-voltage regulator ICs, and convergence and geometry inspection/alignment systems.
J. R. Webb, Pres.
303/938-9099, fax: 303/938-9199
e-mail: sales@displaylabs.com
www.displaylabs.com

DISPLAY PRODUCTS TECHNOLOGY LTD., 1 Langlands Court, Kelvin South Business Park, East Kilbride, G75 0YB

Specialists in the repair of LCDs. Providers of a high-volume quick-turnaround repair/analysis service. Sub-assembly and test facilities available in addition to new product and technical consultancy.
+44(0)-1-3552-39199,
fax: +44(0)-1-355241190

DISPLAY RESEARCH LABORATORIES (DRL), INC., 2051 Grant Rd., Ste. 250, Los Altos, CA 94024

Manufacturers of active-matrix vacuum fluorescent displays (AMVFD). Plans to develop microdisplays (less than 1 in.) on silicon substrates as well as larger-format displays on glass.
David Guo
650/969-3670, fax: 650/969-3769

DISPLAYS & TECHNOLOGIES (D&T), INC., P.O. Box 3501, Zip 98668-3501, 14511 N.E. 13th Ave., Vancouver, WA 98685

Manufacturers of display contrast-enhancement products; ruggedized and enhanced COTS AMLCDs, EL, and CRTs; full-backlit ruggedized and enhanced AMLCDs for military and commercial platforms; full NVIS compliance and testing.
Leon B. Ledave, Pres./Dir. Mktg.
360/574-5000, fax: 360/573-4635

DISPLAYSEARCH, 5900 Balcones Dr., Ste. 230, Austin, TX 78731

FPD market research firm providing monthly newsletters, quarterly reports, annual reports, and databases. Also provides consulting services covering all FPD technologies and markets. Products delivered in English and Japanese.
Lisa Baker, Mktg. Mgr.
512/459-3126, fax: 512/459-3127
e-mail: sales@displaysearch.com
www.displaysearch.com

DISPLAYS, INC., 87 Industrial Park Rd., Lewistown, PA 17044

Manufacturers of a wide range of custom and standard displays, including digital, alphanumeric, bargraph, and dot-matrix versions, used in audio equipment, pinball games, cash registers, operator interfaces, instruments, etc.
Kit C. Kennedy, Pres.
717/242-2541, fax: 717/248-8680

DISPLAY SYSTEMS, INC., 15 Barber Pond Rd., Bloomfield, CT 06002

Designers/manufacturers of custom LCD, LED, EL, and VF display modules. Also, controls for meters, process-variable controllers, and many types of industrial controls. Applications include security systems, medical, military, and industrial.
Richard C. McComb, Pres.
203/726-1201, fax: 203/726-1202

DISPLAYTECH, INC., 2602 Clover Basin Dr., Longmont, CO 80503

Manufacturers of high-resolution full-color microdisplays, smaller than your finger nail, that pack the imaging capability of a television or computer monitor onto a silicon chip. Three standard resolutions are available. These displays can be used to replace the display in televisions, monitors, digital cameras, camcorders, cellular phones, wearable computers, and head-mounted displays.
Anthony Artigliere, Sr. Dir. Sls.
303/772-2191, 1-800-397-8124
fax: 303/772-2193
sales@displaytech.com
www.displaytech.com

DISPLAY TECH, INC., 1731 Albion Rd., Albion, MI 49224

Manufacturers of electronic (LED) information displays, over 200 sizes available with "canned graphics," editable messages, full network capability, time scheduling, operated by keyboard or with IBM PC compatible.
Dave Bridges, Sls. Mgr.
517/629-2670, 1-800-533-3477
fax: 517/629-3098

DISPLAY TECHNOLOGIES, INC., 1355 Holmes Rd., Elgin, IL 60123

Manufacturers of 5-21-in. monochrome and color CRT monitors, and large-screen monochrome 15- and 19-in. monitors in enclosures. Also, OEM custom monitors.
Carl Cobb, West. Regional Mgr.
415/694-7411, 1-800-544-8823
fax: 415/694-7413

DISPLAY TECHNOLOGY CONSULTANT, INC., 300 Indian Springs Rd., Williamsburg, VA 23185

Consultant on CRTs and emissive FPDs, with emphasis on phosphor materials and properties of luminescent screens.
Peter Seats, Pres.
757/220-3183, fax: 757/220-3263
e-mail: pseats@compuserve.com

DISPLAY TECHNOLOGY LIBRARY FROM INTERLINGUA, 423 S. Pacific Coast Hwy. #208, Redondo Beach, CA 90277

Market researchers/publishers of a unique collection of documents from Japan on manufacturing, R&D, and market and technology trends in the electronic-display field. Tables of contents can be viewed at <http://www.japanese-translation.com>.
David Andrews, CEO
310/792-3636, fax: 310/792-3642

dnp DENMARK AS, Skruengangen 2, Karlslunde DK-2690, Denmark
Manufacturers of optical screens for high-quality projection of video, data, and graphics. Screens available in sizes up to 200 in. Product range includes five different screen series, each offering unique technical specifications.
Søren Weis Lindegaard, R&D Coord.
+45-46-16-5100, fax: +45-46-16-5251
www.dnp.dk

DOLCH COMPUTER SYSTEMS, INC., 3178 Laurelview Ct., Fremont, CA 94538
Manufacturers of environmentally protected flat-panel TFT-based display systems sold as operator interfaces, complete monitors, and OEM subsystems. Touch screens and network-ready embedded Pentiums are available.
Vince Tarpey, Dir. DPG
510/661-2220, 1-800-538-7506
fax: 510/490-8345

DOVE IMAGING SYSTEMS, INC., 400 Fifth Ave., Waltham, MA 02154
Providers of integrated hardware and software components for high-performance high-quality medical imaging applications. All components are modular, providing flexibility and choice in the areas of image access, management, and display.
Melinda Schultz, Inside Sales Mgr.
781/895-1155, fax: 781/895-1133
e-mail: info@dome.com
www.dome.com

DONNELLY APPLIED FILMS CORP., 6797 Winchester Circle, Boulder, CO 80301
Manufacturers of substrates suitable for color STN, color EL, AMLCD, and FED product manufacturing. Also, substrates for TN-LCD and ITO coatings for electrochromic mirrors, and a variety of transparent conductive thin films for a wide range of product applications.
Graeme L. Hennessey, V.P. Sls./Mktg.
303/581-5490, fax: 303/530-3214

DONTECH, INC., 700 Airport Industrial Blvd., Doylestown, PA 18901
Designers/manufacturers of optical filters for anti-reflection/contrast-enhancement and EMI/RFI shielding of electronic displays. Line of rigid rear-projection screens (marketed under Optical Solutions).
Jeffrey S. Reid, Dir. Mktg./Sls.
215/348-5010, fax: 215/348-9959

ERNST W. DORN CO., INC., 15905 S. Broadway, Gardena, CA 90248
Products include the Colt CL series screen-printing press, the PD-125 FPD screen-printing press, Techniclean sheet cleaner, Stallion 4-post screen-printing press, curing ovens, static-control equipment, and screen-printing supplies.
Jim Walker, V.P.
310/523-3676, 1-800-992-3676
fax: 310/523-3612
www.ewdorn.com

DOTRONIX, INC., 160 First Street S.E., New Brighton, MN 55112-7894
Manufacturers of OEM video displays in both monochrome and color, specializing in medical imaging and multimedia presentation monitors.
D. Michael Hunter, Natl. Sls. Mgr.
612/633-1742, 1-800-720-7218
fax: 612/633-1065

DOVER INSTRUMENT CORP., 200 Flanders Rd., P.O. Box 200, Westboro, MA 01581
Designers/manufacturers of ultra-precision air-bearing positioning systems (custom designs and standard products) for lithography, testing, inspection, imaging, grinding, dicing, substrate transport, and large travel X-Y stages for flat-panel applications.
Steve Kohnle, Product Mgr.
508/366-1456, fax: 508/366-9774
e-mail: skohnle.doverinstr.com
www.doverinstr.com

dpix, INC., 3406 Hillview Ave., Palo Alto, CA 94304-1345
Manufacturers of AMLCDs that excel in the most demanding requirements for image quality, offering superior resolution, clarity, and video performance. Eagle displays are designed for military applications and include advanced features such as sunlight readability. The Expression 100 is a 19-in. diagonal AMLCD with true 24-bit color, extended color gamut, wide viewing angle, and real-time video support.
Carl Cobb, Gen. Mgr.
650/842-9608, fax: 650/842-9808
www.dpix.com

DRAPER, INC., 411 S. Pearl St., Spiceland, IN 47385
Manufacturers of front- and rear-projection screens with videowall framing systems. Clear lexan and zero-edge framing available. Rear-projection mirror systems, projector rack systems, and modular multi-screen systems. Command and control consoles.
Bob Wilson
765/987-7999, 1-800-238-7999
fax: 765/987-7142
e-mail: draper@draperinc.com
www.draperinc.com

DRS MILITARY SYSTEMS DIVISION, 16 Thornton Rd., Oakland, NJ 07436
Manufacturers of high-technology, militarized and ruggedized display, signal processing, and trainer products for military and industrial applications.
Joe Dunn, Sr. V.P.
201/337-3800, fax: 201/337-4775

DRS TECHNOLOGIES, INC., 5 Sylvan Way, Parsippany, NJ 07054
Designers, manufacturers, and integrators of rugged and tactical display and processing systems primarily for aerospace/defense applications. Products include portable, flat-panel, and lightweight workstations; combat display systems; sensor processing systems; radar systems; and rugged computers and peripherals.
Bernard Kulp
301/921-8100, fax: 301/869-5008
e-mail: kulp@drs-esg.com
www.drs.com

DSM DESOTECH, INC., 1122 Saint Charles St., Elgin, IL 60120
Manufacturers of UV curable organic/inorganic hybrid hardcoats that provide superior surface abrasion resistance when applied to plastic films. The abrasion resistance and transparency is obtained by using acrylated nanoparticles.
Benjamin Davis, Mktg. Mgr.
847/468-7722, fax: 846/468-7717
e-mail: bdavis@dsmdesotech.com
dsmdesotech.com

DUREL CORP., 2225 W. Chandler Blvd., Chandler, AZ 85224-6155
A joint venture between 3M and Rodgers Corp. High-volume manufacturers of DUREL@3 microencapsulated EL lamps for automotive, watch, and wireless communications applications. Lamp systems for phone and keypad applications offering significant benefits compared to conventional backlighting technologies.
Chris Shol, Mktg. Mgr.
602/917-6000, fax: 602/917-6049

DUPONT, 14 Alexander Dr., Research Triangle Park, NC 27709
Manufacturers of materials for LCDs, PDPs, FEDs, and OLEDs. Holographic photopolymers for reflectors, screens, and color filters. Fodel@ photo-patterned electrodes for PDPs and FEDs. Polyester base films for touch screens and anti-reflective and other display films.
Scott Gordon, Mkt. Dev. Mgr.
919/248-5098, fax: 919/248-5715
e-mail: scot.e.gordon@usa.dupont.com
www.dupont.com

DYNACOLOR, INC., 4F, No. 10, Lane 609, Sec. 5, San Chung City, Taipei County, Taiwan, R.O.C.
Manufacturers of display automation products. The D8000 can perform the measurement and alignment of geometry, convergence, focus, and purity for monitors and CRTs. With the addition of display-control ICs, total solutions can be provided.
Charles Chuang, V.P.
+886-2-278-1938, fax: +886-2-278-1817

DYNAIR ELECTRONICS, INC., 5275 Market St., San Diego, CA 92114
Manufacturers of PRISM, a large-format interactive video-wall display system that can simultaneously display output from four graphics workstations and four video formats in sizes up to 324 ft.² with 1024 x 1024-pixel resolution.
Bob Jacobs, Sls.
619/263-7711, 1-800-854-2831
fax: 619/264-4181

DYNAMIC DISPLAYS, INC., 1625 Westgate Rd., Eau Claire, WI 54703
Manufacturers of low-to-high resolution color and monochrome CRT displays. Integrator and re-seller of LCDs.
Jeff Jenson, Sls. Mgr.
715/835-9440, 1-800-793-6862
fax: 715/835-2436
www.dynamicdisplay.com

DYNAPRO THIN FILM PRODUCTS, INC., 7025 W. Marcia Rd., Milwaukee, WI 53223
Manufacturers of touch screens, controlling electronics, and mouse emulation software as well as LCD and CRT touch-screen monitors. Custom design services and off-the-shelf products available.
Kevin Brown, Sls. & Mktg. Mgr.
414/365-3555, 1-800-222-9214
www.dynapro.com

EAGLE MAGNETIC CO., INC., 7417 Crawfordville Rd., P.O. Box 24283, Indianapolis, IN 46224
Manufacturers providing the magnetic-shielding market with high-permeability (sheet stock and foil) 0.002-0.090-in. standard or ultimate annealed fabrication (prototypes to production), annealing, finishing, and assembly.
Gary H. Noble, Inside Sls.
317/297-1030, fax: 317/299-1323

EARTH COMPUTER TECHNOLOGIES, P.O. Box 7089, Laguna Niguel, CA 92607
Manufacturers of VGA and graphic LCD controllers and subsystems. PC-based controllers in OEM quantities offered. Also, enclosures and VGA-input LCD monitors. Design assistance available.
Jason Alkire, Oper. Mgr.
714/448-9368, fax: 714/448-9316

EASTMAN KODAK CO., 343 State St., Rochester, NY 14650
Manufacturers of off-the-shelf imagers with video interline, full-frame, IR and linear CCDs. Color capabilities are available for both area and linear arrays. The Kodak professional digital camera, infrared camera, and KM-2 camera systems are examples of products using Kodak-manufactured CCDs.
Helen Malz, Sls.
716/588-7612, fax: 716/477-4947

EATON CORP., Flat Panel Displays Div., 21 South St., Danbury, CT 06811
Manufacturers of the Vision 500 series of flat-panel displays designed to provide reliability and high-performance for COTS, rugged, or full military applications.
Joe Amalfitano, Sls. Mgr.
203/798-3173, fax: 203/798-3105
e-mail: josephmalfitano@eaton.com

EATON CORP., Flat Panel Equipment Div., 35 Cherry Hill Dr., Danvers, MA 01923
Manufacturers of the Orion NV6072 series of ion implanters, designed for ion implant processes in the manufacture of advanced amorphous and low-temperature polysilicon AMLCDs.
Wai Yan Sun, Bus. Mgr.
978/524-9231, fax: 978/524-9224

EATON CORP., Pressure Sensors Div., 15 Durant Ave., Bethel, CT 06801
Manufacturers/suppliers of high-quality instrumentation and control equipment to the U.S. Navy. The VISION 500™ series of flat-panel displays are offered in various technologies, resolutions, and sizes.
Jeffrey Kilgore, Sls. Manager
203/798-3122, fax: 203/798-3214

EATON IDT, INC., 173 Heatherdown Dr., Westerville, OH 43081-6166
Manufacturers/suppliers of a comprehensive selection of products, systems engineering, training, service, and warranty. Industrial workstations provide real-time control from control room to plant floor; Factory Mate, AMI, PanelMate.
David Keifer
614/882-3282, fax: 614/875-7111

ECRM TRUST, 554 Clark Road, Tewksbury, MA 01876-1631
Designers, manufacturers, and marketers of high-resolution monochrome laser graphics systems, laser scanning systems, and raster image recorders for the graphic arts and printing industries. Products designed to permit integration with a variety of electronic publishing systems and desktop publishing.
Vince Cooper, Dir. Sls.
508/851-0207, fax: 508/851-7016

EDL DISPLAYS, INC., 1300 Research Park Dr., Dayton, OH 45432
Designers/manufacturers of a line of standard and custom wide-scan-range monitors from 16 to 27 in. viewable. Applications include command and control,

simulation, air-traffic control, shipboard navigation, industrial, and ruggedized. Michael J. McArdle, Gen. Mgr. 937/429-7423 fax: 937/429-6985 www.eddisplays.com

EeRISE CORP., 7F, No. 1, Alley 16, Lane 235, Pao Chiao Rd., Hsin Tien City, Taipei County, Taiwan, R.O.C.
Manufacturers of three-dimensional automatic measurement/alignment systems for digitally controlled monitors, including the ER 9300, a geometry measurement/alignment system; the ER 6700, a misconvergence measurement system; and the ER 2300, a one-dimensional white-balance measurement/alignment system. Joe Li, Sls. Mgr. +886-2-914-5762, fax: +886-2-914-5763

EeV, INC., 4 Westchester Plaza, Elmsford, NY 10523
Manufacturers of CCD image sensors, LCDs and modules, LCD transportation signs, and airport signboards. Peter Fochi, Bus. Mgr. 914/592-6050, 1-800-DIAL EeV fax: 914/682-8922 e-mail: info@eevinc.com www.eev.com

EeV LTD., Waterhouse Lane, Chelmsford, Essex, U.K. CM1 2QU
Manufacturers of a range of specialized LCDs of all technologies, and CCDs and solid-state cameras. +44-245-493-493, fax: +44-245-492-492

E FOR M CORP., Polarizer Film Group, 625 Alaska Ave., Torrance, CA 90503
Manufacturers of standard and custom polarizers and retarder films, contrast-enhancement filters, and custom glass and acrylic laminations. William Bandel, Sls. Mgr. 310/320-9788, 1-800-269-8801 fax: 310/320-9357

EFOS, INC., 2260 Argentia Rd., Mississauga, Ontario, Canada L5N 6H7
Designers and supporters of light-based technologies for virtually any industry. Current products include UV/visible spot curing systems. Registered to ISO9001, an FDA approved facility, and manufacturers under CGMP with worldwide sales and service support. Ruben Burga, Indust. Sls. Mgr. 905/821-2600, 1-800-668-8752 fax: 905/821-2055 e-mail: info@efos.com www.efos.com

EG&G OPTOELECTRONICS, 1330 Cypress St., Covina, CA 91724
Manufacturers of custom and off-the-shelf power supplies and inverters for AMLCD backlights, offering dimming from sunlight-readable to night-vision goggle levels. Available stand-alone or as integrated backlights for avionics, computer, and medical applications. Also, short-arc xenon and metal-halide-based light sources optimized for specific applications such as projection systems. Ed Motokane, Mgr. Bus. Dev. 818/967-9521, fax: 818/967-9862

EG&G OPTOELECTRONICS, 35 Congress St., Salem, MA 01970
Manufacturers of xenon lamps and light systems; power supplies for xenon and metal-halide lamps; AMLCD backlight inverters and lamp assemblies; CCD line

scan and array imagers and cameras; and LEDs, laser diodes, and a complete range of detectors. Jim Reade, Sr. Prod. Spec. 508/745-3200, 1-800-775-6786 fax: 508/745-0894

EG&G POWER SYSTEMS, INC., 1330 E. Cypress St., Covina, CA 91724
Manufacturers of custom AMLCD backlight drivers and lamp assemblies featuring digital control, wide dimming range, high reliability, and regulated luminance output; FED power supplies; and high-intensity xenon and metal-halide lamps for projection displays. Ed Motokane, Mgr. Bus. Dev. 818/967-9521, fax: 818/967-3151

EG&G RETICON, 345 Potrero Ave., Sunnyvale, CA 94086
Manufacturers of solid-state image sensors and solid-state cameras. Dianna Jones, Mktg. Mgr. Comp. Prod. 408/738-1009, fax: 408/738-6979

EKTRON APPLIED IMAGING, INC., 23 Crosby Dr., Bedford, MA 01730
Manufacturers of laser imaging recorder, Model 811, a high-resolution output device for generating continuous-tone 8-bit images onto dry-silver media. Input is via an IEEE-488 interface from user's host computer. Alan Flament, Mktg./Sls. Mgr. 617/275-0475, fax: 617/271-1977

ELASTOMERIC TECHNOLOGIES, INC. 2940 Turnpike Dr., Hatboro, PA 19040
Manufacturers of STAX silver-based elastomeric connectors used to connect ITO traces on glass to PC boards, including thin-film EL (TFEL), gas plasma, vacuum fluorescent displays, and any display module to an external PC board. Brad Lizoite, Mktg. Mgr. 215/672-0787, fax: 215/672-4633

ELDEC CORP., 16620 13th Ave. W., M3-60, Lynnwood, WA 98037
Designers/manufacturers of reliable high- and low-voltage power supplies for CRTs and FPDs. The patent pending backlight driver with 20,000:1 dimming ratio is suitable for display systems requiring both sunlight readability and NVG. Dominic Chow, Mktg. Mgr. 425/743-8633, fax: 425/743-8562 www.eldec.com

ELDIM S.A., 1185 rue d'Epron (Ancienne), 14200 Herouville, France
Manufacturers of the AX160R systems for automated evaluation of electro-optical, colorimetric, and ergonomics characteristics according to viewing direction, wide-range temperature conditions, illumination, and position on display (uniformity). Also, the MURATest video photometer equipment for 2-D uniformity evaluation and its various options, including telecentric optics, human vision, and microdisplay. Jean-Noel Curt, V.P., Mktg. & Sls. Dir. +33-2-31-94-76-00, fax: +33-2-31-94-09-50 e-mail: jncurt@eldim.fr www.eldim.fr

ELDOR CORP., 70 Walnut St., Wellesley, MA 02181
Manufacturers of high-resolution deflection yokes with pre-set raster geometry; high-voltage power supplies; flyback and switch-mode transformers. B. Valle 617/965-0002, fax: 617/965-0003

ELECTROGRAFICS INTERNATIONAL CORP., 1825 Stout Dr., Warminster, PA 18974
Manufacturers of the Polychrome LFC 7000, a large-format camera for direct imaging on chrome or iron oxide. Also, projection steppers for the generation of silicon wafers, precision photomasks, and printed-circuit boards. Ann Grossi, V.P. 215/443-5190, fax: 215/443-9564

ELECTROHOME LTD., 809 Wellington St. N., Kitchener, Ontario, Canada N2G 4J6
Providers of projection solutions based on three broad technology platforms: (1) Texas Instruments' Digital Light Processing™ (DLP™), (2) IBM's Digital Light Valve (DLV), and (3) CRTs. Alan Caskey, V.P. Sales 519/749-3188, 1-800-265-2171 fax: 519/749-3136 e-mail: info@electrohome.com www.electrohome.com

ELECTRO MECHANICAL SYSTEMS INC., 801 W. Bradley Ave., Champaign, IL 61820
Manufacturers of totally integrated touch terminals/monitors and custom touch panels using IR light-beam technology. Mike Lazarevich, Pres. 217/359-7125, fax: 217/359-9839 www.emstouch.com

ELECTRONIC DESIGNS, INC., One Research Dr., Westborough, MA 01581
Manufacturers of commercial and ruggedized displays from 4.0 to 18.1 in. in landscape and portrait modes. Ruggedized options include sunlight readability, wide viewing angle, and extended shock, vibration, and temperature ranges. Display heads, monitors, and computer systems are also offered. Jim Treveloni, Product Mktg. Mgr. 508/366-5151, fax: 508/836-4850 www.electronic-designs.com

ELECTRONIC IMAGE SYSTEMS, INC., A Member of the BARCO Group, 600 Bellbrook Ave., Xenia, OH 45385-4053
Designers/manufacturers of projection displays used in full flight, vehicular, and maritime simulation. Gunnery and target displays, along with stroke and vector systems for land-based entertainment, are also available. Full raster image distortion can be implemented. Michael T. Raines, Mktg. Dev. Mgr. 937/372-7579, fax: 937/372-8645

ELECTRONIC INFORMATION DISPLAYS (EID) '98, West Devon Business Park, Brook Lane, Tavistock Devon P49 9DP, U.K.
EID '98 is the only annual conference and exhibition held in Europe solely dedicated to the display industry. Duncan Laseby, Exhibition Mgr. +44(0)1822-614691 fax: +44(0)1822-614818 www.eid.co.uk

ELECTRONIC TREND PUBLICATIONS, 1975 Hamilton Ave., Ste. 6, San Jose, CA 95125
Market research in flat-panel displays and other electronics industry topics. Karen Selven, V.P. Mktg. 408/369-7000, 1-800-726-6858 fax: 408/369-8021

ELECTRON TUBES, INC., 100 Forge Way, Unit F, Rockaway, NJ 07866
Distributors in the U.S. and Canada for four European manufacturers: Electron Tubes Ltd.-- photomultipliers, photodetector packages, Silicon Sensor GmbH -- silicon sensors, APDs. Brandenburg -- high-voltage power supplies, test equipment and access. Genvolt -- very-high-voltage power supplies, custom power supplies. Jules Green, Sls. Engr. 973/586-9594, 1-800-521-8382 fax: 973/586-9551 e-mail: phototubes@aol.com www.electrontubes.com

ELECTRO-OPTICS, INC., Orlando Div., 2160 Park Ave., Winter Park, FL 32789
Manufacturers of photometers, spectro-photometers, and spectroradiometers for testing and evaluating displays. Dr. Robert K. McMahan, Dir. 407/645-1000, fax: 407/644-9000

ELECTRO PLASMA, INC., 4400 Martin Moline Rd., Millbury, OH 43447
Manufacturers and integrators of ac plasma-based display systems with extensive experience in complex systems integration. Industrial process control. Thomas P. Zouhary, Sls. Mgr. 419/255-5197, fax: 419/242-9713

ELFORM, INC., 1025 Ridgeview, Ste. 200, Reno, NV 89509
Distributor of heat-seal connectors (HSCs) for FPDs, ITO glass, and shielding felt and other flexible shielding products. Robert Short, Dir. Sls. 775/829-1905, fax: 775/829-1693 e-mail: elform@elform.com www.elform.com

ELOGRAPHICS INC., 105 Randolph Rd., Oak Ridge, TN 37830
Manufacturers of touch screens, including AccuTouch® (resistive technology) and IntelliTouch® (surface-acoustic-wave technology). Line of fully integrated plug-and-play TouchMonitors in sizes ranging from 14 to 19 in. Joseph Barresi, V.P. Sls. 510/651-2340

EL-OP ELECTROOPTICS INDUSTRIES, LTD., P.O. Box 1165, Rehovot, Israel 76110
Manufacturers of avionics and tank-fire control systems such as head-up displays, helmet-mounted displays and sights, multi-function displays, and up-front control panels. Ami Yachin, Dir. Corp. Intl. Mktg./Sls. +972-8-486448, fax: +972-8-486748

ELO TOUCHSYSTEMS, INC., 6500 Kaiser Dr., Fremont, CA 94555
Manufacturers of two touch-screen product lines: IntelliTouch (surface-wave technology) and AccuTouch (five-wire resistive technology). Full line of products include controller cards, software drivers, application development tools, and touch-screen-equipped monitors. 510/608-3200, 1-800-ELOTOUCH fax: 510/608-3277 www.elotouch.com

ELTECH, 5524 Bee Cave Rd., Austin, TX 78746
Manufacturers of NovaLite® (screen printed) and fusion-sealed Aclar®, foil type, electroluminescent (EL) lamps;

active-matrix large-pixel-size PC-board-based EL lamps; and dc-ac inverters.
Brad Lizotte, V.P. Sls.
215/441-0633, fax: 215/441-8299

ELTIME VISION SYSTEMS, 10/14 Hall Rd., Heybridge, Maldon, Essex, U.K.
CM9 7LA

Manufacturers of frame stores, image-processing systems, automatic visual inspection systems, and a video-fax system.
D.R. Hurst, Dir.
+44-621-859-500, fax: +44-621-855-335

EMCO ELECTRONICS, LTD., 129 Colohabour Lane, London SE5 9NY, U.K.
Suppliers of industrial monitors, offering a wide range of high-performance CRTs and LCDs including full-sunlight-readable LCD monitors.
Marco Cohen, Product Mgr.
+44-171-501-8800, fax: +44-171-501-8801
www.emco-displays.com

EMERGING DISPLAY TECHNOLOGIES CORP. (EDT), 2680 Walnut Ave., Unit C, Tustin, CA 92780

Manufacturers of standard character, graphics, and custom-designed LCDs featuring TN, STN, and FSTN. Internal glass cell manufacturing, ISO9001, and the ability to address COB, TAB, FPC, touch-screen, and wide-temperature-range LCD modules.
Peter Waker, V.P. Sls. & Mktg.
714/508-2555, fax: 714/508-2557
e-mail: western.sales@edtc.com

EM INDUSTRIES, INC., 5 Skyline Dr., Hawthorne, NY 10532

Manufacturers and suppliers of display materials for liquid crystals, fiber spacers, thin-film materials, UV photoinitiators, dip coatings, and optical crystals.
Frank Allan
914/785-5840, fax: 914/592-9469

EM MICROELECTRONIC - MARIN S.A., Rue des Sors 3, CH 2074 Marin, Switzerland

Manufacturers of high-precision custom LCD products. LCD technologies include TN (direct and multiplexed), first minima TN, SBE-STN, and a full range of dichroics. Capabilities include use of very thin glass substrates, shaped displays, and HSC bonding technology. Also producers of a range of LCD driver chips available in a variety of packages including TAB.
Gary Broder, LCD Mgr.
+41-32-755-5111, fax: +41-32-755-5403

ENABLING TECHNOLOGIES CO., 3102 S.E. Jay St., Stuart, FL 34997
Manufacturers of complete line of braille embossers and computer equipment for the blind.
B. T. Kimbrough, V.P. Sls.
407/283-4817, fax: 407/220-2920

ENDICOTT RESEARCH GROUP, INC., 2601 Wayne St., P.O. Box 269, Endicott, NY 13760

Manufacturers of custom and standard power supplies for information displays, including a complete line of dc-ac inverters for powering cold-cathode fluorescent-tube backlight LCDs.
Richard Alt, Dir. Sls. & Mktg.
607/754-9187, 1-800-215-5866
fax: 607/754-9255
e-mail: sales@ergpower.com
www.ergpower.com

EPIX, INC., 381 Lexington Dr., Buffalo Grove, IL 60089

Variable resolution, image sequence acquisition, processing, display, transmission, and archival boards for the PC/AT-based imaging systems. Products are unique in their ability to acquire images from non-standard sources and standard video formats.
Arthur Schwytzer
708/465-1818, fax: 708/465-1919

EPSON AMERICA, INC., 20770 Madrona Ave., Torrance, CA 90503

Manufacturers of a full line of small to medium size LCDs. Product line includes alphanumeric displays, passive-matrix graphics modules, polysilicon TFT displays, and ultra-MIM active-matrix modules.
Ken Nagai, Group Sls. Mgr.
310/787-6300, fax: 310/782-5350

EPSON ELECTRONICS AMERICA, INC., 1960 E. Grand Ave., 2nd fl., El Segundo, CA 90245

Manufacturers of a full line of LCDs, ranging from passive-matrix graphics modules to polySi TFT monochrome and color displays. Also, a line of D-TFD active-matrix color modules.
Hubie Fillmore, Product Mgr.
310/955-5300, fax: 310/755-5400

ERGONOMICS, INC., P.O. Box 964, Southampton, PA 18966

Distributors of test and measurement equipment to meet VDT test requirements such as MPR2, MPR3, TCO, IEEE, P1140, ECMA, and JEIDA. Manufacturers of safety and accessibility test probes and instruments.
Eric A. George, Mgr. Mktg./Sls.
215/357-5124, fax: 215/364-7582

ERGOSYST ASSOCIATES, INC., 123 W. Eighth St., Ste. 210, Lawrence, KS 66044-2605

Publishers of reference books and journals in the areas of artificial intelligence, display design, CAD/CAM, ergonomics, human-factors, human-computer interaction and VDT health and safety.
John L. Burch
913/842-7334, fax: 913/842-7348

ERGOTRON, INC., 1181 Trapp Rd., St. Paul, MN 55121

Manufacturers of flat-panel mounting arms and stands that feature a wide range of ergonomic adjustability, screen stability, and ease of adjustment previously unavailable. The system consists of modules which can be configured to meet a broad range of flat-panel, touch-screen-controller, and laptop-computer mounting applications.
Dan Hallberg, FP Prod. Mgr.
612/681-7600, 1-800-888-8458
fax: 612/681-7715
www.ergotron.com

ETC COMPUTER, INC., 2917 Bayview Dr., Fremont, CA 94538

Manufacturers of small-footprint specialty display monitors: 10-in. color (super VGA) and 9- and 10-in. monochrome monitors, designed for space-limited applications. Also, providers of turnkey integrated touch screens for 10-, 14-, 15-, and 17-in. monitors.
Kent Huang, Pres.
510/226-6250, fax: 510/226-6252

EURECRAN SA, ZA Cap Alpha Lot No. 1, Rue Monnet, Clapiers 34830, France

Manufacturers of fast LCD development and delivery of larger lots. Specialty LCD for military, optics and others. Driving circuitry, interconnection, design and production of complete modules. Heat-seal technology.
Reinhard G.O. Hampel, Pres.
+33-67-594-510, fax: +33-67-591-712

EVANS & SUTHERLAND COMPUTER CORP., 600 Komas Dr., Salt Lake City, UT 84108

Manufacturers of visual systems for commercial airlines, military, engineering, and aerospace applications. The visual system includes computer image generators, a wide range of high-resolution display devices and associated database preparation and evaluation equipment.
Stephen Black
801/582-5847 x6501, fax: 801/582-5848

EXCEL TECHNOLOGY INTERNATIONAL CORP., Unit 5, Bldg. 4 Stryker La., Belle Mead, NJ 08502

Manufacturers of custom and standard glass-panel LCDs and LCD modules. Also, seven-segmented, dot-matrix, graphics, alphanumeric, and LCD light-valve displays.
Bob Shepard
908/874-4747, fax: 908/874-3278
e-mail: excelix@aol.com

EXTRON ELECTRONICS, 1230 S. Lewis St., Anaheim, CA 92805

Manufacturers of computer-video interfaces, switcher, and distribution products as well as signal-enhancement products such as computer-to-video scan converters, doublers, and processors. Also, a complete line of high-resolution cable.
Jeff Gibson, Natl. Sls. Mgr.
714/491-1500, 1-800-633-9876
fax: 714/491-1517
e-mail: support@extron.com
www.extron.com

EXXENE CORP., 5939 Holly Rd., Corpus Christi, TX 78414

Manufacturers of coatings for CRTs, displays, and plastics. Low gloss, laser, IR, and UV blocking; anti-static; and anti-fog. Weathering, hardness, and chemical resistance are common properties of all coatings. Coating services and custom formulation available.
Edward Bernheim, Pres.
512/991-8391, fax: 512/991-9057

EXZEC, INC., 1840 Oak Ave., Evanston, IL 60201

Manufacture, research, and development of touch-input devices for computers and electronics using guided acoustic waves (bulk, shear mode). SureTouch touch screens respond to varying pressures and can be operated with gloves or in wet or dirty surroundings. Supplier of panels, controllers, and consulting services.
Terence J. Knowles, Pres.
708/866-1868, 1-800-523-5883
fax: 708/866-1808

EYESAVER INTERNATIONAL, 348 Circuit St., Hanover, MA 02339

Manufacturers of custom glass filters/windows for all displays. Anti-reflective coatings, EMI/ELF shielding, optically bonded glass for vandal resistance, and two different types of privacy film are available.
Matthew Smillie, Partner
781/829-0808, fax: 781/829-9963
e-mail: smillie344@aol.com

FAIRCHILD CONVAC USA, 47613 Warm Springs Blvd., Fremont, CA 94539-7470

Manufacturers of photolithography processing equipment, including the LCD Model 600 and Verti-Cel™ 3100 Series. Configured as stand-alone modules or clustered for a full production line, processes include stations for coating, cleaning, developing, etching and stripping, hot plates, and wave coater. These uniquely designed tools are fully production proven for substrates from 4 to 16 in. square.
Ralph Mason, Sr. V.P. Sls./Mktg.
510/659-8370, fax: 510/659-9407

FAI TECHNOLOGY MARKETING, 82 Main St., Ste. 300, Huntington, NY 11743

Full-service market research organization focused on leading-edge electronics technologies. Significant experience in semiconductor, ATE, CIM, and AMLCD market research.
Deborah Ahlgren
516/351-2100, fax: 516/351-2199

FAKESPACE, INC., 4085 Campbell Ave., Menlo Park, CA 94025

Designers/manufacturers of field-sequential displays, glove-based control systems, trackers, and scan converters which enable natural, intuitive interaction with virtual environments in entertainment, simulation and training, workstation-based computer-aided design and engineering, and telepresence research and scientific visualization.
David Eggleston, V.P. Sls.
415/688-1940, fax: 415/688-1949

FAS TECHNOLOGIES, 10480 Markison Rd., Dallas, TX 75238

Developer/supplier of extrusion coating systems for the FPD, high-density interconnect, and silicon-wafer industries. Products include the patented FAS-COAT™ Extrusion Coating System and the Moving-Head System.
Chuck Hinds, Natl. Sls. Mgr.
214/553-9991, fax: 214/553-9919
chinds@fas.com
www.fas.com

FED CORPORATION, 1580 Route 52, Hopewell Junction, NY 12533

Manufacturers of high-resolution head-wearable displays, rugged direct-view displays, and components which provide high-brightness, low-power consumption, wide viewing angle, and wide operating temperature range for commercial, industrial, and military applications, primarily incorporating emissive technologies (FED and OLED).
Susan Jones, Exec. V.P.
914/892-1900, fax: 914/892-1901

FELDMAN TECHNOLOGY CORP., 1 Blake Ave., Watsonville, CA 95076

Providers of patented etching process for metal-oxide transparent conductors available for licensing. Process features fine-line patterning of tin oxide, low cost, room-temperature operation, and fast throughput.
Bernard Feldman, Pres.
831/724-3000, fax: 831/768-8326
e-mail: ftc@cruz10.com

FEPET (FIELD EMISSION PICTURE ELEMENT TECHNOLOGY), INC., 3006 Longhorn Blvd., Ste. 107, Austin, TX 78758

Manufacturers of carbon-based cold cathodes for FEDs and other technologies

requiring a cold electron source. Also, thin-film carbon-deposition equipment for fabricating carbon cold cathodes.

Zvi Yaniv, Pres.
512/339-5020 x130, fax: 512/339-5021
e-mail: dfink@diamond.com
www.diamond.com

FIMI PHILIPS, via S. Banfi 1, Saronno 21047, Italy

Manufacturers of high-resolution 17-, 20-, and 21-in. color CRT monitors with line scan frequencies up to 115 kHz and digital autoscans (models C2082-DAS and C2182-DAS) equipped with micro-processor-controlled features and RS-232 interface.

S. Bonfiglio
+39-2-9618-237, fax: +39-2-9618-305

FLACHGLAS AG, Technical Glass Div., Otto-Seeling Str. 7, P.O. Box 1309, 5810 Witten, Germany

Producers of a wide range of coated and uncoated soda-lime glasses for all display applications. With MICROWIT and MICRO-WIT PLUS, standard or specific customer requirements can be met.

Uwe Vogt
+49-2302-582-256, fax: +49-2302-582-353

FLAT CANDLE CO., 4725 B, Town Center Dr., Colorado Springs, CO 80916

Manufacturers of flat-form-factor fluorescent lamps and accessories for LCD backlighting. Sizes range from 0.8 to 10.4 in. on the diagonal.

Judd Lynn, Pres.
719/573-1880, fax: 719/573-2080

FLAT PANEL DISPLAY CO. (FPD) B.V., 2099 Gateway Pl., Ste. 100, San Jose, CA 95110

Manufacturers of ¼-VGA to XGA active-matrix monochrome and color LCD modules from 2.8 to 11.34 in. on the diagonal; datagraphic, direct-view, and projection modules with features such as sunlight readability; long-lifetime backlights with brightness up to 300 cd/m² and >50,000 hours to half-life.

Leo Pekkelharing, Natl. Sls. Mgr.
408/453-7002, 1-800-235-7373
fax: 408/453-6444

FLATSCREEN TECHNOLOGIES CORP., 633 Michigan Ave., Evanston, IL 60202

Consultancy providing research, development, and engineering of display systems and devices. Integration of electronic displays with optical systems. Specialist in gas-discharge and gas-electron-phosphor displays.

Alan Sobel, Pres.
Phone/fax 847/869-5607

FLEX PRODUCTS, INC., 2793 Northpoint Pkwy., Santa Rosa, CA 95407-7350

Manufacturers of advanced sputtered and electron-beam deposition coatings on flexible LumiFlex™ transparent conductive films used in touch screens, EL displays, and LCD panels. Optional features include EMI/RFI shielding and anti-reflection filters.

Richard Bonkowski, Sls. Mgr.
707/525-7532, fax: 707/525-7725

FLORODA CORP., 17360 S. Gramercy Pl., Gardena, CA 90247-5212

Manufacturers of process, test, repair, and inspection equipment for all types of FPDs, including the VLS vacuum-laser (glass) sealer, GMS glass-marking system, AIM automatic inspection machine, RAMP random-access multi-probe scanning test

system, PPS programmable probing station, a full line of laser-based repair systems, and the MEL-40 laser micro-machining center.

Rod Waters, Pres.
310/532-2700, 1-800-323-7691
fax: 310/329-1015

JOHN FLUKE MANUFACTURING CO., INC. P.O. Box 9090, Everett, WA 98206-9090

Fluke touch control screens are sophisticated operator interfaces for computer-based machinery or systems. With a minimum of training, operators can accurately and efficiently control even the most complex systems simply by touching the screen.

206/347-6100, 1-800-426-0361
fax: 206/356-5116

FORMOSA ADVANCED TECHNOLOGIES CO. LTD., No. 10 R&D Road, 2 Science-Based Industrial Park, Hsinchu, Taiwan, R.O.C.

Manufacturers of dispenser cathodes.
C.-W. Shih
+886-35-784855, fax: +886-35-782970

FOSTA-TEK OPTICS, INC., 320 Hamilton St., Leominster, MA 01453

Manufacturers of custom display readout windows and optical filters for all opto-electronic and display technologies including CRT, LED, LCD, plasma, EL, touch panel, EMI, and TEMPEST. Also, antireflective coatings, custom molding, hard coating, and supercoatings.

Michael B. Smith, Dir. West. Region
508/534-6511, 508/493-2084
fax: 508/537-2168

FPD TECHNOLOGIES, INC., 4525 Production Dr., Dallas, TX 75235

Manufacturers of high-resolution dot-matrix graphic LCD modules, color ARLCDs, and color M-STN LCDs. Color ARLCDs have the performance and quality comparable to AMLCDs. M-STN LCDs are equal to or better in quality than DSTN.

David Chen, V.P. Mktg. & Bus. Dev.
214/638-6668, fax: 214/638-6676

F-P ELECTRONICS, 6030 Ambler Dr., Mississauga, Ontario, Canada L4W 2P1

Manufacturers of display components, electromagnetic hybrid flip disk/LED modules, and hybrid flip disk/fiber-optic LED modules for indoor and outdoor applications, including airport terminals, gasoline pump displays and price signage, time/temperature displays, and clock and advertising signs.

Douglas Greenwood, Gen. Sls. Mgr.
905/624-3020, fax: 905/625-6197

FRESNEL OPTICS, 1300 Mt. Read Blvd., Rochester, NY 14606

Manufacturers of microstructure optics, including Fresnel lenses, prisms, lenticulars, beamsplitters, cylinders, lens arrays, and corner cubes. Products used in display optics and distributed lighting applications.

Donna Desmarais, Sls./Mktg. Mgr.
716/647-1140, fax: 716/254-4940
www.fresneloptics.com

FRONTLINE SYSTEMS, 20817 N. 19th Ave., Ste. 5, Phoenix, AZ 85027

Manufacturers of LCDs with ultrabright-backlight (1000+ nits), daylight-readable full-color graphics with complete environmental protection (100% condensing humidity). Providers of engineering support,

custom designs, and consulting on thermal, end-of-life, and failure analysis.

Greg Heady, Mgr. Engr.
602/581-5188, 1-800-767-9903
fax: 602/581-5285
www.frontlinesystems.com

FUJIPOLY, P.O. Box 679, 365 Carnegie Ave., Kenilworth, NJ 07033-0679

Manufacturers of elastomeric connectors and EL displays, LCDs, component-to-board, and board-to-board applications including Zebra® high-density low-resistance designs and BGA interconnects.

Bob Bjornsen, Mktg. Mgr.
908/298-3850, fax: 908/298-1232
e-mail: fujipoly@aol.com
www.fujipoly.com

FUJITSU MICROELECTRONICS, INC., 3545 N. First St., San Jose, CA 95134

Manufacturers of ImageSite™ color plasma displays. System integrators can build their own monitors based on Fujitsu-supplied color plasma components.

Brian Shannon, Sr. Prod. Mktg. Engr.
408/922-8905, 1-800-866-8608
fax: 408/922-9862
bshannon@fmi.fujitsu.com
www.fmicrc@fmi.fujitsu.com

H. L. FUNK CONSULTING, 7 Diane Ct., Katonah, NY 10536

Consultancy offering 20 years of experience in patent searches and patent trend analysis, market research, competitive intelligence, and demographics. Subscriber to major electronic databases and provider of technical literature and database training.

H. L. Funk
914/232-3530, fax: 914/232-3530

FUTABA CORP., 629 Oshiba, Mobarra, Chiba 297, Japan

Manufacturers of high-luminance multi-color vacuum fluorescent display (VFD) products ranging from simple numeric and dot-matrix displays to large multifunction graphic panels. High-luminance monochrome color FED standard products.

T. Maeda, Mgr. Overseas Mktg. Dept.
+81-475-24-1111, fax: +81-475-23-1346

FUTABA CORP. OF AMERICA, 14492 Sheldon Rd., Ste. 370, Plymouth, MI 48170

Manufacturers of high-brightness multicolor vacuum fluorescent display products ranging from simple numeric and dot-matrix displays to large multifunction graphic panels. Also, high-brightness monochrome color field-emission display (FED) standard products.

C.L. Slupek, Automotive Mktg. Mgr.
313/459-1177, fax: 313/459-1268

FUTABA CORP. OF AMERICA, 1605 Penny Lane, Schaumburg, IL 60173

Manufacturers of high-brightness multi-color vacuum fluorescent display products, ranging from simple numeric and dot-matrix displays to large multifunction graphic panels. High-brightness monochrome and color FED standard products.

Pat Dolezal, Advertising Asst.
847/884-1444, fax: 847/884-1635
e-mail: pdolezal@futaba.com
www.futaba.com

FUTURE FOCUS, INC., 14724 NE 177th St., Woodinville, WA 98072

Consultancy in optical design, specializing in sensors, fiber optics, and display optics.

Gordon Mitchell, Pres.
206/481-5577, fax: 206/489-9360

FUTURE SYSTEMS, INC., P.O. Box 26, Falls Church, VA 22040

Publishers of the Multimedia & Videodisc Monitor (formerly the Videodisc Monitor) which provides news and analysis of multimedia, interactive video, compact disc, and related technologies. Covers product applications in areas including training, retailing, education, the military, and home entertainment.

John Wilson, Mktg. Mgr.
703/241-1799, 1-800-323-DISC
fax: 703/532-0529

GALILEO CORP., Galileo Park, P.O. Box 550, Sturbridge, MA 01566

Manufacturers of products based on fiber-optic and electro-optic technologies for applications in analytical instruments, process analysis, telecommunications, medical instruments, and office equipment.

Products include microchannel plates (MCPs) and MCP-based detectors. OFC, a Galileo company, specializes in optical filters and coatings.

Robert White, Gen. Mgr.
508/347-9191, 1-800-648-1800
fax: 508/347-3849
www.galileoecorp.com

GAMMA SCIENTIFIC, 8581 Aero Dr., San Diego, CA 92123

Manufacturers of electro-optical instruments, including spectroradiometers, colorimeters, photometers, radiometers, NIST-traceable light sources, laser eye-safety power meters, and various other light-measurement devices.

Kelvin Ellis, Sls. Engr.
619/279-8034, 1-800-637-2758
fax: 619/576-9286

e-mail: info@gamma-sci.com
www.gamma-sci.com

G&D ENGINEERING, 23 Crosby Dr., Bedford, MA 01730

Manufacturers of laser imaging recorder, Model 811, a high-resolution output device for generating continuous-tone 8-bit images onto dry-silver media. Input is via an IEEE-488 interface from user's host computer.

Alan Flament, Mktg./Sls. Mgr.
617/275-0475, fax: 617/271-1977

JEROLD H. GARD, Displays Consultant, 5469 Beechwood Ln., Los Altos, CA 94024

Consultancy in cockpit displays, including head-up, head-down, and helmet displays, with special emphasis on the human/display interface and piloting and safety considerations. Ex-chief scientist at Kaiser Electronics.

Jerold H. Gard, Displays Consultant
415/968-2731, fax: 415/968-4795

G. A. STANLEY PALMER LTD., Island Farm Ave., Molesey, Surrey KT8 2UR, U.K.

Distributors of everything that goes into a monitor, and switchable (PDLC) glass and power supplies.

E. Dennis Wickham, Dir.
+44-181-979-7254, fax: +44-181-941-6521
e-mail: gaspalmer@aol.uk

GENERAL ATRONICS CORP., 1200 E. Mermaid Lane, Windmore, PA 19038

Manufacturers of special-purpose I&M cathode-ray tubes.

Howard Brown, Sls. Mgr.
215/233-4100, fax: 215/233-9947

GENERAL VACUUM, 190A Alapha Park, Cleveland, OH 44143

Providers of vacuum equipment and vacuum coating services to the FPD industry. Coatings include clear conductive coatings (ITO), diamond, diamond-like carbon, single and multilayer AR, metallization, and custom coatings for electronic, electro-optic, and optical devices including FPDs.

Gerald T. Mearini, Pres.
216/646-9986, fax: 216/646-9986

GENESIS MICROCHIP, INC., 200 Town Centre Blvd., Ste. 400, Markham, Ontario, Canada L3R 8G5

Manufacturers of cost-effective image-manipulation ICs for products, such as flat-panel monitors, projection systems, DTV/HDTV displays, DVD players, and more.

Robert Hunter, Mgr. Corp. Communs.
905/470-2742 x2294, fax: 905/470-9022
e-mail: rob@genesis-microchip.com
www.genesis-microchip.com

GENMARK, 310 Caribbean Dr., Sunnyvale, CA 94089

Manufacturers of robots for precision transport and prealignment of flat-panel displays within manufacturing capital equipment. Genmark robots uniquely enable in-line cassette- and processing-module placement without capital-intensive linear tracks and enable on-the-fly FPD centering and prealignment.

Victor Sales
408/745-6520, fax: 408/745-0583

GENNUM CORP., 970 Fraser Dr., Burlington, Ontario, Canada L7L 5P5

Manufacturers of bipolar integrated circuits for driving electromechanical displays.

Mike Fielding
905/632-2996, 1-800-263-9353

GENRAD, INC., 7 Technology Park Dr., Westford, MA 01886

Manufacturers of the GenRad/TEL GTS-1 LCD Test and Measurement System for LCD substrates, offering advanced measurement capability which provides fault type and address data for repair, and highly precise measurement data for process and product improvements.

Kyle Krauss
978/589-7121, 1-800-4-GENRAD
fax: 978/589-2050

GERBER SYSTEMS CORP., 83 Gerber Rd. West, South Windsor, CT 06074

Manufacturers of MaskWrite 800 and MaskWrite 500 large-area high-resolution direct-write imaging systems using raster technology to image on film, glass, and other photosensitive-type plates. Both imagers are used for producing lead

frames, FPDs, shadow masks, as well as other applications where high-precision high-resolution images are required.

George Murray, Prod. Mgr.
860/648-8117, fax: 860/251-0653

GEROME MANUFACTURING CO., INC. P.O. Box 1089, Oliver Rd., Uniontown, PA 15401

Manufacturers of custom-fabricated metal components for the electronic-instrument industry. Products include magnetic shields, instrument enclosures, internal chassis assemblies, and NEMA-rated cabinets. In-house capabilities include annealing, metal treating, painting, and silk-screening.

Joseph J. Putita, Plant Mgr.
412/438-8544, fax: 412/437-5608

GEROME MANUFACTURING CO., 403 N. Main St., P.O. Box 737, Newberg, OR 97132

Manufacturing division specializing in hi-tech custom metal fabricated assemblies, usually including high-attenuation magnetic shields, instrument chassis, and exterior cabinetry to customer's design.

Mike Stoyko, Gen. Mgr.
503/538-8356, fax: 503/538-1090

GINSBURY ELECTRONICS LTD., Ginsbury House, Sir Thomas Longley Rd., Rochester, Kent ME2 4DU, U.K.

Specialists in industrial and military display systems and components for CRT- and flat-panel-based technologies including CRT magnetics, HVPS, optical filters, programmable test generators, test equipment, touch screens, and full-color and monochrome monitor solutions.

Neville Milward, Dir.
+44-1634-298900, fax: +44-1634-290904

GLAVERBEL S.A., 166 Chaussee de la Hulpe, B-1170 Brussels, Belgium

Manufacturers of soda-lime glass for the display industry, specializing in extra-thin glass (0.4 mm).

Alain Dinaux
+32-26-74-35-82, fax: +32-26-74-32-87

GLEN TECHNOLOGIES, INC., 6014 Stuart Ave., Fremont, CA 94538

Manufacturers of plasma cleaning equipment for removal of organic contaminants from panel surfaces.

John Morris
510/770-9620, fax: 510/770-9621

GLOBAL IMAGING, 201 Lomas Santa Fe Dr., Ste. 380, Solana Beach, CA 92075

Software and systems integration for image-processing applications. Turnkey superworkstation for scientific visualization of remotely sensed data.

Michael Guberek
619/481-5750, fax: 619/481-5794
1-800-345-4624, 1-800-822-4624 (CA only)

GORDON INSTRUMENTS, INC., 3645 California Rd., Orchard Park, NY 14127-1755

Manufacturers of freestanding digitizing workstations. Planar light sources can be used with all types of digital/analog cameras. The light source is halogen-based with 3200K.

Richard Whipple, Sls. Mgr.
716/662-5353, 1-800-333-2672
fax: 716/662-7839

GRASS VALLEY GROUP, P.O. Box 1114, Grass Valley, CA 95945

Manufacturers of TV switching products; video processing, liming, and distribution equipment; production and routing switchers, digital effects devices, and fiber-optic communications systems.

Russ Johnson, V.P. Sls.
916/478-3160, fax: 916/478-3187

GREEN LIGHT MKTG. & COMMUNS., 366 San Miguel Dr., Newport Beach, CA 92660

Fully integrated technology marketing.

John Mooers, Pres.
714/719-6400, fax: 714/719-6414
e-mail: jmoosers@gmlt.com

GRITZ'S EMPORIUM, INC., 2708 Via Roberto, Carlsbad, CA 92008

Distributors of color and monochrome miniature CRT displays, 0.6, 1.0, 1.5, and 2.0 in. on the diagonal. New 2- and 3-in. high-resolution magna viewers. Mini CRTs

for LCLVs. Viewfinders with electronics for IR cameras and industrial and commercial applications. A 0.6-in. VGA display. Miniature backlights for LCDs.

Edward Gritz, Pres.
760/434-4676, fax: 760/434-7875

H. W. GROSSBOHLIN, 3224 Crazy Horse Dr., Simi Valley, CA 93063

Consulting and troubleshooting in CRTs and CRT displays.

H. W. Grossbohl, Consultant
805/581-1467

JOE HALLETT & ASSOCIATES, 22370 S.W. Grahams Ferry Rd., Tualatin, OR 97062-8022

Consultant to manufacturers and users of display products. Investigation and analysis of user needs, product definition, proposals, and market information for end users and OEMs. Background in consumer, industrial, aerospace, TV, and computer applications. Development, application, and marketing of CRT, flat-panel, and related technologies also available.

Joe Hallett, Consultant
503/692-5554

HANTRONIX, INC., 10080 Bobb Rd., Cupertino, CA 94014

Manufacturers of LCDs, LCD dot-matrix character modules, and LCD dot-matrix graphic modules.

Hollie Lee, Sls. Mgr.
408/252-1100, fax: 408/252-1123

HARRIS CORP., 505 John Rhodes Blvd., R3/7248, Melbourne, FL 32935

Manufacturers of the PhotoPro 2000 and 2500 high-resolution continuous-tone dry photographic printers that require no chemicals, toners, and ribbons.

Ronald J. Reed, Bus. Dev. Mgr.
407/242-5691, fax: 407/242-4245
www.hisd.com/products/imaging/index.html

WALTER HETT & ASSOCIATES
334 Hudson Rd., Stow, MA 01775-1403

Consulting services assisting industry in developing and managing electronics business in the aviation/aerospace marketplace.

Walter Hett, Aviation Consultant
508/567-0760, fax: 508/567-0761

HEWLETT-PACKARD CO., Components Group, 370 W. Trimble Rd., San Jose, CA 95131

Manufacturers of high-efficiency LED products. Broad range of optical packages, thru-hole and surface-mountable LED lamps. Large variety of LED display sizes, fonts, and colors available.

Mark Chandler, Mktg. Mgr.
408/435-6017, fax: 408/435-4980

HIGH LUMEN DISPLAYS, INC., 4779 W. Balsam Dr., Park City, UT 84098

Manufacturers of custom displays and high luminance backlights for LCDs. Displays and backlights range from 1 to 20-in.-diagonal size. Luminance outputs from display to over 1000 cd/m² (300 IL).

Applications include avionics, industrial, and outdoors. Display consulting.

Dan Syrold, Pres.
435/658-3488, fax: 435/658-3489

e-mail: dan@highlumen.com
www.highlumen.com

HITACHI AMERICA, LTD., 3850 Holcomb Bridge Rd., Ste. 300, Norcross, GA 30092

Manufacturers of tube-related devices: TV quality, monitor sizes and resolutions,

and projection tubes. Flat-panel devices: color active and passive matrix, color plasma, 1-1.4-in. poly-Si displays, and mid-resolution color and monochrome graphics displays.

Tim Patton, Bus. Devel. Mgr.
770/409-3000 x205, fax: 770/409-3028

HITACHI DENSHI AMERICA, LTD., 150 Crossways Park Dr., Woodbury, NY 11797

Manufacturers of high-resolution and high-definition large-screen display systems, 15.75-70 kHz. High brightness for use with computer graphics, data, and video sources. Switchers and accessories.

Six display sizes.
516/921-7200, fax: 516/496-3718

HITACHI, LTD., 5-1, 1-chome, Marunouchi, Chiyoda-ku, Tokyo 100, Japan

Manufacturers of color picture tubes; color display tubes; projection tubes; passive and active LCDs; imaging devices; and pickup tubes.

G. Watanabe, Mgr. Sls. Engrg.
+81-3-211-1111, fax: +81-3-212-3857

HOECHST CELANESE CORP., AZ Photoresist Products, 70 Meister Ave., Somerville, NJ 08876

Manufacturers of photoresists, developers, and ancillary chemicals for imaging of flat-panel displays. The TFP-600 series photoresist is for spin coat/extrusion coat, and the RFP-210K series is for roller coat.

Bruce Kiker, E. Sls. Mgr.
972/458-8056, 1-800-422-3884
fax: 972/661-1512

HOECHST CELANESE CORP., AZ Photoresist Products, 12001 North Central Expressway, Suite 1170, Dallas, TX 75243

Manufacturers of a complete line of photoresists, developers, removers, and organic anti-reflective coatings.

Bruce Kiker, Regional Mgr.
972/458-8056, 1-800-422-3884
fax: 972/661-1512

HOFFMAN ENGINEERING CORP., 8 Riverbend Dr., P.O. Box 4430, Stamford, CT 06907-0430

Manufacturers of photometric and radiometric test equipment, automated positioning systems for display performance analysis. Contrast measurement systems, calibrated light sources and laboratory standards. Standards, testing, and certification services.

Lee A. Stephens, Sls. Engr.
203/425-8900, fax: 203/425-8910
e-mail: sales@hoffmanengineering.com
www.hoffmanengineering.com

L. A. HOITT & ASSOCIATES, P.O. Box 3339, Santa Ana, CA 92703

Full-service marketing communication agency offering market research, market planning, identity programs, and creative services including graphic design

tradeshow management, newsletter development, media placement, and more.

Linda Hoitt, Pres.
714/543-7860, fax: 714/972-0304

HOLOGRAPHIC LITHOGRAPHY SYSTEMS, INC., Three Preston Court, Bedford, MA 01730

Developers of manufacturing tools and processes. The HLS System 1000 can generate sub-half-micron structures in a maskless high-throughput production

environment process and features large-field high-resolution patterning.
Jim Nole, VP Mktg.
617/276-4060, fax: 617/276-4074

HOLTRONIC TECHNOLOGIES SA,
12B Champs-Montants, 2074 Marin,
Switzerland
Manufacturers of advanced lithography equipment based on holography. Systems offer large-area sub-micron resolution suitable for TFT-LCDs, FEDs, micro-displays, and other high-resolution displays.
Simon Gray, Mktg. Mgr.
+41-32-753-6800, fax: +41-32-753-6501
e-mail: htsa@worldcom.ch
www.holtronic.com

HOMALITE, Division of Brandy Wine,
Investment Group, 11 Brookside Dr.,
Wilmington, DE 19804
Manufacturers of custom contrast-enhancement display filters made from thermoset polyester or allyl diglycol carbonate. Standard and custom colors with or without low-reflectance surface. Custom fabrication and bending also available.
Beth Soldwisch
302/652-3686, 1-800-346-7802
fax: 302/652-4578

HOME THEATER RESEARCH GROUP,
770 Berkeley Ave., Menlo Park, CA 94025
Market researchers offering multi-client and custom studies on large-screen displays in the home theater/consumer market. Publishers of the Continuing Home Theater Industry Service and Home Theater Industry Newsletter.
Alessandra Almgren, Pres.
650/325-5859, fax: 650/326-8466
www.htgroup.com

HONEYWELL, INC., Business & Commuter
Aviation Systems, 5353 W. Bell Rd.,
Glendale, AZ 85308
Manufacturers of avionics displays for commercial airliners, business aircraft, and helicopters. Providers of CRT, flat-panel, helmet-mounted, and head-up display solutions for the commercial and military avionics markets.
Carl Esposito, Display Prod. Line Mktg.
602/436-4705, fax: 602/436-7232
www.honeywell.com

HONEYWELL, INC., Defense Avionics
Systems Division, 9201 San Mateo Blvd.,
N.E., Albuquerque, NM 87113-2227
Manufacturers of fully militarized high-resolution monochrome and color CRTs and flat-panel displays in a wide variety of sizes for fixed-wing or rotary aircraft applications.
Randall E. Horn
505/828-5931, fax: 505/828-5500

HORNELL AUTOMATION, INC., 1072
Industrial Pkwy. North, Brunswick, OH
44256
Designers/manufacturers of high-capacity high-yield modular equipment for LCD production (MELP®). The MELP series includes the following modules: combination dry-cleaning/rubbing, bake-curing, dry spacer applicator, gasket sealing, align and assembly, breaking, and filling.
Dale B. Priem, Pres.
330/220-0514, fax: 330/220-0516
e-mail: info@hornell-automation.com
www.hornell-automation.com

HORNELL AUTOMATION, Tunavägen 281,
Borlänge S-781 73, Sweden
Manufacturers of the MELP (modular equipment for LCD production): modules for rubbing, dry cleaning, adhesive application, dry-type spacer application, alignment and assembly, filling, and edge sealing. LCD optics test instrumentation for viewing angle, light scattering, and switching time.
Niclas Granér, Pres.
+46-243-390-95, fax: +46-243-390-55

HORNELL ELEKTROOPTIK AB,
Gagnef, Sweden, S-78041
Manufacturers of LCD shutters for use in welding filters and similar applications. Custom-designed optical components based on LC technology.
John Danielson, Mktg. Mgr.
+46-241-62030, fax: +46-241-62107

HOSIDEN AMERICA CORP., 120 E. State
Parkway, Schaumburg, IL 60173
Manufacturers of active and passive LCDs for a variety of applications including automotive, avionics, cellular, desktop computer monitors, office automation, personal communicator, and projection.
Rich Maryanski, LCD Sls. & Mktg. Mgr.
708/885-8870, fax: 708/885-0063

HOWTEK, INC., 21 Park Ave., Hudson,
NH 03051
Manufacturers and marketers of color input and output peripherals for PCs and Mac IIs with supporting software. These peripherals include the Scanmaster series of flatbed and 35-mm film scanners and the Pixelmaster solid ink-jet printer, capable of up to 262,000 colors.
Connie Webster
603/882-5200, fax: 603/880-3843

HOYA CORP. USA, OPTICS DIV.,
960 Rincon Circle, San Jose, CA 95131
Exclusive U.S. distributor of NH TECHNO NA-series glasses for flat-panel display manufacturing. Contrast and color correction filters, and custom coatings for CRT, LED, and other displays available.
Gerald Bottero, V.P.
408/435-1450, fax: 408/435-1536

HOYA ELECTRONICS CORP., 50 Tice
Blvd., Woodcliff Lake, NJ 07675-7664
Manufacturers of optical glass for the IC and display industry. Products includes thin-film deposition (ITO and AR coating).
Robert E. Gesullo
201/307-0003, fax: 201/307-1937

HP REID CO., 1 Commerce Blvd., Palm
Coast, FL 32135
Manufacturers of Al, Cu, and Au-plated Cu bonding wires. Ultrafine sizes of insulated and bare wires available.
Rob Specht, VP Mktg.
904/445-2000, 1-800-772-9473
fax: 904/446-2244

H-SQUARE CORP., 1289 Reamwood Ave.,
Sunnyvale, CA 94089
Manufacturers of H-Square cassettes that ensure maximum cleanliness while providing ESD controls and high-temperature compatibility. Exclusive vertical mizo plates provide the support required to safely transport large (up to 840 x 1025 mm) substrates.
Bud Barclay, V.P. Sls./Mktg.
408/734-2543, fax: 408/734-1132

HUDSON PHOTOGRAPHIC INDUSTRIES,
INC., P.O. Box 227, Irvington, NY 10533
Manufacturers of MIRRORLITE® glassless projection-grade mirror panels (type PGR and PGX) used in rear-projection systems. The mirror panels are optically equivalent to glass mirrors, light weight, rigid, self-supporting, and have built-in mounting devices. Sizes range from 24 x 24 in. to 68 x 240 in.
Norman Rabinowitz, V.P. Sls./Mktg.
914/591-8700, fax: 914/591-8859

HUGHES-JVC TECHNOLOGY CORP.,
2310 Camino Vida Roble, Carlsbad, CA
92009
Manufacturers of large-screen projectors with brightness ranging from 2000 to 3500 lm, filling screens from 8 to 40 ft. wide. These projectors utilize Image Light Amplifier® technology, providing bright, resolute, and pixel-free images.
Alan Brawn
760/929-5300, 1-800-USA-LVPI
fax: 760/929-5708

HUGHES LIGHT VALVE PRODUCTS,
INC., 2310 Camino Vida Roble, Carlsbad,
CA 92009
Manufacturers of liquid-crystal light-valve projectors with high brightness, high resolution, and high contrast ratio and wide horizontal frequency range and video bandwidth; available in a variety of screen sizes.
Alan Brawn
619/929-5300, 1-800-USA-LVPI
fax: 619/929-5708

THE HUMAN FACTORS AND ERGO-
NOMICS SOCIETY, P.O. Box 1369, Santa
Monica, CA 90406-1369
Non-profit professional association concerned with the safety and usability of systems, tools, and environments intended for human use. Publishes resources and conducts meetings on all aspects of human-system interaction.
310/394-1811, fax: 310/394-2410
e-mail: hfes@compuserve.com
www.hfes.org

HUNET, INC., LCD DEPARTMENT., 1-32-
16 Ebisu-nishi Shibuya-ku, Tokyo 150-
0021, Japan
Manufacturers of large-sized (12-in.) SVGA field-sequential TFT-LCDs without color filters.
Yoshihito Yoshii, Mktg. Mgr.
+81-3-3780-2511, fax: +81-3-3780-2555
e-mail: info@hunetlcd.co.jp
www.hunet.com

HYACINTH TECHNOLOGY, INC.,
155 L New Boston St., Woburn, MA 01801
Manufacturers of high-voltage power supplies, amplifiers, and systems for CRT-based, direct-view, color and monochrome, projection, film-recorder applications.
Rajen Patel
617/937-0619, fax: 617/937-6319

HYBRID MICROGRAPHICS, INC.,
5216 Greenpine Dr., Murray, UT 84123
Manufacturers of digital film recorders, computer-output microfilm recorders, digital-output microfilm recorders.
Thomas A. Hoopes, Pres.
801/264-1818, fax: 801/264-10855

HYUNDAI ELECTRONICS INDUSTRIES
CO., LTD., Ichon-si, Kyongki 467-701,
Korea
Manufacturers of a line of TFT-LCDs for notebook PCs.
D. K. Kim, Sls. Dir.
+336-39-8404, fax: +336-39-6415

IBM CANADA LTD., 23 Airport Blvd., Dept.
594/M1, Bromont, Quebec, Canada J0E-1L0
Providers of metallization and personalization services for glass panels for plasma displays and color filters. Sputtered materials include ITO, chrome, copper, and aluminum. Maximum panel size is 38 x 27 in. High throughput photolithography manufacturing line also available.
E. Pires, Mgr./Thin-Film-on-Glass Prod.
514/534-6656, fax: 514/534-6688

IBM CORP., Old Orchard Rd., Armonk, NY
10504
Manufacturers of a line of display and printer products connecting to large systems, mid-range systems, workstation systems, and personal computers. Many of these products have graphics and image capability. Software support for many graphics and image applications is available.
914/765-1900 National organization.
Please refer to your local telephone directory.

IDM (INTERNATIONAL DESIGN MODEL-
ING), 70 Horizon Dr., Bedford, NH 03110
Manufacturers of interconnects with densities of 700 in./in.², hole sizes down to 2 mills (25 µm), areas up to 29 x 29 in., and up to 20 layers.
N. Edward Berg, Pres.
Phone/fax 603/472-7068

IEE, INC., 7740 Lemona Ave., Van Nuys,
CA 91409
Experience in many display technologies including VF, LCD, color LCD, cholesteric LCD, AMLCD, large-screen color ac plasma, ACTFEL, and dc plasma. Capability to integrate any combination of display, keypad, touch screen, backlight, and mechanical packaging.
Steve White, V.P. Sls. & Mktg.
818/787-0311, 1-800-422-0867
fax: 818/901-9046
e-mail: mail@ieeinc.com
www.ieeinc.com

IGS, INC., 916 E. California Ave.,
Sunnyvale, CA 94086-4505
Fabricator and distributor of glass, both coated and uncoated, to the flat-panel, LCD, and projection display manufacturers. Services include cutting, shaping, and polishing of glass. A wide variety of glass is inventoried for immediate delivery.
Donald J. Gamberutti, Customer Relations
408/733-4621, fax: 408/733-0452
e-mail: igsglass@aol.com

ILC TECHNOLOGY, INC., 399 Java Dr.,
Sunnyvale, CA 94089
Designers/manufacturers of Cermac® xenon arc lamps, power supplies, light systems, and Daymax® metal-halide lamps for video projectors.
Joanne Bakerville, Cust. Svc. Mgr.
408/745-7900, 1-800-347-2474
fax: 408/744-0829
www.ilct.com

IMAGE ANALYTICS CORP., 275-D Marcus Blvd., Hauppauge, NY 11788

Manufacturers of custom-designed filters (polarized and color) and image analysis systems for biological research. Ronald M. Miller, Pres. 516/273-8900, fax: 516/273-1190

IMAGE PROCESSING SYSTEMS, INC., 3440 Pharmacy Ave., Scarborough, Ontario, Canada M1W 2P8

Designers/manufacturers of automated display inspection and alignment systems for monitors and TVs using machine-vision technology. Products include handheld measurement tools, geometry alignment systems, and complete turnkey ITC installations.

David J. A. Morrison, VP Mktg. 416/492-4000, fax: 416/492-4001

IMAGE SYSTEMS CORP., 6103 Blue Circle Dr., Minnetonka, MN 55343

Manufacturers/designers of gray-scale high-brightness monitors that sync from NTSC to 2560 x 2048. Sizes range from 9 to 24 in. landscape and 21 and 24 in. portrait. Color FP1610HBMALCD also available.

Marta S. Volbrecht, V.P. Sls. 612/935-1171, fax: 612/935-1386 e-mail: martasv@aol.com www.imagesystemscorp.com

IMAGINE GRAPHICS, LTD., 10 St. Albans Enterprise Centre, Long Spring, Porters Wood, St. Albans AL3 6EN, U.K.

Specializing in display technology including wide-screen (16 x 9) graphics cards for PDPs and multichannel MPEG-2 decoders. Richard James, Sls. & Mktg. Mgr. +44-1727-844-744, fax: +44-1727-811-660 e-mail: sales@imagine-g.com www.imagine-g.com

IMAGING & SENSING TECHNOLOGY CORP. (IST), 300 Westinghouse Circle, M/S 624, Horseheads, NY 14845-2299

Designers/manufacturers of specialized high-performance CRTs for industrial and military applications. Sizes range from 0.5 to 25 in. Phosphor coating of various substrates and targets. Miniature ruggedized biocular CRT displays in 1-, 1.5-, and 2-in. sizes for military track vehicles.

Jeff Taylor, Mktg. Mgr., CRT Products 607/796-4587, fax: 607/796-4490 e-mail: jtaylor@istcorp.com www.istcorp.com

IMAGING DISPLAY TECHNOLOGIES, 5730 Duluth St., Minneapolis, MN 55422

Distributors and consultants in the design and development of high-resolution video monitors for medical and desktop imaging. Offering both color and gray-scale flat-panel and CRT monitors. Scanning frequencies from NTSC/PAL to 200 kHz and refresh rates up to 180 Hz. CRT monitor sizes range from 15 to 21 in. Landscape or portrait LCD monitors in sizes from 15 to 20 in.

Madhu Reddy, Pres. 612/591-2605, fax: 612/591-0726 www.uselectronic.com

IMAGRAPH CORP., 220 Mill Rd., Chelmsford, MA 01824

Manufacturers of PCL/VL-bus video imaging boards. IMASCAN accepts NTSC/PAL, RS-170, RGB, and YUV video signals, and includes SVGA on-board

single/dual monitor operation. WINS 3.1 and NT are supported.

Peter Stoupas 508/256-4624, fax: 508/250-9155

IMAPRO CORP., 2400 St. Laurent Blvd., Ottawa, Ontario, Canada K1G 6C4

Manufacturer and distributor of professional color scanners that scan 24-bit color at 600 and 1200 dpi; an 8K film recorder with no DAC lines in 35mm, 4 x 5, and 8 x 10 formats; a color pre-press system which includes four-color film output.

Harry St. Onge 613/738-3000, fax: 613/738-5038

IMT MASKEN UND TEILUNGEN AG, Im Langacher, Greifensee CH-8606, Switzerland

Large-area photomasks with chrome or iron-oxide layer. Mask sizes up to 32 x 24 in. Resolutions down to 2 µm. Peter Kirkegaard, Sls. Mgr. +41-1-943-1910, fax: +41-1-943-1901 e-mail: pkirkegaard@img.ch www.img.ch

INCLINE CORP., 2192 Anchor Ct., Newbury Park, CA 91320

Providers of flat-panel repair for every technology from LCD to large-area plasma displays. Offering worldwide service and logistics support specific to the flat-panel industry.

Jim Irvine, Mgr. Bus. Devel. 805/376-3300, fax: 805/376-3302 e-mail: jim@incline-lcd.com www.incline-lcd.com

INCOM, INC., 294 Southbridge Rd., Charlton, MA 01507

Manufacturers of fiber-optic faceplates and components, including tapers, CCD windows, image conduit, clad rod, and rigid lightguides. Michael A. Detarando, Dir. Sls./Mktg. 508/765-9151, fax: 508/765-0041

INDIUM CORPORATION OF AMERICA, 1676 Lincoln Ave., Utica, NY 13502

Suppliers of indium tin oxide (ITO) powder to makers of ITO sputtering targets; ONSPEC® metal indium/tin targets; indium ingot, foil, and wire for target bonding to backing plates. Also, indium reclaim service.

Phil Scalise, Sls. Associate 315/853-4900, 1-800-446-3486 fax: 315/853-1000, 1-800-221-5759

INFAX, INC., 2485 Lithonia Industrial Blvd., Lithonia, GA 30058

Manufacturers of digital-to-video converters: multiple CGA, EGA, VGA outputs, serial and parallel data inputs. Monochrome display monitors: 5-, 9-, and 23-in. models. Mike Davis, Pres. 770/482-2755, fax: 770/482-4057

INFINITE GRAPHICS, INC., 4611 E. Lake St., Minneapolis, MN 55406

Suppliers of large-area high-resolution direct-imaged chrome and iron-oxide phototools as well as photoemulsion tools. Developers/marketers of a complete graphics design and manufacturing package for precision graphics. Supplier of turnkey packages, including plotters. Marty Mykkanen, Dir. Mktg. & Sls. 612/721-6283, fax: 612/721-3802 www.igi.com

INFINITY MULTIMEDIA INTL., 14225 Ventura Blvd., Sherman Oaks, CA 91423

Manufacturers/distributors of autostereoscopic 3-D displays and content for the arcade, video-game, and consumer-electronics markets. Multi-view systems provide motion-parallax as well as stereo information. Suzanne Ponder, Sr. V.P. 818/981-4950 x26, fax: 818/501-6224

IN FOCUS SYSTEMS, INC., 27700B SW Parkway Ave., Wilsonville, OR 97070

Manufacturers/distributors of a complete line of monochrome and color PC Viewer LCD projection panels that are placed on an overhead projector to display data and graphics from a PC onto a screen or wall. The Liteshow II™, a portable presentation manager for organizing, enhancing, and displaying computer-generated images in brilliant color. Mike DeWitt, Natl. Sls. 503/685-8888, fax: 503/692-8867

INFODEX, INC., 10 Venus Dr., Wolcott, CT 06716

Designers/manufacturers of a full line of monochrome and color CRT and flat-panel EL display monitors for the military, industrial, and medical markets. Ernie Ulm 203/879-4944, fax: 203/879-4944 x230

INFO-LITE CORP., 422 Cliff St., Fairview, NJ 07022

Manufacturers of large numeric displays and instruments, alphanumeric displays and message signs, backlit indicators and annunciators, matrix pinboard switches, and read switches. Joseph M. Cartelli, Tech. Mktg. Mgr. 201/941-4455, fax: 201/941-4919

INFORMATION PRODUCTS, INC., 414 E. 40th St., Holland, MI 49423

Manufacturers of glass-related components for the touch-screen and display industry. Turnkey supplier with core technologies in glass bending, coating, screen printing, cutting, laminating, and anti-glare applications. Support for all major touch technologies including resistive, SAW, GAW, electrostatic, and NFI. Jim Landsman, V.P. Sls. & Mktg. 616/786-5318, fax: 616/786-5042 jim.landsman@donnelly.com

INNOTECH GROUP, INC., 61W Moreland Rd., Simi Valley, CA 93065

Manufacturers of vertical in-line sputtering systems and in-line evaporation systems for the manufacture of flat-panel displays; rf, dc, and electron-beam power supplies; and vacuum components. William T. Read, Dir. Sls./Mktg. 805/522-9040, fax: 805/522-6017

INNOVATED IMAGE, INC., 710 Denbigh Blvd., Bldg. 6, Suite A-1, Newport News, VA 23608

Providers for presenters, trainers, and educators of LCD and DLP projectors and LCD panels from leading manufacturers, including nView, In Focus, Proxima, Telex, and NEC. J. Landon Lovett, Pres., Mktg 757/872-6896, 1-888-771-6896 fax: 757/872-6783

INSTITUTE FOR PHOTOMETRY AND RADIOMETRY, 1926 Contra Costa Blvd., Suite 163, Pleasant Hill, CA 94523

Manufacturers of high-precision photopic detectors, CIE tristimulus colorimeters,

spot-photometers; P65 light sources; standard LEDs, and testers. Measurement and calibration services for photometric and radiometric parameters; light sources, detectors, transmissivity, reflectivity. Kathleen Murray, Pres. 510/689-2039, fax: 510/689-2788

INSTRUMENT SOCIETY OF AMERICA, 67 Alexander Dr., Research Triangle Park, NC 27709

Worldwide organization for instrumentation and control engineers and technicians. ISA also publishes videotape and interactive videodisc instruction products as well as applications software. Gale Girer, Mgr. Media Pub. 919/549-8411, 1-800-334-6391 fax: 919/832-0237

INSTRUMENT SYSTEMS, 576 Golden Ave., Ottawa, Ontario, Canada K2A 2E9

Distributor of systems for optical measurement solutions with emphasis on display and LED testing. Complete five-axis display test system with CCD-array spectroradiometer. IQCam Imaging Photometer for luminance mapping of displays. Polarization measurements of optical components. Tim Moggridge, N. Amer. Sls. Mgr. 613/729-0614, fax: 613/729-9067 tirm@instrumentsystems.com www.instrumentsystems.com

INSTRUMENT SYSTEMS GmbH, Neumarkter Strasse 83, Muenchen D-81673, Germany

Manufacturers of optical measuring equipment for testing displays and LEDs. Scanning and CCD-array based spectroradiometers, full five-axis positioners for turnkey testing according to VESA and ISO standards, and polarization analyzers. Erich Obermeier, Sls. Mgr. +49-89-454-9430, fax: +49-89-454-9431 e-mail: info@instrumentsystems.de www.instrumentsystems.com

INTECOLOR CORP., 2150 Boggs Rd., Duluth, GA 30136

Manufacturers of monitors and workstations for industrial and ruggedized applications. Marine-certified, NEMA-4 and 4x rated, plus x, y, and z purged versions featuring touch-screen integration, magnetic shielding, and integrated high-performance computers. Rebecca Urbel 770/623-9145, fax: 770/623-9163

INTEGRAL VISION, 38700 Grand River Ave., Farmington Hills, MI 48335-1563

Designers of the LCI-Pro display inspection system for LC, dot-matrix, seven-segment, and vacuum-fluorescent displays. Bob Bachman, Sls. Engr. 248/471-2660, fax: 248/615-2971 www.medar.com

INTERACTION SYSTEMS, INC., 10 Commerce Way, Wolbum, MA 01801

Manufacturers of Crystal Clear™ capacitive touch screens, providing better than 95% light transmission with less than 0.5% reflection in hostile environments with up to 100% humidity. Phil Baker, Mktg. 617/932-0700, fax: 617/932-3088

INTERACTIVE COMPUTER PRODUCTS INC., 23482 Peralta, Unit C, Laguna Hills, CA 92653

Manufacturers of light pens and complete light-pen systems for computer terminals,

workstations (SUN, SPARC, and HP), and personal computers (IBM PCs, clones, and PS/2s). Available for monochrome and color CRT displays. Resolution to 1280 x 1024.
Pat Cooper, Sls./Mktg. Mgr.
714/770-5332, 1-800-392-0540
fax: 714/770-8137

INTERFACE PRODUCTS, INC.,
4630 North Ave., Oceanside, CA 92056
Manufacturers/designers of controls and displays for commercial and military applications, including AMLCDs, passive, touch screens, integrated switch panels, backlights, electroluminescent displays, and display components manufactured in an ISO9001 facility.
Larry Green, Bus. Dev. Mgr.
760/945-0230, fax: 760/945-0239

INTERLINGUA LINGUISTIC SVCS., INC. (see DISPLAY TECHNOLOGY LIBRARY),
423 S. Pacific Coast Hwy. #208, Redondo Beach, CA 90277
Information access and translation company specializing in display literature from Japan, Korea, and China. Documents retrieved and translated include Nikkei's Flat Panel Display Yearbook, FPD Intelligence Magazine, Fuji Chimera's Research Report on Manufacturing, and more.
David Andrews, CEO
310/792-3638, fax: 310/792-3642
www.displaylibrary.com

INTER-LOGIC SYSTEMS CO., INC., 12708 Hoover St., Garden Grove, CA 92841
Manufacturers of probe test fixtures to test display substrates for electrical shorts and opens. LINEAR CONTACTOR can contact stripes as close as 0.010 in. and as many as 100 at one time. Also, probe stations for mounting test fixtures and substrates.
John K. Logan, Pres.
714/891-4456, fax: 714/894-6668

INTERNATIONAL MICRO IND., INC.,
8000 Commerce Parkway, Mount Laurel, NJ 08054-2227
Manufacturers of equipment to bond driver chips to FPDs. Also, contact assembly, including TAB and flip-chip technologies.
Thomas L. Angelucci, Sr., CEO
609/273-0200, fax: 609/273-4364

INTERNATIONAL POLARIZER, INC.,
320 Elm St., Marlborough, MA 01752
Manufacturers of a wide variety of linear polarizers, wave retarders, and circular polarizers. These optical films are also offered laminated to glass or optical plastics.
Peter Colarusso, V.P. Sls. & Mktg.
508/481-4943, fax: 508/481-0222
e-mail: sales@intl-polarizer.com
www.intl-polarizer.com

INTERSERV CORP., 9555 James Ave. S., Ste. 230, Bloomington, MN 55431
Manufacturers of PANALIGN™, a ±1-μm automatic alignment/assembly system for large-area FPDs. The GDx product line of adhesive dispensing systems, with real-time active z-axis control, dispenses adhesive on substrates up to 1200 x 1600 mm. ELECTROMASK® II large-area lithography and photomask imaging systems.
Ron McKay, Sls. Mgr.
612/888-9767, 1-800-445-2738
fax: 612/888-0796
www.interservcorp.com

INTERSTATE ELECTRONICS CORP.,
1001 E. Ball Rd., P.O. Box 3117, Anaheim, CA 92803
Manufacturers of displays for space-borne, airborne, shipboard, and land-based applications. The product offering includes high-resolution color CRTs, thin-film electroluminescent, ac plasma, and LCDs specifically designed for military environments.
Russ Summers
714/758-4032, 1-800-854-6979
fax: 714/758-4111

INTEVAC, INC., 3550 Bassett St., Santa Clara, CA 95054
Manufacturers of the D-STAR™ sputtering system, updated for third-generation ITO and metal thin-film production with rates to 90/hour. The CP-3545 RTP system provides high-throughput processing for crystallization, dopant activation, and dehydrogenation in poly-Si LCDs.
Stacy H. Oresman, Mgr. FPD Sys. Mktg.
408/496-2214, fax: 408/888 8145

INTRONICS, 150 Dan Rd., Canton, MA 02021
Manufacturers of monolithic distortion correction devices that accurately correct for geometric or focus distortion in CRT displays.
Gene Stancato
781/828-4992, 1-800-367-0004
fax: 781/828-5050

ION SYSTEMS, 1005 Parker St., Berkeley, CA 94710
Manufacturers of state-of-the-art electrostatic energy management solutions to help high-tech manufacturers manage their static budgets for maximum yield, throughput, and profitability.
Geoff Barber, Global Prod. Mgr.
510/548-3640, 1-800-367-2452
fax: 510/548-0417
e-mail: ionsys@ion.com
www.ion.com

IPS AUTOMATION, 221 Whitehall Dr., Markham, Ontario L3R 9T1, Canada
Designers/manufacturers of turnkey electronic/machine-vision systems. Also, Automated Display Inspection (ADI) systems that provide inspection and alignment of CRTs used in TVs and computer monitors. Tests performed include intensity, cutoff, brightness, focus, convergence, geometry, etc. Other turnkey include Automated Glass Inspection (AGI) systems for QVS systems for bottle thread inspection.
905/470-8990, fax: 905/470-8991
e-mail: ips@ipsautomation.com
www.ipsautomation.com

IRIS GRAPHICS, INC., 6 Crosby Dr., Bedford, MA 01730
Manufacturers of a family of high-resolution color printers, based on continuous ink-jet technology, used in a wide range of color-critical applications. They offer a perceived resolution of 1500-1800 dpi, support a variety of low-cost substrates, and output four-color images up to 34 x 46.3 in.
Steve Potthoss
617/275-8777, fax: 617/275-8590

IRISTAL LTD., P.O. Box 516, Herzliya 46105, Israel
Manufacturers of flat LCD rear projectors, 148 cm on the diagonal, with very wide viewing angle, high contrast, and high resolution.
Stalaw Michael, Dir.
+972-9-9580-261, fax: +972-9-9561-282

ISCAN, INC., 89 Cambridge St., Burlington, MA 01803
Manufacturers of automatic video tracking and electro-optical systems for human-machine interface, medical, military, and other research applications.
Rikki Razdan, Pres.
781/273-4455, fax: 781/273-0076

ISE ELECTRONICS CORP., P.O. Box 46, Ise, Mie, 516-11 Japan
Manufacturers of vacuum fluorescent displays; VFD module and sub-system; picture-element displays for large-screen information panel; and related products.
Kazuhiro Kasano, Gen. Mgr. Engr. Div.
+81-596-39-1111, fax: +81-596-39-0366

ITG (INTERNATIONAL TECHNOLOGY GROUP), LLC, Plastics Div., 58 Oakdale Ave., San Rafael, CA 94901
Manufacturers of thin-film coated, hard-coated, diffused hard-coated (for PTVs) plastic products; clear or tinted HOSTAGLAS®/Opti-Glass™; antiglare/reflection, antistatic, anti-e-radiation filters for CRTs and electronic displays. Plastic ergonomic components.
Dieter W. Grabis, Pres. & CEO
415/454-8054, fax: 415/457-5983
e-mail: itglc@webtv.net
www.inergy.com/itglic

ITO AMERICA CORP., 123 N.W. 13th St., Ste. 308, Boca Raton, FL 33432
Distributors of materials, components, and manufacturing equipment for assembly of flat-panel displays, including heat-seal connectors, seal materials, LED backlights, and diffuser modules, TAB mounting/bonding equipment, polarizer laminators, PI printing equipment and mattes, and many others.
Arthur Sieders, Sr. Tech. Mktg. Mgr.
602/426-1510, fax: 602/426-1509
e-mail: arthur@itousa.com
www.itousa.com

ITT CANNON, 666 G Dyder Rd., Santa Ana, CA 92705
Suppliers of connectors and interconnection systems to a variety of markets, including information systems, microminiature, automotive, fiber optics, industrial controls and military/spare applications.
Dick Torson
714/557-4700, fax: 714/754-2142

JACO ELECTRONICS, 145 Oser Ave., Hauppauge, NY 11788
Distributors of LCD affiliated products and FPD monitors. Providing value-added services including kitting, touch screens, and full system integration on LCDs.
Richard Walsh, Dir. LCD Mktg.
516/273-5500, 1-800-989-5226
fax: 516/434-3847
www.jacoelectronics.com

JAE ELECTRONICS, INC., 142 Technology Dr., Ste. 100, Irvine, CA 92618
Manufacturers of high-density board-to-board, flex-to-board connectors for use with FPC, hinged connectors with FPC for matched impedance, and easy assembly between main and logic board and monitor.
Sue Wood, Product Mktg. Mgr.
949/753-2618, 1-800-523-7278
fax: 949/753-2699
e-mail: woods@jae.com
www.jae.com

J. A. WOOLLAM CO., INC., 645 M Street, Ste. 102, Lincoln, NE 68508
Manufacturers of spectroscopic ellipsometers for non-destructive thin-film

characterization. Perfect for film thickness, optical constants, resistivity, and multilayer measurements. Display applications include oxides, nitrides, a-Si, ITO, color filters, metals, glass, polymers, liquid crystals, and more.
James Hilliker, Engr.
402/477-7501, fax: 402/477-8214
e-mail: jhilliker@jawollam.com
www.jawollam.com

JENOPTIK LASER, OPTIK, SYSTEME GmbH, Oskar-von-Miller Str. 1, Eching 85386, Germany
Distributors of digital studio cameras and backs that photographs people, catalogs, and stills; one/four-shot modes; color on-line adjustments, up to 36M non-interpolated resolutions, 36-bit tonal range.
Helga Wagensonner, Mktg. Mgr.
49-8165-77-540, fax: 49-8165-77-503
www.eyelike.com

JKL COMPONENTS CORP., 13343 Paxton St., Pacoima, CA 91331
Suppliers of miniature and subminiature incandescent lamps, color filters, and sockets. Also, miniature cold- and hot-cathode fluorescent lamps and inverters, glass wedge lamps, neo-wedge lamps, halogen and xenon surface mount lamps.
Don Sonntag, Cust. Svc. Mgr.
818/896-0019, 1-800-421-7244
fax: 818/897-3056
e-mail: jkl@jklamps.com
www.jklamps.com

KAHN INTERNATIONAL, A California Corporation, 782 Southampton Dr., Palo Alto, CA 94303
Providers of strategic information and consulting services to the projection-display-industry decision makers. The Private Line monthly multiclient report provides timely expert opinion, critical analysis, and supporting information on projection-display markets, technologies, and trends.
Frederic J. Kahn, Pres. & Editor
650/327-2043, fax: 650/429-2035
e-mail: fjkahn@post.harvard.edu

KAISER ELECTRONICS, 2701 Orchard Pkwy., San Jose, CA 95134
Supplier of head-up displays, multi-function displays, display processor and integrated helmet displays, and LCDs for combat aircraft.
408/432-3000 x1705

KAISER OPTICAL SYSTEMS, P.O. Box 983, 371 Parkland, Ann Arbor, MI 48108
Manufacturers of holographic head-up displays, laser eye-protection devices, LCD holographic diffusers and projection screens, holographic filters and components, imaging spectrographs, Raman fiber-optic probes and microscopes, high-resolution CCD cameras, and spectroscopy software.
James McNaughton, Dir. Bus. Dev.
313/665-8083, fax: 665-8199

BOZEL KAMSTRA, 5914 W. Courtyard Dr., Ste. 320, Austin, TX 78730
Marketing-communications firm, coordinating planning and implementation of integrated marketing communications on behalf of clients such as Canon USA, Integrated Design, Inc., Eagle-Picher Industries, Inc., and 3M Company.
Cheryl Seeman
512/343-8484, fax: 512/343-6010

K AND M ELECTRONICS, INC.,
11 Interstate Dr., W. Springfield, MA 01089
Manufacturers of high-reliability high-voltage ruggedized dc power supplies (30 W + 60 W series) for commercial, military, medical, analytical, and other high-definition high-resolution custom display applications (digital film recorders, CAD stations, etc.).
Rick Brighenti, Product Mgr.
413/781-1350 x285, 1-800-442-4334
fax: 413/737-0608

K & R ENGINEERING SALES CORP.,
227 Rt. 206, Flanders, NJ 07836
Manufacturers representative for magnetic shielding, deflection yokes, focus coils, and high-voltage power supplies.
Bob Resker, Pres.
973/584-5235, fax: 973/584-4375

KELTRON POWER SYSTEMS, INC., 225 Crescent St., 3rd. Fl., Waltham, MA 02472
Manufacturers of high-voltage power supplies for applications including video projection, computer/film recorders, x-ray image intensifiers, beam penetration color displays, computer graphics, TV studio monitors, HDTV.
Sean Jaromy, Sls./Mktg. Mgr.
516/582-2080, 1-800-345-2645
fax: 516/582-2080
e-mail: sjaromy@aol.com
www.filloil.com

KENIX INDUSTRIES, INC., 2006 E. 5th St., Tempe, AZ 85281
Manufacturers of a full line of LCD-manufacturing equipment, including PI printer, rubbing machine, seal/Ag printer, dry-spacer applicator, align/assembly machine, press/cure, scribe/breaker, end-seal machine, polarizer laminator, LC fill machine, and related equipment.
W. Joe Cho, V.P.
602/967-9461, fax: 602/921-0836

KENT DISPLAYS, INC., 343 Portage Blvd., Kent, OH 44240
Manufacturers of LCD modules using bistable cholesteric LC technology. Features include No-Power™ image memory, high reflectivity, and 360° viewing cone, and exceptional contrast, even in direct sunlight without backlighting. The ChLCD technology is a solution for cellular telephones, pagers, GPS, gas pump displays, marquees, transportation signage, and other applications.
Cliff Kolp, Sls. Mgr.
330/673-8784, fax: 330/673-4408
www.kentdisplays.com

KENT MODULAR ELECTRONICS, LTD., 611 Maidstone Rd., Rochester, Kent ME1 3QL, U.K.
Manufacturers of high-performance color and monochrome CRT monitors from 5 to 21 in. for industrial, financial, and medical applications. Expertise in custom/replacement monitor design. Also, rugged TFT-LCD touch-screen monitors for desktops and rack and panel mounting.
John Russell, Managing Dir.
+44-1634-830-123, fax: +44-1634-830-619
e-mail: sales@kme.co.uk
www.kme.co.uk

KIMBALL PHYSICS, INC., 311 Kimball Hill Road, Wilton, NH 03086-9742
Manufacturers of UHV electron and ion sources/systems (beam energies from 5 to 100 keV), cathodes, Faraday cups, UV components, multi-CF fittings, vacuum chambers, and eV parts. System options:

energy sweeping, rastering, fast pulsing, and emission current control. Custom design.
Faye Bigarel, Tech. Sls.
603/878-1616, 1-888-546-7497
fax: 603/878-3700
e-mail: info@kimphys.com
www.kimphys.com

KISCO, Division of Kishimoto Sangyo Co., Ltd., 4655 Old Ironsides Dr., Ste. 390, Santa Clara, CA 95054
Distributors/manufacturers of manufacturing equipment and materials including LC filling, PI printing, rubbing, spacer spray, and polarizer cutting and lamination. Chisso liquid crystal, sealing epoxy, pin connectors, high-intensity LED and LCD cells and modules.
Thomas L. Climer, Mgr. LCD Group
408/748-1888, fax: 408/748-1064

KLA ACROTEC, 12-1 Fujimi 1-chome, Chiyoda-ku, Tokyo 102, Japan
Manufacturers of automated inspection systems that locate defects on flat-panel displays as they are being manufactured. Other products include review microscopes and data analysis computers that complement the inspection systems.
N. Higashi-Iriki
+81-3-3230-7011, fax: +81-3-3230-4120

KLA INSTRUMENTS, 160 Rio Robles, San Jose, CA 95134
Distributors (for all locations outside Japan) of KLA Acrotec's automated inspection equipment for flat-panel displays. See "KLA Acrotec" listing for description of this equipment.
Douglas Hendricks
408/434-4200, fax: 408/456-6864

KLEIN INSTRUMENTS CORP., 2236 S.E. Belmont St., Portland, OR 97214
Manufacturers of the CM series of convergence gauges since 1983. Also, the UPG video pattern generator.
Mark Koepping, Sls. Mgr.
503/245-1012, fax: 503/245-8166
e-mail: sales@kleininc.com
www.kleininc.com

KOLLMORGEN CORP., Electro-Optical Div., 347 King St., Northampton, MA 01060-2390
Manufacturers of integrated optronic systems utilizing CCD and thermal imaging cameras together with image processing and control technology at an image control/graphics workstation.
Douglas R. Jones
413/586-2330, fax: 413/586-1324

KONTOY PRODUCTS CO., LTD., 166 Wai Yip St. 9/F, Kwun Tong, Hong Kong
Manufacturers of LCD production equipment and tools.
P. L. Mok, Opms. Mgr.
+852/341-3238, fax: +852/357-4237

KONTRON IMAGE ANALYSIS, 4440 Von Karman Ave., #200, Newport Beach, CA 92660
Manufacturers of digital cameras and image processing, analysis, and archiving software with applications in material analysis, process and quality control, cell and tissue analysis in biomedical, forensics, and microscopy, knowledge-based classification and 3-D reconstruction.
Norbert Schuster, Sls. Mgr.
714/851-1872, fax: 714/851-3180

KOPIN CORP., 695 Myles Standish Blvd., Taunton, MA 02780
Manufacturers of the CyberDisplay 320, 320C, 640, and 640C, a complete family of very small inexpensive monochrome and color 320 x 240 AMLCDs which use very little power, and are specifically designed for use in ultra-portable personal information devices. Displays are used in camcorders, digital cameras, PDAs, GPS systems, HMDs, toys, games, smart cellular telephones, other consumer products.
Glen Kephart, V.P. Mktg. Display Prod.
508/824-6696, fax: 508/824-6958
e-mail: gkephart@kopin.com
www.kopin.com

KORRY ELECTRONICS CO., 901 Dexter Ave. N., Seattle, WA 98109
Manufacturers of night-vision-compatible display products. Designed for avionics cockpit applications. Products offer a wide dimming range and full sunlight readability.
Mike Phillips, Dir. Sls.
206/281-1488, 1-800-257-8921
fax: 206/273-4128
e-mail: mphilip@korry.com
www.korry.com

KRISTEL CORP., 555 S. Kirk Rd., St. Charles, IL 60174-3433
Manufacturers of 3-28-in. custom monochrome and color open-frame and OEM-cabinet CRT display monitors. Broad variety of horizontal frequencies and video inputs available. Touch-screen integration and color TFT-LCD monitor modules also available.
Kevin Michael, Sls. Mgr.
630/443-1290, fax: 630/443-1390

KURDEX/THINFILM EQUIPMENT DIV., 343 Gibraltar Dr., Sunnyvale, CA 94089
Manufacturers/suppliers of high-precision production equipment for large-area substrates up to 600 x 750 mm. Providers of tools for R&D/pilot and high-volume production. Equipment products include sputtering, evaporation, box coaters, PECVD, RIE etching, and PR stripping. Options: stand-alone or configured to full automatic cassette-to-cassette reactors or cassetteless substrate transfer system, cluster, or in-line systems.
William H. Kneeland, Dir. Sls./Mktg.
408/734-8181, fax: 408/734-5151

KYOCERA INDUSTRIAL CERAMICS CORP., 5713 E. Fourth Plain Blvd., Vancouver, WA 98661
Manufacturers of full line of color STN LCDs with 4-VGA, VGA, SVGA, and XGA resolutions. Diagonal viewing areas range from 4-VGA 4.7-in. panels up to the KCT1026B with its XGA (1024 x 768) resolution and 15-in. viewing diagonal.
Joseph R. Maurer, Mktg. Mgr.
360/750-6124, 1-800-826-0527
fax: 360/750-6184

LABSPHERE, INC., P.O. Box 70, Shaker St., North Sutton, NH 03260
Manufacturers of photometric and radiometric instruments for the test and measurement of the optical properties of materials.
Chris Durell, Sls. Engr.
603/927-4266, fax: 603/927-4694
e-mail: labsphere@labsphere.com
www.labsphere.com

LAMBDA PHYSIK, 3201 W. Commercial Blvd., Suite 110, Ft. Lauderdale, FL 33309
Manufacturers of the LAMBDA 4308B, an excimer laser that meets the specific

requirements of TFT annealing featuring 200 W at 300 Hz. Complete with MicroLas Line Beam Optics, production and R&D systems are available.
Ulrike Bracken, Mktg. Asst.
954/677-3665, 1-800-EXCIMER,
fax: 954/486-1501
e-mail: marketingusa@lambdaphysik.com
www.lambdaphysik.com

LAMINATION TECHNOLOGY CORP., 625 Alaska Ave., Torrance, CA 90503
Manufacturers of custom optical filters, screens, and lenses for cleanroom/optical lamination. Also, polarizers, IR filters, diffusers, anti-glare filters, flexible film to glass or plastic sheet. Contract R&D/fabrication services available.
Jack Wignot, Pres.
503/639-6474, fax: 503/639-7562

LANDMARK TECHNOLOGY, 2160 Old Oakland Rd., San Jose, CA 95131
Manufacturers of custom high-brightness backlights for 6.4-20.1-in. LCDs. Screen luminance ranges from 700 to 1500 nits.
Verna Armado, Sls./Mktg. Specialist
408/573-9302, fax: 408/573-0954
e-mail: landmarktek.com

LASERGRAPHICS, INC., 20 Ada, Irvine, CA 92718
Manufacturers of the LFR Plus™ and LFR™ 4000-line digital film recorders; the family of rasterizers, Rascol II, III, IV and Mac Rascol Print, which drive virtually any color printer to produce sharp text and brilliant color prints or transparencies; the RISC Rascol line of controllers, a design based on the high-speed MIPS processor offering a dramatic speed increase by a factor of as much as 15.
Mike DeLucca
714/753-8282, fax: 714/727-9282

LASERTECHNICS, 5500 Wilshire Ave., N.E., Albuquerque, NM 87113
Manufacturers of the DIR gray-scale printer, a high-resolution monochrome continuous-tone printer producing photographic-quality digital prints; StarBurst dual-mode color printer; 300-dpi thermal-wax or dye-diffusion printer.
Rich Bronge, Mktg. Mgr.
505/822-1123, fax: 505/821-2213

LASERTEC U.S.A., INC., 1778 Technology Dr., San Jose, CA 95110
Manufacturers of a new LCD-inspection machine that automatically inspects color filters for defects. Also, a Confocal Laser Scanning Microscope to profile the display surfaces.
Tom Pomposo, Dir. Sls.
408/437-1441, fax: 408/437-1430

LAVERSAB INDUSTRIAL COMPUTERS, 10503 Rockley Rd., Ste. 103, Houston, TX 77099
Manufacturers of industrial computers, terminals, and monitors. All products are NEMA-4 rated and feature TFT active-matrix b/w or color flat-panel displays. Industrial keyboards and resistive touch screens are also available.
Mike Ewell, Mktg. Mgr.
713/568-8394, 1-800-285-7337
fax: 713/568-8399

LCD LIGHTING, INC., 37 Robinson Blvd., Orange, CT 06477
Manufacturers of miniature fluorescent lamps for backlighting LCDs in numerous commercial, civil, military, and space avionics systems. Designs include

environmental, electrical, and dimming characteristics, plus custom phosphor blending, wiring harnesses, connectors, and heater assemblies.
Alton G. Hudson, Sls. & Mktg. Mgr.
203/795-1520, fax: 203/795-2874
e-mail: ahudson@lcdl.com
www.lcdl.com

LEADER INSTRUMENTS CORP.,
380 Oser Ave., Hauppauge,
NY 11788-3694
Manufacturers of video products, video pattern generators, programmable RGB video generators, video encoders, and waveform monitors/vectorscopes.
Gary Brenner, Product Mktg. Mgr.
516/231-6900, 1-800-645-5104
fax: 516/231-5295
e-mail: sales@leaderusa.com
www.leaderusa.com

BERNARD J. LECHNER, Consultant,
98 Carson Rd., Princeton, NJ 08540-2207
Consultancy in display devices and systems and all aspects of television, including HDTV systems and standards. Knowledgeable about patent matters: infringement, interference, etc. Experienced expert witness.
Bernard J. Lechner, Consultant
609/924-7545, fax: 609/924-7547
e-mail: tvbernie@att.net

L. E. FLEX CIRCUITS, INC., 6195 Corte del Cedro, Suite 110, Carlsbad, CA 92009
Offering expertise in the custom design and manufacturing of flexible circuits and complete assemblies. Types inclusive of single- and double-sided, multilayer, and rigid flex in prototype and production volumes.
Bebbie Huft, Sls
760/431-1112, fax 760/431-0551

LEICA, INC., 323D Vintage Park Dr., Foster City, CA 94404
Manufacturers of fully automatic optical inspection and metrology systems for LCD panels up to 550 x 650 mm. High-resolution CD measurements on low-contrast patterns, film thickness on glass, and filled and unfilled LCD gaps.
Richard D. Eandi, Product Mgr.
415/578-0488, 1-800-716-0900
fax: 415/578-8116

LEICA MICROSYSTEMS, INC., 111 Deer Lake Rd., Deerfield, IL 60015
Manufacturers/distributors of microscopes for the electronics and semiconductor industries. Products include image analysis, e-beam lithography, and optical inspection of masks and thin films.
847/405-0123, 1-800-248-0123
fax: 847/405-0147
e-mail: info@leica-microsystems.com
www.leica-microsystems.com

KURT J. LESKER CO., 1515 Worthington Ave., Clairton, PA 15025-2700
Manufacturers of FPD PVD coating systems; production-sized Torus® magnetron sputter guns; organic material evaporation sources; pure materials and targets; r/fdc power supplies, guns, and target bias; and quartz-crystal thin-film monitors and ellipsometers for real-time measurement of physical and optical film thicknesses.
Duane Bingaman, V.P. Sls., USA
412/233-4200, 1-800-245-1656
fax: 412/233-4275
www.lesker.com

LEVY HILL LABORATORIES LTD.,
5 Sheffield House, Fieldings Rd., Cheshunt, Herts., U.K. EN8 9TJ
Manufacturers of scintillators, x-ray screens, and detectors for x-ray image displays. Also, x-ray image storage screens.
Guy Hill, Managing Dir.
+44-99-230-808, fax: +44-99-221-909

LEXEL IMAGING SYSTEMS, INC., 80 Piedra Rd., Ste. 205, P.O. Box 4009, Pagosa Springs, CO 81147
Designers/manufacturers of a broad range of special-purpose CRTs for head-mounted high-resolution medical, projection, recording, and avionics displays used in many commercial and military applications.
Chuck Martino
970/731-5260, fax: 970/731-5261
e-mail: cmartino@pagosasprings.net

LEYBOLD AG, Wilhelm Rohn Strasse 25, Postfach 15-55, D-6450 Hanau, Germany 6450
Suppliers of vacuum coating systems and vacuum processing technology (sputtering, PE-CVD, plasma-etching) for production of active-matrix LCD and color displays.
Dr. Reineck
+33-6181-34-0, fax: +33-6181-34-1690

LEYBOLD CO., LTD., Shin-Osaka Nishiura Bldg., 1st Fl., 2-7-38, Nishi-Miyahara, Yodogawa-ku, Osaka-shi 532-0004, Japan
Distributors of Balzers Thin Films mirrors, filters, beamsplitters, prisms, lenses, and other components made from a variety of materials. Also, the assembly of coated optical elements into opto-mechanical and/or optoelectronic assemblies.
Ichiro Yamauchi
+81-(6)-6393-5166, fax: +81-(6)-6393-5215
e-mail: l.yamauchi@leybold.co.jp
www.btf.balzers.com

LEYBOLD TECHNOLOGIES, INC.,
1860 Hartog Dr., San Jose, CA 95131
Manufacturers of high-throughput in-line sputtering systems, complete with ITO, silicon dioxide, and metal processes commonly used in LCD and other FPD manufacture. Substrate areas range from 350 x 400 mm to 830 x 1500 mm. Also, the Panel 450, a large-area plasma etching system. And the LC 350, a large-area LPCVD system for the deposition of a-Si and p-Si.
Tony Sisco, Sls. Engr.
408/436-2822, fax: 408/436-2847

LIBERTY MIRROR, 851 Third Ave., Brackenridge, PA 15014
Custom design and engineering of optical thin films, specialty mirrors, and optical components. Capabilities cover a broad range from coating customer's material to supplying a complete optical product. Coatings range from highly reflective front-surface mirrors to low-reflection coatings to dichroic and beamsplitter coatings. Also, conductive coatings for EMI and RF applications.
Steve Zebert, Coatings Sls. Engr.
412/224-1800, fax: 412/224-8754

LIGATURE SOFTWARE, INC., 25 Burlington Mall Rd., Ste. 300, Burlington, MA 01803
Developers of CharacterEyes, 32-bit OCR software that scans documents, analyzes page layout, and outputs directly to a word processor. CharacterEyes supports all major scanners and image file

formats. It is available for Windows and Macintosh and is priced at \$695.
Ed McGuiggan, Dir. No. Amer. Oprns.
617/238-6734, 1-800-888-0060
fax: 617/272-3085

LIGHTING SCIENCES, INC., 7830 E. Evans Rd., Scottsdale, AZ 85260
Manufacturers of custom photometric test equipment, including high-speed vid-photo-meter systems (backlight and display technology) and automated goniometer and photometer systems. Also, developers of Raymaster®. Consulting services for a wide range of illumination/optical-design applications.
Dana Hunton, Sls. Mgr.
602/998-9252, fax: 602/998-9498

LINDGREN RF ENCLOSURES, 400 High Grove Blvd., Glendale Heights, IL 60139
Manufacturers of rf-shielded enclosures, rf-shielded anechoic chambers, RF/EMI power, signal, data and control line filters, rf-shielded honeycomb air vents.
Ed White
630/307-7200, fax: 630/307-7487

LINFINITY MICROELECTRONICS, INC.,
11861 Western Ave., Garden Grove, CA 92641
Manufacturers of linear and mixed-signal ICs and modules and the LXM1590 series of single-stage LCD backlight inverters ideal for driving LCD backlight lamps in portable computers, including the latest 12.1-in. panels.
Fabian Battaglia, VP Sls.
714/898-8121, 1-800-524-7011
fax: 714/893-2570
www.linfinity.com

LIQUID CRYSTAL INSTITUTE, Kent State University, P.O. Box 5190, Kent, OH 44242-0001
Technologies available for licensing and research collaboration: cholesteric, PDLC, ferroelectric, four domain, nematics, phase-separated composite films, and more. Applications include displays, switchable windows, projection light valves, beam steering, optical switches, alignment layers, and plastic substrates.
Gregory B. Wilson, Dir., Tech Transfer
330/672-2692, fax: 330/672-2658
e-mail: greg.wilson@kent.edu
www.techtrans

LITE ARRAY, INC., 100 Larkspur Landing Cr. #106, Larkspur, CA 94939
Manufacturers of monochrome and multi-color EL flat-panel displays. Dark-field manufacturing process delivers high brightness and contrast displays. Facilities include a high-volume low-cost production site in China and R&D facilities in the U.S.
Donn Downing, V.P.
415/461-7888, fax: 415/925-1821
e-mail: litearray@nbn.com

LITTON ELECTROOPTICAL SYSTEMS,
1215 S. 52 St., Tempe, AZ 85281
Manufacturers of high-resolution CRTs for a wide range of recording, scanning, and viewing applications, including typesetting, color graphics, medical imaging, and flying spot scanning.
Allen Harding, Sls. Mgr.
602/968-4471, fax: 602/966-9055

LITTON SYSTEMS CANADA LTD.,
25 City View Dr., Etobicoke, Ontario, Canada M9W 5A7
Manufacturers of LED displays for military and aerospace applications.
Van Angelo, Sr. Mktg. Mgr.
416/249-1231 x3905, fax: 416/246-2955

LITTON SYSTEMS, INC., Data Systems Div., 10770 Wateridge Cir., San Diego, CA 92121
Manufacturers of rugged sunlight-readable displays for commercial and military applications, supporting a full range of military and industrial requirements.
John Amick, Bus. Area Dir.
619/623-6488, fax: 619/623-6737

LMT, P.O. Box 269046, MB 116, San Diego, CA 92196
Manufacturers of a complete line of photometers (both luminance and illuminance meters) and colorimeters for display measurements and high-accuracy lab use. Some are NiCd-battery operable for field use with lab accuracy.
Margaret M. Watson
619/271-7474, fax: 619/693-3670

LMT LICHTMESSTECHNIK GmbH
BERLIN, Helmholtzstrasse 9, Berlin D-10587, Germany
Manufacturers of test and measurement equipment for photometric and colorimetric characterization of CRT and other displays. Tristimulus colorimeters, luminance meters, illuminance standards, illuminance meters, and special photometers.
Raymond Hammer, Gen. Mgr.
+49-30-393-4028, fax: +49-30-391-8001
e-mail: lmt@lmt-berlin.de
www.lmt-berlin.de

LOCKHEED INC., P.O. Box 868, 95 Canal St., Nashua, NH 03061
Manufacturers of ruggedized and militarized cockpit display systems, intelligent graphic terminals, and display workstations using color liquid-crystal flat panels and CRTs for application in aircraft, ground vehicles, movable shelters, ships, submarines, and space.
Maureen Arena, Prog. Devel. Mgr.
603/885-3524, 1-800-258-1573
fax: 603/885-7264

LOCKHEED-MARTIN FAIRCHILD, 1801 McCarthy Blvd., Milpitas, CA 95035
Manufacturers of line-scan and area sensors, line-scan development boards and modules, and line-scan and area cameras.
Jim Johnson, Dir. Commer. Mktg.
1-800-325-6975, fax: 408/433-2508

LORAD POWER SYSTEMS, 36 Apple Ridge Rd., Danbury, CT 06810
Manufacturers of custom high-voltage power supplies.
Dan Lyke, V.P.
203/790-1188, fax: 203/731-8458

L-3 DISPLAY SYSTEMS
(Formerly Lockheed Martin Display Systems), 1355 Bluegrass Lakes Pkwy., Alpharetta, GA 30004
Manufacturers of ruggedized, militarized, cockpit and workstation displays and display processor electronics utilizing CRTs and AMLCDs for aircraft, shipborne, submarine, and ground-vehicle applications. Current product line offers AMLCD screen sizes up to 20.1 in. on the diagonal.
John Balderston, Dir. Bus. Dev.
770/752-5485, fax: 770/752-5525
www.L-3com.com

LUCAS CONTROL SYSTEMS PRODUCTS - DEECO™ SYSTEMS, 31047 Genstar Rd., Hayward, CA 94544-7831

Manufacturers of ruggedized industrial computers, serial graphics and text terminals, VGA monitors, and embedded modules for NEMA-4/12 (IP65) applications. Systems incorporate resistive or infrared touch electroluminescent or color LCDs. Sunlight-readable models are available. Jim Blasins, Natl. Sls. Mgr. 216/362-1507, fax: 216/362-1593

LUMINARY TECHNOLOGIES, 6640 Lusk Blvd., Ste. A-200, San Diego, CA 92121
Manufacturers of custom flat-panel display controller cards and module electronics for graphics and video systems. Products include controllers for PMLCDs, AMLCDs, EL, and FEDs. Enhancement technologies include Adaptive Scanning™, Adaptive Addressing™, and WFRC. Robert Hotto, Chief Tech. Off. 619/457-5151, fax: 619/457-4646

LUMINESCENT SYSTEMS, INC., 4 Lucent Dr., Lebanon, NH 03766
Manufacturers of electroluminescent lamps and backlights for liquid crystals, keypads, and graphic panels. Michael Leahey, Sls. Mgr. 603/643-7766, fax: 603/643-5947 e-mail: mleahey@lumsys.com www.lumsys.com

LUMITEX, INC., 8443 Dow Circle, Strongsville, OH 44136
Manufacturers of backlights for LCDs, membrane switches, and control panels. Specialized light sources for inspection (vision) systems. Low-volume applications for fiber optics. High-volume applications with molded-in high-brightness LEDs. Also, low-cost efficient thin bright backlights. Brad Lizotte, Dir. Sls. 440/243-8401, 1-800-969-5483 fax: 440/243-8402 e-mail: blizotte@lumitex.com www.lumitex.com

LUXELL TECHNOLOGIES, INC., 5170A Timberlea Blvd., Mississauga, Ontario, Canada L4W 2S5
Manufacturers of sunlight-readable TFEL displays featuring a viewing angle of 160° and an operating temperature range of from -55 to 85°C. These displays are rugged solid-state devices suitable for demanding applications. Fred Prins, Dir. Sls. 905/206-1708, fax: 905/206-9174 e-mail: luxell@ican.ca

LXD, INC., 7650 First Place, Oakwood, OH 44146
Manufacturers of standard and custom LCDs. Specializing in long-life high-reliability products featuring wide temperature ranges, fast response times, and wide viewing angles. Innovators in large-area and sign displays. Colored polarizers also available. Chuck Oravec, Sls. Mgr. 440/786-8700, fax: 440/786-8711

MACHOVER ASSOCIATES CORP., 152A Longview Ave., White Plains, NY 10605
A computer-graphics consultancy and literary agency providing a broad range of management, engineering, marketing, and financial services worldwide to users, suppliers, and investors. Application areas served include animation, art, business, CAD, CAM, CAE, CIM, documentation,

engineering, graphic arts, multimedia, presentations, process control, science, visualization, and virtual reality. Carl Machover, Pres. 914/949-3777, fax: 914/949-3851 e-mail: cmachover@aol.com www.machover.pgg.com

MAGNETIC RADIATION LABORATORIES INC., 690 Hilltop Dr., Itasca, IL 60143
Manufacturers of magnetic shielding components for CRT and related fields. Alan J. Barone, V.P. 630/285-0800, fax: 630/285-0807

MAGNETIC SHIELD CORP., 740 N. Thomas Dr., Bensenville, IL 60106-1643
Manufacturers of ImageGuard II, a scientifically designed mass-produced CRT enclosure built to solve computer problems caused by magnetic interference. Offered in three standard sizes and 10 finishes for most computer monitors. B. Friestedt, Sls. Mgr. 630/766-7800, 1-800-304-5665 fax: 630/766-2813 e-mail: shields@magnetic-shield.com www.magnetic-shield.com

MANAGEMENT GRAPHICS, INC., 1401 E. 79th St., Minneapolis, MN 55425
Manufacturers of Solitaire image recorders, offering up to 16K resolution on a variety of film formats from 16 mm to 8 x 10 in. and Mac, PC, and workstation compatible. Every Solitaire features patented Digital Geometry Control, an all-digital image-alignment system. All image characteristics are available from Solitaire's front panel. Bill Hansen, Mktg. Mgr. 612/854-1220, fax: 612/851-6159

MAN & MACHINE, INC., 3706 West St., Landover, MD 20785
Specializing in enhancing, customizing, integrating, repairing, buying and selling LCDs. Enhances brightness, laminates antireflective films, and integrates LCDs into kiosks, industrial displays, and mobile applications. Developed the first HRTFT monitor with front lighting for low-light environments. Clifton Broumand, Pres. 301/341-4900, fax: 301/341-4078 e-mail: broumand@aol.com www.man-machine.com

MANX RESEARCH, 2060 Ridgcrest Pl., Escondido, CA 92025
Reports covering the Japanese display industry, projector test and evaluation, manufacturing cost trends — projection systems. Also, custom design reviews, strategy sessions, and consultation. William K. Bohannon, Chief Scientist 619/735-9678, fax: 619/735-8987

MARKET INTELLIGENCE RESEARCH CORP. (MIRC), 2525 Charleston Rd., Mountain View, CA 94043
Market researcher/publisher of high-tech market research reports covering displays, graphics, and image processing. Mel Neri, Mktg. Mgr. 415/961-9000, fax: 415/961-5042

MARK IV INDUSTRIES, LTD., F-P Electronics Div., 5959 Ambler Dr., Mississauga, Ontario, Canada L4W 2P1
Manufacturers of electronic display products for passenger-information display systems for bus, rail, and airport terminals; highway-traffic information; bus-destination signs; scoreboards; fuel-pump displays;

time/temperature, and advertising signs. Douglas Greenwood, Gen. Sls. Mgr. 905/624-3020, 1-800-265-7773 fax: 905/238-3141

MARSHALL INDUSTRIES, 9320 Telstar Ave., El Monte, CA 91731
Distributors of a complete line of flat-panel-display standard or customized solutions for a variety of major applications. Products include FPD kits utilizing single-board computers, embedded micro PC cards, PC 104 modules, touch screens, and accessories. Diana Beckman, Strategic Mktg. Mgr. 818/307-6101, 1-800-800-2970 fax: 818/307-6298

MARUBENI SPECIALTY CHEMICALS, INC., 10 Bank St., White Plains, NY 10606
Suppliers of a complete line of materials for the FPD industry, including UV-cure sealants, polarizing film, and spacers for TN-, STN-, and TFT-LCDs. Also, a line of planarization, RGB, and black-matrix resins for TFT applications; and phosphors, anisotropic conductive film, and moisture-barrier sealants for FED, EL, and plasma displays. Will Liu, Sls. Coord. 914/428-5933, fax: 914/428-7524

MATERIALS RESEARCH CORP., 2120 W. Waterquadalup Rd., Gilbert, AZ 85223
Manufacturers of sputtering systems for pilot-line and high-volume production of ITR, silicon nitride, amorphous silicon, and metal layers. Systems are delivered complete with a guaranteed process to meet film specifications. Tom Kandris 602/437-9035, fax: 602/507-9364

MATRIX COMPONENTS, INC., 13581 Pond Springs Rd., Ste. 315, Austin, TX 78729
Flat-panel repair center. Services include fine-pitch bonding, custom laminating polarizers, developing formulation to match OEM color specifications, prototype development, product consulting, processor repairs, failure analysis, in- and out-of-warranty repair programs, and end-of-life product support. Tony Tittle, Sls. Mgr. 512/258-7590, 1-800-737-3955 fax: 512/219-0021 www.matrixintl.com

MATROX ELECTRONIC SYSTEMS LTD., 1055 St. Regis Blvd., Dorval, Quebec, Canada H9P 2T4
Designers and manufacturers of video controllers targeted to several distinct markets: graphics, imaging, interactive videodisc, videographics, and financial information. Markets encompass a large variety of applications including CAD, 3D-display, medical electronics, and robotics. Spiro Plagakis 514/685-2630, 1-800-361-4903 fax: 514/685-2853

MATSUSHITA ELECTRONICS CORP., 1-1 Saiwai-cho, Takatsuki, Osaka 569, Japan
Manufacturers of the "Pure Flat" tube, the first high-resolution color CRT with a completely flat screen, a slot-type shadow mask, and auto-scanning, providing a "paper-like" image with excellent white quality and brightness uniformity. M. Sanogaway, Mgr., CRT Sls. Dept. +81-0726-82-7614, fax: +81-0726-85-0345

McLAUGHLIN CONSULTING GROUP, 1150 University Dr., Ste. 113, Menlo Park, CA 94025

Providers of marketing and technical consulting, both strategic and tactical. Multi-client reports and custom studies. Areas of specialization include micro-displays, projectors, personal and virtual displays, and rear-projection monitors. Current focus on the impact of digital TV on displays. Technology expertise in PDL, plastic displays. Chuck McLaughlin 650/323-7155, fax: 650/323-7744 e-mail: chuck@mcgweb.com www.mcgweb.com

MDC VACUUM PRODUCTS CORP., 23842 Cabot Blvd., Hayward, CA 94545
Manufacturers of a complete line of UHV components including flanges and fittings, roughing components, electrical and motion feedthroughs, and valves. Also, a complete line of e-beam evaporation sources matching 6-, 10-, and 15-kW solid-state switching power supplies. 510/265-3500, 1-800-443-8817 fax: 510/887-0626

MECC, 200 E. Howard St., Suite 286, Des Plaines, IL 60018
Manufacturers of universal CRT and yoke testing systems (drivers) featuring multi-inductance and multi-frequency. Universal LCD module drivers and moisture meters. Development, quality assurance, and production of CRTs, deflection yokes, and LCDs. Megumi Usui, Sls. Mgr. 847/827-4874, fax: 847/827-4875

MEGA SCAN, 11 Executive Dr., N. Billerica, MA 01862
Designers/manufacturers of ultra-high-resolution monitors and display stations. Resolutions range from 2048 x 2560 gray scale to 4096 x 3300 single bit. Monitors can be configured for a variety of platforms including AT and MicroChannel. Dennis Fennelly 978/663-6060, fax: 978/663-7676

MEGAVISION, P.O. Box 60158, Santa Barbara, CA 93160
Manufacturers of image acquisition, display, processing, and analysis systems oriented toward engineering, and research and development. Ken Boydston, Pres. 805/964-1400, fax: 805/683-6690

MEISSNER + WURST GmbH + CO., Rossbachstr. 38, 70499 Stuttgart, Germany
Manufacturers and designers of ultra-clean production facilities worldwide. Inlab, a key subsidiary, provides automation solutions; a growing demand in the production arena. Stephan Durr, Mgr. Corp. Relations +49-711-8804-303, fax: +49-711-8804-556

MEKEL ENGINEERING, INC., 2800 Saturn St., Suite B, Brea, CA 92821
Manufacturers of the M400 microfilm digitizer that scans 16 and 35mm roll microfilm for quick transfer to digital storage medias; featuring unattended operation, selectable resolution, built-in sensors to detect start and end of each image, and PC controlled. Daniel Clorti 714/996-5696, fax: 714/996-5600

MELLES GRIOT PHOTONICS
COMPONENTS, 1770 Kettering St., Irvine,
CA 92614

Manufacturers and distributors of optical components, coatings, optomechanics, fiber optics, and He-Ne and diode lasers. Products include lenses, mirrors, beam splitters, filters, prisms, polarizers, optical tables, and more. Routinely supply custom and OEM components for specialized needs.

Jeff Silverman, Sls. Mgr.
714/261-5600, 1-800-835-2626
fax: 714/261-7790

MERCK KGAA, Frankfurter Str. 250,
Darmstadt 64293, Germany

Manufacturers of LC mixtures for TN, STN, active-matrix, and special types of LCDs such as dichroic displays, ECB, VAN, PALC, etc.; polarizers and optical films; ITO-coated glass substrates for TN and non-notebook STN applications and electrochromic mirrors.

EM Industries, Inc.
Mr. Sumit Tripathi
914/592-4660 x391
fax: 914/785-5894

MERCK LTD., Merck House, Poole, Dorset,
U.K. BH15 1TD

Manufacturers of liquid crystals for electro-optic displays, liquid-crystal polymers, thermo-chromic LCs, single crystals for UV and IR optics, scintillators, fluoride glass components for fiber optics, and precursors for high-T_c superconductors. Martin G. Pellatt, Bus. Mgr., Adv. Mater. +44-202-745-520, fax: +44-202-723-824

METAVAC, INC., 4000 Point Street,
Holtville, NY 11742

Manufacturers of custom-designed thin-film coatings on glass for EM, anti-reflection, and heater applications. Also, polarized and colored filters and sunlight readability contrast-enhancement filters. Engineering assistance available. Ronald M. Miller, Dir. Filter Group 516/447-7700, fax: 516/447-7715
e-mail: ron@metavac.com
www.metavac.com

METHEUS CORPORATION, 1600 N.W.
Compton Dr., Beaverton, OR 97006

Manufactures, designs, and markets high-resolution and high-performance display controllers for graphics-intensive applications, including medical imaging, air-traffic control, and C4I.

Scott Selby, Sls. Mgr.-Americas
503/690-1550 x7126, 1-800-638-4387
fax: 503/690-1525
www.metheus.com

MEYLAN CORP., 543 Valley Rd., Upper
Montclair, NJ 07043

Manufacturers and distributors of stopwatches, chart recorders, event loggers, gas detectors, tachometers, stroboscopic-tachometers, precision electric timers, elapsed time meters, time study boards, and all related time study equipment.

Alex Pirmanis, Sls. Mgr.
201/744-6400, fax: 201/744-1011

MICRION CORP., One Corporation Way,
Centennial Park, Peabody, MA 01960-7990

Manufacturers of the L1 system for in-process repair of AMLCD panels. This system repairs "open" defects by a patented photolytic laser CVD metal process and short defects by laser ablation. David Casey, Prog. Mgr.
508/531-6464, fax: 508/531-9648

THE MICROMANIPULATOR CO., INC.
1555 Forrest Way, Carson City,
NV 89706

Manufacturers of analytical probing stations including the model 2250, a large-area flat-panel-type tester for diagnostic probing substrates or board-mounted delidded packaged devices. Full line of accessories including thermal chucks, measurement equipment for low-current testing, or for high-frequency testing, manipulators, and probes. John Campbell, Product Mgr.
702/882-2400, 1-800-654-5659
fax: 702/882-7694
www.micromanipulator.com

MICRON DISPLAY (Division of Micron
Technology, Inc.), 3000 S. Denver Way,
Boise, ID 83705

Manufacturers and developers of the latest high-tech flat-panel cold-cathode field-emission displays. Developed a chemical mechanical polishing flat-panel FED for use in consumer and military products, including portable computers, camcorders, thermal weapon sights, and head-mounted displays.

Jim Cathey, V.P. Sls. & Mktg.
208/333-7627, fax: 208/333-7503
www.micron.com/mdv

MICRONIC LASER SYSTEMS AB, P.O.
Box 779, Pelham, NH 03076

Global supplier of advanced laser pattern generation systems serving CRT shadow mask and FPD masks. Donald Ronning, Sls. Mgr.
603/635-9636, fax: 603/635-7211

MICRONIC LASER SYSTEMS AB, Box
3141, Nytorpsvagen 16, Taby 18303,
Sweden

Manufacturers of a complete line of large-area laser plotters producing photomasks for CRTs, active and passive displays, lead frames, plasma displays, and fine line interconnects.

Sven Lofquist, V.P. Mktg./Sls.
+468-792-6095, fax: +468-792-2480

MICROOPTICAL CORP., 33 Southwest
Park, Westwood, MA 02090

Manufacturers of EyeGlass Displays, a new category of HMDs integrated unobtrusively into conventional eyeglasses with no outriggers, or 1-oz. clip-on versions, both producing color VGA virtual images with no blocking of normal vision whether switched on or off.

Tom Holzel, V.P. Mktg./Sls.
781/326-8111 x111,
fax: 781/326-4110
e-mail: tholzel@microopticalcorp.com
www.microopticalcorp.com

MICRO-OPTICS TECHNOLOGIES,
8608 University Green #5, P.O. Box
620377, Middleton, WI 53562

Manufacturers of liquid-crystal-based spatial light modulators, shutters, polarization optics, and related light-control devices. Produces both stock items and custom devices.

Jeff Buchholz
608/831-0655, fax: 608/831-5821

MICROPIX TECHNOLOGIES, LTD.,

1 St. Davids Dr., St. Davids Business Park,
Dalgely Bay, Dunfermline KY11 9PF,
Scotland

Manufacturers of miniature silicon backplane LCDs with XGA resolution and multi-format interface. Also, high-

performance reflective microdisplay systems and subsystems.

Lewis Banks, Bus. Dev. Dir.
+44-1383-828-333
fax: +44-1383-828-345
e-mail: lewisb@micropix.com
www.micropix.com

MICROTECH LIQUID CRYSTALS, INC.,
1720 Macklind Ave., St. Louis, MO 63110

Manufacturers of cholesteric liquid crystals. Les Neudorf, Pres.
314/773-7099, fax: 314/773-7888

MICROTOUCH SYSTEMS, INC.,
300 Griffin Park, Methuen, MA 01844

Manufacturers of high-resolution capacitive touch screens and quality five-wire resistive touch screens. Built to last, they come with a 5-year warranty. Available as kits or integrated CRT monitors and flat-panel displays.

Arthur Demirjian, Telesales Mgr.
508/659-9000, 1-800-642-7686
fax: 508/659-9100

MICROVISION CORP., 550 High St.,
Auburn, CA 95603

Manufacturers of CRT and flat-panel test and analysis systems. The SS200 Series incorporates photodetectors, positioning systems, and application software for R&D and production testing of luminance, uniformity, line width, contrast ratio, and viewing angle.

Stan Buckstad
530/888-8344, 1-800-931-3188
fax: 530/888-8349
sales@microvsn.com
www.microvsn.com

MIDWEST COMPUTER, INC., 1441
Branding Lane, Ste. 100, Downers Grove,
IL 60515

Provider of monitor repair services. Specializing in the repair of industrial and PC monitors. Maintenance programs available. Kim Mueller, Acct. Mgr.
630/963-6500, fax: 630/963-6681
www.midcominc.com

Mil, 3110 W. Ridge Pike, Sanatoga, PA
19644

Distributor of medical imaging and display components for x-ray systems, including camera tubes, CRTs, and high-resolution gray-scale video monitors for CT, MRI, radiology, PACS, and teleradiology.

Clyde A. Mock, Mktg. Mgr.
610/323-2825, 1-800-835-8766, fax:
610/718-0755
e-mail: miipgt@miipgt.com
www.miipgt.com

MILGRAY ELECTRONICS, INC.,
77 Schmitt Blvd., Farmingdale, NY 11709

Manufacturers of a complete line of FPDs, including LCDs, active and dual-scan color, ac plasma, and vacuum fluorescent; VGA, SVGA, XGA, and custom LCD monitors. Also, custom monitor enclosures for industrial/commercial specs; unique packaging, plastic/metal enclosures; small-footprint PCs. All touch technologies available. Controllers, inverters, and sunlight-readable technology also available.

Tony Cannone, Dir. Mktg.
516/420-9800, fax: 516/420-9884

MINOLTA CORP., 101 Williams Dr.,
Ramsey, NJ 07446

Manufacturers of color analyzers for white balance adjustment on CRTs and

LCD panels; convergence meters (on- and off-line) that simultaneously measure horizontal and vertical convergence of RGB; light meters for luminance, illuminance, color temperature, color of light sources, and UV irradiance.

201/818-3517, 1-888-ISD-COLOR
fax: 201/825-4374
e-mail: isddisplay@minolta.com
www.minoltausa.com

MINTRONIX, INC., 5251 Verdugo Way,
Ste. J., Camarillo, CA 93012

Manufacturers of small-form LCD touch-screen PC systems geared toward point-of-sale, interactive kiosks, and man-machine interface programs. Also, a line of flat-panel controller cards. Offering custom cabling service to drive most types of flat-panel displays.

Mark Tellou, V.P. Mktg.
805/482-1298, 1-800-843-1239
fax: 805/967-8088
www.mintronix.com

MITAC INDUSTRIAL CORP., 42001 Christy
St., Fremont, CA 94538

Providers of a full line of 19-in. rack-mount and bench-top industrial PCs with passive backplanes; motherboard solutions for CPUs up to the Pentium Pro; industrial monitors and displays; and PC/AT-compatible LCD/CRT operator interface workstations.

Stewart Austin
510/656-5288, fax: 510/656-2669
www.mitacinds.com

MITO FINE GLASS CO., LTD.,
2-1-2 Marunouchi, Chiyod-ku, Tokyo 100,
Japan

Manufacturers of large polished substrates for displays.

Mgr. Sls. Dept.
+81-3-218-5861, fax: +81-03-213-5486

MITSUBISHI ELECTRONICS AMERICA,
INC., 5665 Plaza Dr., Cypress, CA 90630

Manufacturers of Leonardo, a 40-in. 4.4-in. 66-lb. 4:3 color plasma monitor offering a resolution of 640 x 480, a 15-50 kHz horizontal scanning range, and a wide-viewing angle of 160°, both horizontally and vertically.

Patty Wenke, Prod. Mgr.
714/220-2500, 1-800-843-2515
fax: 714/236-6172
www.mitsubishi-display.com

MITSUBISHI ELECTRONICS AMERICA,
INC., 1050 E. Arques Ave., Sunnyvale,
CA 94086

Manufacturers of the ANGLEVIEW™ family of color TFT-LCDs, offered in 8.4-in. VGA, 12.1-in. SVGA, 14.1-in. XGA, and 15.1-in. XGA. All feature 18-bit color, state-of-the-art 4.3-µm cell gap, and low-reflectivity black-matrix technology. Pam Holbrook
408/730-5900, fax: 408/773-1495
www.angleview.com

MITSUBISHI ELECTRONICS AMERICA,
INC., 800 Cottontail Lane, Somerset,
NJ 08873

Manufacturers of video copy processors for all imaging/hard-copy requirements; monitors; professional S-VHS VCRs; and video projectors. Most units are autoscanned (15-35 kHz) capable. Rich Williams, Reg. Sls. Mgr.
201/563-9889, fax: 201/981-9492

MITSUI COMTEK CORP., 12980 Saratoga Ave., Suite B, Saratoga, CA 95070

Representing Tottori Sanyo and offering 3.9- to 17.0-in. TFT- and STN-LCDs and color LCD modules. Custom and semi-custom LCD modules available. Laurie Czyz, LCD Proj. Mgr. 408/446-7818, fax: 408/446-4632 www.mitsuicomtek.com

MIWA CO., LTD., 720-3, Unane, Takatsu, Kawasaki, Kanagawa 213, Japan

Importers/exporters of laser/electro-optics products; LCD laser annealing systems; beam homogenizer; various types of microscopes; laser trigger systems; optical thickness measurement systems; Ti: sapphire pulsed lasers; YVO₄ micro-laser; Nd:Yag pulsed laser; phacemulsification system; ellipsometers; spectral radiometer, etc.

K. Uno, Pres. +81-44-812-7801, fax: +81-44-812-7800

MKS INSTRUMENTS, INC., 6 Shattuck Rd., Andover, MA 01810

Manufacturers of vacuum/pressure and gas-flow measurement and control instrumentation; vacuum fittings, flanges, valves, and gauges; process monitoring systems and residual-gas analyzers; and pressure and gas-flow calibration systems. Applications Engr. 978/975-2350, 1-800-227-8766 fax: 978/975-0093 mks@mksinst.com www.mksinst.com

MODUTECH, INC., 920 Candia Rd., Manchester, NH 03109

Manufacturers of backlights for LCDs. 603/669-5121, fax: 603/622-2690

MOLEX, INC., 2222 Wellington Ct., Lisle, IL 60532-1682

Manufacturers of a wide range of connector and cables assemblies for CRT and FPDs. Supports both VESA (P+D) and DFP standards and the DDWG DVI standards. Also, specialized connectors for mobile products. Gary Manchester, Strategic Product Mgr. 1-800-78Molex fax: 630/969-1352 e-mail: amerinfo@molex.com www.molex.com

MONITOR TECHNOLOGY CORP., 2500 Niagra Lane North, Plymouth, MN 55447-1878

Domestic manufacturers of 19-24-in. monochrome and gray-scale monitors for OEM applications requiring resolutions from 1024 x 768 to 2560 x 2250. Joe Lloyd, Sls. Mgr. 612/404-0227, fax: 612/551-1581

MONTEREY TECHNOLOGIES, INC., 987 University Ave., Suite 12, Los Gatos, CA 95032

Human factors and ergonomic consulting and support services related to display and workspace design and compliance with ANSI standard 100-1988. Robert T. Hennessy, V.P. 408/354-3149, fax: 408/354-9259

MORRISON ELECTRONICS CORP., 1776 Lone Eagle St., Columbus, OH 43228
Manufactures and engineers large and small alphanumeric and numeric displays for plant floor communications. These

displays range from 0.5 in. to as large as needed.

Charlie Morrison, Pres. 614/851-1100, fax: 614/851-1121

MOTOROLA INC., Semiconductor Products Sector, 5005 E. McDowell Rd., Phoenix, AZ 85008

State-of-the-art semiconductor products for video input processing, video amplification, horizontal output, and power supplies in high- and very-high-resolution CRT monitors.

Bill Roman 602/244-3101, 1-800-521-6274 fax: 602/244-3810

MOTOROLA FLAT PANEL DISPLAY DIVISION, 7700 S. River Pkwy., Tempe, AZ 85284

Manufacturers of flat-panel displays based on field-emissive technology. The new displays will offer TV-like performance in a thin and lightweight format, and will be suitable for a variety of OEM consumer applications.

Cecil Penn 480/755-5500, fax: 408/755-5502 www.flatpanel.motorola.com

MRS TECHNOLOGY INC., 10 Elizabeth Dr., Chelmsford, MA 01824

Manufacturers of the Model 5200 Series high-throughput large-area PanelPrinter™ systems designed to produce the most advanced AMLCDs, FEDs, color filters, etc. A broad range of imaging requirements are met with the industry's highest-performance wide-field G-line lens. Providers of the world's first 1.0- μ m imaging capability useful for large-area poly-Si and FED manufacturing. PanelPrinters™ can also be equipped with wide-field I-line lenses for exposing pigment-dispersed color-filter and other DUV-sensitive materials. James F. Quinn, Sls. Mgr. 508/250-0450, fax: 508/256-3266

M. S. KENNEDY CORP., 8170 Thompson Rd., Cicero, NY 13039

Manufacturers of high-voltage high-speed amplifiers for CRT drives with 1-2 nsec transition times. Custom video signal-processing hybrids, MCMs, and surface-mount assemblies.

Greg Overend, Mktg. Mgr. 315/699-9201 fax: 315/699-8023 e-mail: msk@ntr.net www.mskennedy.com

MTL SYSTEMS, INC., 3481 Dayton-Xenia Rd., Dayton, OH 45432-2796

Manufacturers of flat-tension-mask color monitors; 29-in. autsync color monitors; the Comprehensive Display Evaluation System (CODES); and video test-pattern generators. John Ream 937/426-3111, fax: 937/426-8301

MULTICHIP ASSEMBLY, INC., 71 Daggett Dr., San Jose, CA 95134

Suppliers of newly built and re-worked display module assemblies for commercial, military, and medical applications. Design and development of display drivers and display panels from commercial to high distribution.

Char Bugna, Dir. Disp. Sls. 408/324-0244 x207 fax: 408/324-1036 e-mail: cab@multichipassy.com www.multichipassy.com

THE MULTIMEDIA AND VIDEODISC MONITOR, P.O. Box 26, Falls Church, VA 22040

Monthly newsletter focusing on non-consumer industrial, governmental, and educational uses of multimedia, and emphasizes new products, market statistics and analyses.

John Wilson, Mktg. Mgr. 703/241-1799, 1-800-323-DISC fax: 703/532-0529

THE MUSHIELD COMPANY, INC., P.O. Box 439, 5 Springfield Rd., Goffstown, NH 03045

Manufacturers of custom magnetic shielding for CRTs, yokes, PMTs, storage tubes, PET and CAT scan machines, and electro-optical devices. Providers of engineering design assistance, rapid prototyping, and precise production manufacturing. Also, raw materials and monitor enclosures which eliminate EMI.

Jennifer R. Luker, V.P. 603/666-4433, Toll Free: 1-888-669-3539, fax: 603/666-4013 e-mail: mushield@aol.com www.mushield.com

NAGASE CALIFORNIA CORP., 710 Lakeway, Ste. 135, Sunnyvale, CA 94086

Distributors of SUMIKALAN® polarizing film, high-quality film that performs several functions such as anti-glare, anti-reflection, and low reflection. Also, SUMIKALIGHT® retardation film includes color compensation film for STN-LCDs and viewing-angle improvement film for STN-LCDs. Mitch Watanabe, Mgr., Mktg. & Sls. 408/773-0700, fax: 408/773-9567

NALPAK SALES, INC., 1937-C Friendship Dr., El Cajon, CA 92020

Providers of quality support equipment. Manufacturers of the octagon-shaped tripod case. Distributors of many other case lines, and carries full line of accessory items for the video and motion picture industry including travel karts, cassettes, Magliner trucks, Leatherman tools, Accu-charts, plus many more. Robert Kaplan, Pres. 619/258-1200, fax: 619/258-0925

n&k TECHNOLOGY, INC., 3150 De La Cruz Blvd., Ste. 105, Santa Clara, CA 95054

Manufacturers of thin-film characterization products that simultaneously determines thickness, n and k spectra (190-900 nm), E_p and surface roughness of thin-film structures. The substrate can be opaque or transparent. Examples include a-Si:H, ITO, SiN_x:H, and SiO₂:H. John Reilly, Dir. Sls./Mktg. 408/982-0840, fax: 408/982-0252

NANOMETRICS, INC., 310 DeGuigne Dr., Sunnyvale, CA 94086-3906

Manufacturers of the NanoSpec 5500FPD, a film metrology tool for FPD production applications. Accommodating substrates up to 650 x 550 mm, providing discrete measurements at specific locations or the generation of film-thickness maps. A robotic substrate holder is available as an option. The NanoSpec 4000 FPD is a thin-film measuring system, accommodating flat panels up to 400 x 500 mm. R. Buchanan, Dir. Mktg. 408/746-1600, 1-800-955-6266 fax: 408/720-0196

NATIONAL COMPUTER GRAPHICS ASSOCIATION, 2722 Merrilee Dr., Ste. 200, Fairfax, VA 22031

Trade and professional organization with approximately 7000 individual and corporate members. Sponsors annual computer graphics conference and exposition. Martha Filson, Dir. Corp. Sls. 703/698-9600, 1-800-225-NCGA fax: 703/250-2752

NATIONAL DISPLAY SYSTEMS, 761-A University Ave., Los Gatos, CA 95032

Manufacturers of commercial and industrial flat-panel TFT monitors and systems that combine an embedded computer with a flat-panel display. Products include Vector slimline executive monitors, DataStation series for daylight-readable environments, TouchStation FPD with embedded computer systems, and RacStation and VueMiser rack-mount displays. Panels range in size from 10.4 to 16.1 in. Resolutions of 640 x 480 (VGA), 800 x 600 (SVGA), 1024 x 768 (XGA), and 1280 x 1024 (SXGA) are available. Carmen Piucci, V.P. Sls. 408/395-8688 x110, fax: 408/395-5288 www.nationaldisplay.com

NATIONAL SEMICONDUCTOR CORP., Box 58090, 2900 Semiconductor Dr., C2-475, Santa Clara, CA 95052-8090

Manufacturers of ICs for CRT applications, including RGB and single-channel preamps, RGB CRT drivers and deflection/geometric correction chip sets. Also, ICs for LCD applications, such as notebook-to-display interface chip sets, panel power supplies, and buffers for gray-scale voltage reference. Raphael Tam, Dir. Monitors Mktg. 408/721-8786, fax: 408/721-5691

NEC, 2880 Scott Blvd., P.O. Box 58062, Santa Clara, CA 94052-8062

Manufacturers of TFT active-matrix color LCDs ranging in size from 5.5 to 20.1 in. on the diagonal, with resolutions from QVGA to SXGA. Color plasma-display panels ranging in size from 33 to 50 in. on the diagonal. Targeted at the workstation, desktop monitor, industrial equipment, instrumentation, medical imaging, financial trading, in-flight entertainment, and automotive navigation systems markets. Omid Milani, Sr. Prod. Mktg. Mgr. FPDs 408/588-6000, 1-800-366-9782 fax: 1-800-729-9288 www.nec.com

NEC ELECTRONICS, INC., 475 Ellis St., Mountain View, CA 94039-7241

Manufacturers of an extensive line of 5.5-14.1-in. TFT panels and have announced a 33-in.-diagonal plasma display panel (PDP). Products address a wide range of markets, including mobile computing, in-flight entertainment, multimedia projection systems, information kiosks, factory automation, and medical instrumentation. Joany Winkler, Sr. Pub. Rel. Spec. 415/965-6495, 1-800-729-9288 fax: 415/965-6130

NEOVAC, 980-B Airway Ct., Santa Rosa, CA 95403

Manufacturers of a complete line of ITO coatings deposited on PET and other flexible webs. Standard ITO coatings available in sheet resistivities of 50-400 Ω/\square in widths up to 660 mm wide. Other coatings include metals and alloys.

dielectrics, multilayers, index-matching layers, and vapor barriers.
John B. Fenn, Jr., Pres.
818/888-8649, fax: 818/888-3543
e-mail: jfenn@neovac.com
www.neovac.com

NICHIA AMERICA CORP., 3775 Hempland Rd., Mountville, PA 17554
Manufacturer of super-bright green/blue LEDs and phosphors for CRT, EL, and fluorescent lamps
Scott Ushida, Sls. Mgr.
717/285-2323, fax: 717/285-9379

NIGHT VISION CORP., 7301 N. Lincoln Ave., Ste. 180, Lincolnwood, IL 60646
Designers of high-performance personal optical systems, including image intensifiers, night-vision systems, and very-wide-angle binoculars, which are helmet-mounted, safe for ejection from high-performance aircraft, and can integrate electronic displays and imaging devices.
Danny Filipovich, Pres.
847/329-1300, fax: 847/329-1358

NIKON PRECISION, INC., 1399 Shoreway Rd., Belmont, CA 94002-4107
Manufacturers of production photolithography systems for large-area and high-resolution displays. Line includes the LS-500P proximity printer, the FX-301D and FX-501D for large high-resolution displays, and the FX-401E and FX-402E for very-high-resolution HDTV projection displays.
David E. Kettering, Sr. Sls. Mgr.
415/508-4674, fax: 415/508-4600

NIMTEC, INC., 125 N. Price Rd., Chandler, AZ 85224
Manufacturers of high-quality sputtering targets, including ITO targets with a density greater than 99%, resulting in less nodule formation, higher quality film layers, and less down time.
Kurt Williams, Sls. Rep.
1-800-646-8321
fax: 602/899-0779
jwilliams@nimtec.com

NIPPON ELECTRIC GLASS, 650 E. Devon, Ste. 110, Itasca, IL 60143-1251
Manufacturers of glass substrate for AMLCDs and STN-LCDs. Also, image sensor cover glass and micro-rod spacers.
Wesley Jelinski, O-E Prod. Mgr.
630/285-8500, fax: 630/285-8510

NIPPON SEIKO CO., LTD., 2-2-34 Higashizaoh, Nagaoka, Niigata, 940 Japan
Manufacturers of passive LCDs (including TN, STN, and D-STN), LCD modules (including large-area dot-matrix and multi-color), and thick-film EL and driving circuits (inverters).
Intl. Dept. +81-258-24-3311
fax: +81-258-24-6543

NIPPON SEIKO K.K., Nissei Bldg., 6-3, Ohsaki 1-chome, Shinagawa-ku, Tokyo, 141 Japan
Manufacturers of large high-precision pattern generators (mask making for FPD, exposure for shadow masks); automated test equipment; large high-precision pattern measuring machine for mask-making process. Main products relate to photo-fabrication system.
+81-466-21-3217, fax: +81-466-21-3109

NITTO DENKO AMERICA, 48500 Fremont Blvd., Fremont, CA 94538
Manufacturers of polarizing films, retardation films, and adhesive tapes.
Yoshio Shinozuka, Group Mgr.
510/445-5422, 1-800-356-4880
fax: 408/445-5480
www.nitto.com

NITTO DENKO AMERICA, INC., c/o PERMACEL, U.S. Highway #1, New Brunswick, NJ 08903
Manufacturers of linear and circular polarizing film, retardation film, and other optical plastic materials.
Mike Yoshikawa, Prod. Mgr.
908/418-2775, fax: 908/418-2777

NITTO DENKO CORP., 3rd Floor, Mori Bldg.-31, 5-7-2 Kojimachi Chiyodaku, Tokyo 102, Japan
Manufacturers of polarizing film, retardation film, and other optical plastic materials.
Masato Yoshikawa
908/418-2775, fax: 908/418-2777

NoRAD CORP., 1160 E. Sandhill Ave., Carson, CA 90746
Manufacturers of radiation-blocking optical filters and magnetic- and electric-field shields for CRTs/VDTs. UltraGlass and NoRad shields provide front-mounted radiation, glare, and static shielding. ELF ProTech panels and JitterBox enclosures provide ELF magnetic-field shielding.
Bruce Sperka, Dir. Mktg.
310/605-0808, 1-800-262-3260
fax: 310/605-5051

NORITAKE CO., INC., 2635 Clearbrook Dr., Arlington Heights, IL 60005
Manufacturers of a full line of vacuum-fluorescent display modules in both dot-matrix and graphic formats. Also, a series of drop-in replacements for LCD modules. Custom designs also available. ISO9001 certified.
Albert Smith, V.P.
847/439-9020, 1-800-779-5846
fax: 847/593-2285
e-mail: noritake@compuserve.com
www.noritake-elec.com

NORTECH ENGINEERING, INC., P.O. Box 266, 153 Washington St., East Walpole, MA 02032-0266
Manufacturers of 15-, 17-, and 20-in. industrial video and touch-video monitors, standard and fault-tolerant industrial PCs, and stand-alone NEMA-4 workstations for machine and process control and test and measurement applications.
Melvin F. Silverstein, Pres.
508/668-3490, fax: 508/669-3568

NORTECH SYSTEMS, INC., IMAGING DIV., 2500 Niagara Lane, Plymouth, MN 55447
Designers/manufacturers of high-performance economically priced gray-scale monitors for industrial and medical applications with resolutions up to 2048 x 2560 and brightness levels up to 1000 cd/m². Ruggedized and customization available.
Joe Lloyd, V.P. Sls.
612/404-0226, 1-800-341-4585
fax: 612/404-0227
e-mail: jlloyd@nortechsys.com
www.nortechsys.com

NUMONICS CORP., 101 Commerce Dr., Montgomeryville, PA 18936
Manufacturers of digitizers: opaque, translucent, and backlit with

0.010-0.005-in. accuracy. Active digitizing area from 6 x 6 to 44 x 60 in. Seven step sizes in corded and cordless versions. Also, pressure sensitive in 12 x 12 x 18 in.
Phyllis Ulrich, Sls. Mgr.
215/362-2766, fax: 215/361-0167

NUTMEG CONSULTANTS
2 Shady Brook Lane, Norwalk, CT 06854
Display industry consultant. Forging mutually beneficial U.S.-Korean and other business relationships; investor relations; product positioning and repositioning; planning and management of special events and small conferences; creation/presentation of short courses and tutorials; marketing communications; press relations; promotion and publicity; brochures and publications.
Kenneth I. Werner, Pres.
203/853-7069, fax: 203/855-9769

NUVISION TECHNOLOGIES, INC., 1815 N.W. 169th Pl., Bldg. 3060, Beaverton, OR 97006
Developers/manufacturers/marketers of a broad array of high-quality color display and stereoscopic 3-D components and systems for medical, entertainment, and scientific applications.
Vince Power, Sls. Mgr.
503/614-9000, 1-800-920-9327
fax: 503/614-9100

nView Corp., 860 Omni Blvd., Newport News, VA 23606
Manufacturers of LCD projection products with a worldwide network of dealers and resellers.
nView Sales Dept.
804/873-1354, fax: 804/873-2153

N-VISION, INC., 7680 Old Springhouse Rd., McLean, VA 22102
Designers/manufacturers of high-performance 3-D immersive display systems for visual simulation and VR applications. Products, including the Datavisor® family of displays and the Virtual Binoculars, feature full color, high resolution, and wide field of view characteristics.
Marc Foglia, Acct. Mgr.
703/506-8808, fax: 703/903-0455
e-mail: info@nvis.com
www.nvis.com

OAI (OPTICAL ASSOCIATES, INC.), 1425 McCandless Dr., Milpitas, CA 95035
Designers/manufacturers of UV measurement instrumentation, light sources, exposure systems, and mask aligners for large-area substrates up to 22 x 22 in. Also, offers full calibration services traceable to NIST.
Charles D. Turk, Pres.
408/263-4944, 1-800-843-8259
fax: 408/263-6389
e-mail: sales@oainet.com
www.oainet.com

O&S RESEARCH, INC., 1912 Bannard St., P.O. Box 221, Riverton, NJ 08077
Manufacturers and suppliers of aircraft instrument lighting wedges, cover glasses, and CRT contrast-enhancement filter glass. Line of antireflection coatings includes MIL-C-14806A, AMS 2521A, and MIL-C-675C.
Anderson L. McCabe, Pres.
609/829-2800, fax: 609/829-0482

OCA/OPTICAL CORP. OF AMERICA, 170 Locke Dr., Marlborough, MA 01752
Manufacturers of a variety of optical components including color filters and anti-

reflection coatings compatible with a variety of display systems. Included are micro-plasma products which can be deposited on glass or plastic and which demonstrate excellent hardness and humidity stability.
Walter Lekki, V.P. Mktg./Sls.
508/481-9860, fax: 508/485-0526

OCLI (OPTICAL COATING LABORATORY, INC.), 2789 Northpoint Pkwy., Santa Rosa, CA 95407-7397

Manufacturers of thin-film coatings that improve contrast, brightness, transmission, and EMI shielding for virtually every type of display technology. LCDs: Patented PrintFree™ HEA® deposited on the linear polarizer and HEA 2000 applied directly to an LCD surface, eliminating unwanted glare and improving contrast. Plasma Displays: Laminated glass filter with multi-layer coating to provide EMI/RFI shielding and reduce reflections. Also, providers of dichroic filters, hot mirrors, and front-surface mirrors.
Customer Service
707/545-6440, fax: 707/545-7410
www.ocli.com

OCULAR, INC., 746 Lingco Dr., Richardson, TX 75081
Manufacturers of custom and standard LCDs and LCD modules. Engineering design and turnkey manufacturing of LCD-related products.
Ben Kwang, Mktg. Dir.
972/437-2561, fax: 972/437-2562

OI DIRECT, 343 St. Paul Blvd., Carol Stream, IL 60188
Manufacturers of touch-screen based graphical operator interfaces, industrial computer workstations, programmable message displays, monitors, and marquees. Sells direct to end user.
630/588-2332, 1-888-OI-DIRECT
fax: 1-888-OI-FAX-US
info@oidirect.com
www.oidirect.com

OLYMPUS AMERICA, INC., 2 Corporate Center Dr., Melville, NY 11747
Providers of a diversity of FPD UIS objectives that correct for glass thickness of up to 1.2 mm. Manufacturers of automated inspection systems that include the MHL micro and MM macro stations. The MX50L-TF microscope inspects FPDs up to 17 in.
Herman Shanlian, Tech. Mktg. Mgr.
516/855-5079, 1-800-446-5967, fax: 516/844-5112
e-mail: shanlih@olympus.com
www.olympus.com

OMEGA ELECTRONICS, S.A., P.O. Box 6, Rue des Prés 149, Bienne 2504, Switzerland
Manufacturers of color video replay, black-and-white matrix, alphanumeric and numeric information boards with character heights from 40 to 520 mm; and timing and judging equipment for all sports.
Haldemann Heinz
+41-32-42-97-15, fax: +41-32-41-33-21

OMNICOMP GRAPHICS CORP., 1734 W. Sam Houston Pkwy. N., Houston, TX 77043-2723
Manufacturers and designers of graphic display controllers for a wide range of computing devices, from PCs to high-performance engineering workstations, minis, and mainframes.
Mark Moore
713/464-2990, fax: 713/827-7540

OPTIK TECHNOLOGY, INC., 1215 W. Crosby Rd., Carrollton, TX 75006

Manufacturers of custom LEDs and multichip modules.

Kimberly Johnson, Mktg. Spec.
972/323-2200, fax: 972/323-2396
e-mail: optek1@optekinc.com
www.optekinc.com

OPTICAL DEVICES INCORPORATED, 805 Via Alondra, Camarillo, CA 93012

Manufacturers of linear and circular polarized film and contrast-enhancement filters utilizing polarized film. Also, glass and acrylic windows with matte and anti-reflection surfaces.

William Bandel, Sls. Mgr.
805/987-9993, 1-800-987-8801
fax: 805/987-5789

OPTICAL RADIATION CORP., 1300 Optical Dr., Azusa, CA 91702

Manufacturers of highly collimated UV-light exposure systems used to produce flat-panel displays. Systems range from manual load to fully automated in-line configurations.

Michael L. Yatsko, Dir. Mktg./Sls.
818/969-3344 x2428, fax: 818/969-3681

OPTICAL SOLUTIONS, INC., P.O. Box 889, 700 Airport Blvd., Doylestown, PA 18901

Manufacturers of patented rigid rear-projection screens for single-aperture light sources. Performance properties such as viewing angles, brightness, resolution, contrast, and control of surface reflections can be custom engineered. These new-technology screens are smooth surfaced, with an internal optical structure.
Jack A. Dorazio, V.P.
215/348-4649, fax: 215/348-9959

OPTICS 1, INC., 3050 Hillcrest Dr., Ste. 100, Westlake Village, CA 91362

Consultancy in the optical design, engineering, and production of imaging systems, from initial specifications through detailed lens design, analysis, tolerancing, fabrication, assembly, and alignment.

April Brodigan, V.P. Oper.
805/373-9340, fax: 805/373-8966

OPTIS, INC., 8230 E. Broadway, Suite E2, Tucson, AZ 85710

Distributors of two products to design and analyze information-display devices using software simulation. Newest product, SPEOS, has been used to analyze everything from LCD notebook displays to LED-lit cellular telephone displays.

Michael Gauvin, Pres.
520/721-1010, fax: 520/721-1221

OPTO-CAL, INC., 13891 Deany Ct., Lakeside, CA 92040

Providers of calibration services, specializing in photometric, colorimetric, and radiometric measurements. Calibration of instruments. Also, offering NVIS and secure lighting measurements.
Robert Ruff, Pres.
619/561-9983, fax: 619/561-8810

OPTO SIGMA CORP., 2001 Decec Ave., Santa Ana, CA 92705

Manufacturers of precision optical components, including lenses, mirrors, prisms, beam-splitter cubes, polarizers, and filters. Thin-film dielectric coatings including high reflection, high transmission, polarizing, non-polarizing, narrow band, broad band, and anti-reflection. Translation

stages and opto-mechanical assemblies. All products available with OEM discounts.

Kevin Liddane, OEM Bus. Mgr.
714/851-5881, fax: 714/851-5058

OPTOTEK, LTD., 62 Steacie Dr., Kanata, Ontario, Canada K2K 2A9

Designers/manufacturers of custom LED displays, complete with multichip module type integral drive electronics. Display styles include linear, matrix, and segmented. Most available in red, green, or blue wavelengths.

Steve Wilson, Mgr. Des. Eng. Svcs.
613/591-0336, 1-800-361-2911
fax: 613/591-0584
e-mail: swilson@optotek.com
www.optotek.com

OPTREX AMERICA, INC., 44160 Plymouth Oaks Blvd., Plymouth, MI 48324

Manufacturers of a complete line of standard and custom LCDs, offering an extensive range of state-of-the-art character and high-resolution monochrome or full-color graphics technologies. Full design and manufacturing facilities in North America.
John Parent, Distrib. Sls. Mgr.
734/416-8510 x138, fax: 734/416-8520
e-mail: lcdinfo@optrexusa.com

OPTREX/SATORI, 3830 Del Amo Blvd., Torrance, CA 90503

Marketers of alphanumeric and graphic LCD panels and modules. Extended temperature, EL, LED and CCT back-lighting, NTN, black-and-white, high-contrast fluids, passive color, VGA, and XGA options available.
Ken Yoshikama, Pres.
310/214-1791, fax: 310/214-1721

OPTRO-MECHANICS (USA) CORP., One Blue Hill Plaza, Pearl River, NY 10965-8667

Distributors of a line of microscopes and LCD inspection systems manufactured by Seiwa Optical Co., Ltd., Tokyo, Japan.
Sal Miwa, Pres.
914/620-1999, 1-800-890-3333
fax: 914/620-1950

OPTRONICS LABORATORIES, INC., 4632 36th St., Orlando, FL 32811

Manufacturers of a complete line of research-grade optical radiation measurement systems and related accessories, including radiometers, spectroradiometers, photometers, monochromators, NVIS display measurement systems (to MIL-L 85762A), integrating spheres, lock-in amplifiers, NIST traceable lamps and calibration standards.
Billy Schneider, V.P. Sls.
407/422-3171, 1-800-899-3171
fax: 407/648-5412

OPTRONICS ENGINEERING, 175 B Cremona Dr., Goleta, CA 93117

High-resolution high-sensitivity color video cameras for fluorescence and low-contrast surface inspection. The auto exposure system has a shutter range of 1/10,000-4 sec with light sensitivity as low as 0.0025 lux.

Doug Marker, Sls. Dir.
805/968-3568, fax: 805/968-0933

ORBOTECH, 44 Manning Rd., Billerica, MA 01821

Manufacturers of a comprehensive line of advanced automated optical inspection systems for flat-panel displays and CRT products. AOI systems provide highly

accurate detection of all critical defects in the manufacturing process and act as a true quality guardian for process control during the ramp-up stages of operation and during full production.

Robert Wironen, Natl. Sls. Mgr. Displ. Prod.
978/667-6037 x5061, fax: 978/667-9969

ORC ELECTRONIC PRODUCTS, 1300 Optical Dr., Azusa, CA 91702

Manufacturers of the fully automated ProForm 9000 UV exposure system that handles, aligns, and exposes panels as large as 43 x 59 in. (1100 x 1500 mm). The vertically oriented scanning light source provides high-accuracy uniform exposures.
Thomas Keddy, No. Amer. Sls. Mgr.
626/815-3130, fax: 626/815-3131

ORC LIGHTING PRODUCTS, 1300 Optical Dr., Azusa, CA 91702

Manufacturers of xenon and mercury short-arc lamps, fiber-optic lamps, modules, and complete illumination systems for use in information-display systems, LCD and large-screen projection systems, and miniature spotlight applications.
George Bacher, V.P. Sls.
626/815-3100, 1-800-755-LAMP
fax: 626/815-3074

ORWIN ASSOCIATES, INC. (A Wholly Owned Subsidiary of Clinton Electronics Corp.), 88 Seabro Ave., Amityville, NY 11701

Designers/manufacturers of special-purpose CRT monitors in high-bright color and monochrome. Configurations for FAA/ATC, high-definition imaging for mapping and military applications. Medical workstation displays for diagnostic and procedural applications with advanced electron optics for maximum MTF.
Ben Iannotta, or see Clinton Electronics listing
516/842-7177, fax: 516/842-7410

OSRAM SYLVANIA PRODUCTS, INC., Hawes St., Towanda, PA 18848

Manufacturers and developers of inorganic phosphors for CRTs, VFDs, and PDPs; also for use in fluorescent and EL lamps. In-house screening room, EL lamp test facility, xenon excitation measurement equipment, and phosphor reclaim capabilities. Other display materials include wire, face panel stud buttons, anode buttons, custom metal components, coated heater wires, and metallizing coils.
Diane Seymour, New Products Mktg.
570/268-5174, fax: 570/268-5113
diane.seymour@sylvania.com
www.sylvania.com/beyond

PACIFIC MEDIA ASSOCIATES, 1121 Clark Ave., Mountain View, CA 94040

Market researchers specializing in large-screen displays market quantification. Publishers of detailed estimates in the continuing Large-Screen Displays Industry Service. Conducts the annual North American Reseller Survey and monthly Reseller Tracking Service.
William L. Coggs, Pres.
650/948-3080, fax: 650/948-3092
www.pacificmediaassociates.com

PALOMAR PRODUCTS, INC., 2051 Palomar Airport Rd., Carlsbad, CA 92009

Manufacturers of automatic die attach, wire bond, wedge bond, and TAB bond equipment with manual stations for hot-bar edge connectors and anisotropic film bonders. Manufacturing equipment supplier to TAB driver bonding machines for flat-

panel displays, CRT gun welders, and lamp filament and lamp lead welding equipment.
Laurie S. Roth, V.P. Sls & Mktg. Mgr.
760/931-3427, 1-800-854-3467
fax: 619/931-5191

PALOMAR PRODUCTS, INC., Specialized Displays Group, 2051 Palomar Airport Rd., Carlsbad, CA 92009

Manufacturers of display systems: CRT, biocular, AMLCD (SolarStar™ and NovaStar™) high-resolution bright displays required in ground vehicles, helicopters, aircraft, and air-traffic-control towers.
Russ Schwarzer, V.P. Specialized Displays
760/931-3236, fax: 760/931-5198

PANASONIC COMPUTER PERIPHERALS CO., 2 Panasonic Way, 7D-2, Secaucus, NJ 07094

Manufacturers of 15—21 in CRTs, including Pure Flat displays, and 14- and 15-in. LCDs with maximum resolutions on select models up to 1800 x 1440 and dot pitches as low as 0.24 mm. Monitors also feature a 3-year warranty and on-site replacement (details vary by model).
Michael Valentine, Natl. Sls. Mgr.
770/338-6830, fax: 770/338-6709
www.panasonic.com

PANASONIC INDUSTRIAL CO., Computer Components Group/Displays, 2 Panasonic Way, 7H-7, Secaucus, NJ 07094

Manufacturers and marketers of computer products and components including high-resolution color CRT monitors, LCD monitors, and CCD cameras.
Nick DeGaetano, Sr. Prod. Mgr.
201/392-6920, fax: 201/348-7093
e-mail: degaetanon@panasonic.com

PANELGRAPHIC CORP., 10 Henderson Dr., West Caldwell, NJ 07006

Manufacturers of Chromafilter contrast-enhancing antiglare filter materials for all types of optoelectronic and CRT displays; antifog, antistatic Veguard™ coatings to protect display readout windows from scratching and harsh chemicals
Jane Ryan, V.P. Mktg.
201/227-1500, fax: 201/227-7750

PANELIGHT DISPLAY SYSTEMS, INC., 101 Embarcadero, #100A, San Francisco, CA 94105

Distributor of flat-panel display products for end-users.
So-hail Malik
415/772-5800, fax: 415/986-3817

PANELVIEW, INC., 7670 S.W. Nimbus Ave., Beaverton, OR 97008

Manufacturers of filters and windows for glare reduction, contrast enhancement, and environmental protection on all types of flat-panel displays and IR devices. Users of plastic and glass substrates, specializing in hardcoating and EMI/RFI suppression.
Jerry Bugajski
503/643-9311, 1-800-788-4088
fax: 503/643-8923

PARALLAX GRAPHICS, INC., 2500 Condensa St., Santa Clara, CA 95051

Manufacturers of high-resolution video and graphics display controllers for Qbus, VMEbus, and PC/AT PC/XTbus.
Stu Taylor, V. P. Intl. Sls.
408/727-2220, fax: 408/980-5139

PEARSON & ASSOCIATES, INC., 7400 E. McDonald Dr., Ste. 121, Scottsdale, AZ 85250

Consultancy specializing in the personnel and business development of flat-panel and CRT companies.
Chuck Pearson, CEO
602/953-9783, 1-800-541-3384
fax: 602/996-1261
e-mail: chuck@pearson-assoc.com
www.pearson-assoc.com

PEERLESS INDUSTRIES, INC., 1980 Hawthorne Ave., Melrose Park, IL 60618
Manufacturers of mounting equipment and accessories for video displays, including plasma monitors, TV monitors, LCD projectors, as well as computer monitors.
708/865-8870, 1-800-865-2112
fax: 708/865-2941
www.peerlessindustries.com

PEGASYS DISPLAYS, INC. (A Subsidiary of Dynamic Displays), 1625 Westgate Rd., Eau Claire, WI 54703
Manufacturers of high- to very-high-resolution (1280 x 1024 to 2.5K x 2.0K) grayscale CRT displays. Also, low-to-high resolution color CRT displays.
Len Stewart, Pres.
715/835-9440 x23, fax: 715/835-2436
www.dynamicdisplays.com

PENTAC TECHNOLOGIES CORP., 100 Technology Dr., Broomfield, CO 80021
Manufacturers of precision optical components and subassemblies for computer peripherals.
Robert Arniello, Mgr. Opt. Prod. Mktg.
303/460-1600, fax: 303/460-1628

PERCON, INC., 1720 Willow Creek Circle, Suite 530, Eugene, OR 97402
Manufacturers and distributors of barcode reading equipment and accessories for many different computer/terminal systems, including IBM, Dec, Wyse, and Apple Macintosh. Five-year warranty on all decoders. One-year warranty on all input devices.
Beth Daniels, Dir. Mktg.
541/344-1189, fax: 541/344-1399

PHILIPS COMPONENTS, P.O. Box 218, 5600 MD Eindhoven, The Netherlands
Worldwide manufacturers of electronic components, including display components and electro-optical components.
Jeannet Harpe, Press Off.
+31-40-724-173, fax: +31-40-724-825

PHILIPS COMPONENTS, 100 Providence Pike, Slatersville, RI 02876
Manufacturers of full-frame and frame-transfer CCD imagers and CCD camera modules. Also, custom CCD image sensors for high-speed high-resolution imaging.
Carlo Sabetti, Mktg. Mgr., CCDs
401/767-4428, fax: 401/767-4493

PHILIPS COMPONENTS, FLAT DISPLAY SYSTEMS, 3200 N. First St., San Jose, CA 95134
Manufacturers of FPDs, including AMLCDs and polymer LED products. Display panels ranging from 2 to 23 in. are available for desktop monitors, notebook, industrial, automotive, handheld, and medical system applications.
Mazy Sehrgosha, V.P. Sls., Flat Displays
408/570-5799
e-mail: fids-sales@us.comp.philips.com
www.flatdisplaysystems.philips.com

PHILIPS CONSUMER ELECTRONICS CO. 1 Philips Dr., Knoxville, TN 37922
Manufacturers of a broad range of CRT-based display products from 12-in. monochrome through 21-in. FSQ color. Resolution levels up to 1600 x 1280 are supported by dedicated and multifrequency designs.
John Neilson
719/593-4297

PHILIPS DISPLAY COMPONENTS CO., P.O. Box 963, 1600 Huron Pkwy., Ann Arbor, MI 48106-0963
Manufacturers of color display tubes for TV and monitor applications, monochrome tubes and deflection units for monitor applications, flyback transformers, degaussing coils, various wirewound components, tuners for TV and satellite receivers.
Patrick Canavan, Sls. Mgr.
313/996-9400, fax: 313/761-2776

PHILIPS FIMI, via S. Banfi 1, Saronno 21047, Italy
Manufacturers of displays for computer graphics, medical applications, and public-information. Computer graphics displays: 20- and 21-in. high-resolution color monitors featuring Cyberscreen technology. Medical displays: monochrome and color displays; high-resolution, high-brightness grayscale monitors with new "Triple-Gun" technology. Public-information displays: large-screen (28, 29, and 32 in.) CRT monitors and 42-in. plasma monitors.
Silvio Bonfiglio, Sls./Mktg. Mgr.
+39-2-961-8237, fax: +39-2-961-8305

PHOENIX GROUP, INC. (PGI), 123 Marcus Blvd., Hauppauge, NY 11788
Manufacturers of an extensive line of active-matrix TFT rugged displays. Standard sizes of 6.5, 8.4, 10.4, and 12.1 in. Larger panel, 15 and 18 in. configurations, are available on special request. Display brightness from 150 nits to full sunlight readable, options up to 1500 nits are available, including VGA, SVGA, and XVGA resolutions.
Patricia Wilson, V.P. Sls.
516/951-2700, fax: 516/951-4290
e-mail: pwilson@ivpgi.com
www.ivpgi.com

PHOSPHOR PRODUCTS CO., LTD., 1 Factory Road, Upton, Poole, Dorset BH16 5SJ, England
Manufacturers of DCEL displays and phosphors.
N. Bainton
+44-202-632-116, fax: +44-202-631-980

PHOSPHOR TECHNOLOGY, LTD., Middle St., Nazeing, Essex EN9 2LP, England
Manufacturers and developers of inorganic phosphors for CRTs, FEDs, PDPs, x-ray imaging, IR and UV detection, and other radiation-detecting scintillators.
Gerry Sorce, CEO
+44-(0)-1992-893-424
fax: +44-(0)-1992-893-729
e-mail: sales@phosphor-technology.com
www.phosphor.technology.com

PHOTON DYNAMICS, INC., 6325 San Ignacio Ave., San Jose, CA 95119-1202
Manufacturers of test, inspection, and repair equipment for FPDs, and offers a suite of products to inspect virtually all types of FPDs from research and development through commercial production.
Beth Popham, Marcom Mgr.
408/360-3103, fax: 408/226-9910
e-mail: beth@phodyn.com
www.photodynamics.com

PHOTONICS SPECTRA (LAUREN PUBLISHING CO., INC.), 2 South St., Pittsfield, MA 01021
Publishers of Photonics Spectra, a magazine devoted to photonics technology: optics, lasers, fiber-optics, electro-optics, imaging, and optical computing. Also, the four-book set of The Photonics Directory: The Corporate Guide, Buyers Guide, Handbook, and Dictionary.
David Dover, Dir. Sls.
630/954-2371, fax: 630/954-2372
e-mail: photonics@laurin.com
www.photonicsnet.com

PHOTONICS SYSTEMS, INC., 6975 Wales Rd., Northwood, OH 43619
Manufacturers of ac plasma displays and AMLCD gray-scale monochrome and full-color monitors with options including embedded computers and touch panels. Compatibility with VGA through emerging HDTV, various VESA and other standard computer workstation interfaces.
Donna Schantz, Admin. Asst.
419/666-6325, fax: 419/666-0875

PHOTON, INC., 1115 Space Park Drive, Santa Clara, CA 95054
Manufacturers of test instrumentation that records the energy distribution pattern of optical sources including imaged spot size.
Jim Darchuk, Mktg./Sls. Mgr.
408/492-9449, fax: 408/492-9659

PHOTO RESEARCH, INC., 9731 Topanga Canyon Pl., Chatsworth, CA 91311
Manufacturers of photometers, colorimeters, imaging photometers, and spectroradiometers to measure displays. New products include the PR-705 spectroradiometer.
Amy Aviv, Sls./Mktg. Administrator
818/341-5151, fax: 818/341-7070
e-mail: sales@photoresearch.com
www.photoresearch.com

PHOTRONICS-COLORADO (Formerly Microphase Laboratories) 815 N. Wooten Rd., Colorado Springs, CO 80915
Manufacturers of masks for all types of FPDs, with linewidth precision of 2 µm on soda lime or quartz substrates with emulsion, iron oxide, or chrome coatings. Also, mask-design services.
Martin H. Boothman, Large-Area Mask Mgr.
719/596-8899, fax: 719/596-8333

PHOTRONICS, INC., 15 Sector Rd., Brookfield, CT 06804
Global supplier of photomask photographic and design center services as well as plasma etch systems. Photographic services include photomask fabrication, imaging on film, step-and-repeat, and large-area masks.
Nora McClelland, Acct. Mgr.
408/245-7342, 1-800-292-9396
fax: 408/733-2225

PHYSICAL OPTICS CORP., 20600 Gramercy Pl., Ste. 103, Torrance, CA 90501
Manufacturers of Holographic Light-Shaping Diffusers that are used as randomized surface relief diffusers, homogenizers, and beam shapers. LSDs® allow controlled distribution of light while achieving transmission efficiencies up to 92%. Offering a variety of circular and elliptical angles from 0.2° to over 100°

FWHM that are suitable for many light sources.
Jeffrey Laine, Sls. Mgr.
310/320-3088, fax: 310/320-8067
e-mail: jefflaine@aol.com
www.poc.com

PILKINGTON-LOF (formerly LIBBY-OWENS-FORD)
P.O. Box 799, 811 Madison Ave. Toledo, OH 43697-0799
Manufacturers of low-cost anti-reflective glass plus a wide range of electrically conductive glass for CRT, photocopier, heated glass, electrochromic, and other applications. Product line includes TEC 8, 15, 70, 250, and 1000.
Fred A. Millett, Mgr. Spec. Coated Glass
419/247-4724, fax: 419/247-4517
e-mail: fmlillet@expost1.lof.com
www.pilkington.com

PILKINGTON MICRONICS, LTD. Fourth Ave., Deeside Industrial Park, Deeside, Flintshire CH5 2NR, U.K.
Manufacturers of a range of precision processed glass substrates for TN- and STN-LCDs in 1.1, 0.7, 0.55, and 0.4 mm thicknesses. Also, glass substrates for plasma, field-emission, and OLED applications.
Kate Pike, Sls./Mktg. Mgr.
+44-1244-288-337, fax: +44-1244-288-935
www.pilkington.co

PIONEER NEW MEDIA TECHNOLOGIES, 2265 E. 220th St., Long Beach, CA 90810
Manufacturers of 40- and 50-in. plasma displays. Also offers wall solutions to the display industry.
Jim Krodel
310/952-2111, 1-800-926-4329
fax: 310/952-2990
e-mail: jkrodel@pnm.com
www.pioneerusa.com

PIX ELECTRONICS, INC., 4870 Walden Lane, Lanham, MD 20706
Providers of computerized semi-automated LCD repair services, specializing in avionics and ruggedized LCD repairs. System repair service is also provided.
Gail Hansborough, Pres.
301/306-9400, fax: 301/306-9001
e-mail: gail@pix-electronics.com
www.pix-electronics.com

PIXELINK CORP., 577 Main Street, Hudson, MA 01749
Offering specially integrated LCD solutions used in the medical/healthcare, industrial, defense, and financial environments. LCD products are plug-and-play compatible. Full customization including high output backlight, NEMA configured enclosures, and touch-screen interface.
Eric Hoopis, Mktg. Coord.
978/562-4803, fax: 978/568-0514
e-mail: ehoois@pixelinkcorp.com

PIXEL INTERCONNECT, 11040 SW 63rd St., Portland, OR 97219
Providers of specialized service for FPD interconnect process engineering development, FPD assembly/repair process training and equipment recommendation, test equipment design/fabrication, LED backlight design, and interconnect market development.
Scott Cockey, Pres.
503/244-0646, fax: 503/244-1224
www.pixel-interconnect.com

PIXELVISION, 43 Nagog Park, Acton, MA 01720

Manufacturers of flat-panel core products designed for integration convenience. Display, touch sensor, and interface electronics combined in special bezel assembly for rack-mount, kiosk, or ruggedized monitor development. 16-in. SXGA compatible with most any computer source.
508/264-9443, 1-800-264-9443
fax: 508/264-9446

PIXELWORKS, INC., 8100 S.W. Nyberg Rd., Ste. 100, Tualatin, OR 97062

Manufacturers of ImageProcessors, single-chip FPD controllers that include all the key functions of a flat-panel interface controller on a single chip, making the interfacing of FPDs, such as LCD monitors, easier than that for a CRT.
Mike Barton, V.P. Sls.
503/612-6700, fax: 503/612-6713
e-mail: info@pixelworksinc.com
www.pixelworksinc.com

PIXTECH, INC., 3350 Scott Blvd., Bldg. 37, Santa Clara, CA 95054

Manufacturers of FEDs, emissive flat panels characterized by 160° viewing angles, low power consumption with high brightness (1 W at 70 fL), full video speed, and instant-on at +40 to +85°C. Currently delivering monochrome FEDs to qualified display integrators and OEMs. Larger sizes and color units available late in 1997.
Greg King, Sls. Mgr.
408/986-8868, 1-888-749-8324
fax: 408/986-9896

PLANAR ADVANCE, INC., 13950 S.W. Karl Braun Dr., Beaverton, OR 97005

Manufacturers of performance-differentiated color and monochrome information displays and display systems for avionics, air-traffic control, and vehicular applications. Planar Advance is the federal products division of Planar Systems.
Rich Groppi, Sls. Mgr.
503/614-4100, fax: 503/614-4101
e-mail: rich-groppi@planar.com
www.planar.com

PLANAR AMERICA, INC., 1400 N.W. Compton Dr., Beaverton, OR 97006

Manufacturers/distributors of high-performance flat panels using electroluminescence (EL) technology. Included are high-performance monochrome, multi-color, and full-color displays.
Rick Phillips, Dir. Sls., EL Displays
503/690-1100, fax: 503/690-1493

PLANAR FLAT CANDLE, 4725 B. Town Center Dr., Colorado Springs, CO 80916

Manufacturers of flat fluorescent lamps for LCD backlight subsystems.
719/573-1880, fax: 719/573-1880

PLANAR INTERNATIONAL LTD., Olaninluoma 9, P.O. Box 46, Espoo SF-02201, Finland

Manufacturers and suppliers of electroluminescent flat-panel displays, providing crisp bright images of text and graphics viewable from wide angles and under most lighting conditions. Preferred for industrial applications.
Jukka Eskelinen, Sls. Mgr.
+358-0-420-01, fax: +358-0-422-143

PLANAR STANDISH, INC., W7514 Highway V, Lake Mills, WI 53551

Manufacturers of standard and custom LCDs and LCD modules. Segmented-TN

and full-graphics STN-LCDs for wide-temperature-range applications. Application and full design support available.
Richard Barbieri, Dir. Bus. Dev.
920/648-1000, fax: 920/648-1001
www.standishlcd.com

PLANAR SYSTEMS, INC., 1400 N.W. Compton Dr., Beaverton, OR 97006

Manufacturers of display systems for critical information display needs in medical, transportation, instrumentation, point-of-sale, and defense markets, including high-performance monochrome EL FPDs, ColorBrite™ and military-spec AMLCDs, extended-temperature LCDs, and miniature displays.
Monica Allison, Sales
503/690-1100, fax: 503/690-1493
e-mail: sales@planar.com
www.planar.com

PLASMACO, INC., (A Subsidiary of Matsushita Electric Industrial Co., Ltd.), 180 South St., Highland, NY 12528

Manufacturers of large-area plasma displays.
Jane D. Birk, Applic. Engr.
914/883-6800, fax: 914/883-6867
e-mail: jbirck@plasmaco.com

PLASMATERIALS, 3223 Crow Canyon Rd., Ste. 290, San Ramon, CA 94583

Manufacturers of high-purity materials for the thin-film industry. Specializing in sputtering targets, evaporation materials, bonding service, and backing plates. Specific materials for transparent conductive coatings include fully oxidized and reduced ITO as well as ZnO.
Don Sarrach, Pres.
415/277-0440, fax: 415/277-0469

PLASMA-THERM I.P., INC., 9509 Intl. Ct., St. Petersburg, FL 33716

Manufacturers of plasma process equipment (deposition and etch) for the electronics display industry. Small systems are available for R&D. Fully automated multi-chamber production systems process substrates to 22 in. sq. Complete process support is included.
Scott Deferrari, Dir. Sls./Mktg.
813/577-4999

POLAROID CORP., 1 Upland Rd., N2-1K, Norwood, MA 02062

Manufacturers of "Durable KE" polarizers and a full line of high-quality linear and circular polarizers. Also, 50 new filter formats, a complete line of POLATECHNO (Japan) polarizer products, a new high-performance low-cost anti-reflective film, and a new product line of LIFT holographic reflectors.
Richard Pawlak, OEM Natl. Accts. Mgr.
1-800-225-2770 x6-4481
fax: 781/386-4600
www.pawlakr@polaroid.com

POLAROID CORP., Holographic Products Div., 2 Osborn St., 2nd fl., Cambridge, MA 02139

Manufacturers of Imagix™ diffusers based on a proprietary process which yields high-volume cost-effective material that dramatically increases the brightness and contrast of reflective, transmissive, and transmissive LCDs. The appearance of illumination is achieved without any increase in power consumption.
Bernard Prusaczyk, Dir., Sls./Mktg.
718/386-3354, fax: 781/386-8671

POLAROID CORP., Optical Films Div., 1265 Main St., W4-4H, Waltham, MA 02451

Manufacturers of anti-reflection film, LIFT holographic reflectors, plastic conductor film, durable KE polarizer, and two new films; one designed for projection screen elements and the other for both transmissive and reflective color LCDs.
David Foresyth, Product Mgr.
1-800-386-2770, fax: 781/833-1260
e-mail: displays@polaroid.com
www.polaroid.com

POLAR VISION, INC., 625 Alaska Ave., Torrance, CA 90503

Manufacturers of optical filters for contrast enhancement, sunlight readability, viewing-angle control, vandal resistance, and EMI/RFI shielding. Also, a full range of linear and circular polarized film.
William Bandel, Dir. Sls./Mktg.
310/320-9768, 1-800-269-8801
fax: 310/320-9357
e-mail: sales@polarvision.com

POLHEMUS, P.O. Box 560, 1 Hercules Dr., Colchester, VT 05446

Manufacturers of 3D position/orientation tracking and digitizing systems used in CAD, virtual reality, animation, and biomedical and scientific applications. Product family includes the Digitizer, Tracker, and the IsoTrack.
Tom Jones, Sales Rep.
802/655-3159, fax: 802/655-1439

POLY-OPTICAL PRODUCTS, INC., 17475 Gillette Ave., Irvine, CA 92614

Manufacturers of plastic optical fiber devices. Principal product is backlights for membrane switches, LCDs, and panels. Product line includes miniature light sources, custom cable assemblies, light guides, image guides, sensors, and scanners. Providers of engineering design services and assembly of optical products. ISO qualification and JIT delivery.
Greg Saunders, Dir. Automotive Sls.
949/250-8557, fax: 949/250-1840
e-mail: greg@poly-optical.com
www.poly-optical.com

POLYTRONIX, INC., 805 Alpha Dr., Richardson, TX 75081

Manufacturers of custom twisted-nematic displays, standard TN displays, dichroic displays, polymer-dispersed liquid-crystal film, PDLC displays, active-matrix displays, and special shutters.
Gordon Laurie, Mktg./Sls. Mgr.
214/238-7045, fax: 214/644-0805

POLYVISION CORP., 50 Barnes Park North, Wallingford, CT 06492

R&D company specializing in electrochromic flat-panel displays.
Thomas C. Richards, Dir. Res.
203/294-0203 x 5840, fax: 203/265-7762

PORTRAIT DISPLAYS, INC., 5117 Johnson Dr., Pleasanton, CA 94588

Developers of Pivot® software comprised of WinPortrait® and MacPortrait®, currently available for PIVOT ENABLED™ LCDs for Windows- and Macintosh-compatible computers.
Mikel Estrin, VP Sls.
925/227-2700 x222, fax: 925/227-2705
www.portrait.com

PPM PHOTOMASK, INC., 4950 Fisher St., St-Laurent, Quebec, Canada H4T 1J6

Specializing in photomask fabrication and phototooling services for flat-panel displays

including digitizing, drafting of Calma GDS II, and data conversion from various software; photomasks for optoelectronics, laser diodes, photodiodes, integrated guided-wave optics devices, surface-acousto-wave devices, and VLSI.
Tony Smith
514/737-7030, fax: 514/737-9893

PRECISION ELECTRONIC GLASS, INC., 1013 Hendee Rd., Vineland, NJ 08360

Manufacturers of hand-crafted round-glass CRT bulb blanks in diameters ranging from 0.5 to 7 in. Soft and hard glass tubes are produced to customer specifications. Manufacture prototypes and short runs.
Francis M. Ciancarelli, Sls. Mgr.
609/691-2234, fax: 609/691-3090

PRECISION GLASS TECHNOLOGIES, 3110 W. Ridge Pike, Sanatoga, PA 19464

Manufacturers of optical components, including glass parts, lenses, prisms, flats, mirrors, blanks, achromats, windows, and optical coatings for medical, scientific, laser, military, and harsh-environment applications. Specialties include prototypes, small lots, and custom specifications in glass of all types.
Arthur V. Mengel, Oprns. Mgr.
610/323-2825, 1-800-835-8766
fax: 610/718-0755

PRECISION IMAGING, 320 Martin Ave., Santa Clara, CA 95050

Manufacturers of high-resolution monochrome and color CRT and flat-panel displays used in simulation, military, medical, archival, and stereoscopic imaging.
Skip McLaughlin, Sls. Engr.
408/988-1871, fax: 408/988-1873

PRECISION LAMP, 720 Portal St., Cotati, CA 94931

Manufacturers of panels for backlighting LCD displays using incandescent, LED, or cold-cathode light sources. Also, miniature incandescent lamps that solder directly to PCBs. Precision lamp is ISO 9001 certified.
Bonnie Kadleck
707/792-0333, fax: 707/792-2738

PRECISION OPTICAL FILTERS, 4322 Anthony Ct., Ste. 4, Rocklin, CA 95677

Manufacturers of contrast-enhancement filters, windows, and circular polarizers. Products available in glass, acrylic, and a variety of transmittances, colors, finishes, thicknesses, and sizes. Services include screen printing, machining, and laser cutting.
Brian M. Miller
916/652-4098, 1-800-522-8903
fax: 916/652-2067
e-mail: bmillier@newworld.net

PRI AUTOMATION, INC., 805 Middlesex Tpk., Billerica, MA 01821

Manufacturers of FPD material transport systems, factory automation, FPD stockers, cassette loaders, and process tool loaders with mini-environment.
John Davidson, Syst. Mktg. Mgr.
508/670-4270 x3378, fax: 508/663-1825

PRIMAGRAPHICS LTD., Melbourn Science Park, Melbourn, Royston, Herts., SG8 6EJ, U.K.

Manufacturers of a range of modular, VME-based hardware and software for graphics and image handling. The range includes TV, high- and ultra-high-resolution display controllers (up to 2048 x 2048), a

RISC processor, and an advanced VME memory card.
Kevin Jones
+44-763-262-041, fax: +44-763-262-551

PRINCETON DISPLAY TECHNOLOGIES, INC., 644 Upper Mountain Ave., Montclair, NJ 07043

Supplier of monochrome and color CRT displays, CRTs for color and monochrome TV, electron guns, and electron-gun components.
Suprasad Baidyary, Pres.
973/783-4332, fax: 973/783-0733
e-mail: teletube@aol.com

PROCESS TECHNOLOGIES, INC., 436 W. Rawson Ave., Oak Creek, WI 53154

Providers of hard-surface photomask services for 2 x 2 to 18 x 24-in. sizes; 1-µm lines and spaces up to 8 x 8 in.; and larger plates with a minimum of 15-µm lines and spaces; R&D quantities of InSO electrode-on-glass or plastic available. Chrome-on-glass, iron oxide, and chromium-gold images can be generated.
Manfred Steller, Pres.
414/571-9200, fax: 414/571-9202

PROLUX CORP., 32961 Calle Perfecto, San Juan Capistrano, CA 92675

Designers, manufacturers, and marketers of large-display LCD projector products. The WallZapper 1000S is a portable multimedia projector with SVGA resolution and 700 ANSI lumens. The WallZapper 1000V is VGA and 1000 ANSI lumens. The INFOWALL is a lightweight rollable 67-in. rear-projection display at SVGA resolution.
Steve Lieberman, V.P. Mktg./Sls.
714/661-5400, fax: 714/661-3400

PROMED KEYBOARD GROUP, 580 E. Corporate Dr., Meridan, ID 83642

Custom design and manufacturing of membrane switches, silicone keypads, full travel keyboards, and value-added subassemblies. Software and hardware design as well as R&D available. Patent-pending embedded LEDs able to withstand shock, vibration, and extreme temperatures; dual-action switches; EMI/RFI/ESD shielding along with full in-house machine shop capabilities.
Joe Hageman
208/884-4900, fax: 208/884-4949
e-mail: marketing@pkg.net
www.pkg.net

PROTELEVISION TECHNOLOGIES, 91 McKee Dr., Mahwah, NJ 07430

Manufacturers of TV test equipment including CRT color analyzers, projector color-balance meters, and color-alignment generators.
John McCasland, Natl. Sls. Mgr.
201/529-2188, 1-800-421-0888
fax: 201/529-2109
www.ptv.dk

PROXIMA CORP., 9440 Carroll Park Dr., San Diego, CA 92121

Manufacturers of a complete line of LCD panels and projectors for displaying computer and video images to large or small groups. Proxima's Cyclops interactive pointer provides remote mouse control directly on the projected image.
Customer Service
619/457-5500, 1-800-447-7692
fax: 619/457-9647

PRP OPTOELECTRONICS, LTD., Wood Burcote Way, Towcester, Northamptonshire, U.K. NN12 6TF

Manufacturers of custom LED displays (from seven-segmented to complex multicolor displays with integral control electronics) and monolithic LED arrays (up to 160 emitters on a chip, processed on site in GaAsP and high-brightness AlInGaP).
Richard Kirk, Product Mgr.
+44-01327-359135, fax: +44-01327-359602
e-mail: sales@prpopto.demon.co.uk
www.prpopto.demon.co.uk

PSITECH, 18368 Bandiller Cir., Fountain Valley, CA 92708

Manufacturer/marketers of image frame buffers and grabbers, graphics controllers, image-compression/decompression devices, OpenGL, and X Window systems products, providing resolution-independent image display and capture hardware with host-based industry-standard application program interfaces.
John Kerr, V.P. Sls.
714/964-7818, 1-800-872-7385
fax: 714/968-7884

PST (PROGRESSIVE SYSTEM TECHNOLOGIES, INC.), 11000 N. Mopac Expwy., Ste. 100, Austin, TX 78759

Providers of complete materials-handling solutions to FPD manufacturing facilities. Products include substrate carriers, reticle storage, automated material handling, and mini-environments. Involved in the automation of many FPD process tool manufacturing machines.
Shari Hunt, Mktg. Assoc.
512/342-2500 x1017, fax: 512/342-2010
www.pst-inc.com

P.T.G. PRECISION TECHNOLOGY CENTER, 100 Technology Park, Lake Mary, FL 32746

Manufacturers of a line of zero-width cutting equipment (OWCT™) for glass, ceramic, crystalline, and semiconductor materials from less than 50 µm to greater than 25 mm thick.
Eric Babounachvili, Mktg. Mgr.
407/804-1000, 1-800-581-9281
fax: 407/804-1002
e-mail: ptgamerica@ptg.nu
www.ptg.co.at/ptg

PULNIX AMERICA, INC., 1330 Orleans Dr., Sunnyvale, CA 94089

Manufacturers of miniature CCD cameras, lenses, and accessories. Intensified low-light CCD cameras, high-speed shuttered and gated cameras, integration cameras, and custom OEM cameras.
Rolande Young
408/747-0300, fax: 408/747-0880

QMS, INC., One Magnum Pass, Mobile, AL 36618

Manufacturers of intelligent graphics controllers for dot-matrix printers, and complete laser-printer systems for barcoding, WP/OA, electronic publishing, CAD/CAE, and other applications.
John Corbett, V.P. Sls./Svc.
205/633-4300, fax: 205/633-0013

QUANTEX CORP., 2 Research Ct., Rockville, MD 20850

Manufacturers of electroluminescent displays and lamps, filmless x-ray storage screens, and imaging systems.
Ken Charbonneau, Sls. Mgr.
301/258-2701, 1-800-992-5149
fax: 301/258-9871

QUANTUM DATA, INC., 2111 Big Timber Rd., Elgin, IL 60123

Manufacturers of a comprehensive price/value portfolio of video test equipment with pixel clock rates to 800 MHz for design, test, repair, and demo of video monitors or video projectors.
Chuck Evans, Gen. Sls. Mgr.
847/888-0450, fax: 847/888-2802
www.quantumdata.com

QUANTUM ELECTRONICS, INC., 31 Industrial Park Rd., Lewistown, PA 17044

Manufacturers of a wide range of standard and custom display systems using LED, plasma, incandescent, and mechanical flipper technologies. Unit size ranges from 4 x 6 in. up to 6 x 12 ft.
Kit C. Kennedy, Pres.
717/242-1132, fax: 717/248-8680

RADIANT TECHNOLOGY CORP., 1335 S. Acacia Ave., Fullerton, CA 92831

Designers/manufacturers of infrared furnaces ideally suited for the thermal processing demands and cleanliness requirements for manufacturing FPDs. Patented heating technology delivers extremely light temperature control even under demanding thermal loads associated with large glass panels.
Ray Kruzek, V.P.
714/991-0200, fax: 714/991-0600
e-mail: rkruzek@radianttech.com
www.radianttech.com

RAINBOW OPTICS CO., 6 Countryside Lane, Salem, MA 01970-1768

Optical design association providing optical engineering and consulting services to manufacturers of LCD projectors. Designers of optics and mechanics of projection zoom lenses and of complete optical benches, including lamp, condenser, and keystone distortion corrector. Providers of tolerancing and radiometric analysis and builders of prototypes.
Leon Reznikov, Consultant
508/741-3906, fax: 508/741-8122

RANTEC MICROWAVE & ELECTRONICS, INC., 1173 Los Olivos Ave., Los Osos, CA 93402

Manufacturers of high- and low-voltage power supplies, dc/dc converters, and power systems designed, manufactured, and marketed to a broad range of industries worldwide for commercial, industrial, avionics, and full military applications.
Francesca Peterson, Sr. Mgr., Sls./Mktg.
805/528-5858, 1-800-235-4148
fax: 805/528-6932

RASTEROPS, 2500 Walsh Ave., Santa Clara, CA 95051

Manufacturers of color display systems, accelerators, monitors, video image capture, and display hardware and multimedia accessories for the Apple Macintosh, IBM MicroChannel, and Sun SPARCstation platforms. Products designed primarily for the graphic arts, printing, publishing, and related industries.
408/562-4200, 1-800-SAY-COLOR
fax: 408/562-4065

RAYTHEON CO., Submarine Signal Div., 1847 West Main Rd., Portsmouth, RI 02871

Manufacturers of the Thermal Display Unit with true gray shades at high speeds and high resolution, producing recordings of near-photographic-quality full tonal images,

capable of displaying digital data in graphic or alphanumeric forms.
John Lorea, Sls. Mgr.
401/847-8000 x2054, fax: 401/847-8002

RAYTHEON ELECTRONIC SYSTEMS, 465 Centre St., Quincy, MA 02169

Manufacturers of specialty CRTs for head-down and HUD avionics, air traffic control, and shipboard applications. Also developing high-brightness monochrome and color FEDs for use in avionics and vehicular applications.
Gary Smith, Engr. Mgr.
617/984-8529

RDI COMPUTER CORP., Little Haining, Brockenhurst Rd., Ascot, Berkshire SL5 9HB

Manufacturers of the PowerScreen, a stand-alone, high-resolution LCD in a compact, lightweight, design, with low emissions and low power consumption, and available with a 12.1-in. 1024 x 768 high-resolution active-matrix LCD.
Reg Broughton, Gen. Mgr. Eur. Oprns.
+44-1344-25999, fax: +44-1344-25652

REDIFFUSION SIMULATION LTD., Visual Business Unit, Plant 5, Jenner Rd., Crawley, West Sussex, RH10 6JY U.K.

Manufacturers of monitor, projection, and laser-based large-area displays, primarily for the aviation industry. WIDE is a collimated projection display offering fields of view of up to 40 (V) x 200 (H).
A.P. Usher, Tech. Sls. Exec.
+44-293-518-941, fax: +44-293-560-231

SCOTT REDMOND, P.O. Box 14607, San Francisco, CA 94114

Specialized consulting for 3-D stereoscopic and immersive simulation display systems.
Scott Redmond, Consultant
415/978-2301

REEL 3-D ENTERPRISES, INC., P.O. Box 2368, Culver City, CA 90231

Mail-order retail suppliers of stereoscopic viewers for stereo-pair prints and slides, polarized and anaglyphic (red/blue) 3-D viewing glasses, books about 3-D photography, and books illustrated with 3-D images.
David Starkman, V.P./Tech. Dir.
310/837-2368, fax: 310/558-1653

REFLECTION TECHNOLOGY, INC., 230 Second Ave., Waltham, MA 02154

Manufacturers and designers of full-color and monochrome virtual displays for OEM customers and proprietary handheld telecommunications products that incorporate these displays. Low-cost miniature scanned linear array displays that provide resolutions up to full VGA with high image quality and extremely low power consumption compared to LCDs.
John Summers, Dir. Bus. Devel.
617/890-5905 x2, 1-800-890-5905
fax: 617/890-5918
Chris Williams, Director
+44-123-555-4433, fax: +44-123-552-8971

RETINAL DISPLAYS, INC., 306 Potrero Ave., Sunnyvale, CA 94086

Manufacturers of the Digilens™, a customizable photonic component designed for illumination and magnification tasks within microdisplay-based wearable projector and monitor display products. Complete optical properties are embedded

in a miniature lightweight package, reducing cost, size and complexity.

John Clark, Dir. Bus. Dev.
408/737-1100 x224, fax: 408/737-1190
e-mail: info@retinaldisplays.com
www.retinaldisplays.com

RETROSCAN SCREEN, INC., 148 Madison Ave., New York, NY 10016

Distributors of DNP high-resolution Fresnel/lenticular rear-projection screens in sizes from 50—160 in. Manufacturers of rear-screen projection enclosures, rear projector/mirror mounts, and ancillary rear-screen products.

Charles Levitt, Pres.
212/532-4647, fax: 212/532-4725

REXAM CUSTOM, 700 Crestdale Rd., Matthews, NC 28106

Providers of contact coating and lamination of flexible materials used in the display industry. Pilot and production resources are available in the U.S. and U.K. Coating and aligning of liquid crystals, optical adhesive coating, and micro-replication are available.

Craig Sheppard, Mgr. Bus. Dev.
704/847-9171, 1-800-688-9171
fax: 704/845-4333
www.rexamcustom.com

REYNOLDS INDUSTRIES, INC., 5005 McConnell Ave., Los Angeles, CA 90066-6734

Manufacturers of Avvion HV connectors for CRT applications which allow operation at high altitudes without the need to pot the neck; anode leads adapted to high-altitude requirements; HV connectors, wire, and cabling to interconnect CRT power supplies; HV multipliers.

Dale Hollis, Mgr. Mktg.
310/823-5491, fax: 310/822-8046

RGB DYNAMICS, INC., Research Park, 419 Wakara Way, Salt Lake City, UT 84108

Designers and manufacturers of standard and custom touch-entry systems for system integrators and OEMs using zoned and buried-layer capacitive sensing technology.

Wayne Maw
801/581-9200, fax: 801/466-9220

RGB SPECTRUM, 950 Marina Village Pkwy., Alameda, CA 94501

Designers/manufacturers of systems integrating computer and video signals for display and communications. Products include multi-screen display controllers, high-end scan converters, multi-signal display processors, video scalars, and computer/video signal synchronizers.

Sls. Dept.
510/814-7000, fax: 510/814-7026
e-mail: sales@rgb.com
www.rgb.com

RICHARDSON ELECTRONICS, LTD., 40W267 Keslinger Rd., LaFox, IL 60147

Distributors of CRTs, monitors, and electronic components to complement the display industry. Represents and distributes CRTs from every major CRT manufacturer in the world. Color and monochrome monitors and flat panels available.

Charles J. Acurio, V.P. Display Products
630/208-2200, 1-800-222-2787
fax: 630/208-2350

RIKEI CORPORATION OF AMERICA, 10050 N. Wolfe Rd., #130, Cupertino, CA 95014

Representative of makers of LCD modules, including monochrome graphic;

color graphic, passive and TFT; custom graphic, COG, TAB, STN, and F-STN. Also, LCD panels; including custom, TN, STN, and F-STN; and touch panels, including transparent resistive.

Louis Leong, Sls. Mgr.
408/257-7943, fax: 408/257-9001

RMF PRODUCTS, INC., P.O. Box 520, Batavia, IL 60510-0520

Manufacturers of a line of snap-in bezel and filter assemblies to enhance displays and improve front-panel appearance. Eleven different sizes with various non-glare filters are available.

Richard Frieders, Pres.
630/879-0020, fax: 630/879-6749
e-mail: rmfprod@ix.netcom.com
www.rmproducts.com

ROCKWELL COLLINS, 400 Collins Rd. N.E., Cedar Rapids, IA 52498

Involved in the development and production of low-power high-resolution AMLCD technology. This is critical in delivering the level of situational awareness required in the fast-engineering CWS/ATM and CATM Free Flight Environment.

Gary Frederick, Mgr. Strategic Bus. Dev.
319/295-4965, fax: 319/295-6034

ROGERS CORP., One Technology Dr., P.O. Box 188, Rogers, CT 06263

Manufacturers of DUREL® electro-luminescent lamps.

Robert D. Wachob, V.P. Sls./Mktg.
860/779-5797, 1-800-227-6437
fax: 860/774-9630

ROHM ELECTRONICS USA, 3034 Owen Dr., Antioch, TN 37013

Marketers of LEDs, lamps, modules for indoor/outdoor signage, and other electronic components including LCDs and Hi-brite LEDs.

Mike Halverson, Mgr. Sls.
615/641-2020 x121, fax: 615/641-2022

ROLIC TECHNOLOGIES, LTD., c/o BTG INTL., LTD., 10 Fleet Pl., Limeburner Lane, London EC4M 7SB, U.K.

A licensing joint-venture company formed to commercialize innovative LCD technology, bring together ROLIC's 25 years' experience in LC technology R&D, and BTG International's 50 years' experience in commercializing patented technologies worldwide.

Melanie Edge, Mktg. Exec.
+44-(0)-171-575-1677
fax: +44-(0)-171-575-1525
e-mail: melanie.edge@btgplc.com

ROMAG GLASS PRODUCTS, LTD., Patterson St., Blaydon, Tyne & Wear, NE21 5SG, U.K.

Manufacturers of laminated glass, acrylic, and polycarbonate optical filters for contrast enhancement, radio-frequency shielding, and privacy viewing. For CRTs, both flat and curved filters are available with etched and anti-reflection coated surface finishes. For flat-panel displays, filters incorporating polarizers and transparent coatings are available.

Peter C. Jones, Sls./Managing Dir.
+44-191-414-5511, fax: +44-191-414-0545

RORZE AUTOMATION, INC., 1625 McCandless Dr., Milpitas, CA 95035

Manufacturers of robots and automation systems for FPD substrate handling. The RRG130, a state-of-the-art load/unload substrate handling system, features a high-

throughput dual-arm robot and innovative non-contact optical alignment.

Scott Shollenberger, Sls. Engr.
408/935-9100, 1-800-707-2002
fax: 408/935-9101
www.rorze.com

LOUIS RUDZINSKY ASSOCIATES, INC., Harrington Park, 394 Lowell St., Ste. 17, Lexington, MA 02173

Personnel recruiting in electro-optics, display, and image processing, hardware, software, and marketing professionals.

Louis Rudzinsky
781/862-6727, fax: 781/862-6868

SAES GETTERS U.S.A., INC., 1122 E. Cheyenne Mtn. Blvd., Colorado Springs, CO 80906

Manufacturers of evaporable and non-evaporable getter products for FEDs, CRTs, gas purifiers, and electronic devices. Also, dispensers for safe mercury deposition in plasma displays.

Mike Hagen, Appl. Engr.
719/527-4135, fax: 719/576-5025

SAGE, INC., 2460 N. First St., Ste. 100, Santa Jose, CA 95131

Providers of ICs and video board products to the FPD industry. Products include digital cards for ISA or PCI bus, analog RGB boards, and NTSC/PAL video boards.

Robert Haefling, Dir. Sls.
408/383-5300 x403, fax: 408/383-5310
e-mail: rhaef@sageinc.com
www.sageinc.com

SAIC LTD., 26 Craven Court, Stanhope Road, Camberley, Surrey GU15 3BW, U.K.

Designers/manufacturers of sunlight-readable LCDs, both monochrome and color, for military, rugged, and severe environments, and ATM and video applications. Also, rugged military computers and peripherals for complete systems integration.

Richard Oliver, Bus. Dev. Mgr.
+44-(0)-1276-675511
fax: +44-(0)-1276-676262

SAINT-GOBAIN DISPLAY GLASS, 150 Dey Rd., Wayne, NJ 07470

Manufacturers of glass-based products for the PDP, FED, touch-panel, and photomask markets. Products range from low-compact glass substrates (for PDPs and FEDs), spacers (FEDs), and high-UV-transmission defect-free substrates (photomasks).

Marc Rouberol, U.S. Area Mgr.
973/628-5533, fax: 973/696-4056
e-mail: marc.rouberol@sgcna.com

SAI TECHNOLOGY (Science Applications Intl. Technology), 4224 Campus Point Ct., San Diego, CA 92121

Designers/manufacturers of display subsystems for specialized environments, such as military platforms, industrial and commercial vehicles, and severe-environment fixed-site applications.

Lynn Altadonna, Bus. Dev. Mgr.
619/450-2205, fax: 619/450-3733

SAMPO CORP. OF AMERICA, 5550 Peachtree Industrial Blvd., Norcross, GA 30071

Manufacturers of display peripherals for IBM and Apple platforms. Also, 286 and 386 personal computers, laptops, and notebooks. Color displays in sizes ranging from 14 to 21 in.; horizontal scan from 30 to 90 kHz fixed and/or multi-frequency.

Monochrome displays in sizes from 9 to 24 in.; fixed frequency with resolutions ranging from 640 x 480 up to 1600 x 1280.

Chester Kramarski
404/449-6220, fax: 404/447-1109

SAMSUNG SEMICONDUCTOR, INC., 3655 N. First St., San Jose, CA 95134

Manufacturers of a wide variety of display products, especially TFT devices for portable computer and desktop monitor applications.

Carl H. Steudle, Dir. Sls./Mktg., TFT Display Products
1-800-423-7364, fax: 408/544-4919
www.samsung.semi.com

SAMTEL USA, INC., 644 Upper Mountain Ave., Montclair, NJ 07043-1623

Manufacturers of monochrome display tubes from 3 to 23 in., standard catalog selections or custom-designed.

Suprasad Baidyayoy, Pres.
201/783-4332, fax: 201/783-0733

SANDERS ASSOCIATES INC., Information Systems Div., P.O. Box 2035, Nashua, NH 03061-2035

Manufacturers of ruggedized and militarized displays, intelligent terminals, and display workstations for application in aircraft, ground vehicles, shelters, ships, and submarines.

Robert Perutz, Mgr. Bus. Dev.
603/885-3524, fax: 603/885-4603

SANRITZ CORP., c/o Dana Enterprises Intl., Inc., 1440 S. De Anza Blvd., San Jose, CA 95129

Manufacturers of polarizers for LCDs, optical instruments, and sun glasses, including high-durability high-optical-performance super-high-contrast AR-coated polarizers and retardation films.

David K. Nakamura, Pres.
408/257-6686, fax: 408/973-9620
e-mail: dave@danaenterprises.com
www.danaenterprises.com

SANRITZ CORP., 1-30-13 Narimasu, Itabashi-ku, Tokyo 175, Japan

Manufacturers of polarizers for LCDs, optical instruments, sunglasses, including high-durability, high-optical-performance, super-high-contrast, AR-coated polarizers and retardation films.

D. Nakamura
408/257-6686, fax: 408/973-9620

SARIF, INC., 600 S.E. Assembly Ave., Ste. 100, Vancouver, WA 98661

Manufacturers of high-temperature polysilicon LCDs; 1280 x 1024, 1024 x 768, and custom.

Steven R. Hix, CEO
360/750-0242, fax: 360/750-0244
www.sarif.com

SARNOFF CORP., CN 5300, Princeton, NJ 08543-5300

Providers of design, simulation, modeling, development, and prototype fabrication of electron guns, yokes, CRT tubes, shadow mask, coatings, phosphor screens, active-matrix LCDs, and TFL panels. Product design services available (optical, process/material development, system).

James R. Birch, Dir., Bus. Devel.
609/734-2193, fax: 609/734-2992

SASCAL DISPLAYS, Unit 1, Hayes Metro Centre, Springfield Road, Hayes, Middx UB4 0LE, U.K.

Designers/manufacturers of CRT-display products for custom applications. Mono-

chrome and color displays in all sizes for industrial, ruggedized, and full MIL-SPEC applications are available in small to medium quantities.
Stuart Caldecourt
+44(0)-181-573-0303,
fax: +44(0)-181-569-1515

SATORI ELECTRIC (AMERICA), INC.,
23717 Hawthorne Blvd., Suite 300,
Torrance, CA 90505
Marketing agent for Optrex LCDs. Optrex is a joint venture between Asahi Glass and Mitsubishi Electric Corp. Optrex offers a broad line of LCDs including alphanumeric and graphic types. Displays are offered with the latest high-contrast fluids.
David Liu
310/214-1791, fax: 310/214-1721

SCHIEDERWERK GmbH, Neuburger
Strasse 40, Nurnberg 90451, Germany
Manufacturers of power supplies for mercury metal-halide and xenon arc lamps. Power range: 20 to 1200 W, ac and dc. Featuring line voltage auto-selection; power factor correction.
Barry DuRon, U.S. Sls. Mgr.
310/459-3441, fax: 310/459-9771
e-mail: aviram@ait.net

SCHOTT CORP., Technical Glass Div.,
3 Odell Plaza, Yonkers, NY 10701-1405
Marketers of CRT bulbs for medical and imaging displays, FOTURAN® photo-etchable glass for microtechnology, and thin glass substrates for LCDs and other display technologies.
Bill McLaughlin, Bus. Mgr.
914/968-8900, fax: 914/968-3892
www.schottglass.com

SCHOTT FIBER OPTICS, INC.,
122 Charlton St., Southbridge, MA
01550-1960
Manufacturers of fiber-optic components for industrial, medical, scientific, and other commercial applications. Products include precision micro spacers for FPDs, high-expansion faceplates for CRT applications, clad rods, and image conduits.
Kevin Tabor, Product Mgr.
508/765-9744, fax: 508/764-6273
www.schottfiberoptics.com

SCHOTT GLASS TECHNOLOGIES, INC.,
400 York Ave., Duryea, PA 18642
Manufacturers of contrast-enhancement filters for flat-panel and CRT applications, CRT faceplates, color-filter glass, and NVIS-compatible filters per MIL-L-85762A.
Steve Sokach, Product Mgr.
570/457-7485, fax: 570/457-7330
www.schottglasstech.com

SCHOTT HIGH VOLTAGE, 1161 W. 2320
S., Salt Lake City, UT 84119
Manufacturers of high-voltage and combination high/low-voltage power supplies for use in monitor, imaging, avionics, and medical applications.
Andrew Schmitt, Sls. Mgr.
801/972-3690, fax: 801/972-3699

SCIENTIFIC SYSTEMS SALES CORP.,
333 Jericho Tpke., Jericho, NY 11753
Distributors of CCD wide-dynamic-range high-speed cameras and test systems for displays providing spatial, luminance, and chromaticity measurements.
Arthur Posner, V.P./Gen. Mgr.
516/822-4880, fax: 516/822-4887

SCT GROUP, INC., 4 Mount Royal Ave.,
Ste. 310, Marlborough, MA 01752
Consultancy specializing in marketing communications in science and technology.
C. Michael Toomey, Dir.
508/460-7002, fax: 508/460-7023
e-mail: mike@sctgrp.com
www.sctgrp.com

PETER SEATS, Consultant, Display
Technology, 300 Indian Springs Rd.,
Williamsburg, VA 23185
Consultancy in phosphor, CRT, and FED technologies.
Peter Seats, Consultant
757/220-3183, fax: 757/220-3263

SECURITY DEFENSE SYSTEMS CORP.,
139 Chestnut St., Nutley, NJ 07110
Manufacturers of high-resolution real-time x-ray imaging displays for security and nondestructive-testing quality-control applications.
Don Airey, Gen. Mgr.
973/235-0606, fax: 973/235-0132

SEIKO INSTRUMENTS USA, INC.,
1130 Ringwood Ct., San Jose, CA 95131
Manufacturers of the CH-5500 series of thermal-transfer color hard copiers and the GR-4400 series of advanced raster display systems.
Cheryl Landman, Mktg. Comm. Mgr.
408/922-5800, 1-800-255-7617
fax: 408/922-5840

SEIKO INSTRUMENTS USA, INC.,
Electronic Components Div., 2990 W.
Lomita Blvd., Torrance, CA 90505
Manufacturers of STN, FSTN, and color LCD products for a variety of applications. First to introduce chip-on-glass technology and new low-cost low-power ECB color displays.
Mike McLachlan, Product Mktg. Mgr.
310/517-7771, 1-800-934-9334
fax: 909/975-5699
e-mail: seiko-ecd@salessupport.com
www.seiko-usa-ecd.com

SEIKO INSTRUMENTS USA, INC., Micro
Printer Div., 2990 W. Lomita Blvd.,
Torrance, CA 90505
Manufacturers of products that solve specialized and proprietary problems. Offering four families of thermal printers for a wide range of applications, including medical, test, and measurement; industrial, retail, hospitality, gaming, and warehousing.
Tony DiMarco, Dir. Sls. & Mktg.
310/517-8111, fax: 310/517-8154
www.siumpd.com

SEIWA OPTICAL CO., 1 Blue Hill Plaza,
Peart River, NY 10945-8667
Manufacturers of optics/vision alignment systems, cameras, optics, and illuminators.
Sal Cortorillo, V.P.
914/620-1999, 1-800-890-3333
fax: 914/620-1950

SEKISUI CHEMICAL CO., LTD., c/o Dana
Enterprises Intl., Inc., 1440 S. De Anza
Blvd., San Jose, CA 95129
Manufacturers of plastic spacers for LCD in-cell use, conductive spacers for transfer material connecting ITO glass substrates, COG, and anisotropic use; photosensitive resin for LCD cell closure; and color filters.
David K. Nakamura, Pres.
408/257-6686, fax: 408/973-9620
e-mail: dave@danaenterprises.com
www.danaenterprises.com

SEKISUI FINE CHEMICAL CO., LTD.,
1259 Izumi Minakuchi-cho, Koga-gun 528,
Japan
Manufacturers of plastic spacers for LCD in-cell use, conductive spacers for transfer material connecting ITO glass substrates, COG, and anisotropic use; photosensitive resin for LCD cell closure; and color filters.
D. Nakamura
408/257-6686, fax: 408/973-9620

SEM-COM CO., INC., 1040 N. Westwood,
P.O. Box 8428 (43623), Toledo, OH 43607
Manufacturers of custom glass and glass ceramics for display components, including powdered frits, seal cane, tubulation, spacers, and press-cast parts. Specializing in small-diameter rod and tubing, and various rectangular cross sections. Also offering compositional development services supported by comprehensive database of over 30,000 glasses.
Paul Train, Sls. Engr.
419/537-8814, fax: 419/537-7054

SEMICONDUCTOR EQUIPMENT AND
MATERIALS INTERNATIONAL (SEMI),
805 E. Middlefield Rd., Mountain View,
CA 94043-4080
Resource for the latest FPD business and technology information. Series of SEMICON trade expositions. Offering a wide array of FPD services that include international industry standards, technical programs and workshops, newsletters, technical publications, and education videos.
Sue Chung, FPD Programs Mgr.
650/940-7961, fax: 650/940-7937
www.semi.org

SEMICONDUCTOR SYSTEMS, INC.
(A Subsidiary of FSI International),
47003 Mission Falls Ct., Fremont,
CA 94539-7819
Manufacturers of fully automatic cluster systems designed to clean, coat, cure, and develop photoresist, polyimide, and color filter films on large-area FPD substrates. The unique architecture of the APEX™ FPD microlithography cluster provides complete flexibility in a minimum footprint.
William O'Connor, FPD Sls.
510/683-8858, 1-800-542-9888
fax: 510/656-8226

SEMI-PPD, 805 E. Middlefield Rd.,
Mountain View, CA 94043
A division of an international trade association dedicated to expanding the global market for FPD equipment, material, and services suppliers. Provides tradeshow opportunities; educational publications, posters, and videos; marketing and technical programs; international standards committees; and economic information on FPD supplier markets.
Heidi Hoffman, Mgr., FPD Div.
415/940-6904, fax: 415/940-7919

SEMITOOL, INC., 655 W. Reserve Dr.,
KalisPELL, MT 59901
Manufacturers of the Centurium FPD process automation and control system that links large-substrate fabrication steps with materials handling, creating a clustered batch wet-process tool. Centurium can be configured with modules for stripping, cleaning, and etching applications, with automatic transfer between sequential processes.
Jason Manger, Prod. Mgr.
406/752-2107, 1-800-548-8495
fax: 406/752-5522

SEMITOOL, INC., Equinox Div., 655 W.
Reserve Dr., Kalispell, MT 59901
Manufacturers of wet-processing equipment used in the manufacture of flat-panel displays. Also, etching, cleaning, stripping, developing, coating, and electroplating systems.
Peter Baxter, Equinox Sls. Mgr.
406/752-2107, fax: 406/752-5522

SENCORE INC., 3200 Sencore Dr., Sioux
Falls, SD 57107
Designers, manufacturers, and marketers of an exclusive line of computer monitor analyzing instruments that are designed specifically for the servicer. Products include signal generators, HDTV generators, and color analysis meters.
Jeff Murray, Sls. & Mktg. Mgr.
605/339-0100, 1-800-736-2673
fax: 605/339-0317

SENSOR PRODUCTS, INC., 24 Castle
Ridge Park, East Hanover, NJ 07936-3547
Manufacturers of the Topaq Advanced Analysis System, a revolutionary windows-based sensor for tactile pressure measurement and interpretation. Used in conjunction with Fuji Prescate and Pressurex pressure-indicating films, Topaq renders high-definition color maps of pressure distribution and magnitude.
Jeffrey Stark, Dir. Mktg.
973/884-1755, 1-800-755-2201
fax: 973/884-1699
www.sensorprod.com

SEOS DISPLAYS LTD, Marchants Way,
Burgess Hill, West Sussex, RH15 8QY U.K.
Manufacturers of out-of-the-window display systems for simulation, CRT monitor-based collimated displays, wide-angle edge-matched multichannel projection displays, and unique laser-scanned imaging and display systems.
Owen J. Wynn
+44-444-870-888, fax: +44-444-870-777

SHARP DIGITAL INFORMATION
PRODUCTS, INC., 16841 Armstrong Ave.,
Irvine, CA 92714-4979
Manufacturers of TFEL video monitors with 31 shades, includes capability for split-screen H&V, dual inputs (RS-170 or 5-bit digital), two-frame storage, +24 input to PS. Also, real-time image processing, development systems, and PC/AT general-purpose board which includes memory (19-512 x 512 x 8), I/O, bus interface, and image-processing VLSI.
John Lewis, Sls. Mgr.
714/261-6224, fax: 714/261-9321

SHARP MICROELECTRONICS OF THE
AMERICAS, 5700 N.W. Pacific Rim Blvd.,
Camas, WA 98607
Manufacturers of monochrome and color passive-matrix LCDs, color TFT-LCDs, and highly reflective TFT-LCDs.
Joel Pollack, V.P. Display Products
360/834-8926, 360/834-8903

SHELD AHL, 1150 Sheldahl Rd., Northfield,
MN 55057
Providing thin-film vacuum-deposited coatings onto polymer films and ITO coatings onto polymer films.
Cliff Morris, Mktg. Mgr.
507/663-8723, fax: 507/663-8545
e-mail: cliff.morris@sheldahl.com
www.sheldahl.com

SHINTECH, INC., 90 Ogo-Oku Tabuse-Cho, Kumage-Gun, Yamaguchi 742-15 Japan

Developers of modeling and simulation software for LCD designers and researchers.

Michiyuki Miyashita, Chief Engr.
+81-820-52-5230, fax: +81-820-52-5237

SHIP ANALYTICS, 183 Providence New London Turnpike, North Stonington, CT 06359-1738

Manufacturers of computer-generated ship handling and tactical simulation imagery projected on screens.

Roger C. Cook, Mktg. Mgr.
203/535-3092, fax: 203/535-0560

SI DIAMOND, INC., 2435 North Blvd., Houston, TX 77098

Involved in the commercialization of diamond technology through its subsidiaries: Diamond Tech One, Inc. (interconnect electronics for displays, fabrication operations such as gold bumping, flip-chip, and back-end semiconductor-wafer processing) and SIDT Coatings, Inc. (deposition and vacuum equipment, and specialized coatings to improve production and enhance longevity).
Howard Schmidt, Pres.
713/529-9040, fax: 713/529-1147

S.I. DIAMOND TECHNOLOGY, INC., 12100 Technology Blvd., Austin, TX 78727

Manufacturers of display elements for large electronic billboards, in particular for outdoor applications. As a research organization, developer of FED technology utilizing diamond films. DTO, Inc., and Plasmatron, Inc., are wholly owned subsidiaries providing service to the display and semiconductor industries.
Zvi Yaniv, Pres.
512/331-6200

SIEMENS AG, Siemensallee 84, Karlsruhe 76185, Germany

Designers/manufacturers of high-contrast high-brightness high-performance monochrome CRT displays for medical systems (including workstations), air-traffic control, and document imaging. Also, high-performance color displays for medical, industrial, and CAD applications.
Edgar Litzler, Dept. AUT 31 PM
+49-721-595-6096, fax: +49-721-595-4558

SIGNATONE, Probing Division, 393-J Tomkins Ct., Gilroy, CA 95020

Manufacturers of a line of analytical probe stations, including custom-made flat-panel probes in sizes ranging from 8 to 20 in. sq., and analytical lasers for repair.
Brian Dickson, V.P. Mktg.
408/848-2851, fax: 408/848-5763

*SILICON LIGHT MACHINES, 385 Moffett Park Dr., Ste. 115, Sunnyvale, CA 94089-1208

Manufacturers of high-resolution projection products based on Grating Light Valve™ technology which uses MEMS techniques to create a high-performance cost-effective spatial light modulator on the surface of a silicon chip.

Bruce Lang, Product Mktg. Mgr.
408/541-4905, fax: 408/541-1244
bruce@siliconlight.com
www.siliconlight.com

SILICON VALLEY CHEMLABS, 245 Santa Ana Ct., Sunnyvale, CA 94086

Manufacturers of high-purity electronic-grade chemicals for semiconductor, FPD,

thin-film head, and optical media manufacturing. Products are safe, high performance chemicals which include polymer removers, photoresist strippers, post-CMP cleaners, edge-bead removers, and developers.

Andrea Pollard, Ins. Sls./Cust. Svc.
408/732-4700, 1-800-408-CHEM
fax: 408/732-0733
e-mail: sales@svclabs.com
www.svclabs.com

SILISCAPE, INC., 2585 E. Bayshore Rd., Ste. A, Palo Alto, CA 94303

Manufacturers of low-power-consumption high-resolution (up to SVGA) virtual display systems for portable image display, computing, communications, and entertainment products. Small package size (25 x 30 x 14 mm) allows incorporation into cellphones, pocket communicators, digital cameras, and HMDs.
Greg R. Fenner, Pres./CEO
650/424-3900, fax: 650/424-1433
www.siliscap.com

SILVER CLOUD MFG. CO., 525 Orange St., Millville, NJ 08332-5002

Manufacturers of Durlan II™ display filters and lenses. Custom fabricated to specified thickness, size, and configuration. Special hard-coated anti-glare and anti-reflective surface finishes are available. Filters can include EMI-RFI shielding, light control films, and polarizers, and are excellent screen protectors.
Robert C. Cowperthwait, Sls. & Mktg. Mgr.
609/825-8900 x201, fax: 609/825-8969
e-mail: bob@silver-cloud.com
www.silver-cloud.com

SIMCO STATIC CONTROL AND CLEANROOM PRODUCTS, 2257 N. Penn Rd., Hatfield, PA 19440

Manufacturers of ionization equipment for control of ESD and contamination in FPD manufacturing: overhead and point-of-use ionizing air blowers, air guns, and nozzles; static elimination bars; low-voltage and total-coverage room ionization systems; electrostatic instrumentation.
James Curtis, Mgr.
215/822-2171, 1-800-538-0750
fax: 215/997-3450
e-mail: simco@itw.com
www.simco-static.com

SIMTECH LTD., 29 Hamerkava St., Holon 58101, Israel

Manufacturers of simulators for military applications. The display is based on high-resolution (1280 x 1024) color digitized images with an overlay of graphic elements in real time. The images are displayed on video projectors, color monitors, and LCD monitors.

Ben Z. Beiski, Chief Engr.
+972-3-5577-680, fax: +972-3-5564-471

SMART TECHNOLOGIES, INC., 600-1177 11th Ave. S.W., Calgary, Alberta T2R 1K9, Canada

Manufacturers of a family of large-area (4 x 3 ft.) touch surfaces for use with or without projectors for interactive displays. Software tool kits provided for UNIX, Macintosh, Windows, or OS/2 applications for data conferencing, copyboard replacements, or command and control.
Roy Anderson
403/245-0333, fax: 403/245-0366

S-MOS SYSTEMS, INC., 150 River Oaks Parkway, San Jose, CA 95134

Designers/manufacturers/distributors of a full line of LCDs and flat-panel-display controllers and drivers.
Jamie Brown, Mktg. Engr.
408/922-0200, fax: 408/922-0238

ALAN SOBEL, 633 Michigan Ave., Evanston, IL 60202

Consultant on display devices and systems, specializing in flat-panel technologies. Technical consultation; analysis; problem-solving; report, proposal, and grant-application writing and analysis.
Alan Sobel, Principal
847/869-5607, fax: 847/869-5607
e-mail: alan-sobel@compuserve.com

SOCIETY FOR INFORMATION DISPLAY, 31 E. Julian St., San Jose, CA 95112

International society for the presentation, exchange, and preservation of information-display technology. Sponsor of annual Symposium, Seminar, and Exhibition. Publishers of Information Display Magazine, Journal of the SID, as well as other publications.
Dee Dumont, Exec. Dir.
408/997-1013, fax: 408/997-1531
e-mail: office@sid.org
www.sid.org

SOLOMON TECHNOLOGY (USA) CORP., 21038 Commerce Pointe Dr., Walnut, CA 91789

Taiwanese-based manufacturers of passive monochrome dot-matrix LCD modules, offering upwards of 400 standard designs of character and graphic LCMs. Specializing in custom designs that require only a 1K minimum quantity order. Many reflective and LED backlight designs stocked for immediate delivery for 50-piece minimum quantity orders.
John "JB" Butler, Natl. Sls. Mgr.
909/468-3733 x3039, fax: 909/869-6258

SONERA TECHNOLOGIES, P.O. Box 565, Rumson, NJ 07760

Provider of DisplayMate, an industry standard software utility that produces over 300 high-sensitivity test patterns for setting up, tuning up, testing, evaluating, and adjusting computer and video displays for optimum image and picture quality.
Bob Matthews, Mgr.
732/747-6886, 1-800-932-6323
fax: 732/747-4523
www.displaymate.com

SONY CORP., Display Device Group, 2-10-14 Osaki, Shinagawa-ku, Tokyo 141, Japan

Manufacturers of the super-high-resolution Trinitron™ color CRT; beam-index CRTs; high-resolution image pick-up tubes; projection CRTs; and other display devices.
S. Morikawa, Mgr.
+81-3-495-3630, fax: +81-3-495-3724

SONY CORP., 10833 Valley View Street, Cypress, CA 90630

Manufacturers of sensing products that includes both advanced CCD cameras and Stacion tube cameras.
Lisa Tollner
714/229-4170, fax: 714/229-4333

SONY CORP., 16550 Via Esprillo, San Diego, CA 92127

Manufacturers of 16:9 aspect-ratio 28V 1920 x 1080 graphic wide-monitor computer displays. X-Windows graphic controller, 2048 x 2048, for air-traffic-

control applications. Fully integrated camera, speaker, and microphone peripheral to enable desktop video conferencing. GDM 17- and 20-in. multimode color monitors.
John Wyckoff, Prod. Mktg. Mgr.
619/673-2860, fax: 619/451-0412

SONY GRAPHIC DISPLAY, 3300 Zanker Rd., San Jose, CA 95134

Manufacturers of 13-, 16-, 19-, and 20 x 20-in. Trinitron color graphic displays, and high-resolution displays with high-performance CRT technology.
Kim Nero, Mktg. Coord.
408/955-4202, fax: 408/955-5631

SOPRA, INC. (Subsidiary of SOPRA SA), P.O. Box 2619, 33 Nagog Park, Acton, MA 01720-6619

Manufacturers of semi-automated and fully automated tools for non-contact characterization of thin-film layers and materials, and for process control and monitoring. Handles up to 1-m² panels. Also, high-energy (15–30 J) excimer lasers for annealing of a-Si on glass or plastic substrates.
J.-C. Fouere, G.M.
978/263-2520, 1-800-54-SOPRA
978/263-2790
www.sopra-sa.com

SOUTHWALL TECHNOLOGIES, INC., 1029 Corporation Way, Palo Alto, CA 94303

Manufacturers of sputtered coatings on optical-grade film. Applications include AR, electrochromic half-cells, EL lamps, EMI/RFI shielding, flexible circuits, IR rejection, LC displays, optical tape media, specular reflectors, touch panels, and VDT/CRT filters (flat or formed).
Ming Tong, Product Mgr.
415/962-9115, x150, 1-800-477-4784
fax: 415/967-0182

SPECIALTY COATING SYSTEMS, INC., 5707 W. Minnesota St., Indianapolis, IN 46241

Manufacturers of high-performance coating equipment, process development, and coating contract services for the electronic, medical, ferrite core, and silicone/rubber industries, including liquid materials as well as vacuum-deposited Parylene conformal coating.
Andrew Brooks, Asst. Mktg. Mgr.
317/244-1200, 1-800-356-8260 x272
fax: 317/240-2092

SPECTRON ENGINEERING, INC., 255 Yuma Ct., Denver, CO 80223

Manufacturers of optical measuring devices, spectrometers, spectroradiometers, and automated display-testing systems.
Zdzislaw Krzystek
303/733-1060, fax: 303/733-2432

SPECTRUM SCIENCES, INC., 3050 Oakmead Village Dr., Santa Clara, CA 95051

Manufacturers of large-substrate ion implanter for implant processing of FEDs or poly-Si AMLCDs. Substrate sizes up to 1 x 1 m. Energy ranges available from 20 keV to 6 MeV.
Mike Tucker, V.P.
408/727-1567 x24, fax: 408/727-1322

SPIE, P.O. Box 10, Bellingham, WA 98227-0010

SPIE, The International Society for Optical Engineering, is a nonprofit technical

society dedicated to advancing scientific and engineering applications of optical, electro-optical, and optoelectronic technologies through its publications, symposia, and short courses.
Sue Davis, Dir.
206/676-3290, fax: 206/647-1445

SPIRE CORP., One Patriots Park, Bedford, MA 01730-2396

Manufacturers of laminators for LCD and AMLCD panels; ion-implantation services for TFEL and AMLCDs; phosphor activation; vertical cavity solid-state lasers; and high-performance solar cells.
Ward D. Halverson, Dir. Display Svcs.
781/275-6000, 1-800-657-0938
fax: 781/275-7470
www.spirecorp.com

SPSE, THE SOCIETY FOR IMAGING SCIENCE AND TECHNOLOGY, 7003 Kilworth Lane, Springfield, VA 22161

A nonprofit technical society devoted to meeting the information needs of imaging professionals - scientists, engineers, and technicians working in the area of photographic and electronic imaging. Its purpose is to advance the understanding and application of imaging science and technology.
Lori Jones, Membership, 703/642-9090

STALAW CO., P.O. Box 516, Herzliya 46105, Israel

Manufacturers of extremely slim LCD rear projectors with wide viewing angle in all directions. Speaker-independent speech-recognition commands for LCD projectors with 100% accuracy of recognition.
Michael Stalaw, Dir.
+972-9-9580-261, fax: +972-9-9561-282

THE STAN-ALLEN CO., INC., P.O. Box C, 655 Center St., Ludlow, MA 01056

Manufacturers of close-tolerance steel-rule dies and specializing in tools for cutting films for electroluminescent displays.
Michael Ghareeb, V.P. Sls./Mktg.
413/589-9961, 1-800-428-3324
fax: 413/589-0006

STANFORD RESOURCES, INC., 20 Great Oaks Blvd., San Jose, CA 95119-1309

Market researchers/publishers of printed and electronic reports on the display industry, including quarterly and annual reports on shipments of CRTs, all FPDs, CRT and LCD monitors, projection displays, and associated market and technology sectors.
Laura A. Barretto, Dir. Sls./Mktg.
408/363-8666 (direct); 360-8400 (corporate)
fax: 408/360-8410
e-mail: barretto@stanfordresources.com
www.stanfordresources.com

I. I. STANLEY CO., INC., 2660 Barranca Pkwy., Irvine, CA 92714

Manufacturers of super-high-intensity LEDs, chip-type SMD LEDs, light-bar LED modules, and LED dot-matrix displays. A full complement of LCDs with LED, CFL, and EL backlighting is available. Also, touch-panel LCDs.
Roy Mader, Mktg. Mgr.
714/222-0777, fax: 714/222-0555

STANLEY ELECTRIC CO., LTD, 2-9-13, Nakameguro, Meguro-ku, Tokyo 153, Japan

Manufacturers of super-bright LEDs, LED displays, LED printheads, LCDs, ELs, CFLs, photoreceptors (OPC, a-Si), sub-miniature lamps, miniature halogen

lamps, and driver and controller electronics for displays.

Takashi Kashiwagi
+81-3-3710-2222, fax: +81-3-3792-0007

STANLEY ELECTRIC CO., LTD, R&D Laboratory, 1-3-1 Eda Nishi, Midori-ku Yokohama 225 Japan

Manufacturers of super-bright LEDs, LED displays, LED printheads, LCDs (TN, STN, GH-D, TFT, CSH), ELs, CFLs, photo-receptors, subminiature lamps, miniature halogen lamps, and driver and controller electronics for displays.
Takashi Kashiwagi
+81-3-3710-2222, fax: +81-3-3792-0007

G. A. STANLEY PALMER LTD., Island Farm Ave., West Molesey, Surrey KT8 2UR, U.K.

Distributors of CRTs, wound components (coils), filters, and sockets and frames for monitors, with back-up consultancy services.

Dennis Wickham
+44-81-979-7254, fax: +44-81-941-6521

STEAG MICROTECH, INC., 8305 Cross Park Dr., Austin, TX 78754

Manufacturers of precision clean/coat/develop cluster tools or stand-alone modules and surface film thickness measurement tools. Providers of capillary coating technology for precision, low-cost coatings.

Dana Scranton, V.P. Sls./Mktg.
406/755-8367, fax: 406/755-8368

STEREOGRAPHICS CORP. 2171 E. Francisco Blvd., San Rafael, CA 94901

Manufacturers of hardware producing flickerless professional-quality computer- or video-generated 3D images for viewing on computer monitors or with high-resolution 3D projection systems.
Amy Mar, Sls. Admin.
415/455-1832, 1-800-783-2660
fax: 415/450-3020

STEREOMEDIA, INC., 2307 W. Olive Ave., Burbank, CA 91506

Suppliers of stereoscopic 3-D (S3-D) video systems and broadcast-quality 3-D video production. Distributors for Reality® LCD Glasses (60/120 Hz), special-application display modules, and the world's largest selection of 3-D video stock and file footage for virtual-reality developers.
Anthony Coogan, Pres.
818/559-6515, fax: 818/559-6598

SUMITOMO METALS, 5201 Great America Parkway, #320, Santa Clara, CA 95054

Manufacturers of image and video processing semiconductors for consumer, scientific, industrial, and medical imaging products. These include image scalars, buffers, filters, and feature extraction processors.
Alan Black, Mgr., Sls. & Mktg.
408/982-2503, 1-800-392-4447
fax: 408/982-2522
www.smi-lsi.com

SUPERIOR MICROPOWDERS, 3740 Hawkins N.E., Albuquerque, NM 87109

Manufacturers of phosphor, glass, conductor, dielectric and resistor powders and dispersions for display and thick-film electronic applications. Phosphors are spherical, non-milled, unagglomerated, small average size with controlled particle-size distributions.
James Caruso
505/342-1492, fax: 505/342-2168
e-mail: caruso01@smp1.com
www.smp1.com

SUPERTEX INC., 1235 Bordeaux Dr., Sunnyvale, CA 94089

Manufacturers of high-voltage monolithic HVCMOS driver ICs and DMOS discretes/arrays for EL/plasma/VF/LCD panels and printer/plotter ultrasound imaging heads. Suitable for monochrome, gray-scale, and color applications up to 80 channels and 600 V.
Dilip Kapur, Dir. Mktg.
408/744-0100, 1-800-222-9884
fax: 408/222-4895
e-mail: prodinfo@supertex.com
www.supertex.com

KARL SUSS AMERICA, INC., P.O. Box 157, Route 100 & Suss Dr., Waterbury Ctr., VT 05677

With a well established installation base in both the U.S. and Europe, Suss aligners are uniquely suited to meet specific process requirements, with resolutions in the 2-5-µm range on panels up to 8 x 8 in. The coaters utilize the patented Gyrsel closed cover system to provide highly uniform coatings on substrates up to 24 x 24 in. with manual or automated handling.
Paige Lowry, Mktg. Coord.
802/244-5181, 1-800-685-7877
fax: 802/244-5103

KARL SUSS AMERICA, INC., PROBER DIV., P.O. Box 157, Suss Dr., Waterbury Ctr., VT 05677

Manufacturers of a complete line of manual, semi-automatic, and fully automatic probing systems and accessories, including manual and motorized probe heads, dc to W band probes, microscopes, microwave and hot chucks, and localized environmental chambers.
Robert Jamison, Sls. Mgr., Prober Div.
802/244-5181, fax: 802/244-5103

SWISS CONTROLS, INC., 2603 E. Barker Ave., Michigan City, IN 46360

Manufacturers of EL lamp power inverters, dc-ac for custom design and fabrication. Large and small volume requirements welcome. Two-week turnaround on prototype requests in most cases.
Thomas Smith, V.P. Sls./Mktg.
219/872-5544, 1-800-348-3257
fax: 219/872-5882

SYMCO, INC., 29 Poplar Dr., Stirling, NJ 07980-1527

Suppliers of imaging products for resale including CCD cameras, imaging frame grabbers, TV lenses, monitors, encoders, decoders, video printers, and LCD projectors.
Frank Culotta, Pres.
908/647-6262, fax: 908/647-4904

SYNTRONIC INSTRUMENTS, INC., 100 Industrial Rd., Addison, IL 60101

Manufacturers of magnetic components for CRTs. Full line of deflection yokes, focus coils, beam-alignment devices, and mounting systems. Products for military avionics, medical monitors, full-color displays, helmet-mounted/miniature displays, and other special-purpose CRTs.
Patricia A. Rohlfes, Sls./Mktg. Coord.
630/543-6444, fax: 630/543-0287

TAIYO YUDEN USA, INC. (XENTEK), 1770 La Costa Meadows Dr., San Marcos, CA 92069

Manufacturers of CCFT inverters, and dc/ac drivers for LCD backlights.
Eddie Yanagida, Product Mgr.
760/471-4001, 1-800-493-6835
fax: 760/471-4021
e-mail: tyeddie@ix.netcom.com
www.xentek.com

TAMARACK SCIENTIFIC CO., INC., 1040 N. Armando St., Anaheim, CA 92806

Manufacturers of photolithographic exposure production systems, including new high-yield scanning projection tools with exposure areas up to 840 x 1025 mm used in the manufacture of color filters, AMLCDs, FEDs, ELs, and plasma displays.
Ivan Courtright, Sls. Mgr.
714/238-7400, fax: 714/632-1455
www.tamsco.com

T&M INSTRUMENTS REPRESENT. LTDA, R. Princesa Isabel, 1.750, Brooklin Paulista, São Paulo, SP 04601-003, Brazil

Distributors specializing in the promotion, sales, and service of all the necessary equipment to develop, manufacture, and repair displays, including test and measurement equipment such as programmable video test signal generators, CRT color analyzers, convergence gauges, and light meters.
Antonio Francisco, Dir.
+55-11-240.9526, +55-11-240.9580
fax: +55-11-240.2414
e-mail: iminstr@uol.com.br

TANNAS ELECTRONICS, 1426 Dana Pl., Orange, CA 92666

Consulting services in electronic information displays; design of display components and products; evaluation of display companies and component sources; tours (Asia) and seminars; and marketing, human factors, and electro-optic studies.
Lawrence E. Tannas, Jr., Pres.
714/633-7874, fax: 714/633-4174

TARGET MATERIALS, INC., 1145 Chesapeake Ave., Columbus, OH 43212

Full-service manufacturer of high-performance thin-film materials, providing a vast array of metals, ceramics, and alloys for sputtering targets and evaporation sources in virtually any customer defined configuration.
Michael D. Murphy, V.P. Sls. & Mktg.
614/486-7055, 1-800-292-8639
fax: 1-800-292-8654

TARTAN TECHNICAL, INC., 24 Westech Dr., Tyngsboro, MA 01879

Value-added resellers of color output and input devices, including color printers, digital projectors, large-format printers, digital label systems, film recorders, and scanners. Printing technologies from leading manufacturers include dye sublimation, thermal transfer, laser, solid ink, and ink jet.
Kathleen McLeod, V.P.
508/649-8940, 1-800-869-0507
fax: 508/649-8947

TATUNG COMPANY OF AMERICA, INC., 2850 El Presidio Street, Long Beach, CA 90810

Manufacturers of a variety of monochrome and color monitors, ranging in screen size from 12 to 20 in. and designed for basic and sophisticated applications.
Michael Lee
310/637-2105, fax: 310/637-8484

TDK CORP. OF AMERICA, POWER CONVERSION GROUP, 1600 Feehanville Dr., Mt. Prospect, IL 60056

Manufacturers of a standard line of high-efficiency dc/ac inverters available in low-profile narrow-width compact packages for virtually every display application. Detailed specifications, application notes, and LCD cross-reference guides are available. Other products include dc/dc power converters and ac/dc power supplies.
Tat Hirose, Power Conversion Mgr.
847/390-4478, fax: 847/390-4498
e-mail: power@tdkca.com
www.tdkca.com

TEAM SYSTEMS, INC., 2934 Corvin Dr., Santa Clara, CA 95051

Manufacturers/distributors of complete lines of PC-based and standalone analog and digital video generators, which are all fully programmable and can cover display resolutions up to 2K x 2K and offer various pixel frequencies up to 440 MHz. Applications are in engineering, manufacturing, evaluation, and servicing of monitors, projection systems, and, most recently, flat-panel devices.
Wall Klees, Sls. Mgr.
408/720-8877, 1-800-338-1981
fax: 408/720-9643
e-mail: info@team-systems.com
www.team-systems.com

TECH-COM INTERNATIONAL, INC., 8341 E. Evans Rd., Suite 108, Scottsdale, AZ 85260

Manufacturers of compound curved high-gain projection screens. DURAGAIN® and AquaBRIGHT® high-gain maintainable coatings. Integrator of large-screen displays.
Max Mariani, Dir. Oper.
602/998-4600, fax: 802/443-8833

TECHNEGLAS, 707 E. Jenkins Ave., Columbus, OH 43207

Manufacturers of CRT glass funnels and panels from 1 to 38 in. Global niche CRT market encompasses industrial, military, medical, home, and projection applications.
James E. Kyle, Sls./Mktg. Mgr.
614/445-4800, fax: 614/445-4702
e-mail: jkyle@techneglas.com

TECHNICAL VISIONS, INC., 14000 S.W. Karl Braun Dr., M/S 46-944, Beaverton, OR 97077

A contract engineering company specializing in liquid crystal, plasma, and plasma-addressed liquid-crystal (PALC) flat-panel-display development. Capabilities include fabrication of display prototypes measuring 21 in. diagonally.
Thomas S. Buzak, Pres.
503/627-1411, fax: 503/627-2225

TECHNI-MET, INC., 300 Lambertson Rd., Windsor, CT 06095

Manufacturers of sputtered coatings on flexible substrates, transparent conductive films for EL lamps, touch sensors, pen input sensors, AR filters, and EMI/RF shielding. Specializing in custom coatings to meet unique performance requirements.
Jeffrey A. Bouchard, Dir. Sls./Mktg.
860/688-2300, fax: 860/688-0278
e-mail: technimet@earthlink.net

TECH SPRAY, INC., P.O. Box 949, Amarillo, TX 79105

Manufacturers of aerosols and specialty products satisfying the commercial needs of global markets. Products include contact cleaners, defluxers, degreasers, conformal

coatings, static control products, wipes, swabs, desoldering braid, dusting gas, and freeze spray.

Bill Butler, I. Sls. Mgr.
806/372-8523, 1-800-858-4043
fax: 806/372-8750
e-mail: tspray@arn.net
www.techspray.com

TEKNEK ELECTRONICS LTD., Quarriers Village, Bridge of Weir, Renfrewshire PA11 3SA, U.K.

Manufacturers/designers of equipment for removal of particulate contamination from sheet and web substrates, especially prior to coating, laminating, and printing.
Mark Sunderland, Commercial Mgr.
+44-0505-690-707, fax: +44-0505-614-708

TEKRA ATG (Advanced Technologies Group), 16700 W. Lincoln Ave., New Berlin, WI 53151

Manufacturers of Terrapin hardcoated plastic films to meet the demands of the advanced display maker. Designed applications include touch screens, flat-panel displays, and films for vacuum-deposition coatings.
Peter J. Moulds, Bus. Unit Mgr.
414/797-3269, 1-800-238-6904
fax: 414/797-3276
e-mail: pjmoulds@tekra.com
www.tekraatg.com

TEKTRONIX, INC., P.O. Box 500, Beaverton, OR 97077

Manufacturers of portable handheld digital photometer/radiometer/colorimeter products capable of making a wide range of display measurements. Several pre-calibrated plug-in heads are available for high-accuracy display and ambient measurements.
Chuck Price, Mktg. Mgr.
503/627-5077, fax: 503/627-5622

TEKTRONIX, INC., Display Products Operation, P.O. Box 500, Beaverton, OR 97077

Manufacturers of display products, providing high-resolution color and monochrome displays as well as 3-D stereoscopic display systems based on its liquid-crystal technology developments.
Richard Osborn, Prod. Mktg. Mgr.
503/627-5064, 1-800-TEK-WIDE x5000
fax: 503/627-1070

TELEDYNE LIGHTING & DISPLAY PRODUCTS, 12525 Daphne Ave., Hawthorne, CA 90250

Manufacturers of ALPHA LIGHT™ diffuse illuminators; DYNELAMP™ pixels, segments, fonts, and tiles; DYNEVIEW™ information-display systems; and DYNELUX™ high-intensity lighting. Light sources include the latest LEDs, fluorescent, incandescent, halogen, and arc lamp technologies. Products are monochromatic, multicolor, and full color. Color field-sequential imaging for advanced low-power cost-effective LCD and SLM display applications is a specialty.
Bill Kennedy, Bus. Dev.
213/242-1900, fax: 213/242-1924
www.teledynelighting.com

TELEDYNE KINETICS, 410 S. Cedros Ave., Solana Beach, CA 92075

Manufacturers of connectors for connecting flat-panel displays to printed-circuit boards.
Doreen Deschamps, Mktg. Commun.
619/755-1181, 1-800-344-4334
1-800-991-9988 (CA only)
fax: 619/755-6163

TELELINE CANADA, LTD., 100 Bathurst Dr., Waterloo, Ontario N2V 1V6, Canada

Manufacturers/distributors of high-performance color and monochrome CRT displays for industrial, financial, medical, and process-control applications. Custom mechanical and signal interface design expertise. Rugged TFT touch-screen monitors.
Tony Poduch, Sls. Mgr.
519/725-4200, fax: 519/725-4300
e-mail: sales@telelinecanada.com
www.telelinecanada.com

TELESENSORY, 520 Alamanor Ave., Sunnyvale, CA 94086

Manufacturers of access devices for blind and low-vision people. Product line includes computer-screen enlargers, speech and braille output devices, OCR system, braille printers and video magnifying reading aids.
Larry Meyer
408/616-8700, 1-800-227-8418
fax: 408/616-8753

TELETRAC INC., 137 Aero Camino, Santa Barbara, CA 93117

Manufacturers of test probes and shorts repair laser systems for FPDs. Custom test and measurement systems built around load/unload robots, machine-vision systems, large X,Y,Z theta stages, linear motors, and laser interferometer positioning.
Barton F. Norton, Mktg. Dir.
805/968-4333, fax: 805/968-1613
www.teletrac.com

TELEX COMMUNICATIONS, INC., 9600 Aldrich Ave. S., Minneapolis, MN 55420

Manufacturers of LCD desktop panels and projectors, including the 13-lb. P170 data/video projector with built-in sound, 16-million colors, backlit remote, multi-lingual on-screen menus, 140 ANSI lumens of brightness, and accepting 3 video sources and 2 computer inputs.
Joe Tranchilla
612/887-5531
1-800-828-6107 x531, fax: 612/887-5595

TELIC OPTICS, INC., 420 Maple St., Suite 25, Marlborough, MA 01752

Consultants in optical design and analysis including lens design, illumination systems analysis, and stray-light analysis. Custom optical analysis software also provided.
Jim Howard, V.P.
508/485-4088, fax: 508/485-4618

TELTRON TECHNOLOGIES, INC., 2 Riga La., Birdsboro, PA 19508-1303

Designers, manufacturers, and recyclers of monochrome and color CRTs and display subsystems, including ruggedized, high-resolution, miniature, multibeam, and projection types. Also, imaging tubes usable in the visible, IR, UV, and x-ray spectrum.
Arthur H. Mengel, COO
610/582-9450, fax: 610/582-0851
e-mail: teltron@ptdprolog.net
www.teltrontechn.com

TEMESCAL, A Part of BOC Coating Technology, 2700 Maxwell Way, P.O. Box 2529, Fairfield, CA 94533-0252

Manufacturers of R&D and production systems that use sequential-layer electron-beam evaporation for the FPD industry. These batch and cluster tool systems are

used for various applications ranging from metallized gate layers to FED emitters.
Brian Kaemmer, Sls. Mgr.
707/423-2100, fax: 707/425-1706
e-mail: temescal.sales@ct.boc.com
www.boc.com/vacuum/coating/temescal.htm

TENCOR INSTRUMENTS, One Technology Drive, Milpitas, CA 95035

Designers and manufacturers of innovative wafer defect inspection, software-based yield management, thin-film measurement, and metrology systems used in semiconductor manufacturing and related industries.
Tony Aniello, Worldwide Sls.
408/571-3000, fax: 408/571-3030

TENCOR INSTRUMENTS, 3231 Scott Blvd., Santa Clara, CA 95054

Manufacturers of the FLX-2350FP, a thin-film stress-measurement system designed for flat-panel-display applications. The system monitors stress at room temperatures, and features a 500-mm scanning capability to allow local stress analysis along the scan.
Dov Hirsch, Sr. Prod. Mgr., Film Stress Prod.
408/654-2436, 1-800-358-6784
fax: 408/982-9654

TERAPIXEL, Olanrinluoma 9, 02200 Espoo, Finland

Manufacturers of large-area photomasks for display manufacturing. Maximum areas, 22 x 24 in.; minimum lines, 3 µm. Applications include LCDs, FEDs, ELs, plasma, and others.
Arto Salin, Pres.
+358-9-423-537, fax: +358-9-423-813

TEXAS INSTRUMENTS, P.O. Box 655474, Dallas, TX 75285

Digital Light Processing (DLP™) solutions deliver compelling all-digital images as further evidence of projection display and near-photographic printing quality.
972/995-2011, fax: 972/995-4360

TEXAS INSTRUMENTS JAPAN LTD., 4-13-23, Shibaura, Minato-ku, Tokyo 108, Japan

Manufacturers of color plasma display drivers/controllers for future A/V systems, including new chip process of high-voltage CMOS based on technology exchange agreement with Supertex. LCDs in slim TAB packages and chip-on-glass assembly covering all flat panels.
Plasma: Hiro Kawai; LCD: Toshi Ikai
+81-3-3769-8724, fax: +81-3-3457-6777

THIN FILM DEVICES, INC., 1180 N. Tustin Ave., Tustin, CA 92807

Manufacturers of sputtered thin-film FPD coatings: ITO, IMITO (index matched ITO) to LC and epoxy, black chrome, metallizations, hot and cold mirrors, anti-reflective, and others are stocked or custom manufactured. Also, four-point probes that provide etched ITO and IMITO glass, heaters, EMI shields, laminated filters, and glass-cutting services.
Linda Braun, Tech. Sls./Mktg.
714/630-7127, fax: 714/630-7119

THIN FILM TECHNOLOGY, INC., P.O. Box 1942, 153 Industrial Way, Buellton, CA 93427

Offering complete vacuum-coating and substrate patterning services for fast, flexible response to customer requirements. Both evaporation and r/f dc magnetron sputtering techniques are employed to

produce conductive, resistive, dielectric, wear-resistant, or optical coatings on a variety of substrates. Coating chamber sizes range from 18 in. in diameter to 8 ft. diameter x 14 ft. deep.
Doug Cambell, Sales
805/688-4949, fax: 805/688-8487

THOMAS ELECTRONICS, INC.,
100 Riverview Dr., Wayne, NJ 07470
Manufacturers of CRTs, CRT assemblies, flat lamps for LCD backlights, ruggedized LCD assemblies, CRT refurbishment capability, mini-monitors, and full-color shadow-mask avionic CRT assemblies.
Bruce Piaget, V.P. Sls.
973/696-5200, fax: 973/696-8298
e-mail: sales@thomaselectronics.com
www.thomaselectronics.com

THOMAS ELECTRONICS OF N.Y., INC.,
208 Davis Parkway, Clyde, NY 14433
Manufacturers of CRTs, CRT assemblies, flat lamps for LCD backlights, ruggedized LCD assemblies, CRT refurbishment capability, mini-monitors, and full-color shadow-mask avionic CRT assemblies.
Bill Kuney, Sls. Engr.
315/923-2051, fax: 315/923-4401

THOMSON COMPONENTS & TUBES CORP., 40G Commerce Way, Totowa, NJ 07511-0540
Manufacturers of CRTs for medical, projection, and avionic applications (helmet-mounted, head-up, and head-down displays). Optical components for display systems and CCD cameras for medical imaging.
Andrew Fay, Prod. Mgr. OPTO+Med. Imag.
973/812-4344, fax: 973/812-9050
e-mail: afay@tctus.com
www.tctus.com

THOMSON-CSF SERVICES INDUSTRIE,
105 Avenue de General Eisenhower #31023, Toulouse BP1009, France
Manufacturers of high-performance graphics generators and full-featured X-Window terminals that support 1280 x 1024 to 2048 x 2048 resolution and provide standard X11R6 software interface and high-speed drawing and pixbl capabilities. A wide scope of interfaces are available (Ethernet, FDDI, PCI, etc.).
Alain M. Cousin, Bus. Dev. Mgr.
+33-1-4537-8937, fax: +33-1-4537-8938

THOMSON TUBES ELECTRONIQUES,
38, rue Vauthier, B.P. 305, Boulogne-Billancourt F-92102 France
Manufacturers of professional CRTs: very-high-resolution, head-up, head-down, helmet-mounted, projection, beam index, and ruggedized shadow-mask monitors; ac plasma displays (military and civil), color and monochrome with gray scale and high brightness. Models suitable for PC monitors.
P. Menes, Sls. & Mktg. Dir.
+33-1-4909-2828, fax: +33-1-4604-5209

3-D IMAGETEK CORP., 23701 Birtcher Dr., Lake Forest, CA 92630
Manufacturers of the 3DP-2000/NVP (NTSC, VGA, PAL) for LC-based HMD or projector designs, which de-multiplexes and distributes left-eye/right-eye and stereoscopic 3-D video encoded in either field-sequential or line-segmentation (ENIGMA) formats; ASIC package in production quantities; NTSC/VGA and

PAL/VGA compatibility to end-user products.
Craig M. Crawford, Pres.
714/455-1806, 1-800-355-5565
fax: 714/455-1990

3DTV CORP., P.O. Box Q, San Rafael, CA 94913-4316
Manufacturers/distributors of a wide variety of hardware and software for making and displaying stereoscopic video and computer graphics, ranging from low-cost consumer kits to professional systems.
Michael Starks, Pres.
415/479-3516, fax: 415/479-3316

THREE-FIVE SYSTEMS, INC., 1600 N. Desert Dr., Tempe, AZ 85281
Designers/manufacturers of user-interface devices for operational control and information-display functions in OEM products. Specializing in LCD and LED components and technology in providing custom design and manufacturing services for the communications, medical electronics, industrial process control, wireless data collection, and office automation marketplaces.
Radu Andrei, V.P. Mktg.
602/389-8975, fax: 602/389-8801
e-mail: display@threefive
www.threefive.com

3M ELECTRICAL SPECIALTIES DIV.,
Bldg. 130-3N-56, P.O. Box 2963, Austin, TX 78769-2963
Designers, manufacturers, and marketers of products for a variety of specialty electrical applications including control of static electricity, insulating tapes, resins and heat-shrink products.
Harry Borrelli, V.P.
1-800-328-1368, fax: 512/984-2211

3M ELECTRONIC PRODUCTS DIVISION,
3M Austin Center, 6801 River Place Blvd., Austin, TX 78726-9000
Manufacturers of electronic interconnects, assemblies, sockets, wire, and cable for all electronic/electrical applications.
512/984-1800, 1-800-225-5373 or 1-800-3M-HELPS, fax: 512/984-6972

3M OPTICAL SYSTEMS, 3M Center,
Bldg. 260-5N-10, St. Paul, MN 55144-1000
Providers of multiple enhancement solutions for the electronic-display industry that includes optical enhancement films and polarizers to improve LCD brightness.
Bill Hibbard, Tech. Sls./Mktg. Mgr.
651/737-8686, fax: 651/736-4503
e-mail: wahibbard1@mmm.com

3M PRODUCT INFORMATION CENTER,
3M Center, Bldg. 515-3N-06, St. Paul, MN 55144-1000
Manufacturers of commercial graphics, visual systems, sound products, and image-processing systems, components, and equipment for the trade-show, display, POP, and promotional industries.
612/737-6501, 1-800-3M-HELPS
fax: 612/737-7117

TIMELINE, INC., 23605 Telo Ave., Torrance, CA 90505
Distributor of surplus inventories of LCDs, both graphic and alphanumeric; non-enclosed monitors; computer-related equipment.
Ron Klein
310/217-8912, fax: 310/532-8304

TNP INSTRUMENTS, INC., 119 E. Star of India La., Carson, CA 90746
Manufacturers of LCD probe station, laser repair systems, and thin-film cell-gap and CIE measuring systems on platforms of up to 2 x 2 m. Auto loader, auto focus, and motorized turret for fully automated system; integrates with inspection systems and test instruments.
Vu Tran, Pres.
310/532-2222, fax: 310/527-0470
e-mail: tnp@tnp-insts.com
www.tnp-insts.com

MICROJOIN, INC. (Formerly Toddco General, Inc.), 13535 Danielson St., Poway, CA 92064
Manufacturers of high-quality hot-bar TAB-bonding equipment used for rework operations, flat-panel repair, and high-mix production. Unique all-ceramic thermode design ensures superior quality and throughput for high-mix applications.
Debie Burford, Natl. Sls. Mgr.
619/877-2100, fax: 619/877-2110
www.toddco.com

TOPCON TECHNOLOGIES, INC., 37 W. Century Rd., Paramus, NJ 07652
Manufacturers of spectroradiometers and luminance colorimeters for non-contact measurement of spectral distribution, luminance, colorimetry, and correlated color temperature of display devices such as CRTs and LCDs in particular.
Bill Maguire, Natl. Sls. Mgr.
201/261-5410, 1-800-223-1130
fax: 201/262-1504
e-mail: bmaguire@topcon.com
www.topcon.com

TORAY ENGINEERING CO., LTD., c/o TEK (America), Inc., 2100 Rexford Rd., Ste. 216, Charlotte, NC 28211
Manufacturers of a complete line of equipment to support display manufacturing including, but not limited to, COG and TAB bonders for assembly; a Title Marker for ID marking for production control; and a Flat Board Prober for testing.
Kirk Minamii, Chief Rep.
704/364-1009 x22, fax: 704/364-3321
e-mail: tekusa@comcast.net

TORREY PINES RESEARCH, 6359 Paseo Del Lago, Carlsbad, CA 92009
Researchers/developers of unique coating and micro-dispensing solutions using electrostatic and ink-jet printing technologies. Offering the PDLab® Breadboard, a flexible platform for experimentation and data acquisition.
Gary Swager, V.P. Sls. & Mktg.
760/929-4800, fax: 760/931-1671
e-mail: info@tpr.com
www.tpr.com

TOSHIBA AMERICA ELECTRONIC COMPONENTS, INC., 1060 Rincon Cir., San Jose, CA 95131
Manufacturers of color AMLCDs: medium-size 4-6-in. LCDs for navigational, visual, and entertainment; notebook-size 7.8-12.1-in. LCDs for portable computing; and large-size high-brightness 12.1-15-in. LCDs for desktop LCD monitors and industrial applications.
Cameron Zand, Sls. Engr.
408/456-8900, fax: 408/456-9002

TOSHIBA AMERICA ELECTRONIC COMPONENTS, INC., 1 Parkway North, Ste. 500, Deerfield, IL 60015-2547
Manufacturers of a wide range of high-performance CRT products. Specifically, 15-in. MNN; 17-, 19-, and 21-in. Microfilter

CRTs for desktop monitor applications; and 27V, 32V, 36V, and 16:9 multimedia CPTs for PC/TV monitor applications.
Daniel Ryan, Bus. Dev. Mgr.
847/831-8251, fax: 847/945-1044
e-mail: dan.ryan@taec.toshiba.com
www.toshiba.com/taec

TOSOH SMD, INC., 3600 Gantz Rd., Grove City, OH 43123-1895
Manufacturers of sputtering targets and evaporation sources in high-purity materials and custom materials for all sputtering and evaporation systems. Offers R&D support, technical support, proprietary non-destructive testing data, and customer service support for all semiconductor and media/specialty/FPD customers.
Mark Gore, Mktg. Mgr. Spec. Products Grp.
614/875-7912, fax: 614/875-0031
e-mail: goremj@tsmd.com
www.tsmd.com

TOTOKU ELECTRIC CO., LTD.,
3-21, Okubo 1-Chome, Shinjuku-ku, Tokyo 169, Japan
Manufacturers of high-resolution monochrome and color CRT monitors and deflection yokes.
FOREIGN TRADE DEPT. +81-3-5273-2008
fax: +81-3-5273-2092

TOUCH CONTROLS, INC., 520 Industrial Way, Fallbrook, CA 92028
Manufacturers of the RayFire Pro™, a patent-pending digital fiber-optic video and data-transmission system providing full workstation connectivity and true color graphics to remote HMI terminals located up to 6 miles from host computer.
Ed Larson, Sls. Mgr.
760/723-7900, 1-800-848-4385
fax: 760/723-7910
e-mail: sales@touchcontrols.com
www.touchcontrols.com

TOYO SPECTRUM CORP., 2934 Corvin Dr., Santa Clara, CA 95051
Manufacturers of color and gray-scale thermal video printers with an integrated video interface and frame buffer to directly capture the picture for a "screen-dump" in less than 1 sec.
George Stoeppel
408/720-8877, 1-800-338-1981
fax: 408/720-9643

TRACOR AEROSPACE INC., 2800 Indian Ripple Rd., Dayton, OH 45440-3696
Designers and manufacturers of a line of monochrome and color military avionics displays, graphics symbol generators with aircraft navigation interfaces, and night-vision equipment.
John Rizzo
937/427-7245, fax: 937/427-7459

TRICOR SYSTEMS, INC., 1650 Todd Farm Dr., Elgin, IL 60123-1145
Manufacturers of specialized and custom computerized test instrumentation, including a low-cost video photometer for measuring displays, contrast, viewing-angle performance, flatness, haze, residue, and other appearance characteristics.
Thomas M. Allen, Sls./Mktg. Mgr.
847/742-5542, 1-800-575-0161
fax: 847/742-5574
e-mail: info@tricolor-systems.com
www.tricolor-systems.com

TRIDENT MICROSYSTEMS, INC., 189 N. Bernardo Ave., Mountain View, CA 94043
Developers and marketers of high-performance graphical-user-interface

accelerators, mixed-signal SVGA controller chips, LCD graphics controllers, double-byte character chipsets, and video-processing chipsets for video-windowing and desktop video production.
Hans Olsen
415/691-9211, fax: 415/691-9260

TRONIX, INC., 231 Silver Sands Rd., East Haven, CT 06512-4140
Manufacturers of high-voltage power supplies for x-ray image intensifiers.
J. Wood
203/468-3019, fax: 203/468-3024

TSC, 322 Lindbergh Ave., Livermore, CA 94550
Re-manufacturers of sputtering and evaporation systems, providing vacuum rebuild to full PLC computer integration and rewiring, new instrumentation and power supplies.
Jerry L. Martin, V.P.
510/373-9730, fax: 510/373-9574

TSD DISPLAY PRODUCTS, INC., 35 Orville Dr., Bohemia, NY 11716-2598
Manufacturers of high-resolution monochrome CRT display monitors.
Steven R. Sloan, Dir. Sls.
516/589-6800, fax: 516/589-6858

TSP, INC., 2009 Glenn Pkwy., Batavia, OH 45103-1676
Manufacturers of electronic display anti-glare and contrasting windows for LCDs and all energy-emitting displays. Coated windows provide scratch and chemical resistance and reduce glare. Fabrication and printing of finished parts.
Stewart Nellis, Sls. Mgr.
513/732-8900, 1-800-277-9778
fax: 513/732-6988
e-mail: stewn@tsp.com

TÜV RHEINLAND OF NORTH AMERICA, INC., 5860 W. Las Positas Blvd., #19, Pleasanton, CA 94588
Testing house providing ergonomics testing and certification services for hardware and firmware for the European market. Other services include certification to the ANSI/UL 1950 standard for the U.S. market, EMC testing, and ISO 9000 registrations.
Klaus Ehrlich
510/734-8100, 510/734-8455

TWO TECHNOLOGIES INC., 419 Sargon Way, Horsham, PA 19044
Designers and manufacturers of hand-held terminals.
Joan Rickards, V.P. Sls.
215/441-5305

TYSON CONSULTING GROUP, 612 White Pine Rd., Buffalo Grove, IL 60089-3330
Consultancy in medical-device development covering: market evaluation, demographics, and needs analysis; concept testing and refinement; and marketing-program planning, including direct sales, distribution, and promotion. Seminars available on the health-care industry, with emphasis on product-related activities and trends.
Ted R. Tyson, Pres.
847/459-9189, fax: 847/215-6141

UCE, INC., 1580 Route 52, Hopewell Junction, NY 12533
Manufacturers of LCDs, application-specific displays, and custom and standard displays. Liquid crystals include nematic, scattering, dichroic, phase-change, and

stored scatter. Also, optical light valves, shutters, attenuators for projection and direct-view, and optical switches.
Greg Borstelmann, Sls. Mgr.
914/456-7119, fax: 914/892-1710

UDT INSTRUMENTS, Marketing Dept., 727 S. Wolfe St., Baltimore, MD 21231
Manufacturers of electro-optical instruments, including colorimeters, photometers, radiometers, fiber-optic power meters, and position-sensing equipment.
Vince Shapanus, Sls. Engr.
410/342-2626, 1-800-891-2709
fax: 407/673-7005
e-mail: info@udtinstruments.com
www.udtinstruments.com

ULTRA ELECTRONICS COMMAND & CONTROL SYSTEMS, Knaves Beech Business Centre, Loudwater, High Wycombe, Buckinghamshire HP10 9UT, U.K.
Manufacturers of a range of display and console solutions for the military market. These slim-profile consoles products are based on large-area high-resolution COTS display equipment, re-housed and ruggedized.
Mike Williams, Technology Products Mgr.
+44(0)-1628-530-000
fax: +44(0)-1628-524-557
e-mail: mike-williams@ueccs.co.uk
www.flatscreens.co.uk

ULTRA EQUIPMENT CO., 2391 Zanker Rd., #370, San Jose, CA 95131
Manufacturers of configurable photolithography cluster tools for coating, developing, and cleaning of substrates up to 34 in. on the diagonal. Also spin coaters for uniform coating of square and rectangular substrates, high-pressure and megasonic spray cleaners, spray developers, and high-accuracy flip-chip bonders.
Fred Namek, V.P. Mktg./Sls.
408/955-7850, fax: 408/955-7878

ULVAC TECHNOLOGIES, INC., 401 Griffin Brook Dr., Methuen, MA 01844
Supplier of PVD, PE-CVD, RIE, and evaporation systems for TFT, LCD, FED, OLED, and other FPD manufacturing. New products include research and pilot-sized production systems for the manufacture of OLEDs.
Robert L. Gardner, Corp. Dir. Sls./Mktg.
978/686-7550, fax: 978/689-6300

UNIX CORP., 6780 Cortona Dr., Santa Barbara, CA 93117-3022
Developing polymer emissive displays for portable hand-held devices. Target markets are cellular phones and pagers.
James H. Long, Jr., Pres. & CEO
805/562-9293, fax: 805/562-9144
www.unix.com

UNIGRAF, Ruukintie 18, Espoo 02320 Finland
Manufacturers of industrial computers, videowall controllers, and displays for control-room applications. Also, PC-based programmable video test generators for video-monitor service and manufacturing.
Jouko Ala-Tuori, Dir.
+358-9-802-76423, fax: +358-9-802-6699
e-mail: jouko.ala-tuori@unigraf.fi
www.unigraf.fi

UNIPAC OPTOELECTRONICS CORP., No. 3 Industry E. 3rd Rd., Science-Based Industrial Park, Hsinchu, Taiwan
Manufacturers of slim-module color TFT-LCDs in sizes ranging from 1.8 to 14.1 in.
Tyler Shan, Dir. Mktg. & Sls.
+886-3-577-2700 x1502,
fax: +886-3-577-2730
e-mail: tyler@unipac.com.tw

UNIVERSITY OF MICHIGAN, Display Technology & Manufacturing Center, 2360 Bonisteel Blvd., Ann Arbor, MI 48109-2108
University research facility offering R&D in FPD manufacturing and materials technologies. Capabilities in FPD devices, materials, and circuits; process control; microelectronics on low-temperature substrates; and factory optimization and control.
Linda K. Owens, Admin. Mgr.
313/764-4336, fax: 313/936-0347

UNITED STATES DISPLAY CONSORTIUM (USDC), 50 West San Fernando St., Suite 920, San Jose, CA 95113
An industry-led public/private partnership providing a forum for flat-panel manufacturers, developers, users, and equipment and materials suppliers. Mission is to expand the infrastructure required to support a world-class competitive U.S.-based display industry.
Michelle Ali, Mktg. Commun. Mgr.
408/277-2400, fax: 408/277-2490
www.usdc.org

USHIO AMERICA, INC., 10550 Camden Dr., Cypress, CA 90630
ISO 9001 manufacturers of metal-halide, xenon, and halogen lamps for projection systems. Low-voltage dc and ac metal-halide lamps.
Rachael Perkins, OEM Product Spec.
714/229-3178, 1-800-326-8600
fax: 714/229-3175
e-mail: rperkins@ushio.com
www.ushio.com

U.S. PRECISION GLASS, 1900 Holmes Rd., Elgin, IL 60123
Manufacturers of flat-glass components for a variety of touch screens and flat-panel-display manufacturers. Services include cutting, grinding, polishing, chemical tempering, optical coating, silk screening, and light assembly.
Greg Olson, Natl. Sls. Mgr.
847/931-6403, fax: 847/931-4144

UTI CORP., Collegeville, PA 19426
Manufacturers of precision miniature metal components in 100 different alloys; specifically, oxide and dispenser cathode components.
Paul Ashby
610/539-0700, 1-800-523-0441
fax: 610/489-1150

VACUUM ENGINEERING & MATERIALS CO., INC., P.O. Box 4480, Santa Clara, CA 95056-4480
Manufacturers of sputtering targets, evaporation materials, and backing plates. A large selection of high-purity metals, intermetallics, dielectrics, and cermets for PVD coatings. Sputtering targets and evaporation materials manufactured to customer's exact specifications of size and purity. Also, a complete line of cathodes and crucible liners.
Jack Kavanagh, Sls. Mgr.
408/986-8900, fax: 408/986-8980

VACUUMSCHMELZE GmbH, Gruener Weg 37, Hanau D-6450, Germany
Manufacturers of magnetic shieldings from low-frequency ac fields through to earth's fields; customer-specified monitor shielding, standard monitor shielding, shielding sheets for monitors; foils, parts, and magnetically shielded rooms.
Hans-Dieter Naunheim, Dipl.-Ing.
+49-6181-38-2768, fax: +49-6181-38-2645

VALTECH CORP., 1011 Daisy Point Rd., Pughtown, PA 19465
Manufacturers of VALTRON® detergents formulated for precision cleaning of FPDs, available in acidic, neutral, and alkaline formulations. Effective in contact and non-contact cleaning systems; micron-filtered prior to packaging with excellent detergency.
Richard T. Girard, Pres.
610/469-9634, fax: 610/469-9635

VARITRONIX, LTD., 22 Chun Cheong St., TKO Industrial Est., Tseung Kwan O, Hong Kong
Manufacturers of custom and standard LCDs, custom and standard dot-matrix and graphic LCD modules, touch-sensing customer input terminals, and touch screens.
Caleb Dong, Mktg. Mgr.
+852-2343-6000, fax: +852-2343-9555

VARITRONIX S.A.R.L., 74 Avenue Charles de Gaulle, 91420 Morangis, France
Distributors of custom and standard LCDs, custom and standard dot-matrix and graphic LCD modules, touch-sensing customer input terminals, and touch screens.
Guy Cresson
+33-1-6909-7070, fax: +33-1-6909-0535

VARITRONIX (UK) LTD., 3 Milbanke Ct., Milbanke Way, Bracknell, Berks RG12 1RP, U.K.
Manufacturers of both custom and standard liquid-crystal displays and modules. New products include graphics panels and direct-contact touch overlays.
Robert Hill, Appl. Engr.
+44(0)-1344-303-077,
fax: +44(0)-1344-300-099

VAT, INC., 500 W. Cummings Park, Woburn, MA 01801
Manufacturers of high-quality vacuum valves. Products include gate, angle, fast-closing, throttle, pressure control, retrofit, and customized valves for a variety of applications.
Joyce Mackiewicz, Sls. & Mktg. Coord.
781/935-1446, 1-800-935-3940
fax: 781/935-3940
e-mail: usa@vatvalve.com
www.vatvalve.com

VDC, One Apple Hill, Natick, MA 01760
Business planning, product planning, and market research for the electronics industry: materials, components, subsystems, and systems level.
Marc Regberg, V.P.
508/653-9000, fax: 508/653-9836

ARON VECHT & ASSOCIATES, 95 Corringham Rd., London NW11 7DL, U.K.
Consultants specializing in displays: phosphors, EL, LCDs, etc. Also, super-pure chemicals, thin-film technology, CVD, financial and marketing, assessment

of new technologies, technology transfer, and liaison between Europe and U.S.
Aron Vecht
+44-1-81-455-4361, fax: +44-1-81-316-8405

VEECO PROCESS METROLOGY, 602 E. Montecito St., Santa Barbara, CA 93103
Manufacturers of the Dektak OSP-1100, the first stylus-based surface profiler with the capacity to measure film thickness on large FPD substrates up to 1100 mm square.
Tim Ballinger, Mktg. Commun. Mgr.
805/963-4431, 1-888-24-VEECO
fax: 805/965-0522
www.veeco.com

VENTURE DEVELOPMENT CORP., 1 Apple Hill, Natick, MA 01760
Consultancy specializing in technology market research and strategy. Publishers of The North American Market and User Needs for Operator Interfaces and Monitors in Discrete & Process Manufacturing Applications, 3rd edition.

VESA STANDARDS (Video Electronics Standards Assn.), 2150 N. First St., Ste. 440, San Jose, CA 95131
Worldwide open trade association representing 365 members. Current mission is to provide and develop timely, relevant open display and display interface standards, ensuring interoperability and encouraging innovation and market growth. Membership includes hardware, software, PC display and component manufacturers, cable and telephone companies, and service.
Cathy Egan, Member/Mktg. Svcs. Mgr.
408/435-0333, fax: 408/435-8225
www.vesa.org

VIDEO DISPLAY CORPORATION, 1868 Tucker Industrial Rd., Tucker, GA 30084
International headquarters of parent company, guiding a group of eight divisions, manufacturing CRTs, camera tubes, electron optics, and custom monitors.
770/938-2080, 1-800-241-5005
fax: 770/493-3903

VIDEO DISPLAY CORPORATION (APEX ELECTRONICS DIVISION), 100 8th St., Passaic, NJ 07055
Manufacturers of electron-optics equipment and manufacturing equipment.
M. Dorola, Gen. Mgr.
201/773-1220, fax: 201/838-1298

VIDEO DISPLAY CORPORATION (CHROMA VIDEO DIVISION), P.O. Box 119, White Mills, PA 18473
Manufacturers of entertainment and high-resolution data display color tubes from 10 to 35 in. Automated 150,000-ft.² in-line production facility.
Ervin Kuczog, Gen. Mgr.
717/253-3910, fax: 717/253-3912

VIDEO DISPLAY CORPORATION (DATA DISPLAY DIVISION), 1868 Tucker Industrial Rd., Tucker, GA 30084
Manufacturers of monochrome CRTs, avionics and military CRTs, and research and development.
Robert S. Liss, Prod. Serv. Mgr.
770/938-2080, 1-800-241-5005
fax: 717/493-3903

VIDEO DISPLAY CORPORATION (NOVATRON DIVISION), 1416 Alpine Blvd., Bossier City, LA 71111
Manufacturers of projection tubes and assemblies from 5 to 9 in. Automated 35,000-ft.² in-line production facility.
Charles Acurio, Gen. Mgr.
318/747-0140, fax: 318/747-6690

VIDEO DISPLAY CORPORATION (SOUTHWEST VACUUM DIVISION), 4601 Lewis Rd., Stone Mountain, GA 30083
Manufacturers of electron-optics, components, custom cathodes, and custom gun mounts.
Robert Wolfkiel, Gen. Mgr.
770/934-2245, fax: 770/934-2286

VIDEO DISPLAY CORPORATION (TELTRON TECHNOLOGIES DIVISION), Baltic Mews Corporate Center, 2 Riga Lane, Birdsboro, PA 19508
Manufacturers of general, military, and special-purpose image and cathode-ray tubes to the most stringent specifications. MIL-145208A qualified supplier to DoD, FAA, NASA, DESC, and government prime contractors.
Arthur Mengel, Gen. Mgr.
610/582-9450, fax: 610/582-0851

VIDEO DISPLAY CORPORATION (VIDEO ELECTRONICS DIVISION), Calle Zinc #99, Garza Garcia, Nuevo Leon 66210 Mexico
Manufacturers of monochrome CRTs from 7 to 24 in. Automated 150,000-ft.² in-line production facility.
Rafael Garcia, Gen. Mgr.
+52-8-336-1897, fax: +52-8-336-0578

VIDEO DISPLAY CORPORATION (Z-AXIS DIVISION), 15 Eagle St., Phelps, NY 14532
Manufacturers of specialty monochrome and color monitors.
Carl Beechler, Gen. Mgr.
315/548-5000, fax: 315/548-5100

VIDEO INSTRUMENTS, 2155 Bellbrook Ave., Xenia, OH 45385-4043
Manufacturers of products that provide reference images for performance evaluation, test, and maintenance of video displays of all types, recorders, and image processors. Products range from small, portable low-cost units to high-performance precision instruments, all programmable for various scan rates and display formats.
Karen Pellerin, Sales Coord.
937/376-4361, 1-800-962-8905
fax: 937/376-2802
www.videoinstruments.com

VIDEOTECH SYSTEMS INC., 8499 Greenville Ave., Ste. 205, Dallas, TX 75231
Manufacturers of display terminals with digitized video pictures, featuring TV quality pictures. Sold as a complete terminal or software only (T-VIEW).
Bob Gillman
214/343-4500

VIDIWALL CORP., 30 Chapin Rd., Pinebrook, NJ 07058
Manufacturers of videowall processor, stackable projection cubes, and monitors, and a complete line of peripheral control products and software.
Michael Serwe, Mktg. Dir.
201/882-0584, fax: 201/882-0656

VIEWMAGIC, INC., (Formerly ETC Computer, Inc.) 2917 Bayview Dr., Fremont, CA 94538
Manufacturers of small-footprint specialty display monitors: 10-in. color (super VGA) and 9- and 10-in. monochrome monitors, designed for space-limited applications. Also, providers of turnkey integrated touch screens for 10-, 14-, 15-, and 17-in. monitors.
Kent Huang, Pres.
510/226-6250, fax: 510/226-6252

VIEWTEK, INC., 150 Executive Dr., Ste. Z, Edgewood, NY 11717
Designers/manufacturers of LCD controllers and industrial monitors. Controller boards support both graphics and video. Offering the highest quality video from VGA to XGA, supporting NTSC/PAL and SECAM formats.
Andrew J. Mulrain, Mktg. Mgr.
516/243-6200, 1-888-FLAT-PANEL
fax: 516/243-3308
e-mail: sales@view-tek.com
www.view-tek.com

VIKAY AMERICA, INC., 195 W. Main St., Avon, CT 06001
Manufacturers of custom and standard TN- and STN-LCDs; graphic, dot matrix, and general-purpose LCD modules; LCD keypad assemblies; turnkey LCD product assembly. Singapore and Malaysia manufacturing locations.
Tom Markiewicz
860/678-7600, fax: 860/678-7625

VIKING IMAGING, INC., 8060-A Byan Dairy Rd., Largo, FL 33777
Manufacturers of impact printers, electro-photographic laser printers, and non-impact ion-deposition printers.
Jack Gise
813/547-1400, fax: 813/547-4900

VILLA PRECISION INTERNATIONAL, 3027 W. Indian School Rd., Phoenix, AZ 85017-4186
Manufacturers of precision glass scribing and breaking machines for the international FPD industry. Current product line includes multi-headed X-Y, high precision X-Y, and "shapes" scribes as well as a single-head unit for R&D or product development uses.
Thomas L. Muir, Managing Dir.
602/266-2366, fax: 602/266-2926
www.villa.com

VIOX CORP., 6701 Sixth Ave. So., Seattle, WA 98108
Manufacturers of custom glass frits and powders for the electronic and display industries. Providers of glass development, laboratory samples, and volume manufacturing. Offering services for high-purity technical glasses.
Thomas Burnett, V.P.
206/763-2170, fax: 206/763-2577
e-mail: glass@viox.com

VIRATEC THIN FILMS, INC., 2150 Airport Dr., Faribault, MN 55021
Manufacturers of sputter-deposited optical thin-film coatings on glass and plastic for displays and imaging applications. Patented multilayer AR coatings are designed to reduce glare and reflection, improve light transmission and contrast, and provide static dissipation and electromagnetic shielding. Applications include directly coated CRTs, bonded panels for flat CRTs, PDP filters, anti-glare filters for computer monitors, TVs, TFT-LCDs, and laptops for industrial

instrumentation, navigational, and automotive dashboard displays.
Barbara Heine, Mktg. Spec.
507/332-4128, fax: 507/334-0059
e-mail: bheine@viratec.com
www.viratec.com

VIRTUAL VISION, INC., 7659 N.E. 178th Place, Redmond, WA 98052
Product line includes a broad range of light-weight ergonomic ruggedized head-mounted displays. The V-Cap 1000 presents images via a patented see-through optic that is transparent when not in use and offers 640 x 480 resolution.
Sandra D'Adam, Mktg.
425/882-7878, 1-800-800-8033
fax: 425/882-7373
www.virtualvision.com

VISICOM IMAGING PRODUCTS, 1 Burlington Woods Dr., Burlington, MA 01803
Manufacturers of graphics display controllers and frame grabbers for VME, PC-ISA, VL, PCT, and IBM/RISE 6000 computers. Supports CRTs and EL displays with resolutions from 640 x 480 up to 1600 x 1280 with 8, 12, 24, and 32 bits per pixel. Digital and analog video inputs are also supported.
Larry H. Taitelbaum, Dir. Sls. East
617/221-6700 x125, fax: 617/221-6777

VISONICS LABS, 8401 E. Desert Steppes Dr., Tucson, AZ 85710
Manufacturers of 3-D oscillographic displays in real time; multiple viewers each see a unique view without glasses; autostereoscopic, autoperallactic displays.
Homer Tilton, Pres.
520/885-5840, fax: 520/885-2922

VISPRO CORP., P.O. Box 6239, Beaverton, OR 97007-0239
Manufacturers of structural ceramic products typically used as envelopes for CRTs. Multilayer ceramic packages include LTCC, HTCC, and MCMs.
Steven E. Annas, Pres.
503/526-5268, fax: 503/544-9652

VISTA CONTROLS CORP., 27825 Fremont Ct., Santa Clarita, CA 91355
Manufacturers of helmet-mounted displays providing unrestrained inertial-sensed head-position and high-resolution stereoscopic video using active-matrix VGA FPDs. The family of products include the Vista Vision, See-Thru-Armour™, and the Wireless Stereo Vision System.
Edie Hathaway, Sls./Mktg. Asst.
805/257-4430, fax: 805/257-4782

VISUS LTD., 2A Katzir St., Tel-Hashomer, Ramat-Gan, 52656 Israel
Design, simulation, and production of backlights. CAD for optical/lighting systems design including simulation of light behavior, total internal reflection, and more. Design of low-profile planar light sources. Reflector design, and human factors and applications.
J. Lorch, Dir. Mktg.
+972-3-535-0968, fax: +972-3-534-1650

VIVID SEMICONDUCTOR, INC., 7400 W. Detroit St., Ste. 100, Chandler, AZ 85226
Designers of the TruColor 8 family of 8-bit column drivers that brings true color to any portable computer.
Donna B. Higgins, Sr. Mktg. Coord.
602/961-3200, fax: 602/961-1135
www.vividsemi.com

VIVITEK CO., LTD., 27 Industrial East 9th Rd., 1st Fl., Science-Based Industrial Park, Hsinchu, Taiwan, R.O.C.

Manufacturers of field-sequential full-color LCDs. Sizes range from 1-, 5-, 7-, and 9-in. monitors for industrial and commercial applications. ASIC IC and video boards for conversion from computer (VGA) or video (NTSC/PAL) signals to field-sequential format. Also, an LCD projector with SVGA resolution.

Henry Chern, Gen. Mgr.
+886-3-5779-436, fax: +886-3-5779-449

VIVITEK CO., LTD./DELTA PRODUCTS CORP., 4905 S.W. Griffith Dr., Ste. 203, Beaverton, OR 97005

Manufacturers of a wide range of unique high-resolution small-size color displays, ranging from 1 to 10 in., using liquid-crystal color shutter (LCCs) technology. Also, large-area (21 in.) virtual-image displays and liquid-crystal shutter-based 3-D stereoscopic displays.
Sat Narayanan, Mktg. Mgr.
503/641-8246, 1-800-959-3660
fax: 503/641-7269

VL ELECTRONICS, INC., 3250 Wilshire Blvd., Ste. 1901, Los Angeles, CA 90010-1502

Manufacturers of custom and standard LCDs; custom and standard graphic, dot-matrix LCD modules; TN, STN, film-compensated b/w STN, b/w double STN, color-coded STN, guest-host, Heilmelr, extended-temperature STN displays; touch-sensitive screens; turnkey complete product development and manufacturing.
Christopher Kreslake, Oper. Mgr.
213/738-8700, fax: 213/738-5340

VOICE CONNEXION, 17971 Skypark Cir., Ste. F, Irvine, CA 92614

Manufacturers of voice recognition and synthesis products for PCs. Also, handheld computers with voice I/O, keypad, and barcode.
Shirley Dworak, V.P. Sls.
714/261-2366, fax: 714/261-8563

VOLTAGE MULTIPLIERS, INC., 8711 W. Roosevelt Ave., Visalia, CA 93291

Manufacturers of high-voltage rectifiers in axial-leaded and surface-mount form. Also, custom assemblies including voltage multipliers and power supplies.
Kim McElbannon, Field Sls. Mgr.
209/651-1402 x31, fax: 209/651-0740
e-mail: kmcc@voltagemultipliers.com

VOLTARC TECHNOLOGIES, INC., 400 Captin Neville Dr., Waterbury, CT 06705

Manufacturers of custom-designed hot and cold-cathode fluorescent lamps for use in backlighting of liquid-crystal displays, and aperture lamps for use in scanning and inspection.
Ellen Debs, Sls. Engr.
203/578-4600, 1-800-962-6366
fax: 203/578-4605

WACOM CO., LTD., 4-1-12 Ikebukuro, Toshima, Tokyo 171 Japan

Manufacturers of LCD integrated digitizers with a cordless stylus; LCD integrated data terminal with handwriting recognition.
Masahiko Yamada, Dir. Intl. Div.
+81-33-985-0097, fax: +81-33-985-8636

WACOM TECHNOLOGY CORP., 501 S.E. Columbia Shores Blvd., Ste. 300, Vancouver, WA 98661

Manufacturers of digitizer pen tablets and pen input subsystems. The patented,

battery-free, eraser-pen technology works with a variety of display devices, including TFT color LCDs. The low-frequency rf signal is fully compliant with host radio-communication systems, and is integrated into many ruggedized and commercial pen computers.

Steve Sechrist, Technology Mktg. Mgr.
360/750-8882, 1-800-922-6613
fax: 360/750-8924

WAMCO, INC., 11555 A Coley River Circle, Ft. Valley, CA 92708

Developer and manufacturer of optical filters for all display applications. Filters optimized for contrast enhancement, color correction, and NVIS compatibility.
Producer of customized NVIS diffuser/filter for AMLCD backlighting. On-site optical and environmental test capabilities. Exclusive U.S. distributor of Oshino sub-miniature incandescent lamps.
Harry Reichardt, Sls. Engr.
714/545-5560, 1-800-225-4810
fax: 714/545-6093

WANDE, INC., 4088 Lindberg Dr., Dallas, TX 75244

Manufacturers of a complete line of automated equipment for LCD production. The integrated system includes glass scribing/breaking/polishing, glass cleaning, imaging, developing/etching/stripping, printing/coating, buffing, spacer application, liquid-crystal filling, ITO sputtering subsystems, etc.
David Chen, V.P. Mktg./Bus. Dev.
972/701-8886, fax: 972/701-8885

WASATCH HIGH VOLTAGE, 2424 So. 900 West, Salt Lake City, UT 84119

Manufacturers of flying-spot scanners, high-voltage power supplies, and sweep deflection systems.
Ginnie Johnson, Mgr.
801/973-4090, fax: 801/973-0176
www.nytone.com

WATKINS-JOHNSON COMPANY, Semiconductor Equipment Group, 440 Kings Village Rd., Scotts Valley, CA 95066

Manufacturers of high-throughput continuous process APCVD reactors for thin-film deposition in flat-panel-display array fabrication. The WJ 16CVD system provides high-quality deposition of SiO₂ dielectric films for large-size AMLCD substrates and most advanced TFT devices. High utilization capability and high throughput provide for extremely low total cost of ownership.

Linda Johnson, Sls./Mktg.
408/438-2100, fax: 408/438-6827

WELCH ALLYN, Lighting Products Div., 4619 Jordan Rd., Skaneateles Falls, NY 13153-0187

Manufacturers of miniature metal-halide arc lamps with arc gaps of 1-2 mm. Lamps are ideal for compact LCD projectors.
Jim Kiesa, Sls. Mgr.
315/685-4347, fax: 315/685-2854

WELLS-GARDNER ELECTRONICS CORP., 2701 N. Kildare Ave., Chicago, IL 60639

Manufacturers of monochrome and color CRT displays. Products range from CGA through SVGA. Custom and standard products are available. Video-related contract assembly also available.
Lawrence J. Brady, V.P., Sls. Mgr.
312/292-5640, fax: 312/252-8072

WESTAIM ADVANCED DISPLAY TECHNOLOGIES, INC., 15 City View Dr., Toronto, Ontario M9W 5A5, Canada

Manufacturers of solid-state displays, which are a combination of thin-film phosphors with thick-film screen printing. Advantages include low-cost high-yield manufacturing processes, fewer process steps, greater viewing angles, rugged structure, and crisper brighter colors with full-motion video response speeds.
Stefani Chan, Mktg. Coord.
416/246-1030 x223, fax: 416/246-0458
e-mail: schan@westaim.com
www.westaimad.com

WESTAR CORP., 11520 St. Charles Rock Rd., Ste. 208, St. Louis, MO 63044

Manufacturers of display-performance measurement systems and display drive electronics that offer an integrated solution for measuring electro-optical performance of displays or display components. Also, the LCDcube™ line of drive electronics accepts analog video formats and outputs digital video to drive commercial and military AMLCDs.
Susan Carrillo, Mktg. & Sls. Mgr.
314/298-8748 x234, 1-800-518-8379
fax: 314/298-8067
e-mail: dtes@westar.com
www.westar.com

WESTLAND ELECTRONICS, P.O. Box 215, 30 Depot La., Old Chatham, NY 12136

Consulting services for electronic-display equipment and systems. Technological studies and reports on all subjects related to these specialties.
Sol Sherr, Pres.
518/794-8151, fax: 518/794-9426
e-mail: ssherr@taconic.net

WHITE ELECTRONIC DESIGNS, 1 Research Dr., Westborough, MA 01581

Manufacturers of AMLCDs, display interface products, and mechanical products. Standard product offerings include display head modules and 4-18 in. custom products. The interface products include switch panels and keyboards, front-panel assemblies, and custom LCD modules.
Dennis Oberlin, Dir. Sls.
508/366-5151, 1-800-800-7726
fax: 508/836-4850
e-mail: doberlin@bowmartechnologies.com
www.whiteedc.com

WHITTAKER ELECTRONIC SYSTEMS, 1785 Voyager Ave., Simi Valley, CA 93063

Manufacturers of MIL-SPEC high-resolution color and monochrome monitors for domestic and international naval applications that pass MIL-S-901C Grade B shock. Also provide plasma programmable entry panels for airborne applications.
Stephen C. Jones, Mgr. Product Dev.
805/584-8200, fax: 805/527-8332

WICO, 7847 N. Caldwell, IL 60714

Manufacturers of analog and digital joystick controls for video arcade games and home computer entertainment systems.
Bill Potzke
1-800-323-4258, fax: 847/647-8526

WINSOR CORP., Ceramic Lighting Div., 410 S. 96th St., #7, Seattle, WA 98108

Manufacturers of high-performance backlights for LCDs. These are typically flat monolithic fluorescent lamps using

hot-cathode technology to achieve high output and high luminous efficacy.
John Ford
206/767-4070, fax: 206/767-3747

WINTRON TECHNOLOGIES, 614 Sparing St., Howard, PA 16841

Designers/manufacturers of CRT components including deflection yokes, high-voltage power supplies, transformer multipliers, flyback transformers, width and linearity coils, degaussing coils, and sweep boards.
Rose Hutchings, Dir. Sls./Mktg.
814/625-2720, fax: 814/625-2725
e-mail: winsales@wintrontech.com
www.wintrontech.com

J. A. WOOLLAM CO., INC., 650 M St., Ste. 102, Lincoln, NE 68508

Manufacturers of a variety of spectroscopic ellipsometers for non-destructive materials analysis: multilayer thickness, optical constants, percent crystallinity, composition, growth or etch rates, and more. Applications include dielectrics, semiconductors, metals, polymers, and more.
James Hilliker, Engr.
402/477-7501, fax: 402/477-8214
www.jawoolam.com

WPI ELECTRONICS, INC., 40 Depot St., Warner, NH 03278

Designers and manufacturers of standard and custom electronic ballasts, power supplies, and ignitors for xenon, mercury, and metal-halide arc lamps ranging from 35 to 1200 W.
Paul Iverson, Product Mktg. Mgr.
603/456-3111, fax: 603/456-2498

WYLE ELECTRONICS, 15370 Barranca Parkway, Irvine, CA 92618

Distributors of flat-panel displays by Sharp Electronics. Products include AMLCDs, passive color and monochrome displays, character displays, and EL displays. Integrates displays in ISO 9002 facility.
714/788-3720, 1-800-283-9953
fax: 714/789-1461

XEROX COLOR GRAPHICS, 5853 Rue Ferrari, Bldg. A, MS 3-12, San Jose, CA 95138

Manufacturers of engineering copiers, printers, Versatec plotters, and supplies for document management.
1-800-538-6477

XKD CORP., 6351 San Ignacio Ave., San Jose, CA 95119

Manufacturers of CRT monitors for use in aircraft simulators, radar installations, ruggedized models for use in ground mobile, airborne, and shipborne applications. Monitors range in size from 4 x 3 in. devices to 25-in. CRT systems.
L. C. Heinzmann, Pres.
408/224-8460, fax: 408/224-8190
e-mail: sales-service@xkd.com
www.xkdcorp.com

XMR, INC., 47281 Bayside Pkwy., Fremont, CA 94538

Manufacturers of high-power industrial excimer lasers and laser-based systems for use in manufacturing high-definition display devices. Developed and proven processes for recrystallizing a-Si to poly-Si for improved AMLCD manufacturing.
Len Goldfine, Dir. Sls./Mktg.
510/668-1517, fax: 510/668-0169

XYRATEK INTERNATIONAL, LTD.,
13581 Pond Springs Rd., Austin, TX
78729

Providers of warranty, logistics, and repair services. Performing all processes in product repair including inventory management, advance exchange, and spares distribution. Component level repair of FPD/LCDs, monitors, HDDs, notebooks, PCBs, and FDDs. Locations in the U.S., Europe, and S.E. Asia.
Tom Ward, U.S. Sls. Mgr.
512/258-7590, 1-800-787-3955
fax: 512/219-0021
auston_sales@us.xyratex.com
www.xyratex.com

XYBION ELECTRONIC SYSTEMS, 8380 Miralani Dr., San Diego, CA 92126-4347
Manufacturers of low-light intensified gated CCD scientific imaging systems. Scientific-application video cameras and image-processing software, including intensified, multispectral and gated video cameras. Integrated and cooled b/w and color cameras produced for the microscopy market.
Richard A. Sturz, Sls. Mgr.
619/566-7850, fax: 619/566-2032

YAMAHA SYSTEMS TECHNOLOGY, 100 Century Center Court, Suite 800, San Jose, CA 95112
Manufacturers of single-chip or board-level IBM VGA, EGA, CGA, MDA, and Hercules compatible graphics controllers for driving EL, plasma, LCD (color or monochrome), or CRT displays all from a single device.
Robert Starr, Natl. Sls./Mktg. Mgr.
408/437-3133, 1-800-543-7457
fax: 408/437-8791

YOUNG TECHNOLOGY, 277 Rickenbacker Circle, Livermore, CA 94550
Manufacturers of a line of thermal press equipment used for bonding of heat-seal connectors for connecting flat-panel displays to PCBs.
Alex Rossi
510/490-6373, 1-800-394-6373
fax: 510/456-9810

Z-AXIS, INC., 15 Eagle St., Phelps, NY 14532
Designers and manufacturers of high-reliability color and monochrome CRT displays ranging in size from 5 to 27 in. Z-axis provides monitors for industrial control, medical instruments, commercial test equipment, and point-of-sale applications.
John Dillman, Sls. Mgr.
315/548-5000, fax: 315/548-5100
www.z-axis-monitors.com

CARL ZEISS, INC., Microscope Division, One Zeiss Dr., Thornwood, NY 10594
Manufacturers of advanced microscope systems for the testing, inspection, and measurement of all microelectronic components. Microscopes available for all applications including stereo, confocal, video, and fully automated systems. Also, image analysis software to support all applications.
Microscope Div.
1-800-233-2343, fax: 914/681-7446

ZENITH COMPONENTS GROUP, 1000 Milwaukee Ave., Glenview, IL 60025
Manufacturers of 5-19 in. (monochrome) and 9-25 in. (color) displays with a wide

range of phosphors, face treatments, operating frequencies, and auxiliary power.
Robert Uhlir
708/391-7733, 1-800-827-8720
fax: 708/391-7078

ZENITH ELECTRONICS CORP., Rauland Div., 2407 W. North Ave., Melrose Park, IL 60160
Manufacturers of 19V, 20V, 25V, and 27V consumer-grade CRTs, with expansion to 17-in. conventional monitor tubes in 1997. Also, manufacturers of electron guns for both consumer and display-grade applications.
Richard Steinmetz, V.P. Tech. Sls./Mktg.
708/450-8306, fax: 708/450-8393

01 PRODUCTS, INC., 3050 Hillcrest Dr., Ste. 100, Westlake Village, CA 91362
Manufacturers of head-mounted display products designed for industrial, medical, and virtual-reality OEMs, featuring the PT-01 professional-use HMD, which permits extended use without eyestrain and provides multiple adjustments for user-selectable image placement.
Garrick Matheson, V.P. Mktg.
805/446-1453, 1-800-538-3008
fax: 805/373-8966

Directory notes

• Listings are free and without obligation. Companies advertising in this issue are listed in boldface type in both Parts I and II.

Suggestions for new categories of products and services relevant to the display industry, or further subdivisions or clarification of existing categories, are welcomed.

• If your organization is not included in this year's directory and would like to be listed in next year's directory, the Fourteenth Annual Directory, please write to Jay Morreale, c/o Palisades Institute for Research Services, Inc., 411 Lafayette Street, 2nd Floor, New York, NY 10003; 212/460-8090 x212, fax -5460.

Company divisions can be listed separately if they are at different locations with different product lines - please submit a separate application form for each division.

Application forms for the Fourteenth Annual Directory of the Display Industry will be mailed with the February 2000 issue. ■



Dare To Compare

Compare custom fabricated cans and enclosures from Eagle Magnetic to the drawn cans you're currently using for magnetic and non-magnetic shielding applications. You'll find that Eagle fabricated cans:

- are better quality, stronger products
- meet your specifications more exactly and fit better
- save you time and money in assembly
- accommodate holes, offsets, welds, plating, and other secondary operations
- can be delivered in short runs and exact counts, just-in-time, when you need them
- actually cost you less than drawn cans

Can you really afford drawn cans. For further information contact Eagle today.



EAGLE MAGNETIC CO., INC.
P.O. Box 24283 • Indianapolis, IN 46224
PHONE (317) 297-1030
FAX 317-299-1323

Circle no. 24

SID '00

Long Beach, California

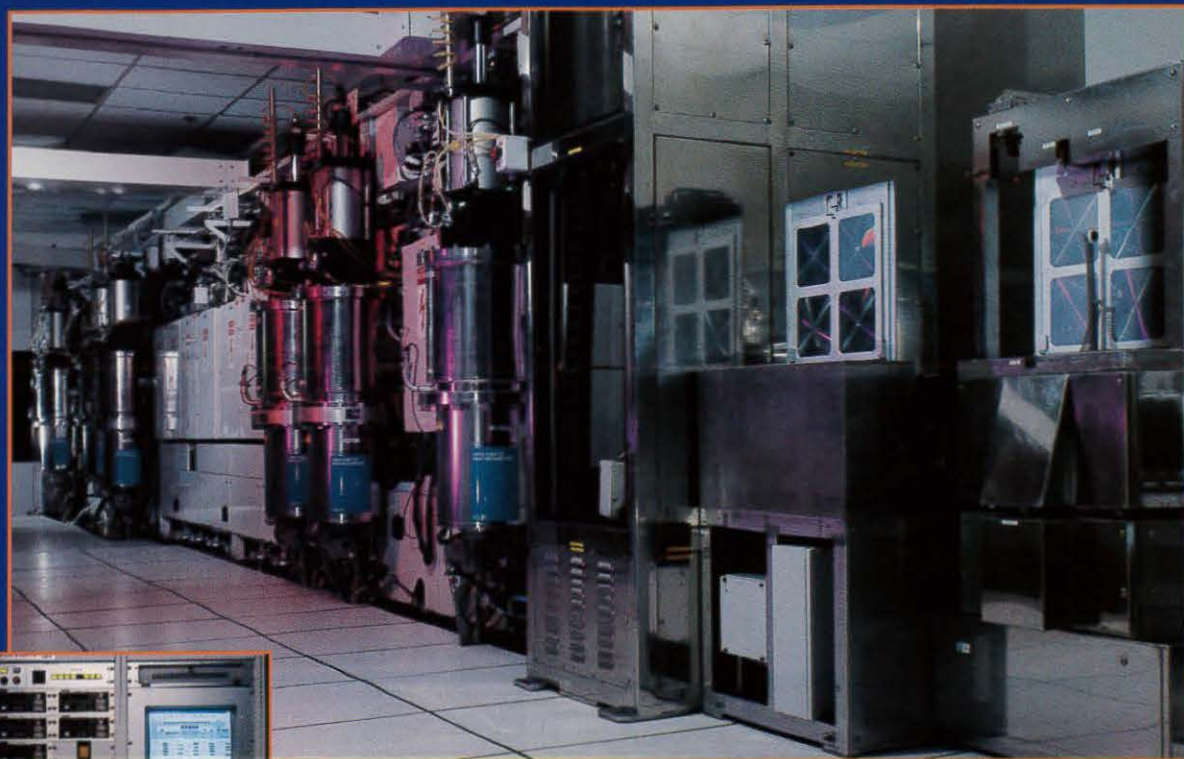
Long Beach

Convention Center

May 14-19, 2000

Mark Your Calendar Now!

Our Thin Film Coatings are unsurpassed because . . .



ULVAC SDP-300 sizes to 24" and SHD-9 sizes to 32"

No one can match our Quality, Price and Delivery!

Extremely low defect*, large area coating in high volume

- Display Products
- ITO Coated Substrates
- Index Matched ITO (ITO with AR)
- Chrome-Copper-Chrome
- Black Chrome (Black Matrix)
- Anti-Reflective Coats (BBAR, etc.)
- EMI/heater windows (with BBar)
- Lamination

* (5KLux)

SPECIAL CUSTOMER SERVICES INCLUDE:

- Volume or Custom Orders
- Glass/Plastic Substrates
- ITO Stock Sheets . . . and more
- Etching & Patterning (to 2 μ m)
- Glass Cutting/Beveling/Polishing

ALL COATINGS ARE ION-SPUTTERED

THIN FILM DEVICES, INCORPORATED

1180 North Tustin Avenue • Anaheim, CA 92807

Circle no. 26

Phone: 714/ 630-7127

Fax: 714/ 630-7119

email: sales@tfdinc.com

TFD

TCO

Are you CONFUSED by TESTING STANDARDS?

ISO

Let Microvision's display test systems
simplify them for you with **AUTOMATIC** test suites!

Microvision's SS200 series of display test equipment offers fully automatic test suites for flat panels, CRTs, projection & cockpit displays, in monochrome or color. One click of the mouse and your test suite is automatically initiated, performing fast & accurate measurements in accordance with ISO (9241 parts 3, 7 & 8 and 13406-2), TCO (95 & 99), NIDL and VESA (FPDM) specifications. Or you can develop your own test sequence with Microvision's proprietary MATL software. With the SS200 family, you can quickly interchange between CRT and flat panel testing. And the system is portable and compact, fitting easily into any test area.

Used by testing laboratories
world-wide.

MICROVISION

550 High Street, Auburn, CA 95603
Tel: (530)888-8344 * (800) 931-3188
Fax: (530)888-8349
Email: sales@microvsn.com



Visit our Website at:
www.microvsn.com

Circle no. 27

Some things just shouldn't be covered up...

Our infrared touch frame is specially designed for 42" gas plasma displays. Only infrared fits around the display - not over it. No disassembly, no permanent adhesive, no overlay to degrade your image quality. And because infrared is the most rugged and reliable touch technology on the market, you're assured of years of reliable performance, even in the most severe conditions.

After 25 years as the world's leading manufacturer of infrared touch technology, no one knows touch like Carroll Touch. *Why take chances with anything else?*



...Like vibrant color and stunning image quality



**Carroll
TOUCH**

1-800-241-5281
www.carrolltouch.com

Carroll Touch USA
2800 Oakmont Drive
Round Rock, TX 78664
(800) 241-5281

Carroll Touch Europe
Sneserevej 6, DK-4733
Tappernoje, Denmark
(45) 55 96 03 36

Carroll Touch Japan
42-27, 4-Chome,
Izumi, Sugunami-Ku,
Tokyo 168 Japan
(81) 3 5306-2100



42" gas plasma display with
Carroll Touch infrared touch frame

Circle no. 28

Introducing the world's most advanced FED technology in a high-volume cluster tool.

The new Temescal® FCE-7000 from BOC Coating Technology is very big news: In fact, if you're looking for high-volume FED flat panel deposition with lowest cost of ownership and incredible flexibility, it just doesn't get much better than this...

To start with, there's BOC's world-class e-beam technology – which gives you the best uniformity, highest rates, longest life and largest source inventory, to cite just a few of its merits.

Then, this is a cluster tool. So you can deposit a single film or a

whole stack, in just about any way you'd like.

Plus, your panel size choices are virtually unlimited. The tool now handles up to 600mm x 720mm, which happens to be the largest in the world. But BOC can also configure it for even larger sizes upon request.

Highest throughput. Lowest cost of ownership.

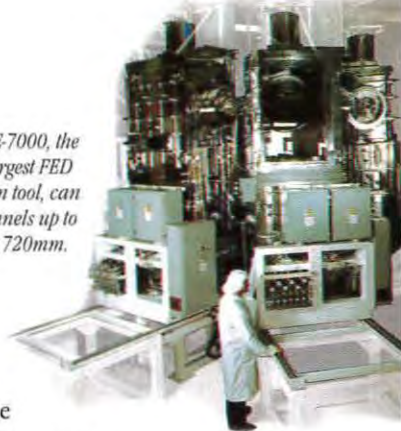
The FCE-7000 is a proven production tool that generates throughput speeds of from 10 to 60 panels per hour – and even up to 70 and 75 on certain processes. And when you combine that kind of throughput with high production quality levels, you get a very attractive return on your investment.

Designed for production, BOC's flexible cluster configuration lets you deposit a single film or an entire stack.

And this system also reduces downtime and requires less maintenance.

Plus, it provides more advanced automation and higher materials utilization. So you can see how it achieves the lowest cost of ownership of any flat panel deposition system in the industry.

BOC's FCE-7000, the world's largest FED production tool, can process panels up to 600mm x 720mm.



A full spectrum of solutions.

BOC has been producing coating systems for more than 35 years now.

So they can provide not only high-throughput production systems, but also prototype R&D and intermediate systems, as well.

They can also provide you with an unmatched repertoire of process and system knowledge and managed engineering expertise.

So, even if your process is not yet fully developed, you can depend on BOC to help you answer the questions, negotiate the risks and get where you want to go.

Bottom line, it means smarter solutions – from the big performance guys, BOC. Call them and see for yourself...

Temescal, a part of BOC Coating Technology, 2700 Maxwell Way, Fairfield, CA 94585. (707) 423-2100. Fax: (707) 425-6071.

 **BOC**
COATING
TECHNOLOGY

From the day we're born,
we go into the world
looking for what we
want **with our eyes.**



Almost nothing has a bigger impact on product preference than the visual performance of a display. OCLI's image enhancement technology delivers **vivid colors, high contrast** and **crisp resolution** on direct view and projection displays. The difference is an immediately visible improvement that will win over even the most discriminating customers, the moment they see it.

Contact us for more information: www.ocli.com

USA (707) 545-6440 (888) 312-0848 EUROPE (49) 6162-93030 JAPAN (81) 3-3225-8974

Circle no. 30

display continuum

continued from page 4

do to meet the needs of this large and growing user community.

Amy's story is a real one. She tells it like it is, and she has said it better than I can say it. So here is Amy's letter to her father.

Hi Dad!

As I said the other day, I do have a comment on screen accuracy, but I have no idea if it will be of use to you as it is completely specific to my job and its recent woes. I'm afraid you may need some background information.

Background

To let our clients see, mid-project, what their job will "really" look like when printed, we run Digital Waterproofs (DWPs) for them. The DWP is a proofing medium using liquid ink-jet technology that has been specially calibrated to duplicate the exact colors one would see after running 4/C films. Our charge for one of these proofs is \$150 per 26-in.-square sheet. In a perfect world, each job we do would be DWP-ed first before actually being run to films, as a final color-check and error check. This final DWP is - ideally - what we get the client to sign off on before we run the even more costly films.

More Background

We have numerous clients whose jobs involve what we call "critical" color, which is basically a euphemism meaning "this client will be unbelievably nit-picking about his/her photos."

For a Normal Critical Color Job: (1) We make a digital waterproof (DWP) of the photo or art in question for client review. (2) We get the digital waterproof back all marked up with comments like "remove 5% magenta," "less yellow in the facial highlights," "too much black in the mid tones," etc. (3) We make the desired changes and, yep, make another DWP. (4) Sometimes we have it nailed at this stage, but sometimes we get the new DWP back, all marked up again, and we have to (5) Make more changes and run a third DWP for final sign off.

Still More Background

Normally, our "critical color" clients are fairly savvy about the graphics industry - they tend to be industry professionals (like art directors from ad agencies) - and have relatively high budgets, high enough that an extra \$150 here or there is considered par for the course. When we quote prices for their jobs, they

know that extra proofs for color-checking are being built into the final bill.

That said, most of our clients are not critical-color clients. They are ordinary Joes who have small to mid-sized businesses that they

want to promote, and no graphics-industry experience. They just want their print jobs done quickly and cheaply, and are happy with whatever they get. Um, did I mention "CHEAPLY"?!?



SIMPLY CENTER THE COLORED BALL ON THE TARGET

Measure color and light output using the CS-1 Color Sensor in conjunction with Quantum Data's VGM color measurement software (included).

The RGB sensor provides interactive adjustment of your test monitor. The sensor package attaches to the monitor with a suction cup, and connects to your PC via a serial port. Easy.

Just contact us for more information.



The Art of Technology

QUANTUMDATA

2111 Big Timber Road, Elgin, IL 60123

Phone: (847) 888-0450 Fax: (847) 888-2802

Website: <http://www.quantumdata.com>

E-mail: sales@quantumdata.com

Circle no. 31

display continuum

Finally – Here's Where I Get to My Point
Every once in a while we get a "Harriet" (not her real name!). Harriet works for a mid-sized metal-mesh fabricator, for example. (In fact, we discovered after dealing with her for

a bit that she is an accountant there, which perhaps explains much.) Harriet is nitpicking to an extent that boggles the mind, but her experience with our industry is nil, and so is her budget.

LCD Dot Matrix Modules in Sizes and Styles to

Fit Every Need. When it comes to variety and quality performance, nothing measures up to

Data Modul character and graphic LCD dot matrix modules.

Available in the industry's broadest selection,

with wide viewing angles, character heights

from 3mm to 12 mm, and versatile graphic

capabilities, our LCD modules offer the following advantages:

- Custom modification options
- Full range of temperatures
- Full line of accessories
- Available in TN, STN and FSTN technologies
- Choice of colors
- Availability from stock
- ISO 9001 and CE certification

Contact us to find out how our modules can fit into your plans, or for the distributor nearest you.

Clearly
defined
characters
and graphic
solutions



DATA MODUL

120 Commerce Dr., Hauppauge, New York 11788 • Toll Free: 877-951-0800
Tel: 516-951-0800 • Fax: 516-951-2121 • Website: www.datamodul.com

Circle no. 32

How nitpicking is Harriet? To request even the most trifling text changes, Harriet types up a paragraph-long description on each change (directions, plus editorial comments) and makes an appointment to go over the changes in person, spending a good 5 minutes on each change. Then she spends an extra half-hour obsessing about all the things that might go wrong and begging us to reassure her that everything will come out OK.

Harriet took a micrometer to the paper samples we sent her. This, you say to yourself, is a woman who will want to see proofs constantly in order to double-check every little thing that she is so overwhelming worried about, but no – horrors – they cost so much! Laser proofs, OK – but no DWPs!

She was not only nitpicky in general about the layout and contents of her brochure, she was absolutely adamant that her cover photo, which we had to retouch and play around with, have very specific colors in it. She spent horrific amounts of time at my shoulder, peering at the computer screen as I worked, insisting I tell her precisely how accurate my monitor was. She asked me that question a million times in the progress of the job, but she would not pay for an accurate proof.

I had no answer for her when she asked me about my monitor's accuracy. So I just shrugged my shoulders and told her for the umpteenth time, "Harriet, I really don't know what to tell you. I can't promise you anything." And I listened to another hour of her begging me to promise her the printed piece would look just like what she saw on the screen.

In the end, Harriet spent far more money hovering over me, wasting my \$150-per-hour computer time, than she would have spent paying for a round of DWPs. And I got so many headaches! What does one do with/for clients like this? They must know what their piece will look like, but mustn't pay for the expensive proofing. Could my monitor ever be "accurate" in the sense that it would look just like a typical 4/C (cyan, magenta, yellow, black) printed piece?

Moving Beyond the Anecdote

I don't even know how to compare a light-based color experience with an ink-on-paper-based color experience. It seems like an apples-to-oranges comparison to me: Paper is always going to be at least partially opaque and will never be displayed backlit, and a

screen is never not going to be backlit, and does not have the properties of an opaque object. Hmmmm....

Regarding Mr. Silzars' comments about some sort of universal calibration for monitors, I don't think *color* itself is necessarily even the issue here. I think that the relative *opacity* of an object has a huge impact on how we perceive its color. Think of a green leaf sitting on a sky-blue table - then picture looking upward at that leaf on the branch, the sunny sky behind it. A monitor would almost have to have some sort of relative opacity factor built into it, that could be enabled or disabled, in order to switch from viewing RGB (light-based) colors to CMYK. A CMYK printed piece is visible because of the light falling *on* it from a light source. An on-screen RGB image is visible because it *is* light.

Not that this is physically possible, but what if you could enable a control to "dull" your monitor into an opaque surface in order to successfully mimic a printed page - at which point your desk space would have to be pretty well lighted? That brings us to another problem! Up front in our office we have a "viewing table," which our picky clients use to color-check their proofs. Above this neutral-colored table is a special lamp designed to emit (as nearly as possible) colorless light - because, of course, most light sources (lamps, stars ...) have significant color to them. So even if a display screen could mimic opacity, its total color appearance would still depend upon the color and quality of the light falling on it - AAAAAAAAAARRGH!

Well, it's late now, so I'd better sign off. Hope this has some pertinence for you! Thanks for letting me get my work woes off my chest, by the way!

- Love, Aim

On behalf of all our readers - thank you, Amy, for allowing us to share so vividly in your real-life experiences.

Wouldn't it be great if those of us in the display community could respond to Amy's needs a bit better? For example, the next time you are sitting in the audience or presenting a paper at a technical conference dealing with color in displays, ask the question "But, what about Amy?" Are we responding adequately to her current and future needs? What are we doing about the missing colors? What about color-matching displays to each other? What about matching displays to hardcopy devices?

I think we display technologists still have lots of work ahead of us!

Should you wish to continue this colorful dialogue, you may reach me by e-mail (as Amy and her dad did) at silzars@ibm.net, by

telephone at 425/557-8850, by fax at 425/557-8983, or by the printed medium (whose pigments, by the way, don't match display phosphors) at 22513 S.E. 47th Place, Issaquah, WA 98029. ■

Test Signal Generator for Digital Flat Panel Displays



UNIGRAF VTG-1108

- Support for multiple bitmap formats
- Text with Bitmap and Vector fonts
- Resolution up to 1920 x 1440 and higher
- Windows and MS-DOS software
- Full control of sync polarity and state
- Full DDC (read/write) and ATE support
- Multiple generators in one PC
- Unlimited number of permanent patterns, timings, colours, palettes, signal formats and sequences
- External Personality Modules for LVDS, Panel-Link, RGB analog, parallel interfaces and for future solutions
- Scrolling colours or bitmaps for test pattern animation

The VTG-1108 ISA board is a digital video signal generator designed for testing, evaluating and servicing different types of Flat Panel Displays in Manufacturing, R & D and Service. It supplies the necessary signals for displaying test patterns on LCD, EL or Plasma Displays or other equipment using digital video inputs, colour or monochrome.

 **UNIGRAF**
ISO 9001 CERTIFICATED FIRM

UNIGRAF Oy, Ruukintie 18
FIN-02320 Espoo, Finland
Tel. +358 9-802 7641
Fax + 358 9-802 6699
Email: sales@unigraf.fi
Http://www.unigraf.fi

Take a closer look at your LCD service partner



Assign responsibility for flat panel display warranty management and repair to a specialist - Xyratex. Reduce your inventory pipeline costs and repair turn time while you concentrate on product development and sales.

x y r a t e x

The Xyratex advantage:

- Facilities in the US, Europe, and Southeast Asia provide global coverage
- ISO 9002 certification ensures technical excellence
- Financial strength guarantees long term partnerships

Xyratex LCD repair services include:

- In-warranty and post-warranty repair and refurbishment
- End-of-life services
- Total warranty management - not only the complete warranty process but repair of the entire product, such as a flat panel monitor or portable computer

Xyratex provides full repair capabilities, including service contracts, for portable computers. Our overall component repair capabilities ensure low cost and fast turn time.

Xyratex combines its technical expertise with logistics and materials management to be your flat panel display and notebook service partner.

Xyratex Warranty Services ... Supporting IT Solutions Worldwide

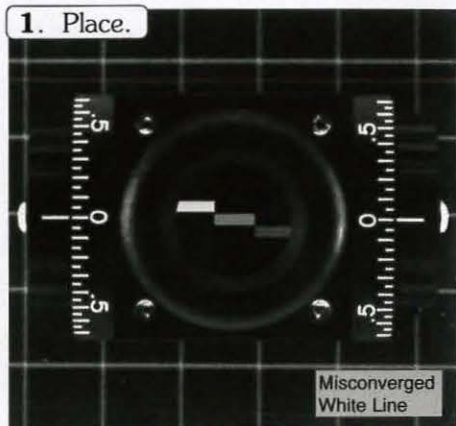
In Europe phone + 44 (0) 1705 486363
fax + 44 (0) 1705 492228

In the US phone + 1 800 737 3955
or + 1 512 258 7590
fax + 1 512 219 0021

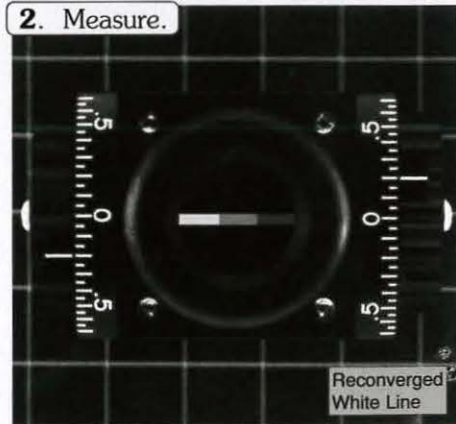
Online information www.xyratex.com



1. Place.



2. Measure.



KLEIN
Instruments Corporation

Contact us now at
Klein Instruments
Portland, OR USA
ph (503) 245-1012
fax (503) 245-8166
www.kleininc.com

Circle no. 35

Circle no. 34

editorial

continued from page 2

today's 0.55-mm glass. The short-term solution, said Bos, is strengthened glass and rubber mounting cushions for the display. Longer term, the solution may well be plastic substrates. Picvue's Jacob Lin has patents on plastic substrates and is very interested in the technology. Bos feels plastic substrates are very close to being ready for mass production.

At Picvue, as at virtually all of the Taiwanese companies I visited, I was impressed with the openness with which managers shared information. There is a sense of justifiable pride in building not only successful companies, but also a successful high-tech national economy. And people are pleased to tell their stories - without the help (or hindrance) of PR people.

- KIW

We welcome your comments and suggestions. You can reach me by e-mail at kwerner@sid.org, by fax at 203/855-9769, or by phone at 203/853-7069. The contents of upcoming issues of *ID* are available on the *ID* page at the SID Web site (<http://www.sid.org>).

8

99

NOVEMBER

*Fifth International
Conference on the Science
and Technology of
Display Phosphors*

*SAN DIEGO, CALIFORNIA
NOVEMBER 8-10, 1999*

• An international conference on the future prospects of phosphors for:

- OLEDs - ELDs - FEDs
- CRTs - Plasma Displays
- PL Devices - LC Backlights

Please send new product releases or news items to Information Display, c/o Palisades Institute for Research Services, Inc., 411 Lafayette Street, 2nd Floor, New York, NY 10003.

Lesker Cluster Tool for OLED Flat Panel Displays

Linear Sputter Deposition
(2 Sources with Linear Substrate Travel)

Metal Deposition
(4 thermal boots)

Organic Deposition #2
(3 Groups of 3 OLED Sources)

Mask Storage

Robotic Central
Distribution Center

Reactive Plasma
Cleaning

Organic Deposition #1
(3 groups of 3 OLED Sources)

Entry Loadlock

Exit Loadlock

*KJLC Substrate
Transfer Module*

Processes 6" square substrates with exceptional OLED layer uniformity, repeatability, and reliability

Cluster tools designed and manufactured by
Kurt J. Lesker
Company

1-800-245-1656 412-233-4200 www.lesker.com

The 7th International Conference on Ferroelectric Liquid Crystals (FLC '99). Contact: Prof. Wolfgang Haase, Condensed Matter Research Group, Institute of Physical Chemistry, Darmstadt University of Technology, Petersenstr. 20, D-64287 Darmstadt, Germany; +49-61-51-16-33-98, fax -49-24, e-mail: flc99@tu-darmstadt.de, <http://flc99.tu.darmstadt.de>.
Aug. 29-Sept. 3, 1999 Darmstadt, Germany

The 19th International Display Research Conference (EuroDisplay '99). Sponsored by SID and in cooperation with ITG. Contact: Dipl.-Ing. Rupert Rompel, VDE Verband Deutscher Elektrotechniker e.V., Stresemannallee 15, D-60596 Frankfurt am Main; +49-69-6308-381, fax +49-69-9631-5213, e-mail: 100145-67@compuserve.com.
Sept. 6-9, 1999 Berlin, Germany

The 6th Annual Flat Panel Strategic and Technical Symposium, "Vehicular Applications of Displays and Microsensors." Sponsored by The University of Michigan Center for Integrated Microsystems and the Metropolitan Detroit Chapter of SID. Contact: R. Donofrio, Display Device Consultants, 6170 Plymouth Rd., Ann Arbor, MI 48105; 734/665-4266, fax -4211, e-mail: rldonofrio@aol.com.
Sept. 22-23, 1999 Ypsilanti, MI

The Fifth International Conference on the Science and Technology of Display Phosphors. Sponsored by SID, PTCOE, and DARPA. Contact: Mark Goldfarb, Palisades Institute for Research Services, Inc., 411 Lafayette St., New York, NY 10003; 212/460-8090 x203, fax -5460, e-mail: mgoldfar@newyork.palisades.org.
Nov. 8-10, 1999 San Diego, CA

Electronic Information Displays (EID '99). Sponsored by the SID UK/Ireland Chapter. Contact: Trident Exhibitions, Jon Jones, West Devon Business Park, Brook Lane, Tavjstock, Devon, PL19 9DP, U.K.; +44-1822-614-671, fax -818.
Nov. 16-18, 1999 Surrey, U.K.

The Seventh International Color Imaging Conference. Sponsored by IS&T and SID. Contact: IS&T, 7003 Kilworth Lane, Springfield, VA 22151; 703/642-9090, fax -9094, e-mail: info@imaging.org.
Nov. 16-19, 1999 Scottsdale, AZ

WHICHEVER VIDEO TEST ENVIRONMENT YOU CHOOSE TO WORK IN...



STANDALONE



PC PLUG-IN

ONE VIDEO TEST GENERATOR STANDS OUT FOR PRICE AND PERFORMANCE

360 MHz

Announcing the 360 MHz 801GG Video Test Generator.



Powerful! Over 150 standard test images. Over 130 popular formats. 14 for HDTV. All pre-programmed. Plus, create your own tests easily with our VGM [Video Generator Manager] software. The 801GG-ISA is available as a PC plug-in for \$5,700. Or the 801GG, a standalone unit, is only \$7,700. Contact Quantum Data now.



The Art of Technology

QUANTUMDATA

2111 Big Timber Road, Elgin, IL 60123
 Phone: (847) 888-0450 Fax: (847) 888-2802
 Website: <http://www.quantumdata.com>



Circle no. 37

Kent

STATE UNIVERSITY

LIQUID CRYSTAL INSTITUTE

From the nation's
academic leader in Liquid
Crystal technology
and education . . .

Patented liquid crystal
technologies available for
licensing and research
collaboration:

- Cholesteric
 - PDLC
- Ferroelectric
- Four Domain
 - Nematics
- Phase Separated
Composite Films

For applications including:

- Rigid and flexible displays
 - Switchable windows
- Projection light valves
 - Beam steering
- Optical switches
- Alignment layers
- Polymers-walls-field induced
 - Plastic substrates

Contact KENT's Office of
Technology Transfer:
(330) 672-2692
<http://www.techtrans.kent.edu>

Industrial Partnerships are
sponsored by
ALCOM (Advanced Liquid
Crystalline Optical Materials),
an NSF Science and
Technology Center —
a consortium of three
Northeastern Ohio Universities:

Kent State University
Case Western Reserve University
The University of Akron

Contact LCI and ALCOM at:
<http://www.lci.kent.edu>

Image courtesy of O. Lavrentovich

Circle no. 38



Bergquist Touchscreen



Other Touchscreens

**When You Put A Bergquist
Touchscreen Next To Others,
The Comparison Is Clear.**

With Bergquist, you don't see the effect of the separator dots so your panel display stays clear. In a simple side by side comparison with the touchscreen you're using now and a Bergquist touchscreen, it's easy to see greater clarity. Brilliant colors, sharper images and crisper words, will all make your touchscreen easier to read and navigate. Better clarity, better product. See the clear difference today. Call 1.800.949.4021

TOUCH PRODUCTS DIVISION


BERGQUIST

301 Washington Street, Cannon Falls, Minnesota 55009 507.263.3766 Fax 507.263.5085
www.bergquistcompany.com



Circle no. 39

Simplicity with Power.



That's the Klein VPG250.

	yes	no
• Programmable custom patterns?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
• Displays and runs DDC 1/2B from test unit?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
• Programmable timings?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
• Pre-loaded VESA timings?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
• Displays xyY from colorimeter accessory?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
• Helps test work flow smoother?	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Call today for a FREE five-day trial!

KLEIN Instruments
Corporation

2236 SE Belmont St, Portland, OR 97214 USA
tel 503.245.1012 fax 503.245.8166
sales@kleininc.com www.kleininc.com

Circle no. 40

LAMINATORS

For equipment specifications and additional information, please contact PV Sales at 781-275-6000

Spire Corporation offers large-area vacuum lamination equipment for high throughput processing of:



© 1998 Spire Corporation

- LCD/AMLCD flat panel displays
- Touch screen panels
- Optical filters and polarizers

Spire laminators, widely used in the production of photovoltaic modules, apply uniform temperature and pressure over areas up to 4 m².

SPI-LAMINATOR™ Models 240, 350, 460, & 660:

- 1 m² to 4 m² process area
- 2.5 cm max. stack thickness
- Built-in vacuum system
- Conveyor load/unload option
- Clean room compatible
- Custom engineering available

Programmable Processing:

- Temperature, 180°C (max.)
- Pressure, 1 atm (max.)
- Chamber Vacuum, 1 mm Hg
- Automatic or Manual Cycles

Spire Corporation
One Patriots Park
Bedford, MA 01730-2396/USA
TEL 781-275-6000
FAX 781-275-7470
EMAIL pvsales@spirecorp.com



Circle no. 41

THE CONOSCOPE®

The fastest system for visual performance evaluation of Flat Panel Displays:

- **Luminance**
- **Contrast**
- **Chromaticity**
- **Reflectance (BRDF)**
- **Luminance dynamics**

versus viewing direction and driving conditions.

More information:
<http://www.autronic-welchers.de>



autronic-MELCHERS GmbH 

Rosswald 18, D-76229 Karlsruhe, Germany, Phone +49-721-96264-45, Fax +49-721-96264-85, email: Sales@autronic.melchers.de

Circle no. 42

Precision

Flexibility

Westar's FPD Performance Measurement Systems give you something unique -- precision and flexibility. Westar's FPM Systems provide photometric and colorimetric measurements, real-time reporting of test results, increased test and analysis productivity, and performs standard tests as well as your own custom tests.

Westar's FPD Performance Measurement System

- Tests displays up to 54" automatically.
- Tests for luminance, chrominance, contrast & viewing angle performance...and more!
 - Performs standard tests including: VESA, ISO, NIDL & SAE.
 - Uses popular sensors, such as PR, Minolta, and Topcon.

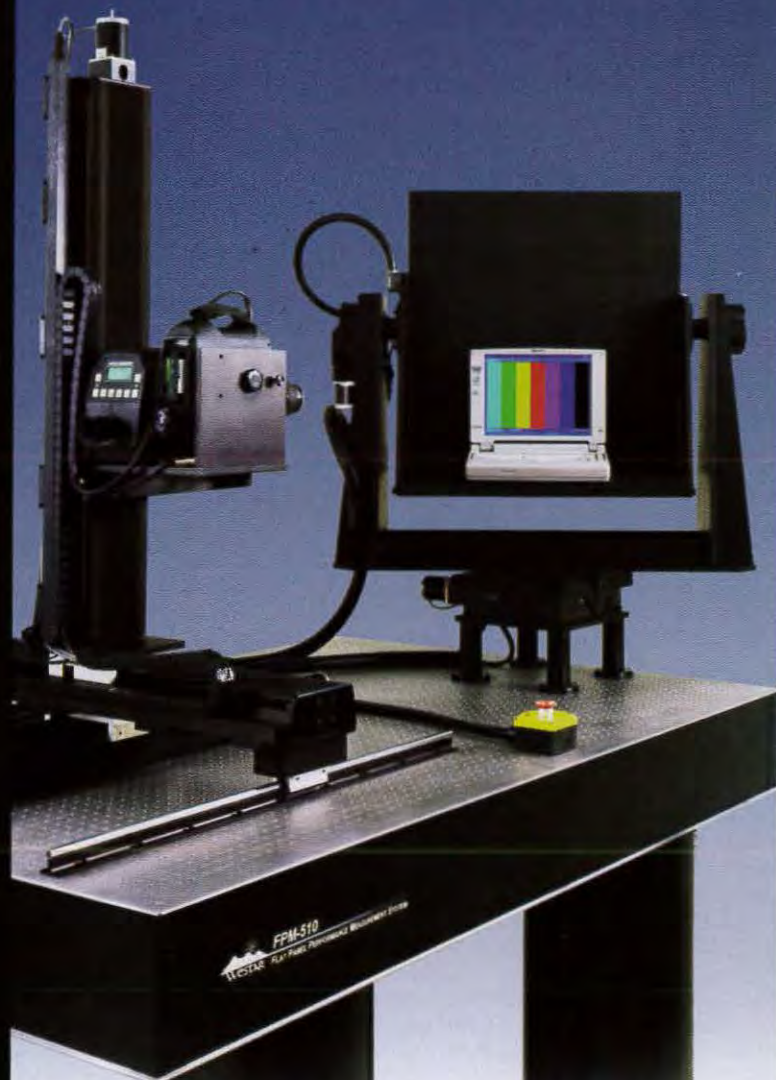
Powerful ViewPoint™ software integrates sensors, motion control, analysis, and reporting functions. It also includes a wide variety of fully integrated display interfaces!



FREE Video and CD

For more information on Westar's revolutionary new systems, call today for our **FREE** video and CD.

Copyright © 1999, Westar Corporation
Trademarks are property of their respective owners. Patents Pending.



USA: Westar Corp., 314-298-8748 ext.286
Japan: Kyokuto Boeki Kaishi, Ltd., 03-3244-3795
Korea: Truco, Inc., 02-3487-1070
Taiwan: Advanced Team Enterprise Co., Ltd., 02-27035466
China: Advanced Team Technology Service, 769-632-6399
Europe: Ginsbury Electronics, Ltd., +44 (0) 1634-298900

<http://www.westar.com>

Circle no. 43

SID Conference Calendar

Next Show!

The 1999 International Display Research Conference (EuroDisplay '99)

The 19th edition of the International Display Research Conference will be held at the Maritim ProArte Hotel in Berlin, Germany, September 1-6, 1999. This year's conference is comprised of 49 papers from Asia, 46 from Europe, and 18 from the U.S. and Canada. The presentations reflect the current thrust of flat-panel research on organic LEDs, virtual displays, and light valves on Si for projection, printing replacing vacuum processes, and reflective displays with color or multiline addressing. A highlight promises to be the performance of the Berlin Philharmonic.

6 **99**
SEPTEMBER
19th International Display Research Conference
(Euro Display '99)
BERLIN, GERMANY
SEPTEMBER 6-9, 1999

- An international conference on display research and development aspects of:
 - Display Fundamentals, Display Devices,
 - Hard Copy & Storage, Input Systems,
 - Integrated Devices and Applications,
 - Image and Signal Processing,
 - Color Perception, Human Factors

8 **99**
NOVEMBER
Fifth International Conference on the Science and Technology of Display Phosphors
SAN DIEGO, CALIFORNIA
NOVEMBER 8-10, 1999

- An international conference on the future prospects of phosphors for:
 - OLEDs - ELDs - FEDs
 - CRTs - Plasma Displays
 - PL Devices - LC Backlights

16 **99**
NOVEMBER
7th Color Imaging Conference: Color Science, Engineering, Systems & Applications
SCOTTSDALE, ARIZONA
NOVEMBER 16-19, 1999

- An international multidisciplinary forum for dialogue on:
 - Creation and capture of Color Images
 - Color Image reproduction and interchange
 - Co-sponsored with IS&T

14 **00**
MAY
SID '00
LONG BEACH, CALIFORNIA
MAY 14-19, 2000

- SID's MAJOR ANNUAL EVENT
- An International Symposium, Seminar, and Exhibition - Featuring:
 - Technical Sessions - Poster Session
 - Author Interviews - Evening Panels
 - Short Courses - Applications Seminars
 - Technical Seminars - Applications Sessions
 - Product Exhibits - Display Technology Showcase

For additional information:

Dee Dumont
Society for Information Display
31 East Julian Street
San Jose, CA 95112
408/977-1013, fax - 1531
www.sid.org



Since 1962, a professional worldwide interdisciplinary society committed to the advancement of information display.

DEVELOPMENT ENGINEERS

Philips Display Components, the world's largest color television manufacturing company, is seeking Development Engineers for its Ottawa, Ohio facility. These candidates will be an integral part in the introduction of a new product line, as well as the improvement of existing systems. Areas of particular interest include, but are not limited to, physical and chemical processing (i.e., electron gun and phosphor dusting system development.) Limited international travel may be required.

A Bachelors Degree in Chemical or Electrical Engineering is required. Masters Degree is preferred. Candidates will also possess excellent interpersonal and communication skills, and a minimum of 5 years experience in a manufacturing environment.

Philips offers a very competitive salary and benefit package including relocation. Applicants should forward their resume and salary requirements to: Philips Display Components, 700 North Pratt Street, Ottawa, OH 45875, Attn: T. Mello, OR fax to (419) 523-3218.

Philips is an equal opportunity employer M/F/V/D/H.



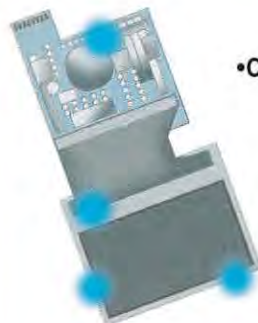
Let's make things better.

(419) 523-9255

EFOS

NOVACURE®

UV / Visible Display Bonding



- Complete control for reliable, precise, repeatable curing
- Custom light guides and optics for simultaneous tack/cure of multiple sites
- Continuous process feedback/monitoring
- ISO 9001 quality system with worldwide sales and service

- Chip-On-Glass
- Pin Attachment
- Fill Hole Sealing
- Encapsulation
- Glass-Glass Bond
- Strain Relief
- Coating
- Gasketing

EFOS Inc.

Tel: 905-821-2600

Fax: 905-821-2055

e-mail: info@efos.com

web: www.efos.com

800-668-8752

Circle no. 44

SID '00

Long Beach, California

Long Beach

Convention Center

May 14-19, 2000

Mark Your Calendar Now!

Increase EMI/RFI Protection with DURALAN II™

High Performance Windows, Lenses and Filters

- Laminated Within the Filter
- Various Conductors Available
- Abrasion Resistant Surface
- Anti-Glare Finishes
- Various Transparent Colors
- Contrast Enhancement



SILVER CLOUD
MANUFACTURING CO.
GRAPHICS AND ELECTRONICS

For additional information call 609/825-8900, FAX: 609/825-8969, or visit our Web site at: www.silver-cloud.com

Circle no. 45

sustaining members

Acer Display Technology
 Ad-Vance Magnetics, Inc.
 Advance Reproduction Corp.
 American Panel Corp.
 Applied Concepts, Inc.
 Arconium
 Artesyn Solutions, Inc.
 ATI Technologies
 autronic - Melchers GmbH
 BPS
 Brewer Science, Inc.
 Brimar Ltd.
 Canon, Inc.
 CELCO
 Cherry Electrical Products
 Chungwha Picture Tubes, Ltd.
 Clinton Electronics Corp.
 Colorado MicroDisplay, Inc.
 Coming Japan K.K.
 Crystaloid LCDs
 Display Inspection Systems
 Display Laboratories
 DisplaySearch
 Displaytech, Inc.
 DNP Denmark
 Dolch Computer Systems
 Earth Computer Technologies
 ELDEC Corp.
 Electro-Plasma, Inc.
 Emco Electronics Ltd.
 Endicott Research Group, Inc.
 ERSO/ITRI
 FED Corp.
 F-P Electronics
 Futaba Corp. R&D Center
 General Vacuum, Inc.
 Hewlett-Packard Co.
 Hitachi, Ltd.
 Hoya Corporation USA
 IBM
 Imaging & Sensing Technology
 Incom, Inc.
 Industrial Electronic Engineers, Inc.
 Infinite Graphics, Inc.
 Infodex, Inc.
 Instrument Systems
 Interface Products, Inc.
 Interserv Corp.
 Interstate Electronics Corp.
 Ise Electronics Corp.
 Kent Displays
 Lixel Imaging Systems, Inc.
 LinFinity Microelectronics, Inc.
 Lite Array, Inc.
 Micron Display Technology, Inc.
 Micronic Laser Systems
 Microvision Corp.
 Mitsubishi Electric Corp.
 Mitsubishi Electronics America
 Molex, Inc.

Motorola FPD Division
 NEC Corp.
 Nippon Seiki Co., Ltd.
 OKI Electric Industry Co., Ltd.
 Optical Coating Lab., Inc.
 Optrex America, Inc.
 Philips Flat Display Systems
 Phosphor Technology Ltd.
 Photon Dynamics
 Photo Research
 Pilkington Micronics Ltd.
 Pix Electronics, Inc.
 Planar America
 Planar Standish, Inc.
 Plasmaco, Inc.
 Polar Vision, Inc.
 Polytronix, Inc.
 Progressive System Technology
 Q.C. Optics, Inc.
 Quantum Data Inc.
 Retinal Displays, Inc.
 RF Power Products
 ROLIC Research Ltd.
 Samoff Corp.
 Schott Corp.
 Semiconductor Systems, Inc.
 Sharp Corp. - Japan
 SI Diamond Technology, Inc.
 Sony Corp. Research Center
 Stanford Resources, Inc.
 Superior MicroPowders
 Supertex, Inc.
 Symbol Technologies, Inc.
 Syntronic Instruments, Inc.
 Tamarack Scientific
 TDK Corp.
 TEAM Systems
 Techneglas, Inc.
 Teledyne Lighting & Display
 Terapixel, Inc.
 Thomas Electronics, Inc.
 Thomson Components & Tubes
 Three-Five Systems, Inc.
 Toshiba America Electronic Corp.
 Ultra Electronics Command &
 Control Systems
 ULVAC Technologies, Inc.
 Unipac Optoelectronics Corp.
 Universal Display Corp.
 Ushio America, Inc.
 Viratec Thin Films Inc.
 Vishay-Dale Electronics, Inc.
 Westaim Advanced Display
 Technology
 Westar Corp.
 White Electronic Designs, Inc.
 WINTEK Corp.
 WinTron Technologies
 XCITEK, Inc.
 XMR, Inc.

index to advertisers

Ad-Vance Magnetics.....	19	Microvision	8,78
American Polarizers.....	19	OCLI	80
autronic-Melchers	88	Optrex America	C2
Bergquist	87	Philips Display Components.....	91
BOC Coating Technology.....	79	Photo Research.....	32
Carroll Touch	78	Polar Vision.....	15
CELCO (Constantine Engineering Laboratory Company)	C4	Quantum Data	81,86
CyberTouch.....	25	Sencore.....	29
Data Modul	9,82	Silver Cloud Manufacturing.....	91
Display International.....	28	Society for Information Display	90
Displays Consulting Group.....	27	Spire Corp	88
Eagle Magnetics.....	76	Syntronic Instruments	6
EFOS	91	TDK Corp	11
ELDIM	31	Team Systems	3,15
Ergotron	28	Thin Film Devices.....	77
Kent Displays.....	30	Three-Five Systems.....	C3
Klein Instruments.....	84,87	3M Optical Strstems.....	7
Kurt J. Lesker	85	Toshiba.....	5
H. L. Funk Consulting.....	16	Unigraf	83
LCD Lighting.....	10	Video Instruments.....	19
Liquid Crystal Institute	87	Westar Corp	89
		Xyratex.....	84

Business and Editorial Offices

Palisades Institute for Research
 Services, Inc.
 411 Lafayette Street, 2nd Floor
 New York, NY 10003
 Jay Morreale, Managing Editor
 212/460-8090 x212 Fax: 212/460-5460

Sales Office

Palisades Institute for Research
 Services, Inc.
 411 Lafayette Street, 2nd Floor
 New York, NY 10003
 Tracy Leibowitz, Sales Manager
 212/460-8090 x211 Fax: 212/460-5460

The World in the Palm of Your Hand

Imagine a world where you will use your cellular phone for more than just phone calls. A world where surfing the web or checking your e-mail through your cell phone is as easy as pressing a button on your remote control. The wireless industry is rapidly developing these products and Three-Five Systems is developing the displays for them. Our LCoS™ microdisplays deliver amazing resolution in a compact portable module that will let you see the world with total clarity.

- High information - resolutions up to SXGA
- Comfortable viewing - 35 degree FOV optics
- Low impact to battery life - 60 mW power consumption
- Small, thin, lightweight - 0.5" diagonal, 0.5 ounces

For over a decade, Three-Five Systems has been a leading supplier of display solutions for the mobile phone industry and is known for innovative solutions to tough display challenges. To learn how Three-Five Systems can revolutionize your products and your business, give us a call.



THREE-FIVE SYSTEMS, INC.™
We Display Excellence

Three-Five Systems, Inc.
Tempe • 602-389-8600 Fax: 602-389-8801

Three-Five Systems Ltd.
Europe • 44-1793-549100 Fax: 44-1793-549135

Three-Five Systems, Inc.
www.threefive.com email: Display@threefive.com

Circle no. 46

SURF THE 21ST CENTURY WITH CELCO YOKES

As CELCO celebrates their 49th year providing state-of-the-art components for CRT displays, we wish to thank not only our longtime friends, but also the new pioneers in the CRT imaging industry.

We are excited to be on the leading edge of the newest technology in space, avionics, defense, medicine, scientific research, virtual reality and miniature, portable display applications.

CELCO's *newest generation* of high resolution yokes is the result of challenges to meet the needs of high performance in specialized medical imaging displays.

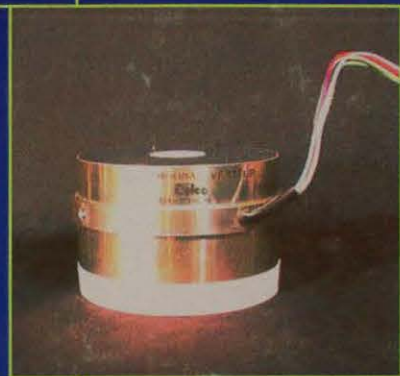
CELCO, a Charter Member of the ever-growing Society for Information Display, annually exhibits their newest products for the CRT display industry at SID.

CELCO founder and CEO, John M. Constanine, Sr., is a SID Fellow honored by the Society "for his widely recognized and significant contribution to the advancement of the display field."



Computer-wound, patented design for high resolution medical monitors

CELCO Yoke
for Naval
Shipboard Display



Left: Commercial
Head-Up
Display Yoke

Top: Flight Mgt.
Display Yoke

Bottom: F-18 Map
Display Yoke

CELCO HMA400
Deflection Yokes for
Helmet-Mounted,
Miniature and Virtual
Reality Displays



CELCO

Contact CELCO Yoke Design Engineers
with your exact display requirements.

70 Constantine Drive ♦ Mahwah, NJ 07430
Tel: 201-327-1123 ♦ Fax: 201-327-7047

E-Mail: info@celco-nj.com ♦ www.celco.com ♦ www.deflectionyoke.com