Program

SIGGRAPH '83

July 25-29, 1983
Detroit, Michigan

acm

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SIGGRAPH '83

Welcome to SIGGRAPH '83!

This is the Tenth Annual Conference on Computer Graphics and Interactive Techniques. The focus this year is on computer-aided design, manufacturing and engineering—partly because we are in Detroit, and partly because these are increasingly important application areas for computer graphics. Indeed, more than a third of the papers, panels and courses are concerned with CAD, CAM and CAE.

The scope apparent in the balance of the program, however, reflects the long-term ACM/SIGGRAPH policy that the conference present a snapshot of current activity throughout the vast breadth of research, development and applications in computer graphics. To complement the national conference, the ACM/SIGGRAPH board has been actively supporting smaller conferences and workshops. These provide an opportunity for smaller groups with a common interest to meet and discuss a specific topic.

A major ACM/SIGGRAPH goal is that the national conference be of interest to attendees with a variety of backgrounds. Thus the courses include both introductory tutorials and advanced seminars on many diverse subjects; the technical papers focus on research and innovative applications; the panel sessions treat subjects of particular current interest in a less formal way, emphasizing trends; the equipment exhibition provides an opportunity both to acquire a feeling for the vast range of graphics hardware, software and services now being marketed, and for the prospective buyer to shop comparatively amongst the major manufacturers of nearly any computer graphics product; the exhibitor forum provides an opportunity for manufacturers to present technical details of their product lines; the birds-of-a-feather meetings provide an opportunity for people with a common interest to gather and commune. The exhibition of computer art and film & video shows vividly demonstrate aesthetic use of the hardware, software, and algorithms discussed elsewhere at the conference.

Putting on a conference the size of SIGGRAPH '83 requires an immense amount of work by a large number of people. Some of their names appear on succeeding pages; it is hardly possible for us to adequately express our appreciation for the long hours they have put in, or for the uniformly cheerful spirit of cooperation they have shown.

The annual SIGGRAPH conference has grown spectacularly in 10 years. Nevertheless our objective is not growth, but quality. We hope that quality will be your overriding impression of this year's conference.

Enjoy! That's what it's all about.

John C. Beatty, Kellogg S. Booth
Conference co-chairs

SIGGRAPH: The organization

SIGGRAPH is the Association for Computing Machinery's Special Interest Group on Computer Graphics. Its 11,000 plus members share an interest in the theory, design, implementation and application of computer-generated graphics and interactive techniques to facilitate man/machine communication and understanding.

There are local SIGGRAPH groups in Boston, Chapel Hill, Chicago, Los Angeles, Philadelphia, Princeton, San Francisco and Washington, D.C. SIGGRAPH membership includes subscriptions to *Computer Graphics,* SIGGRAPH's quarterly publication, and to *SIGGRAFFITI,* a quarterly newsletter. Membership dues are $10 for ACM members and associate members, $5 for ACM student members and $25 for non-ACM members.

Requests for membership applications should be addressed to:
Association for Computing Machinery
11 West 42nd Street
New York, New York 10036
(212) 869-7440

The SIGGRAPH executive committee members are:
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Robert A. Ellis, Vice-Chair
Maxine D. Brown, Secretary
Sara A. Bly, Treasurer
James E. George, Past Chairman
Bary W. Pollack, Editor-in-Chief
Ingrid Carlbom, Director
Pat Cole, Director
Louise R. Etra, Director
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Conference committee

Conference co-chairs

John C. Beatty
University of Waterloo

Kellogg S. Booth
University of Waterloo

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Technical program (panels)
Human Computing
Resources Corporation

James Baroody
Preliminary and final programs
Xerox Corporation

Kathy Eastman-Hinrichs
Courses co-chair
Tektronix, Inc.

Hiram French
Exhibit co-chair
Megatek Corporation

John French
User groups
Exxon Production
Research Co.

Copper Giloth
Exhibition of computer art
Real Time Design, Inc.

Susan Hartwig-Hood
Exhibit co-chair
Megatek Corporation

Michael Herman
Merchandising
Dome Petroleum Limited

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National Research Council
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Conference poster
Schlumberger-Doll Research

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Registration
Summagraphics Corporation

Tim Stevenson
Courses co-chair
Graphic Software
Systems, Inc.

Peter Tanner
Technical program (papers)
National Research Council
of Canada

Jane Veeder
Audio/Visual
Independent artist

Robert Whitton
Exhibitor Forum
Whitton Associates

Technical program committee

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University of New Hampshire

Ingrid Carlbom
Schlumberger-Doll Research

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Lucasfilm Ltd.

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Intermetrics, Incorporated

Bary Pollack
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University of Utah

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National Research Council of Canada

Turner Whitted
Bell Laboratories

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Purdue University

Frank Bliss
Ford Motor Company

Maxine Brown
Digital Productions

Laura Carey
Motorola, Microsystems Division

Barbara Duncan
Tektronix, Inc.

Karen Stevenson
Schwabe, Williamson, Wyatt, Moore & Roberts

Exhibition of computer art committee

Joanne Culver
Northern Illinois University

Jessie Reid
Wise Creative Services

Exhibition of computer art jury

Joanne Culver
Northern Illinois University

Copper Giloth (chair)
Real Time Design, Inc.

David Morris
Sculptor

Jessie Reid
Wise Creative Services

Gene Youngblood
California Institute of the Arts

Film & video shows jury

Edwin Catmull
Lucasfilm Ltd.

Doris Kochanek (chair)
National Film Board of Canada

Bill Kovacs
Robert Abel and Associates

Staff

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Cynthia Neal

Audio/Visual management

Phil Morton
Video Research Consultants

Audio/Visual consultant

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Ken Gallagher
Barby Patronski
John Patronski

Exhibition management

Robert T. Kenworthy, Inc.

Hank Cronan
Kay Kenworthy
Robert Kenworthy
Barbara Voss

Graphics design

Guenther Tetz
University of Illinois—Chicago

Local arrangements

Carol Lynn
Engineering Society of Detroit

Presentation visuals (courses)

Robin King
Sheridan College

Presentation visuals (technical program)

C-2 Computer Graphics
Preparation Service
Computing Division
Los Alamos National
Laboratory

Technical program secretary

Beth Haas

Technical program reviewers

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Cornell University

Kurt Akeley
Silicon Graphics, Inc.

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Lucasfilm Ltd.

Indranil Chakravarty
Schlumberger-Doll Research

Janet Chin
TYMSHARE, Inc.

Beth Cobb
University of Utah

James Cobb
University of Utah

Elaine Cohen
University of Utah

Rob Cook
Lucasfilm Ltd.

G. Coulouris
Queen Mary College

William Cowan
National Research Council of Canada

Frank Crow
Xerox PARC

Tom Duff
Lucasfilm Ltd.

Gunter Enderle
Kernforschungszentrum Karlsruhe

Steven Feiner
Brown University

Eliot Fiebush
IKONAS Graphic Systems, Inc.

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A. Robin Forrest
University of East Anglia

Alan Francis
Computercraft Ltd.

W. R. Franklin
Rensselaer Polytechnic Institute

Henry Fuchs
University of North Carolina at Chapel Hill

Don Fussell
University of Texas at Austin

Kicha Ganapathy
Bell Laboratories

William Gordon
Drexel University

Henri Gouraud
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Xerox PARC

Satish Gupta
IBM Research Center

J. R. Gurd
University of Manchester

Samir Hanna
Cornell University

Marc Hannah
Silicon Graphics, Inc.

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University of New Hampshire

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University of Sydney

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The George Washington University

Doug Kay
Marks and Marks

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Atari Inc.

Myke Klucewicz
University of Utah

Lewie Knapp
University of Utah

Jeff Lane
Arrigoni Computer Graphics Inc.

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Turner, Lansdown, Holt and Paterson

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Phoenix Data Systems

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University of New Hampshire

Gary Meyers
Cornell University

Jim Mohan
McDonnell Douglas

Tom Moran
Xerox PARC

Henry Moreton
Schlumberger-Doll Research

Timothy Mueller
University of Utah

Bruce Naylor
Georgia Institute of Technology

Greg Nelson
Xerox PARC

Hannah Newman
Canadian Department of Communications

Kristen Overmeyer
Mechanical Dynamics

Chris Parr
University of Texas at Dallas

Theo Pavlidis
Bell Laboratories

Mary Pickett
General Motors Research Laboratories

Michael Pique
University of North Carolina at Chapel Hill

Tom Porter
Lucasfilm Ltd.

Michael Potmesil
Bell Laboratories

Lyle Ramshaw
Xerox PARC

Bill Reeves
Lucasfilm Ltd.

Aristides Requicha
University of Rochester

Craig Reynolds
Symbolics

Rocky Rhodes
Silicon Graphics, Inc.

David Rogers
CADIG

D. S. Rosenthal
University of Edinburgh

Jarek Rossignac
University of Rochester

Ramon Sarraga
General Motors Research Laboratories

Dino Schweitzer
University of Utah

Alvy Ray Smith
Lucasfilm Ltd.

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University of Utah

Francis Sullivan
National Bureau of Standards

Steven Tanimoto
University of Washington

Paul ten Hagen
Mathematisch Centrum

Spencer Thomas
University of Utah

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Godfried Toussaint
McGill University

Herb Voelcker
University of Rochester

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University of Manchester

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General Motors Research Laboratories

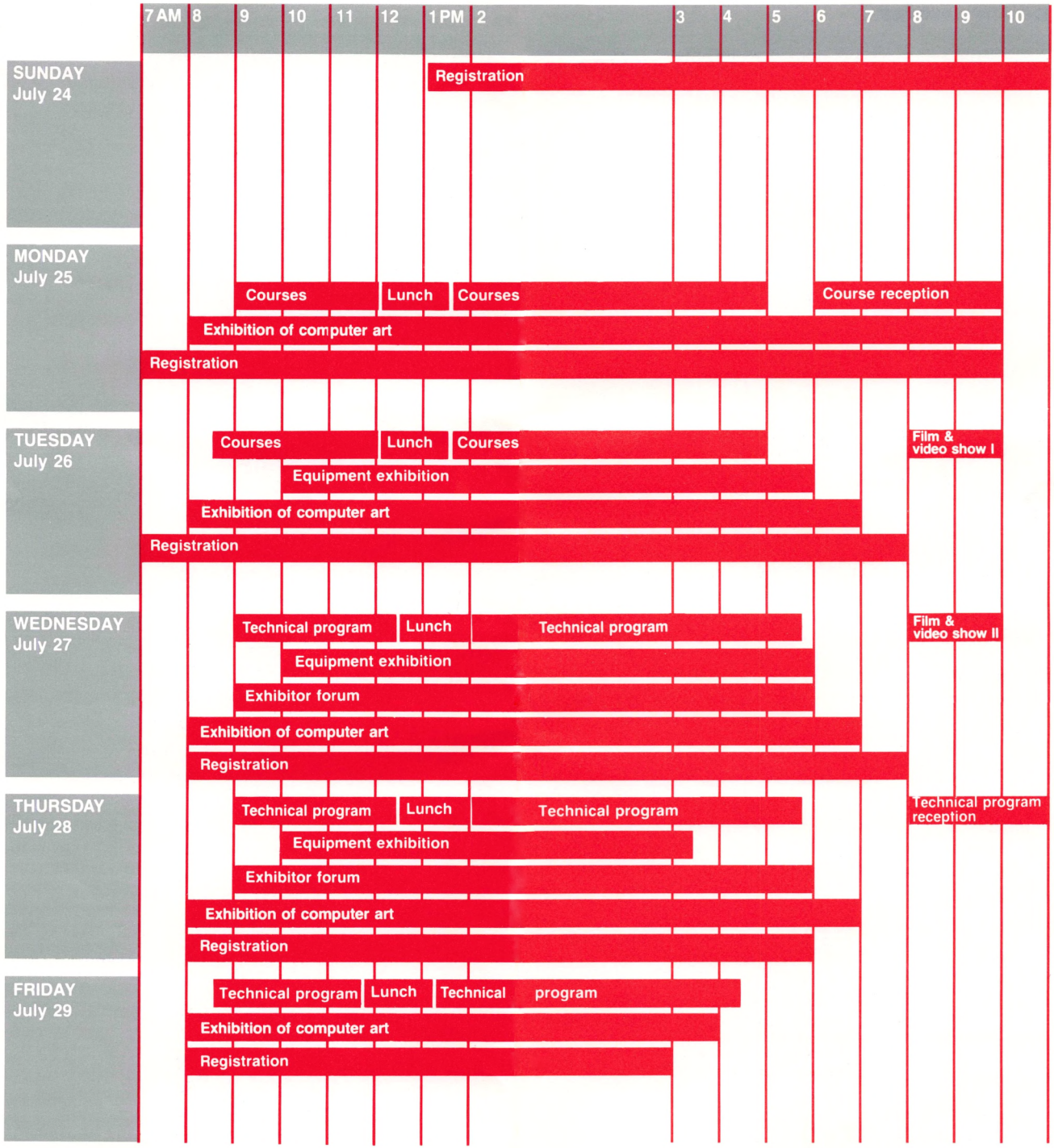
Kevin Weiler
General Electric

Michael Wesley
IBM Corporation

Lance Williams
NYIT

SIGGRAPH '83

Conference-at-a-glance



Special Events

Exhibition of computer art

The SIGGRAPH '83 exhibition of computer art will run Monday through Friday in the Cobo Hall Ballroom, room 2001-A/B, where a total of 91 works of computer-generated art will be shown. Artists and scientists will be displaying video, film, hard copy and sculpture. Frame buffer and interactive installations will also be shown. The exhibition will open daily at 8 a.m.

A color slide set, full-size poster and museum-quality art catalog are available highlighting selected works and emphasizing methods of integrating computers into the artistic process.

Birds-of-a-feather sessions

Room 3044 in Cobo Hall will be available Wednesday and Thursday for birds-of-a-feather meetings. Attendees are invited to utilize this room for informal small group discussions. A sign-up board is located in the registration area in Hall C of Cobo Hall.

Exhibition opening ceremony

A short ceremony will mark the opening of the SIGGRAPH '83 exhibition on Tuesday at 10 a.m. The ceremony will take place at the entrance to Hall C. Everyone is invited.

Film & video shows

Two different programs of the finest scientific, commercial and artistic computer-generated motion graphics are scheduled for Tuesday and Wednesday evenings. Two hours of films and videotapes selected by the film & video jury will be featured each night.

Both shows will begin at 8 p.m. in the Cobo Hall Arena. Projection equipment will include a high-intensity GE Light Valve for 3/4" and 1" digitally enhanced video with a concert quality stereo sound system, as well as high-output 35mm and 16mm film projectors.

A catalog listing of the films and videotapes shown, with technical details, will be available. Also, a film & video show poster will be available as part of the three-poster set.

SIGGRAPH executive committee meeting

The SIGGRAPH executive committee will meet Thursday from 5:45 p.m. to 8 p.m. in the Greco Room at the Westin Hotel. All ACM/SIGGRAPH members are invited to attend.

Social activities

A course reception is scheduled Monday evening in Cobo Hall A, B and C and will feature a special 6 p.m. to 8 p.m. preview of the SIGGRAPH '83 exhibition. Beef, ham and turkey carved especially for you and complemented by fruit, cheese and other goodies will be served until 10 p.m. Two complimentary drinks are included. A cash bar will also be available. (Only course registrants are invited to this event).

A technical program reception is scheduled for Thursday evening. This first-ever SIGGRAPH after-dinner reception will feature outrageous desserts, drinks and Irish coffee. The reception will begin at 8 p.m. in the Renaissance Ballroom at the Westin Hotel. Two complimentary drinks are included. A cash bar will also be available. All technical program registrants are invited.

User groups

The user groups listed below are scheduled to meet in conjunction with SIGGRAPH '83. The people indicated can be contacted after the conference.

Tuesday, July 26, 1983

AGE
1 p.m. - 5 p.m.
Cobo Hall, room 3035
Randy Covill, (617) 667-7070

UGCS
3 p.m. - 5 p.m.
Cobo Hall, room 3041
Joseph Bristow, (303) 635-5753

VIM Applications & Graphics Products Committee
6 p.m. - 9 p.m.
Cobo Hall, room 3082
Peggy Brehm, (602) 231-1502

Wednesday, July 27, 1983

Evans & Sutherland
1 p.m. - 5 p.m.
Cobo Hall, room 3036
Neil Harrington, (801) 582-5847

VEGUS
5 p.m. - 8 p.m.
Cobo Hall, room 3064
Sherry Keowen, (213) 346-3410

Thursday, July 28, 1983

Megatek Users Group (MUG)
12 p.m. - 5 p.m.
Cobo Hall, room 3036
Henrik Jonson, (619) 455-5590

Template Users Network
1 p.m. - 6 p.m.
Cobo Hall, room 3042
Fred Wefer, (619) 455-5590

MOVIE.BYU
5 p.m. - 6 p.m.
Cobo Hall, room 3035
Hank Christiansen, (801) 378-6325

DICOMED
5:30 p.m. - 8 p.m.
Cobo Hall, room 3041
Karen Erickson, (505) 844-1223

Courses

Course information

The courses will be held Monday and Tuesday at four different locations: Cobo Hall, the Westin Hotel, the Veterans Memorial Building and the Engineering Society of Detroit. Courses will begin at 9 a.m. on Monday and 8:30 a.m. on Tuesday, ending at 5 p.m. on both days.

Shuttle buses running at regular intervals will connect the conference hotels and the course locations. All buses to the Engineering Society of Detroit will depart from Cobo Hall.

Refreshments will be served during morning and afternoon breaks in areas adjacent to the course locations.

Luncheons will be served each course day in areas near the course locations. Luncheon ticket(s) are included in your registration packet.

Registration for one or more courses admits you to the exhibition, exhibitor forum, art show, and film & video shows free of charge.

Notes for your course(s) are included in your course registration. Additional copies can be purchased in the registration area in Hall C of Cobo Hall.

Courses

Courses-at-a-glance

Courses	Mon. July 25	Tues. July 26	Course Site*
General Courses			
1. Introduction to Computer Graphics (T)			CH
2. Color Perception (T)			WH
3. Introduction to Raster Graphics (T)			CH
4. Psychology of User-Computer Interfaces (T)			VMB
5. How to Design User-Computer Interfaces (T)			VMB
6. Developing Applications Using GKS (T)			ESD
Animation			
7. Introduction to Computer Animation (T)			WH
8. Introduction to TV, Film, Video and Printing (T)			CH
9. Advanced Image Synthesis (S)			ESD
10. State-of-the-Art in Image Synthesis (S)			ESD

*Key

CH	Cobo Hall
WH	Westin Hotel
VMB	Veterans Memorial Building
ESD	Engineering Society of Detroit

Courses

Courses	Mon. July 25	Tues. July 26	Course Site*
CAD/CAM/CAE			
11. Introduction to Computer-Aided Design (T)			
12. CAD Systems (T)			
13. Introduction to Solid Modeling (T)			
14. Advanced Topics in Solid Modeling (S)			
15. Freeform Surfaces (T)			
16. VLSI and Computer Graphics (S)			
17. Robotics (S)			
Graphics Applications			
18. The Artist/Designer and Computer Graphics (S)			
19. Graphics in Office Automation (S)			
20. Graphics and Data Bases (T)			
21. Distributed Graphics Systems (S)			
22. Applying Computer Graphics in Science and Engineering (T)			
23. Graphical Techniques for Exploring Data (T)			

Courses

Monday, July 25, 1983

1
Monday

Introduction to Computer Graphics
Cobo Hall — Room 2040

Chair:
Marceli Wein, National Research Council of Canada

Lecturers:
Brian A. Barsky, University of California, Berkeley, California
Kenneth B. Evans, National Research Council of Canada, Ottawa, Ontario
Alain Fournier, University of Toronto, Toronto, Ontario
Marceli Wein, National Research Council of Canada, Ottawa, Ontario

Topics: Part 1 of a two-day course
Introduction / Wein
Basic software / Evans
Calligraphic hardware / Barsky
Raster hardware / Fournier
Advanced software / Fournier

3
Monday

Introduction to Raster Graphics
Cobo Hall — Room 3037

Chair:
Donald P. Greenberg, Cornell University

Lecturers:
Ted Crane, Cornell University, Ithaca, New York
John C. Dill, Cornell University, Ithaca, New York
Donald P. Greenberg, Cornell University, Ithaca, New York
Roy A. Hall, Cornell University, Ithaca, New York
Gary W. Meyer, Cornell University, Ithaca, New York

Topics:
Introduction / Greenberg
Raster concepts / Meyer
Frame buffer architecture / Crane
Low level graphics / Dill
Raster algorithms / Greenberg
Color and color spaces / Greenberg, Meyer
Illumination models and reflection / Greenberg, Hall
Anti-aliasing and other display problems / Hall
Applications / Dill
Conclusion / Greenberg

Courses

4
Monday

Psychology of User-Computer Interfaces

Veterans Memorial Building — Ballroom

Chair:
Jack D. Grimes, ITT Programming
H. Rudy Ramsey, ITT Programming

Lecturers:
Jack D. Grimes, ITT Programming,
Stratford, Connecticut
H. Rudy Ramsey, ITT Programming,
Stratford, Connecticut

Topics:
Introduction / Grimes
Brief history of human factors / Ramsey
Requirements analysis, part I / Grimes
Requirements analysis, part II / Ramsey
Functional design / Ramsey
Dialogue design, part I / Grimes
Dialogue design, part II / Ramsey
Workstation design / Grimes
Questions and answers / Grimes, Ramsey

6
Monday

Developing Applications Using GKS

Engineering Society of Detroit — Auditorium

Chairs:
Thomas B. Clarkson III, Graphic Software
Systems, Inc.
David H. Straayer, Tektronix, Inc.

Lecturers:
Peter R. Bono, Athena Systems, Inc.,
Pawcatuck, Connecticut
Julian Gallop, Rutherford Appleton Laboratory,
United Kingdom
David H. Straayer, Tektronix, Inc.,
Wilsonville, Oregon
James Warner, Precision Visuals, Inc.,
Boulder, Colorado

Topics: Part 1 of a two-day course
Introduction / Straayer
Device-Independent concepts / Warner
Context of GKS standards / Bono
Overview of GKS: Simple output / Bono
GKS overview expanded: Refined output / Bono

7
Monday

Introduction to Computer Animation
Westin Hotel — Columbus

Chair:
Frederic I. Parke, New York Institute of Technology

Lecturers:
Bruce Doll, New York Institute of Technology, Old Westbury, New York
Patrick Hanrahan, New York Institute of Technology, Old Westbury, New York
Richard Lundin, New York Institute of Technology, Old Westbury, New York
Robert McDermott, New York Institute of Technology, Old Westbury, New York
Duane Palyka, New York Institute of Technology, Old Westbury, New York
Frederic I. Parke, New York Institute of Technology, Old Westbury, New York
Alvy Ray Smith, Lucasfilm Ltd., San Rafael, California
Garland Stern, New York Institute of Technology, Old Westbury, New York

Topics: Part 1 of a two-day course
Introduction / Parke
Introduction to computer assisted animation / McDermott
Review of splines and transformations / Smith
Scan and paint / Stern
Background painting / Palyka
Automatic inbetweening / Palyka
2-Dimensional compositing and recording / Doll
Human factors and interfacing to clients / Palyka
2-Dimensional case study: The Mouse's Ear / Palyka
Questions and answers / Parke, McDermott, Smith, Stern, Doll, Palyka

Courses

8
Monday

Introduction to TV, Film, Video and Printing

Cobo Hall — Room 3039

Chair:
Stephen R. Levine, Electronic Graphics Associates

Lecturers:
John Blunden, Lawrence Livermore National Laboratory, Livermore, California
Bruce Eric Brown, Chromatics, Inc., Orem, Utah
Stephen R. Levine, Electronic Graphics Associates, Livermore, California
John McCann, Polaroid Corporation, Cambridge, Massachusetts
Bernice Rogowitz, IBM T. J. Watson Research Center, Yorktown Heights, New York

Topics:
Introduction / Levine
The technology of video / Levine
The technology of film / Blunden
Human vision / Rogowitz
Introduction to printing as applied to computer graphics / Brown
Techniques for calculating color sensations / McCann

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Monday

Advanced Image Synthesis

Engineering Society of Detroit — Main Auditorium

Chair:
James F. Blinn, Jet Propulsion Laboratory

Lecturers:
James F. Blinn, Jet Propulsion Laboratory, Pasadena, California
Frank Crow, Xerox Palo Alto Research Center, Palo Alto, California
Turner Whitted, Bell Laboratories, Holmdel, New Jersey

Topics:
Introduction / Blinn
Anti-aliasing / Crow
Geometric calculations: Polygons and fractals / Crow
Implicit and quadric surfaces / Blinn
Parametric surfaces / Whitted
Intensity calculations: Light reflection and texture mapping / Blinn
Environment modeling and ray tracing / Whitted
Systems issues / Blinn, Crow, Whitted

11
Monday

Introduction to Computer-Aided Design

Cobo Hall — Room 3040

Chair:
Bertram Herzog, Herzog Associates, Inc.

Lecturers:
F. J. Caterina, FMC Corporation,
San Jose, California
S. H. Chasen, Lockheed Georgia Company,
Marietta, Georgia
R. M. Dunn, R. M. Dunn & Associates,
Woodbridge, Connecticut
J. Farkas, Bodine Corporation,
Bridgeport, Connecticut
R. Heilman, RAMTEK, Inc.,
Santa Clara, California
B. Herzog, Herzog Associates, Inc.,
Boulder, Colorado
R. F. Riesenfeld, University of Utah,
Salt Lake City, Utah
H. B. Voelcker, University of Rochester,
Rochester, New York

Topics:
Introductory remarks / Herzog
The functional elements of a CAD system / Heilman
Present and future uses of CAD / Dunn
How to justify a CAD system / Chasen
Developments in solid modeling / Voelcker
Developments in sculptured surface representation / Riesenfeld
User experience: Large systems / Caterina
User experience: Small systems / Farkas
Panel discussion / All speakers

13
Monday

Introduction to Solid Modeling

Westin Hotel — Cabot

Chair:
Aristides Requicha, University of Rochester
Herbert Voelcker, University of Rochester

Lecturers:
David Racklyeft, General Motors Technical Center, Warren, Michigan
Aristides Requicha, University of Rochester, Rochester, New York
Robert Tilove, General Motors Research Laboratories, Warren, Michigan
Herbert Voelcker, University of Rochester, Rochester, New York

Topics:
Fundamentals I / Voelcker
Fundamentals II / Tilove
A case study: GMSolid / Racklyeft
Survey of current research / Requicha

16 Monday

VLSI and Computer Graphics

Veterans Memorial Building — Banquet Room

Chair:
Henry Fuchs, University of North Carolina at Chapel Hill

Lecturers:
James Clark, Silicon Graphics, Inc., Mountain View, California and Stanford University, Stanford, California
Henry Fuchs, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina
John Ousterhout, University of California, Berkeley, California
Robert Sproull, Carnegie-Mellon University and Sutherland-Sproull and Associates, Pittsburgh, Pennsylvania
Neil Weste, Bell Laboratories, Holmdel, New Jersey

Topics:
Introduction / Fuchs
Graphical aspects of mask level IC design / Ousterhout
Graphical aspects of symbolic IC design / Weste
Introduction to VLSI hardware for graphics processing / Sproull
VLSI-Enhanced CAD workstations / Clark
VLSI for computer image generation / Fuchs

18 Monday

The Artist/Designer and Computer Graphics

Westin Hotel — Cartier

Chair:
Vibeke Sorensen, Virginia Commonwealth University
Zsuzsanna Molnar, Evans & Sutherland

Lecturers:
James F. Blinn, Jet Propulsion Laboratory, Pasadena, California
Joanne Culver, Northern Illinois University, DeKalb, Illinois
Tom DeWitt, Rensselaer Polytechnic Institute, Troy, New York

Frank Dietrich, West Coast University, Los Angeles, California
David Em, independent artist, Sierra Madre, California
Darcy Gerbarg, New York University School of the Arts, New York, New York
Robert McDermott, New York Institute of Technology, Old Westbury, New York
Zsuzsanna Molnar, Evans & Sutherland, Irvine, California
Vibeke Sorensen, Virginia Commonwealth University, Richmond, Virginia
Richard Taylor, MAGI Synthavision, Santa Monica, California

Topics:
Overview of computer art and design / Molnar, Sorensen
Micros in graphic design education / Sorensen
Overview of paint systems / Gerbarg
Introduction to 3-D graphics concepts / Blinn
Survey of animation systems / McDermott
Graphics programming languages / Molnar
Designing for the feature film / Taylor
The artist in the lab / Em
Interactive tools for the artist / DeWitt
Real-time animation / Dietrich
Designing video games / Culver
Art shows / Culver
Panel discussion: Access to tools (getting your own system, collaborating with commercial production houses, working in the laboratory research environment, building your own system) / All speakers

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Monday

Graphics and Data Bases

Cobo Hall — Room 2043

Chair:
Douglas B. Neal, Decision Resources Corporation

Lecturers:
Richard Heath, Central Intelligence Agency, Washington, D.C.
Douglas B. Neal, Decision Resources Corporation, Washington, D.C.
Alan Paller, AUI Data Graphics and ISSCO, Washington, D.C.
Robert Van Houten, U.S. Army Command and Control Support Agency, Washington, D.C.
Richard Wiersma, Decision Resources Corporation, Washington, D.C.

Topics:

Overview of problems, solutions and consequences of linking graphics and data bases / Neal
Approaches to linking graphics and data bases / Wiersma
Rising demands of senior managers: How linking graphics and data bases can win points for DP/MIS staff by meeting top level needs / Neal
After delivery of hardware and software: Seven steps which make the difference between having lots of users and few users / Paller
Managing graphics and data in an integrated micro-mini-mainframe environment / Wiersma
Implementing graphics and analysis systems to support financial management / Neal
TACK: Building a system which allows analysts to merge RAMIS data bases with mapping software to enable easy and sophisticated geographic analysis / Heath
The impact of graphics on the management and organization of data in command control and communications / Van Houten
New directions for graphics and data bases / Neal

23
Monday

Graphical Techniques for Exploring Data

Cobo Hall — Room 2048

Chair:

Sara A. Bly, Lawrence Livermore National Laboratory

Lecturers:

Sara A. Bly, Lawrence Livermore National Laboratory, Livermore, California
William S. Cleveland, Bell Laboratories, Murray Hill, New Jersey
Robert McGill, Bell Laboratories, Murray Hill, New Jersey
James J. Thomas, Battelle Pacific Northwest Laboratories, Richland, Washington

Topics:

Basic graphical techniques for representing data / Thomas
Scatterplots and smoothing them / Cleveland
Smoothing data in three or more dimensions / Cleveland
Additional techniques for representing multivariate data / Thomas, Bly
Hardware considerations / Thomas
Theory of graphs based on human graphical perception / McGill

Tuesday, July 26, 1983

1
Tuesday

Introduction to Computer Graphics
Cobo Hall — Room 2040

Chair:
Marceli Wein, National Research Council of Canada

Lecturers:
Brian A. Barsky, University of California, Berkeley, California
Kenneth B. Evans, National Research Council of Canada, Ottawa, Ontario
Alain Fournier, University of Toronto, Toronto, Ontario
Marceli Wein, National Research Council of Canada, Ottawa, Ontario

Topics: Part 2 of a two-day course
Input, interaction, user interface / Evans, Wein
Software packages and standards / Wein
Modeling / Barsky
Color / Fournier
Dynamics / Wein
Trends, new developments, questions / All speakers

2
Tuesday

Color Perception
Westin Hotel — Cartier

Chair:
William B. Cowan, National Research Council of Canada

Lecturers:
William B. Cowan, National Research Council of Canada, Ottawa, Ontario
Colin Ware, National Research Council of Canada, Ottawa, Ontario

Topics:
Introduction to physiology and the psychophysics of color vision / Cowan
The CIE system of color imagery; color difference formulae / Ware
CIE calibration of a color monitor / Cowan
Color appearance / Ware
Color order systems; color naming; color and attention / Cowan

5
Tuesday

How to Design User-Computer Interfaces

Veterans Memorial Building — Ballroom

Chair:
James Foley, The George Washington University

Lecturers:
James Foley, The George Washington University, Washington, D.C.
John Sibert, The George Washington University, Washington, D.C.
James J. Thomas, Battelle Pacific Northwest Laboratories, Richland, Washington

Topics:
Introduction / Foley
Methodology for designing user interfaces / Foley
Guidelines for designing user interfaces / Sibert
Draftpad — A simple user interface / Foley
Interaction tasks, techniques and devices / Foley
Visual presentation of information / Foley
Tools for implementing user interfaces / Thomas

6
Tuesday

Developing Applications Using GKS

Engineering Society of Detroit — Auditorium

Chairs:
Thomas B. Clarkson III, Graphic Software Systems, Inc.
David H. Straayer, Tektronix, Inc.

Lecturers:
Peter R. Bono, Athena Systems, Inc., Pawcatuck, Connecticut
Julian Gallop, Rutherford Appleton Laboratory, United Kingdom
David H. Straayer, Tektronix, Inc., Wilsonville, Oregon
James Warner, Precision Visuals, Inc., Boulder, Colorado

Topics: Part 2 of a two-day course
Review of previous day's session / Straayer
Advanced concepts / Gallop
Interfacing non-GKS existing applications / Straayer
Questions and answers / All speakers

7
Tuesday

Introduction to Computer Animation

Westin Hotel — Columbus

Chair:
Frederic I. Parke, New York Institute of Technology

Lecturers:
Bruce Doll, New York Institute of Technology, Old Westbury, New York
Patrick Hanrahan, New York Institute of Technology, Old Westbury, New York
Richard Lundin, New York Institute of Technology, Old Westbury, New York
Robert McDermott, New York Institute of Technology, Old Westbury, New York
Duane Palyka, New York Institute of Technology, Old Westbury, New York
Frederic I. Parke, New York Institute of Technology, Old Westbury, New York
Alvy Ray Smith, Lucasfilm Ltd., San Rafael, California
Garland Stern, New York Institute of Technology, Old Westbury, New York

Topics: Part 2 of a two-day course
Commercial production / Doll
Effects animation / Doll
3-Dimensional shape representation / Hanrahan
3-Dimensional modeling tools / Hanrahan
Animatable 3-Dimensional models / McDermott
Animation languages / Hanrahan
Interactive "key pose" animation / Stern
Sampling, filtering and anti-aliasing / Smith
3-Dimensional case studies:
Parameterized faces / Parke;
Robot animation / Lundin
Questions and answers / Doll, Hanrahan, McDermott, Stern, Smith, Parke, Lundin

10
Tuesday

State-of-the-Art in Image Synthesis

Engineering Society of Detroit — Main Auditorium

Chair:
Rodney Stock, Lucasfilm Ltd.

Lecturers:
Alan H. Barr, Raster Technologies, Inc., North Billerica, Massachusetts
James T. Kajiya, California Institute of Technology, Pasadena, California
Rodney Stock, Lucasfilm Ltd., San Rafael, California
Richard Voss, IBM T. J. Watson Research Center, Yorktown Heights, New York

Topics:
Introduction / Stock
Recent developments in solid primitives / Barr
General state-of-the-art in ray tracing / Kajiya
Flexible deformations in solid primitives / Barr
Ray tracing procedural and fractal primitives / Kajiya
State-of-the-art in animation graphics hardware / Stock
Fractal forgery / Voss

12
Tuesday

CAD Systems

Cobo Hall — Room 3040

Chair:
Bertram Herzog, Herzog Associates, Inc.

Lecturers:
J. W. Adams, McAuto, St. Louis, Missouri
Richard Caselli, Applicon, Troy, Michigan
Lawrence M. Gozzard, Computervision Corporation, Bedford, Massachusetts
T. Hall, Bausch & Lomb, Austin, Texas
Patrick Hanratty, MCS, Santa Ana, California
Charlotte Hudgin, Bruning, Itasca, Illinois
D. J. Lauer, GRAFTEK, Boulder, Colorado
John Leasia, CADLINC Incorporated, Elk Grove Village, Illinois
Stanley McMillen, Gerber Systems Technology, Inc., S. Windsor, Connecticut
Leif Rosquist, Calma Company, Santa Clara, California
Gordon K. Short, Omnitech Graphics Systems, Inc., Ottawa, Ontario
George Steinke, Intergraph Corporation, Huntsville, Alabama

Robert Thomas, Control Data Corporation, Minneapolis, Minnesota
John Trefz, Sigma Design Incorporated, Englewood, Colorado
David Weisberg, Auto-trol Corporation, Denver, Colorado
Randy Wheeler, IBM Corp., Southfield, Michigan

Topics:
McAuto / Adams
IBM / Wheeler
MCS / Hanratty
Calma / Rosquist
Sigma Design / Trefz
Bausch & Lomb / Hall
Bruning / Hudgin
Omnitech / Short
Applicon / Caselli
Auto-trol / Weisberg
Computervision / Gozzard
Intergraph / Steinke
Gerber / McMillen
GRAFTEK / Lauer
CDC / Thomas
CADLINC / Leasia
Panel discussion / All speakers

14 Tuesday

Advanced Topics in Solid Modeling

Westin Hotel — Cabot

Chair:
Aristides Requicha, University of Rochester
Herbert Voelcker, University of Rochester

Lecturers:
Donald Meagher, Phoenix Data Systems, Albany, New York
Jeanine Meyer, IBM T. J. Watson Research Center, Yorktown Heights, New York
Aristides Requicha, University of Rochester, Rochester, New York
Burkard Wordenweber, University of Cambridge, United Kingdom

Topics:
Octree representations / Meagher
Boolean operations / Requicha
Finite element meshing / Wordenweber
Robot simulation / Meyer

15
Tuesday

Freeform Surfaces

Veterans Memorial Building — Banquet Room

Chair:
Richard F. Riesenfeld, University of Utah

Lecturers:
Elaine Cohen, University of Utah, Salt Lake City, Utah
A. Robin Forrest, University of East Anglia, United Kingdom
Ronald N. Goldman, Control Data Corp., Minneapolis, Minnesota
William J. Gordon, Drexel University, Philadelphia, Pennsylvania
Richard F. Riesenfeld, University of Utah, Salt Lake City, Utah

Topics:
Introduction to freeform curves and surfaces / Riesenfeld
Computing freeform curves and surfaces / Cohen
Operator calculus for sculptured surface interpolation / Gordon
An intuitive approach to Bezier and other random curves and surfaces / Goldman
User interfaces for freeform surface design / Forrest

17
Tuesday

Robotics

Cobo Hall — Room 3039

Chair:
Philippe Villers, AUTOMATIX, Inc.

Lecturers:
Jack Bradt, SI Handling Systems, Inc., Easton, Pennsylvania
Arnold Reinhold, AUTOMATIX, Inc., Billerica, Massachusetts
Gordon VanderBrug, AUTOMATIX, Inc., Billerica, Massachusetts
Philippe Villers, AUTOMATIX, Inc., Billerica, Massachusetts

Topics:
The role of robotics and artificial vision in industry today / Villers
Simple robotic applications using "dumb robots" / Villers
Advanced vision sensors for inspection and robots / Reinhold

Intelligent robotic systems: Arc welding and assembly / VanderBrug
Material handling and transport systems for robot equipment: Flexible manufacturing systems / Bradt
Cost justification of robotics systems / Reinhold

19 Tuesday

Graphics in Office Automation

Cobo Hall — Room 2048

Chair:
Amy D. Wohl, Advanced Office Concepts Corporation

Lecturers:
John Gilmour, Landart Systems, New York, New York
Howard L. Morgan, Advanced Office Concepts Corporation, Bala Cynwyd, Pennsylvania
John A. Murphy, Advanced Office Concepts Corporation, Bala Cynwyd, Pennsylvania
Alan Paller, AUI Data Graphics and ISSCO, Washington, D.C.
Amy D. Wohl, Advanced Office Concepts Corporation, Bala Cynwyd, Pennsylvania

Topics:
Office automation: An overview / Wohl
Graphics and decision support systems / Morgan
Electronic publishing / Gilmour, Murphy
The GM board room — integrating word processing with 35mm slide making / Paller

21 Tuesday

Distributed Graphics Systems

Cobo Hall — Room 2043

Chair:
Robert M. Dunn, R. M. Dunn & Associates

Lecturers:
D. H. Davidson, Jr., ICONIX, Cupertino, California
Robert M. Dunn, R. M. Dunn & Associates, Woodbridge, Connecticut
David Grabel, Lexidata Corporation, Billerica, Massachusetts
Griffith Hamlin, Los Alamos National Laboratory, Los Alamos, New Mexico
Donald Meagher, Phoenix Data Systems, Albany, New York

Topics:
Architectural issues in distributed graphics systems / Dunn
Survey of a range of graphical workstations / Hamlin
Transformations and operations in a distributed graphics system / Meagher
Data requirements for distributed graphics systems / Grabel
Data driven distributed graphics systems / Davidson
Panel discussion / All speakers

22 Tuesday

Applying Computer Graphics in Science and Engineering

Cobo Hall — Room 3037

Chair:
David J. Kasik, Boeing Computer Services

Lecturers:
Jeremy Jaech, Boeing Computer Services, Seattle, Washington
David J. Kasik, Boeing Computer Services, Seattle, Washington
Rik Littlefield, Battelle Pacific Northwest Laboratories, Richland, Washington

Topics:
An architecture for graphics application development / Kasik
Using graphics in large-scale applications / Jaech
Using graphics in specialized applications / Littlefield
An application-oriented guide to the exhibits / Kasik

Technical program

Technical program information

The SIGGRAPH '83 technical program will be held Wednesday through Friday. Thirty-four papers will be presented during 11 sessions. Informal in-depth coverage of selected topics will be provided by panel sessions running in parallel with the technical papers.

All technical paper presentations will be given in the Cobo Hall Arena. All panel sessions will be held in Hall A of Cobo Hall.

Refreshments will be served during morning and afternoon breaks in areas adjacent to the sessions.

Each technical program registrant receives one copy of the SIGGRAPH '83 proceedings. Admission to the exhibition, exhibitor forum, art show, and film & video shows is included.

Wednesday, July 27, 1983

9:00-10:30 Wednesday

Image Generation I

Chair:
Ed Catmull, Lucasfilm, Ltd.

Pyramidal Parametrics
Lance Williams, New York Institute of Technology

Lighting Controls for Synthetic Images
David R. Warn, General Motors Research Laboratories

Artificial Texturing: An Aid To Surface Visualization
Dino Schweitzer, University of Utah

9:00-10:30 Wednesday

Panel: Computer Graphics in Higher Education

Four curricula which integrate computer graphics into the educational process will be described, and a representative of SIGGRAPH will describe plans and progress towards forming an education committee.

Chair:
James D. Foley, The George Washington University

Panelists:
Al Bork, University of California-Irvine
Maxine Brown, Digital Productions
Robin King, Sheridan College
Andries van Dam, Brown University
Mike Wozny, Rensselaer Polytechnic Institute

10:45-12:15
Wednesday

User Interface

Chair:
Daniel Bergeron, University of New Hampshire

Towards A Comprehensive User Interface Management System
W. Buxton, M.R. Lamb, D. Sherman, K.C. Smith, University of Toronto

SYNGRAPH: A Graphic User Interface Generator
Dan R. Olsen, Jr., Elizabeth P. Dempsey, Arizona State University

A Graphics Editor for Benesh Movement Notation
Baldev Singh, Schlumberger-Doll Research; John C. Beatty, Kellogg S. Booth, Rhonda Ryman, University of Waterloo

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10:45-12:15
Wednesday

Panel: Advances in New Display Technology

The state of the art in new display technologies such as electroluminescence, AC and DC gas discharge displays, liquid crystal displays and electrochromics will be discussed. New CRT developments such as the flat tube will also be considered. Future trends in this area will be emphasized.

Chair:
Sol Sherr, Westland Electronics, Ltd.

Panelists:
Ifay Chang, IBM Corporation
Thomas Maloney, PanelVision
Peter Pleshko, IBM Corporation
Elliot Schlam, Eradcom
Peter Seats, Thomas Electronics Inc.

2:00-3:30
Wednesday

Welcoming Session

SIGGRAPH '83 Welcome
John C. Beatty, Kellogg S. Booth

SIGGRAPH Report
Thomas DeFanti

A tour of the SIGGRAPH '83
Audio/Visual System
Jane Veeder, Phil Morton

1983 SIGGRAPH Awards
Jon Meads

Steven A. Coons Award
Ivan E. Sutherland

Computer Graphics Achievement Award
James F. Blinn

3:45-5:30
Wednesday

Raster Algorithms

Chair:
Alain Fournier, University of Toronto

Near Real-Time Shaded Display of Rigid Objects
Henry Fuchs, Gregory D. Abram, Eric D. Grant, University of North Carolina at Chapel Hill

A Scan-line Hidden Surface Removal Procedure for Constructive Solid Geometry
Peter R. Atherton, General Electric Company

Ray Tracing Algebraic Surfaces
Patrick Hanrahan, University of Wisconsin-Madison

New Techniques for Ray Tracing Procedurally Defined Objects
James T. Kajiya, California Institute of Technology

3:45-5:45
Wednesday

Panel: Technical Implications of Proposed Graphics Standards

The panelists in this session will summarize recent technical developments in the efforts to standardize computer graphics. Several alternative approaches to 3-D standards will be presented and contrasted. The Virtual Device Metafile will also be discussed, as will a proposed binding of the GKS standard to FORTRAN.

Chair:
David Straayer, Tektronix, Inc.

Panelists:
Peter Bono, Athena Systems, Inc.
Richard Ehlers, Evans & Sutherland Computer Corp.
Gunter Enderle, Karlsruhe Nuclear Research Centre
Theodore Reed, Los Alamos National Laboratory
David Shuey, McDonnell Douglas Automation
Mark Skall, National Bureau of Standards
Elaine Sonderegger, SIGGRAPH
Tom Wright, ISSCO

Thursday, July 28, 1983

9:00-10:30
Thursday

Applications

Chair:
Herbert Freeman, Rensselaer Polytechnic Institute

Computer Graphic Modeling of American Sign Language
Jeffrey Loomis, Howard Poizner, Ursula Bellugi, Alynn Blakemore, The Salk Institute of Biological Studies; John Hollerbach, Massachusetts Institute of Technology

Incense: A System for Displaying Data Structures
Brad A. Myers, Xerox Palo Alto Research Center

Graphical Style—Towards High Quality Illustrations
Richard J. Beach, University of Waterloo, Maureen Stone, Xerox Palo Alto Research Center

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9:00-10:30
Thursday

Panel: The Simulation of Natural Phenomena

Natural phenomena such as smoke, clouds and fire generally involve complex databases and are time variant. Realistic portrayals typically require large amounts of storage and computation time. This panel will discuss the issues and problems associated with the simulation of these phenomena.

Chair:
Charles A. Csuri, Ohio State University

Panelists:
James Blinn, Jet Propulsion Laboratory
Julian Gomez, Ohio State University
Nelson Max, Lawrence Livermore National Laboratory
William Reeves, Lucasfilm Ltd.

10:45-12:15
Thursday

Anti-Aliasing Techniques

Chair:
Jim Clark, Stanford University

A Parallel Scan Conversion Algorithm with Anti-Aliasing for a General-Purpose Ultracomputer
Eugene Fiume, Alain Fournier, University of Toronto; Larry Rudolph, Carnegie-Mellon University

Anti-Aliased Line Drawing Using Brush Extrusion
Turner Whitted, Bell Laboratories

Edge Inference with Application to Antialiasing
Jules Bloomenthal, New York Institute of Technology

10:45-12:15
Thursday

Panel: Solid Modeling

Many techniques are now available for generating, storing, analyzing and manipulating computer models of solid objects. This panel will discuss the advantages, disadvantages, uses, abuses and suitability of these techniques.

Chair:
Ronald N. Goldman, Control Data Corporation

Panelists:
David Gossard, Massachusetts Institute of Technology
Richard Riesenfeld, University of Utah
Herbert Voelcker, University of Rochester
Tony Woo, University of Michigan

2:00-3:30 Thursday

Systems and Standards

Chair:
Robert Hopgood, Rutherford-Appleton Research Labs

A Device-Independent Network Graphics System
Deborah U. Cahn, Albert C. Yen, Lawrence Berkeley Laboratory

A Core Graphics Environment for Teletext Simulations
Douglas F. Dixon, RCA/David Sarnoff Research Center

Minimal GKS
Randall W. Simons, Sandia National Laboratories

Panel: Japanese Computer Graphics: Challenges and Opportunities

Panel coordinator:
Laurin Herr, Pacific Interface

These sessions will acquaint the audience with some of the key trends in Japanese computer graphics, focusing on the areas of hardware manufacturing and commercial production which appear to hold the greatest potential challenge and opportunity for the international computer graphics community.

2:00-3:30 Thursday

Part I: Computer Graphics in the World of Japanese Commercial Production for Art, Entertainment and Advertising

This panel will present an overview of the world of Japanese commercial production, discussing the present and future utilization of computer graphics for art, entertainment and advertising in Japan. The current state of Japanese production facilities, the developing use of computer graphics by artists, and research in special purpose computer graphics animation and production systems will be discussed.

Chair:
Laurin Herr, Pacific Interface

Panelists:
Akira Amano, freelance writer
Madoka Katou, Dentsu, Inc.
Yoichiro Kawaguchi, Nippon Electronics College
Kouichi Omura, Osaka University

3:45-5:15
Thursday

Shape Representation

Chair:
Richard Riesenfeld, University of Utah

Local Control of Bias and Tension in Beta-splines
Brian A. Barsky, University of California at Berkeley; John C. Beatty, University of Waterloo

Topologically Reliable Display of Algebraic Curves
Dennis S. Arnon, Purdue University

Curve-fitting With Piecewise Parametric Cubics
Michael Plass, Maureen Stone, Xerox Palo Alto Research Center

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Panel: Japanese Computer Graphics: Challenges and Opportunities

Panel coordinator:
Laurin Herr, Pacific Interface

These sessions will acquaint the audience with some of the key trends in Japanese computer graphics, focusing on the areas of hardware manufacturing and commercial production which appear to hold the greatest potential challenge and opportunity for the international computer graphics community.

3:45-5:45
Thursday

Part II: Industrial Strategies of Japanese Computer Graphics Manufacturers

This panel will examine different views of the world computer graphics market held by several leading Japanese computer graphics manufacturers. Current and projected product lines will be outlined and various technical development strategies of the companies represented will be discussed.

Chair:
Tosiyasu Kunii, University of Tokyo

Panelists:
Tsuneo Ikedo, Seillac Company Ltd.
Kazukiyo Ishimura, Yamaha Research Institute
Kansei Iwata, Graphica Computer Corp.
Katsutomo Kishimoto, Daikin Industries Ltd.
Kazuo Naito, Daini Seikosha
Shohei Saimi, Japan Radio Corp.

Friday, July 29, 1983

8:30-10:00
Friday

Geometric Input Techniques

Chair:
Ingrid Carlbom, Schlumberger-Doll Research

Solid Model Input Through Orthographic Views
Hiroshi Sakurai, Nissan Motor Company; David C. Gossard, Massachusetts Institute of Technology

Spatial Input/Display Correspondence in a Stereoscopic Computer Graphic Work Station
Chris Schmandt, Massachusetts Institute of Technology

Three-Dimensional Computer Graphics for Craniofacial Surgical Planning and Evaluation
Michael W. Vannier, Mallinckrodt Institute, Washington University; Jeffrey L. Marsh, St. Louis Children's Hospital, Washington University; James O. Warren, McDonnell Douglas Aircraft Company

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8:30-10:00
Friday

Panel: Computer Graphics and Visual Designers

What do designers and visual communicators require from workstations? The speakers in this panel will address this question, critiquing current systems and offering their views about where research could be directed in the next five years to produce truly useful and effective workstations for designers. Industrial, graphics and architectural design aspects will be highlighted in this session.

Chair:
Aaron Marcus, Aaron Marcus and Associates

Panelists:
Del Coates, design consultant
William Mitchell, CAD Design Group

10:15-11:45
Friday

Solid Modeling

Chair:
John Dill, Cornell University

Localized Set Operations for Solid Modeling
Martti Mäntylä, Markku Tamminen, Helsinki University of Technology

Design of Solids with Free-Form Surfaces
Hiroaki Chiyokura, Fumihiko Kimura, University of Tokyo

Geometric Modelling and Display Primitives Towards Specialised Hardware
Adrian L. Thomas, University of Durham

10:45-11:45
Friday

Panel: Artists Interfacing with Technology: Basic Concepts of Digital Creation

The discussion will focus on artists' interactions with computerized tools. As artists' concepts and goals are quite different from those of computer scientists or other users of graphics systems, they have a unique contribution to make to computer graphics.

Chair:
Frank Dietrich, West Coast University

Panelists:
Larry Cuba, independent artist
Darcy Gerbarg, New York University
Andrew Lippman, Massachusetts Institute of Technology
Dan Sandin, University of Illinois-Chicago

1:15-2:45
Friday

Raster Techniques

Chair:
Maureen Stone, Xerox Palo Alto Research Center

An Inexpensive Scheme for Calibration of a Colour Monitor in Terms of CIE Standard Coordinates
William Cowan, National Research Council of Canada

Interactive Image Query System Using Progressive Transmission
Francis S. Hill, Jr., University of Massachusetts; Sheldon Walker, Jr., University of Maine; Fuwen Gao, Beijing Normal University

Graphics in Overlapping Bitmap Layers
Robert Pike, Bell Laboratories

1:15-2:45
Friday

Panel: Solid Modeling: A User Perspective

This panel will consist primarily of users of solid modeling systems. Participants will discuss topics of interest to potential users as well as developers of geometric modeling systems. These topics will include user interface questions and domains of applicability, as well as the integration of systems into real production environments.

Chair:
Frank W. Bliss, Ford Motor Company

Panelists:
Carl Machover, Machover Associates
Donald Witte, Bendix
Carl Vogel, General Motors Corporation

3:00-4:30
Friday

Image Generation II

Chair:
Turner Whitted, Bell Laboratories

Particle Systems—A Technique for Modeling a Class of Fuzzy Objects
William T. Reeves, Lucasfilm Ltd.

Temporal Anti-Aliasing in Computer Generated Animation
Jonathan Korein, Norman Badler, University of Pennsylvania

Modeling Motion Blur in Computer Generated Images
Michael Potmesil, Bell Laboratories;
Indranil Chakravarty, Schlumberger-Doll Research

3:00-4:30
Friday

Panel: Ramifications of CAD/CAM on the Automotive Supplier Community

Efforts by parts manufacturers to use computer graphics data provided by the automotive firms have had varying degrees of technical and economic success. This new interaction has generated a number of issues which the panel will discuss. These issues include standards, compatibility and economic justification.

Chair:
Wayne Hamann, Ford Motor Company

Panelists:
W. Frankish, Engineering Service, Inc.
M. Glowacz, Revere Mold
T. E. Kelble, Dana Corporation
M. J. Linsell, Ford Motor Company
G. A. MacAlpine, Time Engineering
J. F. Yevitch, General Motors Corporation

Exhibitor forum

Exhibitor forum

Exhibitor forum information

The Wednesday and Thursday exhibitor forum consists of presentations by exhibitors. Concurrent sessions will be held in the areas of future applications, hardware trends, business graphics and CAD/CAM/CAE applications according to the schedule below. Check the kiosk in the registration area in Hall C of Cobo Hall for any additions to this schedule!

Exhibitor forum

Wednesday, July 27, 1983

Business graphics
Cobo Hall — Room 3040

9:00-9:30	ImagiTex, Inc. Larry Hummel
9:30-10:00	Dicomed Corporation James V. Kubiak
10:00-10:30	ImagiTex, Inc. Larry Hummel
10:30-11:00	ISSCO Larry Dusseau
11:00-11:30	Data Type, Inc. Avery Blake
11:30-12:00	Precision Visuals, Inc. John Thompson
1:30-2:00	Micro-Term, Inc. Rick Margerison
2:00-2:30	Superset, Inc. Shelly Liebman
4:30-5:00	Apple Computer, Inc. Steven MacKay

CAD/CAM/CAE
Cobo Hall — Room 3039

9:00-9:30	Data Design Logic Systems, Inc. J. Newland
9:30-10:00	Datacopy Corporation Michael H. Rehmus
10:00-10:30	Wicat Systems Glenn Stewart
10:30-11:00	ARTEL Communications Corporation Richard A. Cerny
11:00-11:30	Metheus Corporation Terry Smith
11:30-12:00	Symbolics, Inc. T. McMahon

Exhibitor forum

12:00-12:30	Inmos Corporation Pete Wilson
1:00-1:30	Versatec Alan Dawes
1:30-2:00	Tektronix, Inc. Will Gallant
2:00-2:30	J. S. Staedtler, Inc./MARS CAD Division Hermann Hahn
2:30-3:00	Aydin Controls Ron Schlie
3:00-3:30	Superset, Inc. Jerry Donaldson
3:30-4:00	Summagraphics Corporation Frank Garvey, Irwin Scarano, Dave Graft
4:00-4:30	Orcatech, Inc. John Chatterley

Future applications
Cobo Hall — Room 3038

9:00-9:30	Inmos Corporation Pete Wilson
9:30-10:00	ImagiTex, Inc. D. Tuft
10:00-10:30	Dicomed Corporation John E. Grimaldi
10:30-11:00	Photonics Technology, Inc. Donald K. Wedding
11:00-11:30	ImagiTex, Inc. D. Tuft
11:30-12:00	International Imaging Systems John North
12:00-12:30	Symbolics, Inc. Abraham Hirsch
1:30-2:00	Datacopy Corporation Michael H. Rehmus
2:00-2:30	Picture Element Limited John Nickolls

2:30-3:30	Apple Computer, Inc. Panel

Hardware trends
Cobo Hall — Room 3037

9:00-9:30	Sun Microsystems, Inc. Jay Puri
9:30-10:00	Altek Corporation Lowell Nerenberg
10:00-10:30	Ridge Computers Hugh Martin
10:30-11:00	Picture Element Limited Michael Ogrinc
11:00-11:30	Inmos Corporation Ron Sartore
11:30-12:00	Wicat Systems Alistair Cockburn
12:00-12:30	Metheus Corporation Gary Romans
12:30-1:00	Vermont Microsystems, Inc. James D. Richards, III
1:00-1:30	Data Type, Inc. Avery Blake
1:30-2:00	Envision George Van Gehr
2:00-2:30	Gould/DeAnza Imaging Systems Division Mike Battaglia
2:30-3:00	Omni Graphics Corporation Anthony G. Masraff
3:00-3:30	Photonics Technology, Inc. Donald K. Wedding
3:30-4:30	Apple Computer, Inc. Bruce Daniels
4:30-5:00	Imaging Technology, Inc. Gary MacDonald
5:00-5:30	Adage, Inc. Nick England
5:30-6:00	Jupiter Systems, Inc. Peter Harris

Exhibitor forum

Thursday, July 28, 1983

Business graphics
Cobo Hall — Room 3040

9:00-9:30	ImagiTex, Inc. Larry Hummel
9:30-10:00	Dicomed Corporation James V. Kubiak
10:00-10:30	ImagiTex, Inc. Larry Hummel
10:30-11:00	ISSCO Larry Dusseau
11:00-11:30	Data Type, Inc. Avery Blake
11:30-12:00	Apple Computer, Inc. Steven MacKay
2:00-2:30	Superset, Inc. Shelly Liebman
3:00-3:30	Ann Arbor Terminals, Inc. Gary DeLuca

CAD/CAM/CAE
Cobo Hall — Room 3039

9:00-9:30	Data Design Logic Systems, Inc. J. Newland
9:30-10:00	Datacopy Corporation Michael Rehmus
10:00-10:30	Wicat Systems Glenn Stewart
10:30-11:00	Selanar Corporation Lee Ambrosini
11:00-11:30	Tektronix, Inc. Will Gallant
11:30-12:00	Symbolics, Inc. T. McMahon
12:00-12:30	Inmos Corporation Pete Wilson

Exhibitor forum

1:00-1:30	Versatec Alan Dawes
1:30-2:00	Intelligent Software Systems Alan C. Morse
2:00-2:30	J. S. Staedtler, Inc./MARS CAD Division Hermann Hahn
2:30-3:00	Aydin Controls Ron Schlie
3:00-3:30	Superset, Inc. Jerry Donaldson

Future applications
Cobo Hall — Room 3038

9:00-9:30	Dicomed Corporation John E. Grimaldi
9:30-10:00	ImagiTex, Inc. Dick Tuft
10:00-10:30	Selanar Corporation Lee Ambrosini
10:30-11:00	Picture Element Limited John Nickolls
11:00-11:30	ImagiTex, Inc. Dick Tuft
11:30-12:00	Photonics Technology, Inc. Donald K. Wedding
12:00-12:30	Symbolics, Inc. Abraham Hirsch
12:30-1:00	Inmos Corporation Pete Wilson
1:00-1:30	International Imaging Systems John North
1:30-2:00	Datacopy Corporation Michael Rehmus
2:00-2:30	Precision Visuals, Inc. Doug Walton

Exhibitor forum

Hardware Trends
Cobo Hall — Room 3037

9:00-9:30	Altek Corporation Lowell Nerenberg
9:30-10:00	ARTEL Communications Corporation Richard Cerny
10:00-10:30	Omni Graphics Corporation Anthony Masraff
10:30-11:00	Megatek Corporation Jeff Wolking
11:00-11:30	Inmos Corporation Ron Sartore
11:30-12:00	Wicat Systems Alistair Cockburn
12:00-12:30	Metheus Corporation Gary Romans
12:30-1:00	Adage, Inc. Nick England
1:00-1:30	Gould/DeAnza Imaging & Graphics Division Mike Battaglia
1:30-2:00	Envision George Van Gehr
2:00-2:30	Data Type, Inc. Avery Blake
2:30-3:00	Picture Element Limited Michael Ogrinc
3:00-3:30	Photonics Technology, Inc. Donald K. Wedding
3:30-4:00	Sun Microsystems, Inc. Beau James
4:00-4:30	Vermont Microsystems, Inc. James D. Richards, III
4:30-5:00	Imaging Technology, Inc. Gary MacDonald
5:00-5:30	Superset, Inc. Ian Hirschsohn
5:30-6:00	Summagraphics Corporation Gerry Matthews

Exhibition

Exhibition Information

Exhibition hours

Tuesday, July 26	10 a.m. - 6 p.m.
Wednesday, July 27	10 a.m. - 6 p.m.
Thursday, July 28	10 a.m. - 3:30 p.m.

The exhibition, which features 185* internationally renowned suppliers to the computer graphics industry, will include the very latest in products and services in this largest of SIGGRAPH exhibitions since the inception of these annual computer graphics conferences and exhibitions.

The exhibition has demonstrated explosive growth from an initial 10 booths and 3,000 square feet in Philadelphia in 1976 to this record setting 1983 edition with 185* exhibitors occupying 200,000 square feet of exhibit space in Detroit's Cobo Hall.

This extraordinary support from the supplier community attests to the vitality of the industry.

*Exhibitors added to the roster after June 1 are included in the addendum to the program.

Booth 817 **Adage, Inc.**

One Fortune Drive
Billerica, Massachusetts 01821
(617) 667-7070
Frederick Shirk
Vice President, Marketing

User Group Contact:
Randy Covill
Product Manager

Adage, Inc. will be exhibiting high-performance, interactive Adage 3000 color raster display systems that are used for computer graphics and image processing applications.

These Adage color raster systems are configured from a series of standard modules that provide:

- High Performance Hardware — microprogrammable 200 nsec 32-bit processor, 3-D transformation hardware, real-time vector generation, fast and flexible look-up memories.
- Large Image Memories — frame buffers ($512^2 \times 8$ up to $2048^2 \times 24$ standard).
- Flexible Display — pan, scroll, zoom, full window and viewport control, variable frame and line rate.

Booth 1435 **Addison-Wesley Publishing Company, Inc**

1 Jacob Way
Reading, Massachusetts 01867
(617) 944-3700
October Graham
Product Manager

Addison-Wesley will feature outstanding professional resource books, including new books on ADA, the UNIX System, Smalltalk—80, operating systems, systems analysis and design, data structures, logic design and computer organization, and error control codes . . . as well as its best selling book on interactive computer graphics.

Booth 1139 **Advanced Color Technology, Inc.**

21 Alpha Road
Chelmsford, Massachusetts 01824
(617) 256-1222
John M. McIntyre
Product/Marketing Manager

Advanced Color Technology will be exhibiting the ACT-1 Color Ink Jet Printer, interfaced to various raster graphic terminals via a video interface and 8-bit parallel port. Advanced Color Technology will be introducing the new ACT-II High Resolution Color Graphics Ink Jet Printer, ACT's new direct overhead transparency printing capability and new interfacing capability.

Booth 917 **Advanced Electronics Design, Inc.**

440 Potrero Avenue
Sunnyvale, California 94086
(408) 733-3555
Stan Coffee
Vice President Marketing/Sales

User Group Contact:
Robin Ratajczak
Marketing Communications Manager

Advanced Electronics Design (AED), manufacturer of a spectrum of high-performance low-cost color graphics terminals will be debuting the new AED1024 Color Terminal, in addition to their standard AED512, 767 and AEDS11 systems. The AED1024 features viewable resolution of 1024 × 768 within its virtual address space of 1024 × 1024 × 8. A total of 256 simultaneous colors are displayable from a palette of 16.8 million. This feature makes the 1024 well suited for CAD/CAM and graphic arts. AED will be displaying additional enhancements to their current product line.

Booth 471 **ALTEK Corporation**

2150 Industrial Parkway
Silver Spring, Maryland 20904
(301) 622-3906
Lowell Nerenberg
Director of Sales and Marketing

User Group Contact:
Maxine T. Brand
Marketing Communications Manager

ALTEK will be introducing three new products along with their high accuracy DATATAB® backlit and opaque graphic digitizers. The DATATAB free cursor digitizers have resolution/repeatability of .001", accuracies of ±.010", ±.005" or ±.003". Sizes range up to 42" × 130". The Rear Projection DATATAB, with its unique fine wire grid (.004" diameter bonded to glass), is used for projecting images from behind and onto the table's special surface. The revolutionary APACHE™ Electro-Optically Aided Cursor can be near a line (within .1") and it will automatically correct digitizing errors made by an operator. SUPER-DISK II is a new, low cost, stand-alone digitizing/editing workstation with real-time graphic display.

Booth 127

AMF Logic Sciences, Inc.

10535 Rockley Road, Suite 103
Houston, Texas 77099
(713) 879-0536
Roger Fuller
Vice President of Marketing

User Group Contact:
John Barugh
Vice President of Engineering

AMF Logic Sciences, Inc. is a leading manufacturer of high speed raster generators and stand-alone plotting systems requiring high speed raster generation. AMF Logic Sciences, Inc. will exhibit the new Remgraph III Color Graphics/Seismic Interactive Work Station featuring the HSR-11B High Speed Raster Generator and Ultra-High Resolution Color CRT.

Booth 943

Analog Technology Corporation

15859 E. Edna Place
Irwindale, California 91706
(213) 960-4004
James L. Lawrence, Jr.
President

User Group Contact:
David L. Raymond
Vice President

ATC's new Model 200 printer-controller enables the Texas Instruments 810 RO matrix impact printer to emulate the Tektronix 4010 series

graphics terminal by means of a direct vector-to-raster conversion in the controller's 250K byte memory. In addition to compatibility with software such as Tektronix Plot 10, ISSCO DISSPLA and TELLAGRAF, simple commands allow the user to trade off plot size and resolution against plot speed. ATC's raster graphic and forms, barcode and label printing controllers will also be demonstrated.

Booth 1206 **The Anderson Report**

4505 E. Industrial Street 2-J
Simi Valley, California 93063
(805) 581-1184
Ken Anderson
Publisher

The Anderson Report is a monthly newsletter edited exclusively for the computer graphics industry. Each issue features current news of the industry, information about new products, orders and installations, people and places, and a calendar section. Every issue also includes a special Inside Report on a major computer graphics vendor. This report is a comprehensive analysis of the company, its products and market position.

Booth 1343 **Ann Arbor Terminals**

6175 Jackson Road
Ann Arbor, Michigan 48103
(313) 663-8000
Gary DeLuca
National Sales Manager

Booth 961 **Apollo Computer, Inc.**

15 Elizabeth Drive
Chelmsford, Massachusetts 01824
(617) 256-6600
John Bowne
Product Marketing Manager

User Group Contact:
Mary E. Allard
Advertising/Sales Promotion Manager

Apollo Computer, Inc. will exhibit its DOMAIN processing systems — the DN300 Desktop Mainframe, DN420 computational node, and DN600 color computational node — dedicated

32-bit general purpose computers connected in a high-speed local area network which provides transparent access to data, resources and programs through a network-wide virtual memory operating system.

Apollo systems are currently used in applications such as computer-aided design (CAD), engineering (CAE) and software engineering (CASE), and computer science research and scientific problem solving.

Booth 335 **Apple Computer**

20525 Mariani Avenue
Cupertino, California 95014
(408) 996-1010
Sydne Chanteloup

Apple Computer's exciting personal computers — Lisa, Apple III, and Apple IIe — offer the widest range of solutions on the market. See powerful, versatile systems for business, education, and home. Many new software and data communication products.

Booth 1105 **ARTEL Communications Corporation**

93 Grand Street, P.O. Box 100,
West Side Station
Worcester, Massachusetts 01602
(617) 752-5690
Nancy Krakora
Public Relations

Fiber optic communication systems to replace coaxial and wire cabling in remoting computer graphics workstations in CAD/CAM, process control, imaging and other applications. Artel's family of fiber optic graphics interface systems extend processor-to-workstation separation up to 100 times farther than possible with ordinary coaxial cable, while eliminating electromagnetic interference, lightning and grounding problems, increasing communications security and decreasing conduit congestion and installation costs. Interfaces include ultra-high resolution video, digital data and specific CAD/CAM interfaces compatible with Computervision and IBM.

Booth 168 **Asia Dynamics, Inc.**

131 Rowayton Avenue
Rowayton, Connecticut 06853
(203) 866-8769
Charlotte Holtvedt

Asia Dynamics is introducing a new product for image graphic processing. It is called NEXUS 6400 and is produced by Kashiwagi Laboratory. The NEXUS 6400 is a high-performance, stand-alone real-time color image processor. It has a built-in image processor (pipeline architecture) for image arithmetic and logic with up to 64 512 × 512 × 8-bit image memories. Several peripheral options are available.

Booth 801 **Association for Computing Machinery**

11 West 42nd Street
New York, New York 10036
(212) 869-7440
Bobbie Zucker
Director of Conference Management

As *the* educational and scientific society of the information processing community, ACM attracts and serves the finest theoreticians and practitioners throughout the world, the leading edge of computer technology — gathering at conferences and chapter meetings, publishing and reading the most probing technical literature, sharing ideas and information, promoting the common good of computing professionals. It is a volunteer organization whose composition and activities have always reflected the changing nature and needs of people engaged in computing arts and sciences.

Booth 900 **ACM 1983 Annual Conference**

c/o City of New York Computer
Services Center
111 Eighth Avenue
New York, New York 10011
(212) 620-5055
Thomas A. D'Auria

Don't miss ACM '83, October 24-26, in exciting New York City! The conference theme, "COMPUTERS: EXTENDING THE HUMAN RESOURCE," promises a diversified technical program featuring the expertise of well-known

leaders in the computing community. Combine these quality presentations with a host of educational and technical exhibits, and the 4th International Computer Chess Tournament, for an unsurpassed ACM annual conference. Stop by booth #900 for details.

Booth 1079 **Auscom, Inc.**

2007 Kramer Lane
Austin, Texas 78758
(512) 836-8080
Linda Lewis
Marketing Manager

Auscom provides a reliable and proven method of attaching graphics systems directly to an IBM (or Plug Compatible) Channel. The Model 8911 Programmable IBM Channel Interface, a compact and rack-mountable device, attaches directly to any channel and emulates an IBM control unit. Multiple parallel and/or serial ports are available on the down-line side. Device-driver software is available for the majority of high-resolution graphics systems on the market and Auscom can provide new drivers as needed. The Model 8900 Interface Module card set is available to OEMs and customers that use a DEC CPU.

Booth 539 **Aydin Controls**

414 Commerce Drive
Fort Washington, Pennsylvania 19034
(215) 542-7800
John Carmello
Marketing Manager

AYDIN CONTROLS, exhibiting in Booth 539, is demonstrating versatile color graphic display computers, terminals, monitors, and application software packages for CAD, Seismic Data Interpretation, 3-D Solid Modeling, Imaging and Full Graphics.

The AYCON 16/Series Display Computer, PATRIOT™ Series high resolution color monitors and VideoCopier color computer graphics camera system are on exhibit with AYDIN's new Video Digitizer. AYDIN manufactures various color graphic systems with a reputation for reliability and performance.

Booth 942 **AZTEK**

23265 South Pointe Drive
Laguna Hills, California 92653
(714) 770-8406
Kevin D. Bull
Marketing

Manufacturer of computer graphic software and turnkey systems. The software available includes an impressive array of business graphics, text graphics, and freeform art software. These packages are designed for optimum resolution output for presentation quality slides, overheads and hardcopy. The software runs on a variety of mainframes, minis, and micros. Aztek turnkey systems include 1000 line resolution color monitor, high speed, high resolution graphics processor, monochrome display, HP1000 computer with 256K high speed memory expandable to 2MB, 12 × 12 digitizing tablet, Slide-graphics II software, all incased in attractive oak cabinetry, etc.

Booth 361 **Bausch & Lomb**

1212 East Anderson Lane
Austin, Texas 78752
(512) 837-8952
John J. Schwan
Vice President/General Manager

The Producer is a turnkey computer-aided drafting system manufactured and marketed by Bausch & Lomb. Producer systems are available in single and multistation configurations which support up to six drafters simultaneously. Bausch & Lomb offers single source support including: hardware, software, training, installation, and a hotline for technical assistance and service.

Booth 360 **Bausch & Lomb Houston Instrument Division**

8500 Cameron Road
Austin, Texas 78753
(512) 835-0900
John Williams
Marketing Communications Manager

User Group Contact:
Wayne Morris

Computer peripherals including plotters and digitizers featuring the DMP-29 eight pen digital plotter, DMP-41 graphics plotter suitable for architectural and engineering needs, DMP-40 low-cost single pen plotter and digitizers with a large range of sizes.

Booth 927 **Benson, Inc.**

2690 Orchard Park Way
San Jose, California 95152-2059
(408) 945-1000 x 5148
Al Salottolo
Vice President, Marketing/Sales

Benson will exhibit its expanding line of electrostatic plotters, pen plotters, controllers, vector to raster converters, and media for computer graphics hardcopy applications. Electrostatic plotter/printers are available in 11" through 44" widths, plotting up to 4 ips and 2000 lines per minute. The featured plotters at SIGGRAPH '83 will be the recently introduced 400 dot per inch Suprascan™ electrostatic plotter and the Model 1565 Radial Bed Pen Plotter with an integral intelligent microprocessor and an integral CRT/Keyboard Operator Station.

Booth 144 **Business Computer Systems**

221 Columbus Avenue
Boston, Massachusetts 02116
(617) 536-7780
Susan Rapaport
Promotion Director

User Group Contact:
Jim Difilippo
National Sales Manager

Business Computer Systems is a new computer publication devoted entirely to users of business computer systems in business applications. Business Computer Systems' controlled circulation is identified by make and model number in current use at their business location. Editorial coverage emphasizes peripherals, software and other related products for the expansion of business computer systems.

Booth 727 **CalComp**

2411 W. La Palma Avenue
Anaheim, California 90630
(714) 821-2281
Marietta Schoenherz
Trade Show Coordinator

CalComp has the broadest array of computer graphics hardware available in the industry: turn-key systems, graphics displays, vector and raster plotters, and digitizers. Support is provided through technicians and systems analysts worldwide.

CalComp will be showing the new M-84 Business Graphics plotter as well as showing the new 945/965 beltbed plotters. The Vistagraphic™ 4318 raster display as a Graphic Development System will be demonstrated. Also being demonstrated will be the Model 953 controller, driving both vector and raster plotters; the OTRONA with 2000 digitizer and the 9000 digitizer. The exhibit will also have a showcase of graphic supplies.

Booth 1425 **Celco**

70 Constantine Drive
Mahwah, New Jersey 07430
(201) 327-1123
Don Miraco
(408) 649-3580

User Group Contact:
Paul Constantine
Vice President

The high resolution color film recording system manufactured by Celco sets new industry standards in the production of extremely high quality imagery. "THE CELCO MACHINE" with its high recording speed, 4000 × 4000 pixel resolution and variable format (16 mm to 8″ × 10″) features is widely accepted in computer generated business graphics, animation and special effects, satellite imagery and scientific R & D precision color film recording applications.

Booth 1002 **Charles River Data Systems, Inc.**

4 Tech Circle
Natick, Massachusetts 01760
(617) 655-1800
Donna Caruso
Marketing Support Manager

User Group Contact:
Jim Isaak
Director Product Marketing

CRDS offers a complete family of UNIX-like 32-bit microcomputers, display terminals and system software. The Universe 68/05-A model offers 256Kb RAM memory, 10Mb fixed disk, 1Mb floppy & 4 serial ports. The Universe 68/37-A model offers 256Kb RAM memory, 32Mb fixed disk, 1Mb floppy & 4 serial ports & is a desk top or rack mount two-box system. The 68/47-A model has 256Kb RAM memory, 32Mb fixed disk, 10Mb removable Winchester & 4 serial ports. The UNOS operating system provides device independent I/O, a hierarchical file system, simplified synchronization of program execution, and program management. The basic tools UNOS provides are process management, file system management, text processing and programming. The high level languages UNOS supports are BASIC, C, FORTRAN 77, Pascal, RM/COBOL, and UNIX System III software tools.

Booth 379 **CIE Terminals, Inc.**

2505 McCabe Way
Irvine, California 92714
(714) 660-1421
Ellen Yamane
Marketing Communications Manager

CIE Terminals, a newly formed subsidiary of C. Itoh Electronics, will feature their complete line of graphic video display terminals and matrix line printers.

Booth 1071 **Computer Decisions**

50 Essex Street
Rochelle Park, New Jersey 07662
(201) 843-0550
Don Huber
Vice President/Publisher

COMPUTER DECISIONS is the magazine for MIS/DP management and information resource-involved management at large corporations and other large user organizations. COMPUTER DECISIONS offers in-depth management features and applications coverage.

Booth 678 **Computer Design Publishing Company**

119 Russell Street
Littleton, Massachusetts 01460
(617) 486-9501
Gene Pritchard
Director of Marketing

The magazine of computer-based systems, primarily concerned with the design & application of computer based systems. COMPUTER DESIGN offers direct action postal mailers and list rental as part of their services. Current issues will be available for distribution.

Booth 1211 **Computer Graphics Lab, Inc.**

405 Lexington Avenue
New York, New York 10174
(212) 557-5130
Marco Cardamone
Director of Sales

User Group Contact:
Bruce Laskin
Executive Vice President

IMAGES — Computer Graphics Lab, Inc., is currently offering a general purpose, computer-based electronic painting and graphic design system called IMAGES (Image Manipulation and Graphic Enhancement System). To date, the company has sold and installed over 30 systems to users in the broadcast teleproduction, corporate and education industries.

TWEEN — Computer Graphics Lab, Inc., is also developing high-end, digital animation production systems for commercial applications. These include both two-dimensional electronic in-betweening and ink and paint capabilities, as well as three-dimensional modeling and three-dimensional key-frame animation systems.

Both the 2-D and 3-D systems will be field upgradable from the basic IMAGES system.

Booth 1204 **Computer Graphics World**

1714 Stockton Street
San Francisco, California 94133
(415) 398-7151
Randall L. Stickrod
Publisher

Computer Graphics World is the only monthly trade magazine devoted exclusively to computer graphics. Editorial content features extensive coverage of computer graphics applications and comprehensive news coverage of new developments throughout the industry. Additional regular features include interviews with key newsmakers, hardware and software reviews and evaluations, and surveys of computer graphics users. Special issues focus on topics such as international developments, rapidly developing areas of application such as management information systems and CAD/CAM, and highlights from the major trade shows and conferences.

Booth 1050 **Computer Pictures Magazine**

330 West 42nd Street
New York, New York 10036
(212) 947-0020
Dean Ross Eaker, Publisher
Tom Tolnay, Editor

Computer Pictures Magazine was developed to bridge the gap between the executive and the engineer. Too often, these movers in our industry speak different languages, and that's where we come in. Computer Pictures is designed to keep you informed, aware and fully knowledgeable about the significant software and hardware developments in the computer graphics field. Computer Pictures ranges across the full spectrum of Business, Broadcast, and Entertainment, covering creative applications and supported by sound business sense.

Computer Pictures is a magazine dedicated to the imaginative interfacing of reader and writer.

Booth 235 **Comtal/3M**

505 W. Woodbury
Altadena, California 91001
(213) 797-1175
Rod Pollum
Sales and Marketing Manager

User Group Contact:
Dave Hall
Marketing Services Supervisor

Comtal/3M will demonstrate two digital image processing systems — the newly announced Vision Two, running under CIPAL (Comtal Image Processing Application Library) programs, and the company's popular Vision One/20. The Vision Two-CIPAL package is a complete turn-key system which provides full analytical capabilities. With the FORTRAN option, software development and customizing CIPAL routines are supported. The Vision One/20 features interactive manipulation of 512^2 images, and may be operated as a stand-alone system, or may be interfaced to a wide variety of host computers. The company has more than 600 systems installed worldwide in a variety of applications, including medical and seismic analysis, LANDSAT, weather, simulation, and printing/graphic arts.

Booth 277 **Conference Book Service**

80 South Early Street
Alexandria, Virginia 22304
(703) 823-6966
Cindy Ruths, Exhibit Coordinator
Mark Trocchi, Scheduling Manager

A browsing collection of technical books and journals in the field of computer graphics.

Booth 865 **Cray Research, Inc.**

1440 Northland Drive
Mendota Heights, Minnesota 55120
(612) 681-3248
John E. Aldag, Ph.D.
Senior Applications Analyst

Cray Research, Inc. designs, manufactures, markets and supports large-scale, high-performance computers used by industry and

government for engineering, research and technological processing. Over 45 CRAY supercomputers installed worldwide are used for such diverse applications as weather forecasting, structural analysis, nuclear safety, basic research, oil reservoir modeling, and computer graphics.

Booth 861 **CSPI**

40 Linnell Circle
Billerica, Massachusetts 01821
(617) 272-6020
Martin Schrage
Director of Marketing

User Group Contact:
Eric Hilmann
Mini-MAP Product Manager

Mini-MAP™ is a 32-bit floating point array processor which performs numerous high-speed image processing computations required by the graphics OEM. Featuring up to 16 megabytes of memory, it is available as a package system or a board set with backplane for interfacing to Digital Equipment Corporation's PDP-11, VAX-11, and LSI-11 computers. Full software support includes a comprehensive graphics library of image processing algorithms. Typical performance measurements are a 1024 × 1024 2-D real FFT in 8.8 seconds or a 1280 × 1024 4-color image rotation (raster scan storage format) in 27.5 seconds.

Booth 1238 **Cubic Systems**

2372 Ellsworth Street
Berkeley, California 94704
(415) 540-5733
John Connors
Vice President Marketing and Sales

The CS-5 Graphics System is a complete, general purpose 3-D solid modelling system featuring powerful interactive software or optional access from high level language programs. The raster display resolution is 512 × 512 × 16-bits per pixel with two separate image planes, creating a megabyte of graphics memory. Using the IBM PC as a processor, the CS-5 offers mainframe capabilities at the price of a microprocessor. Sophisticated software

includes anti-aliasing, hidden line and surface removal and smooth shading. These and other powerful features represent a major breakthrough in efficiency and capability for graphics users.

Booth 855 **Cullinet Software**

400 Blue Hill Drive
Westwood, Massachusetts 02090
(617) 329-7700
Bob Kniffin
Director of Marketing Communications

Cullinet Software (formerly Cullinane Database Systems) designs, develops, and markets an IBM-compatible line of software which provides solutions from micro to mainframe. IDMS, the nucleus of Cullinet's data management system, is the most widely recognized database management system. Cullinet's comprehensive modular applications in financial and manufacturing areas are integrated with IDMS and provide multi-plant, multi-warehouse control. Cullinet's powerful color graphic management system, Trend-Spotter, through the use of a touch-sensitive screen, furnishes instant graphic representations of current data retrieved from IDMS. Cullinet introduced three additions to the product line in April. Integrated Personal Computer Software, an information database which connects the micro and mainframe and IDMS/Relational will be available in the fourth quarter.

Booth 843 **CW Communications/Inc.**

375 Cochituate Road, Box 880
Framingham, Massachusetts 01701
(617) 879-0700
Roy J. Einreinhofer
Vice President, Marketing

CW Communications/Inc. is the world's leading publisher of computer related magazines and newspapers. Copies of Computerworld, Computerworld O/A and Computerworld On Communications will be distributed from the booth. CW Communications also publishes ISO World, InfoWorld and PC World in the United States, and 26 other publications in 16 countries around the world.

Booth 463 **Datacopy Corporation**

1070 East Meadow Circle
Palo Alto, California 94303
(415) 493-3420
Michael H. Rehmus
Director of Marketing

Get your portrait taken and see the highest resolution commercially available digitizing camera and display offered in the world. With Datacopy's products, you can see 17X more resolution than standard video — 1720 × 2592 × 8-bits of information captured in only 2.6 seconds! Your portrait will be digitized, displayed, and if you want a souvenir, a complimentary digitized portrait is yours for asking.

What else can you see in our booth? A personal computer-based page make-up system using our camera and display will be demonstrated. Come by and discuss your application.

Booth 377 **Datacube, Inc.**

4 Dearborn Road
Peabody, Massachusetts 01960
(617) 535-6644
Stan Karandanis
Marketing Manager

Datacube, Inc. is a manufacturer of video graphic/image processing boards for Intel's Multibus and DEC's Q-bus. Our team of engineering designers includes expert and visionary people with years of experience in graphics and memory-related fields. Our goal is to provide state-of-the-art graphic/image processing products at a competitive price.

Booth 455 **Data Design Logic Systems, Div. of United Scientific Corp.**

4800 Patrick Henry Drive
Santa Clara, California 95054
(408) 988-7722
George MacDonald
Product Manager

User Group Contact:
George MacDonald
Product Manager

Data Design Logic Systems designs and manufactures low cost computer aided drafting systems and low cost high resolution micro-stepped plotters. The line includes flat bed and drum tractor plotters.

Booth 811 **Data General Corporation**

4400 Computer Drive
Westboro, Massachusetts 01580
(617) 366-8911
David Rome/Susan Baumann
Industrial Systems Marketing

User Group Contacts:
Brendan Monigan/Cynthia Mollus
Technical Products Marketing Communications

Data General Corporation, a Fortune 500 minicomputer giant, will display three of its newest product offerings. Data General's Technical Products Group, a front runner in the Industrial Automation Marketplace, will demonstrate the capabilities of its MV 10000, GW 4000, and G-500. The 32-bit ECLIPSE MV 10000, the most powerful minicomputer in the industry, is targeted for Industrial Automation Applications, including computer-aided engineering, computer-aided design, and computer-aided manufacturing markets. DG's new high resolution GW 4000 expert workstation is designed for computer-aided design applications. The Dasher G-500 is a 15-inch, medium resolution color graphics terminal providing low-end CAD capability for ECLIPSE computer systems.

Booth 1419 **DATAGRAPH, INC.**

2 West Street
Weymouth, Massachusetts 02190
(617) 331-0803
U.K. Burkheiser
Marketing Manager

DATAGRAPH will exhibit its family of dot addressable COLOR GRAPHIC TERMINALS emulating VT 100 and Tektronix 4010/4012 terminals: VTC 8002 — a 16-bit microprocessor based color graphic terminal with a 14″ high resolution monitor (0.31mm dot pitch) and a resolution of 640 × 480 pixels displaying 16 out of 256 colors (option: 256 out of 256) including ZOOM and PAN; VTC 8000 and VTC 8001

color graphic terminals with 14″ high resolution monitors (0.31mm dot pitch) and a resolution of 512 × 256 and 8 displayable colors (VTC 8001: 8 out of 256 colors).

Booth 1061 **Data Sources**

20 Brace Road
Cherry Hill, New Jersey 08034
(609) 429-2100
Herb Spatola
Group Sales Manager

Data Sources is a comprehensive directory of hardware, software, communications and services. It is updated and published quarterly. It currently covers a total of 25,000 products including 14,000 software packages and profiles over 7,000 companies. It is the one stop reference to review all product options in the DP industry.

Booth 1437 **Data Type Inc.**

2615 Miller Ave.
Mountain View, California 94040
(415) 949-1053
Avery Blake
President

Data Type will be showing AutoGraph graphics display terminals and interactive workstations in color and monochrome, medium and high resolution. The input options are: mouse, joystick, and digitizer. The output options are: mono and color printers. Data Type also manufactures graphics conversion kits for TeleVideo data terminals.

Booth 152 **Design Aids, Inc.**

27822 El Lazo Road
Laguna Niguel, California 92677
(714) 831-5611
Robert Corbett
Director Marketing/Sales

User Group Contact:
Kenneth Roberts (Texas Instruments)
Manager Technical Design

Design System 1 is the most powerful system because it is the only computer drafting system for schematics, logic diagrams, and chemical process drawings, that performs layout automatically. All other systems require that the user lay out his drawing on a grid before it is entered into the system or compose it in gridded fashion on a screen. With Design System 1, the input sketch is truly freehand and non-gridded. The output is similar to the input in terms of signal flow only. Symbols and lines are moved and straightened to provide an overall minimum drawing size of high quality and then can be generated for output to most CAD systems.

Booth 327

Dicomed Corporation

9700 Newton Avenue South
Minneapolis, Minnesota 55431
(612) 887-7950
Becky McManus
Marketing Services Manager

A complete system of presentation Graphics Design Stations and Image Recorders for business graphics, audio-visual and graphic art applications.

The IMAGINATOR™ Design Console features a unique iconic menu, millions of colors and 20 fonts. The 148SR Color Image Recorder offers up to 8,000 line resolution. The PRESENTER™ Business Graphics Design Station features a color monitor for proofing. The D38+ Design Station offers free-form illustration as well as business graphics capabilities. And the DICOMEDIA® Micro 1 and Micro 2 packages turn an Apple® or IBM® Personal Computer into a business graphics workstation.

Booth 566

Digital Design/Morgan-Grampian Publishing Company

1050 Commonwealth Avenue
Boston, Massachusetts 02215
(617) 232-5470
Lynda Neue
Exhibits Manager

Digital Design is edited for systems integrators, senior design engineering managers and designers of computer related equipment in six key market areas: primary computer and

systems manufacturers, systems integrators, manufacturers of computer components, manufacturers of computer peripherals, manufacturing integrating OEM's and large volume commercial end users.

Booth 241 **Digital Engineering, Inc.**

630 Bercut Drive
Sacramento, California 95814
(916) 447-7600
Terry Hostek
Marketing Manager

Retro-Graphics terminal enhancements provide bit-mapped graphics, Tektronix 4010/4014/4027 simulation, resolutions as high as 800 × 480, I/O capability, and Tek-based graphics software compatibility on a variety of "dumb" alpha-numeric displays. Scientific, engineering, and business computer users can create complex graphics at one-third to one-half the cost of competitive graphics terminals.

Booth 827 **Digital Equipment Corporation**

146 Main Street
Maynard, Massachusetts 01754
(617) 264-1583
Sally Laughon
Exhibit Coordinator

User Group Contact:
Laurie Dick

See Digital's office systems in action including ALL-IN-1, our integrated office system which provides departmental office solutions, as well as integration of a wide range of graphics products. We'll also feature the DECmate II word processing workstation.

Experience an interactive "newlook" demonstration of Digital's fast VS11 Raster Graphics Display System, featuring multi-memory, three-dimensional plotting, and multiple-grid plotting to name a few. With a variety of graphics software packages now available, VS11 is looking better than ever! Discover a whole new dimension in process control with Digital's sophisticated PROVUE Color Graphics Display Management System. We've developed the graphics . . . So you can concentrate on your application.

Booth 979 **Dimension Research**

23010 Cottage Drive
Southfield, Michigan 48034
(313) 355-0412
Lee Lacey
President

Dimension Research will be demonstrating the first hard copy system that allows computer graphics imagery to be viewed in three dimensions without the aid of special glasses or viewers. The new service will permit computer designers to submit perspective or isometric views from their data base for conversion into a HOLO/CAD hologram on glass or plastic. Using the technology of composite holography, Dimension Research can give extraordinary stereoscopic hard copy from almost any 3-D system output in either wire frame or solid modeling.

Booth 1063 **DISER, INC.**

385 East 800 South
Orem, Utah 84057
(801) 227-2300
Dennis Hunter
Marketing Director

DISER, Inc. will be displaying the Modula Computer, featuring the Modula-2 programming language of Dr. Niklaus K. Wirth, the creator of Pascal. Utilizing a 64-bit bus the Modula Computer feeds an 832×640-bit mapped graphics screen and laser printer device. The system includes a multi-window debugger, a library of programming helps and mouse input device. Multiple fonts can also be displayed and created.

Booth 1155 **Dubner Computer Systems, Inc.**

158 Linwood Plaza
Fort Lee, New Jersey 07024
(201) 592-6500
Ivan J. Maltz
Staff Consultant

The Dubner CBG-2 produces broadcast quality color images and animation sequences. The CBG includes a full function character generator with many advanced features including diagonal

typing, and infinite edge and shadow combinations. Images can be drawn directly on the screen using the digital paint system. Additionally, three-dimensional images with surfaces and hidden line removal can be created and rotated around any point in space. Once a sequence of images has been created and recorded on disk, they can be played back, in real-time, at speeds up to sixty fields per second. This true animation capability contributed to the CBG being presented with the 1982 Emmy Award for Outstanding Engineering Achievement.

Booth 1153 **DYNAIR Electronics, Inc.**

5275 Market Street
San Diego, California 92114
(619) 263-7711
Thomas R. Meyer
Product Manager

DYNAIR Electronics, Inc., a San Diego-based manufacturer of high resolution RGB graphics switching and distribution equipment will present a solid-state modular 1000 line RGB graphics switching system. Modular units which switch five (5) RGB signals to a single display and up to 1000 RGB signals to 1000 displays will be shown.

Booth 1042 **EIKONIX Corporation**

23 Crosby Drive
Bedford, Massachusetts 01730
(617) 275-5070
Brenda Boomhower
Marketing Coordinator

User Group Contact:
Thomas J. Bilotta
Manager, Digital Imaging Products

Manufacturer of high resolution image digitizing cameras and systems. Camera/systems exhibit flexibility, speed and utility for both production and laboratory environments. Applications include electrophoresis, gel scanning, mapping, x-rays, well logs, computer animation and general image processing.

Booth 230 **Elector USA Inc.**

5128 Calle Del Sol
Santa Clara, California 95050
(408) 727-1506
Guido Govaert
Sales Manager, Computer Products

Barco CDCT 4000/5000 color raster scan graphics displays: high-performance, high-resolution, 37.5KHz scan, 50MHz bandwidth; 14″, 20″, and 26″.

Barco CD/CF color raster scan graphics displays: industrial grade; 15″ and 19″.

Barcodata high performance high resolution raster scan color graphics projector: variable scan rates. Also composite video.

Booth 240 **Electrohome Limited**

809 Wellington Street North
Kitchener, Ontario, Canada N2G 4J6
(519) 744-7111
Heather Rowe
Product Manager

Electrohome will exhibit a large screen color projection unit, with unique single lens design, that projects high resolution data, graphics and video from a computer graphics terminal, video camera or video cassette recorder. Other products on display will be a monochrome large screen projection system as well as high resolution color and monochrome monitors, packaged and open frame, in varying screen sizes.

Booth 1444 **Electronic Engineering Times**

111 East Shore Road
Manhasset, New York 11030
(516) 365-4600
Frank Burge
Publisher
John Griffin
Director of Marketing

Electronic Engineering Times — The largest circulation newspaper in the electronics industry.

Computer Systems News — The newspaper for OEM/systems management.

Booth 566 **Electronic Imaging/Morgan-Grampian Publishing Company**

1050 Commonwealth Avenue
Boston, Massachusetts 02215
(617) 232-5470
Lynda Neue
Exhibits Manager

Electronic Imaging — a new publication for corporate technical management, engineers, designers and scientists in the electronic imaging fields.

Booth 1344 **Electronic News**

7 East 12th Street
New York, New York 10003
(212) 741-4230
Zachary J. Dicker
Vice President and Publisher

Electronic News — the weekly publication covering business and technical news for the electronics and computer industry.

Booth 1255 **Electronic Systems Products, Inc.**

One Tico Road
Titusville, Florida 32780
(305) 269-6680
Peg Whitmore
Manager, Marketing Communications

Electronic Systems Products (ESP) Titusville, Florida, designs, fabricates, manufactures and markets proprietary, large-screen video projector systems that serve a wide range of customers. ESP will demonstrate its two newest models at SIGGRAPH '83: the AQUASTAR IIIC, a high-resolution, high-performance, video projector designed for color computer graphics display, and the AQUARAY, a new color video projector with a unique self-contained microprocessor that controls all functions, monitors alignment, and analyzes circuit operations. Applications for ESP projectors include teleconferencing, training, meetings and conventions, management information systems, entertainment, simulation, computer graphics, closed circuit, computer-aided design (CAD/CAM) and vocational instruction.

Booth 172 **Elographics, Inc.**

1976 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
(615) 482-4038
Robert R. Highfill
Marketing Manager

The Elographics Corp. will be exhibiting advanced digitizing technology with their E270 Transparent Position Sensor, E232 Cursor Control Pad, and E233 High Resolution Digitizing Tablet. The E270 allows the full power of your processor to be used by simply touching the display of the CRT.

The E232 Cursor Control Pad is a 3″ × 3″ finger touch device that may be mounted in or near a keyboard.

The E233 Digitizing Tablet is used for on-line entry of handprint or graphic information using a standard ball point pen or pencil. All products incorporate the latest membrane technology designed, developed, and patented by Elographics.

Booth 969 **Engineering Automation Systems, Inc.**

52 Chamberlain Highway
Kensington, Connecticut 06037
(203) 529-3200
N. Denis Crowther
Vice President — Sales

Engineering Automation Systems, Inc. has launched a powerful, low cost, engineering workstation and PCB design system — the EAS/700 Series. This turnkey system designs boards with up to 16 layers. It features integrated, interactive automatic placement and automatic routing, coupled with real-time design rule checking. The full color or monochromatic, high resolution (1024 × 780) display has multilingual capabilities. Additionally, the system boasts a full function word and graphics processor which can merge graphics with text.

System features include: MC68000 CPU with 1M byte of memory, graphics display system with Intel 8086/8087 processors, menu driven UNIX system, 5¼″, 19M byte Winchester and floppy disks, and 19″ color monitor.

Booth 901 **Engineering Society of Detroit**

100 Farnsworth Avenue
Detroit, Michigan 48202
(313) 832-5400
Carol Lynn
Conference Manager

The Engineering Society of Detroit (ESD) is a professional society made up of over 7,500 members. In addition to Michigan residents, 10 percent of ESD's members reside outside the state of Michigan in 40 states and 20 foreign countries. The majority of the membership consists of representatives from the automotive, utility, construction and general manufacturing industries. At the core of ESD's service to the individual and community are two technical programs developed to enhance the professionalism of its members. ESD's monthly magazine, The Detroit Engineer, is another benefit of society membership. It contains newsworthy feature articles and a calendar of ESD events.

Booth 911 **Envision**

631 River Oaks Parkway
San Jose, California 95134
(408) 946-9755
Peter L. Moulds
Product Manager

User Group Contact:
Peter L. Moulds

Envision color products are designed for use in business, engineering and industrial applications that require both high-quality color graphics and text processing. Envision's color terminals provide alphanumeric features such as: VT-100 compatibility, programmable soft keys, character cell graphics and 16 colors from a pallette of 4096. Color graphics features include: 640 × 480 resolution, local drawing primitives, windowing and zoom. The model 230 features a display list, 16K × 16K virtual resolution and segment operations. Envision's color printers provide 300 cps draft printing, 100 cps letter-quality printing and six inches per second graphics printing. They can print in eight colors at resolutions up to 360 × 144 dots per inch.

Booth 366 **EQS Systems**

8588 Mayfield Road, P.O. Box 445
Chesterland, Ohio 44026
(216) 729-2222
Ronald Larsen
Applications Engineer

EQS Systems is a distributor of computer graphics systems, peripherals and software. EQS will exhibit high quality, low cost digitizing pads and digital plotters from the Houston Instrument Division of Bausch & Lomb; low cost, high resolution color graphics systems from Vectrix Corporation; 2-D and 3-D computer-aided design (CAD) systems — Design Graphix and CADAPPLE — built around the Terak and Apple Computers; and an IBM PC-based schematic generator from Futurenet Corporation.

Booth 1321 **European Software Contractors A/S**

c/o American Software Contractors
48 Cummings Park
Woburn, Massachusetts 01801
(Danish address available from ASC)
In USA call (617) 933-6102
In Europe call +45 2 930133
Alice B. Taylor, Sales Manager (US)
Jan G. Knudsen, President (Denmark)

User Group Contact:
Hans Hertling
Director (Sweden)

ESC will feature UNIRAS, the UNIversal RASter system, on a variety of raster graphics output devices. UNIRAS represents a new generation of graphics software systems, putting equal emphasis on accurate calculations and delightful presentation of results. UNIRAS enables the creation of high resolution color hard copy from relatively lower resolution CRT displays. Several applications packages will be presented in the areas of mapping, seismic analysis, image processing, and business graphics. In addition, two new products will be shown: INTERRAS for interactive business graphics, and CADRAS for solid modeling.

Booth 158 **Florida Computer Graphics**

1000 Sand Pond Road
Lake Mary, Florida 32746
(305) 321-3000
Jo Hunnicutt
Manager, Marketing Communications

On display will be stand-alone and intelligent workstations for use in business, industrial, engineering and scientific applications. All FCG systems offer true bit mapped graphics, 32 of 256 colors, ergonomics design and a wide variety of host interfaces and input/output devices.

Booth 561 **General Electric Company**
Projection Display Products Operation

Electronics Park
Syracuse, New York 13221
(315) 456-2152
Charles P. Venus
Manager Domestic Sales

The General Electric Company will demonstrate the large screen Talaria™ television projectors. The Talaria television projector will accept either composite or RGB video conforming to NTSC, PAL or SECAM. Projectors have also been interfaced to computer-based systems with non-standard video output. The projected video image size can be varied from 2 ft. to 25 ft. in width depending on throw distance. The aspect ratio is 4:3. Projectors exist with 250, 500 or 1000 lumen light output at a scan standard of 525, 875 or 1023 lines. Optional projection lenses are available. Projectors are available for purchase, lease or rental.

Booth 655 **Gould, Inc. DeAnza Imaging and Graphics Division**

1870 Lundy Drive
San Jose, California 95131
(408) 263-7155
Chuck Nordby
Vice-President, Marketing

User Group Contact:
Mike Battaglia
Eastern Regional Marketing Manager

Gould DeAnza will display their new, low cost Image Processing System, the FD 5000. It features four to 16 banks of 512 × 512 × 8-bit memory, digitizer, feedback processor, and optional integral LSI-11 computer system.

Gould DeAnza will also show their upgraded LIPS software capabilities, featuring hardware based FFT capability and improved statistics capability.

New hardware for their IP 8500 series will include a sophisticated graphics command processor, the AGP, with LIPS compatibility, high level interface modes, and full modularity. Descriptive literature will also be provided on DeAnza's Real Time Disk.

Booth 171

Government Data Systems Magazine

475 Park Avenue South
New York, New York 10016
(212) 725-2300
George Joel Fine
Publisher

Government Data Systems is edited for federal, state and local information managers and public administrators involved in systems-based solutions to government problems. It is the one magazine that brings together important new studies of government oriented systems applications and operations as well as current reports on management programs, training techniques and public policy.

Booth 369

Graphic Controls Corp.

P.O. Box 1271
189 Van Rensselaer Street
Buffalo, New York 14240
(716) 853-7500
Paul E. Klas
Product Marketing Manager/Plotter Supplies

Graphic Controls has been a major producer of recording charts for over 50 years. We now offer a full line of plotter supplies, manufactured to fit most of the plotters in use today.

We manufacture ink-writing plotter media, electrostatic media and toner. GC plotter media is available in a wide range of sizes and papers.

Specially selected materials provide optimum plotting capabilities.

We also offer plotter pens for most ink-writing plotters. Our Plotter Supplies are marketed nationally through our direct sales force.

Booth 1001 **Graphic Strategies, Inc.**

1445 Koll Circle
San Jose, California 95112
(408) 294-1300
Stephen R. Johnson
Vice President, Marketing

Graphic Strategies will exhibit its VGM Series high-performance colorgraphic interface to the 32-bit VERSAbus™. The product line incorporates the NEC 7220 VLSI technology and includes proprietary logic that significantly enhances drawing performance. Advanced features such as high-speed vector, circle and arc generation; line and area texturing; arbitrary cursor shapes with 2-D transformations and high quality fonts will be demonstrated on the Motorola and Charles River Data Systems MC68000 microcomputers. The new high-performance, low-cost colorgraphic interface to the VME bus will be announced.

Booth 341 **Grinnell Systems Corporation**

6410 Via Del Oro Drive
San Jose, California 95119
(408) 629-9191
Kelly M. Carrothers
Advertising/Marketing Coordinator

Grinnell Systems will introduce its new Series 2800 Family of special purpose computer/graphics/imaging/image processing systems. The Model 2800-32 will be exhibited, in addition to a 1024 × 1024 high resolution imaging system within the new product line. The GMR 270 Series will also be demonstrated, running on DEC computers and displayed on Conrac monitors. Series 2800 consists of numerous system configurations and computing system modules that can be arranged in a variety of cost effective combinations. Grinnell's Series 2800 fulfills graphic display, image enhancement, and image processing needs for a multitude of applications.

Booth 1415 **GTCO Corporation**

1055 First Street
Rockville, Maryland 20850
(301) 279-9550
George Helser
Sales Manager

Digi Pad is the digitizer family that offers the OEM or end user the most comprehensive line of compatible graphic input tablets.

Micro Digi Pad is an ultra low cost digitizer tablet for efficient graphic input, cursor tracking, and menu function input. Micro Digi Pad is ideal for personal computers.

Vector Sketch is a 2-D graphics package that runs on the IBM PC. The Vector Sketch is truly low cost CAD.

Booth 1311 **GTI Corporation, Computer Graphics Division**

10060 Willow Creek Road
San Diego, California 92131
(619) 578-3111
Alan Barnum-Scrivener
Systems Analyst

The POLY 2000 — an advanced design, polygon-based real-time, 3-D, color shaded graphics system featuring an ultra-high throughput architecture, employing multiple, overlapped bit-slice processors. Implementing a proprietary scan-line hidden surface algorithm, the POLY 2000 allows highly-realistic, color pictures of complex 3-D objects to be displayed on a standard RGB monitor. The real-time display, interlaced at 30 frames per second, permits the user to dynamically interact with the displayed data base.

Features include: 16-bit homogeneous coordinate representation; generalized 4 × 4 matrix transformations, including user-controllable full perspective; X, Y, and Z plane clipping; display of up to 2000 polygons with as many as 4000 edge intersections per scan line; 640 × 480 pixel display with a palette of over 16,000,000 colors.

Booth 131 **Hardcopy Magazine**

(Seldin Publishing, Inc.)
1061 South Melrose Avenue
Suite D
Placentia, California 92670
(714) 632-6924
Dick Winn
Advertising Sales Manager

Hardcopy will be distributing its July CAD/CAM issue and accepting CAD/CAM press releases. Hardcopy is the only magazine serving the entire community of DEC users. Hardcopy is geared exclusively toward the enormous market which has evolved around DEC computer-based and end users, manufacturers, software houses, systems and terminal distributors and others associated with DEC-oriented products or services.

Booth 627 **Hewlett-Packard Company**

3000 Hanover Street
Palo Alto, California 94304
(415) 857-1501
Rudann Clark
Sales Promotion Manager

User Group Contact:
Jo Anne Cohn
HP User's Group Liaison

Hewlett-Packard will demonstrate its broad range of graphics capabilities, used to increase productivity among technical and commercial users. Both Hewlett-Packard hardware and software solutions will be on display, including business graphics, graphics workstations, and CAE solutions.

Booth 261 **Hitachi America Limited**

59 Route 17 South
Allendale, New Jersey 07401
(201) 825-8000
David Sapper
Sales Manager

Hitachi will show a full line of high resolution RGB color monitors and introduce the new HM-4619. The HM-4619 represents the state-of-the-art in high resolution color monitor technology. This model includes 0.2 mm dot pitch and 1280 × 1024 resolution at 60 Hz refresh rates (non-interlaced). Hitachi will also exhibit the HM-3619A, which includes Digital Dynamic Convergence® .

Booth 739 **IBM Corporation**
Academic Information Systems

1241 East Main Street
P.O. Box 10244
Stamford, Connecticut 06904
(203) 359-7240
Irene J. Kopley
Headquarters Marketing

IBM will be demonstrating some of its graphics products capabilities, hardware and software. Featured in the exhibit will be: the Device Attachment Control Unit (DACU) attached to a 4341 computing system and supported by an RPI Graphics Laboratory demonstration program; the 3277 Graphics Attachment based direct numerical control application supported by a Princeton University Interactive Computer Graphics Laboratory demonstration program; the IBM Personal Computer based color graphics; and the 7350 Image Processing system.

Booth 1421 **ID Systems Corporation**

4089 Leap Road
Hilliard, Ohio 43026
(614) 876-1595
Ray D'Onofrio
Vice President, Marketing

ID Systems will be featuring its array of high-performance, low cost color and monochrome graphic terminals; the new ID200V family and the popular ID100V family. These terminals

provide the user with a full featured color alpha-numeric terminal plus a high-performance color graphics terminal for business, scientific and engineering graphic applications. Both families of graphic terminals are available with different levels of resolution. The ID100 is also available as a retrofit to your existing VT100™. Hardcopy output capabilities for these terminals include color camera systems and color printer/plotters.

Booth 1049 **IEEE Computer Society**

10662 Los Vaqueros Circle
Los Alamitos, California 90720
(714) 821-8380
Janet Endrijonas
Advertising Manager

The IEEE Computer Society will make available copies of its IEEE COMPUTER GRAPHICS AND APPLICATIONS magazine and assorted other society publications. IEEE membership information will also be provided.

Booth 905 **Ikegami Electronics (USA), Inc.**

37 Brook Avenue
Maywood, New Jersey 07607
(201) 368-9171 or (213) 534-0050
Craig H. Sloss
Display Monitor Sales

User Group Contact:
Frank Heyer
Manager, Sales and Engineering

Ikegami Electronics will be demonstrating its full line of raster-scan CRT display monitors for the OEM computer industry. Featured will be the HDM Series of high resolution (1280 × 1024) delta-gun color and monochrome monitors, the CD Series of high resolution (1024 × 1024) in-line gun color monitors, the DMA Series of high resolution monochrome monitors, the UD Series of medium resolution color monitors, and the BDM Series — ten different monochrome monitors for virtually any data application.

Booth 268 **Ikier Technology, Inc.**

42 Pleasant Street
Watertown, Massachusetts 02172
(617) 924-3113
Diane L. DiNicola
Marketing

Ikier Technology, Inc. was founded in January, 1981. Its purpose has been to develop, manufacture, and market high-performance computer graphics products, with a strong focus on raster-scan graphics controllers for the widely-used Multibus class of computers. Ikier's principal market is systems houses and OEMs who incorporate Ikier hardware and software products in turnkey graphics application systems. Ikier products consist of the HRG, a high resolution, black & white, Multibus compatible graphics controller, the Eagle, a complete graphics workstation, the MPC Multiplane Controller, and the HRG2, which packs an entire color graphics controller on a single Multibus board.

Booth 1043 **Image Dynamics, Inc.**

Please see Trillium Corporation

Booth 136 **Imaging Technology Inc.**

400 West Cummings Park, Suite 4350
Woburn, Massachusetts 01801
(617) 938-8444
Robert Wang
Marketing Manager

User Group Contact:
Gary MacDonald
Applications/Sales Engineer

Imaging Technology manufactures OEM Image Processing Modules which are plug compatible with either the Intel Multi-Bus or DEC Q-Bus System. The modules are designed to digitize video B/W or RGB frames in 1/30th of a second and have a resolution of 512 × 512 × 8- to 24-bits with graphic overlay. Additional modules include the ALU-512 pipe-line processor unit for edge enhancement high/low pass filtering, 3 × 3, 5 × 5, and 15 × 15 convolutions. Applications include inspection, teleconferencing, computer graphics, and medical imaging.

Booth 763 **ImagiTex, Inc.**

77 Northeastern Boulevard
Nashua, New Hampshire 03062
(603) 889-6600
Larry D. Hummel
Vice President, Marketing

User Group Contact:
Robert M. Hanselman
Manager, Customer Support

ImagiTex, Inc., a new company specializing in advanced image processing and scanning subsystems, will unveil its complete ImagiTizer Series at SIGGRAPH. The CCD scanner and image processing workstation will demonstrate the product's ability to handle both black and white and continuous tone imagery and line art.

Booth 1304 **IMTEKS Inc.**

28 Kaysal Court
Armonk, New York 10504
(914) 273-5805
Charles Fizer
President

IMTEKS Inc. manufactures a plain-paper typesetter called the PPT-10. The PPT-10 is an electronic, typographically-oriented, sheet-fed laser page printing device.

For the in-plant printer and publisher, the PPT-10 will emulate a phototypesetter and produce typeset quality page documents on standard plain paper at a reproduction rate of 10 pages per minute. In addition, line art illustration elements and logotypes can be combined with text to form a complete page.

The PPT-10 laser printer is a low-cost alternative to the phototypesetter when the objective is to produce a limited number of documents on demand. Page copies of fully-composed pageproofs with all accompanying fonts, folios, and illustration line art are produced exactly as they would appear from a digital typesetter.

The PPT-10 offers significant cost advantages with regard to purchase price, consumed expendables and document reproduction, as compared to a phototypesetter.

Booth 1065 **INMOS Corporation**

Box 16000
Colorado Springs, Colorado 80935
(303) 630-4000
Deborah Collins
Marketing Analyst

The 1983 Product Line includes: Fast 16K Static RAMs, High Performance 64K Dynamic RAMs, and 64K EPROMs.

Booth 839 **Intecolor Corporation (An Intelligent Systems Company)**

225 Technology Park/Atlanta
Norcross, Georgia 30092
(404) 449-5961
Tully Johnstone
Marketing Support Manager

An exciting very high resolution color graphics terminal will be introduced at SIGGRAPH: the Intecolor VHR19, a 19″ color graphics terminal featuring 1024H × 1024V addressable resolution, 1024H × 1024V viewable. The VHR19 combines 4014 emulation and alphanumeric functions with state-of-the-art graphics display processors in a separate cabinet. VHR19 features include: advanced raster CRT, 8 colors from a palette of 4096, 80 × 32 display, 36 programmable functions, ANSI X3.64, most VT100 functions, 101-key detached keyboard, two RS-232C ports, DMA, and full graphics commands including POINT, LINE, POLYLINE, RECTANGLE, ARC, COLOR, ZOOM, PAN, FILL, and CIRCLE. Intecolor also will show a full range of low- and medium-range color graphics terminals and desktops.

Booth 1239 **Intelligent Software Systems**

529 Belchertown Road
Amherst, Massachusetts 01002
(413) 253-3482
Tom Manwell
Marketing Director

The DataViews graphics software system allows users to compose screens of animated displays to simultaneously track hundreds of variables in real-time. The system generates displays quickly without the need for programming, compiling, and/or linking.

DataViews graphics software includes a vast collection of menus, command prompts, and aids providing immediate display feedback. The display formats provided are appropriate for business and finance, science, engineering, aerospace, instrumentation, and process control.

DataViews is written in machine and device independent "C" code, and can be run on virtually any modern machine, "from C/Unix/68000 supermicro workstations on up."

Booth 839 **Intelligent Systems Corporation**

Please see Intecolor Corporation

Booth 661 **Intergraph Corporation**

One Madison Industrial Park
Huntsville, Alabama 35807
(205) 772-2560
Ben Smith
Manager of Public Relations

Intergraph will exhibit a VAX-based interactive computer graphics system, with advanced color workstation and new Interact workstation running the latest state-of-the-art mechanical design applications software.

Booth 1039 **International Imaging Systems**

1500 Buckeye Drive
Milpitas, California 95035
(408) 262-4444
Dave Racionzer
Applications Engineering Manager

International Imaging Systems (I^2S) is a world leader in digital image processing technology. Its hardware and software systems packages are in widespread use throughout the world in applications as diverse as satellite image interpretation, medical diagnostic imaging, industrial inspection and scientific investigations. A continuous program of integrated software and hardware development ensures state-of-the-art systems that are easy to use by both technical and non-technical personnel and can be adapted to real-world problems.

Booth 749 **ISSCO**

10505 Sorrento Valley Road
San Diego, California 92121
(619) 452-0170
Ellen Gore
Manager, Customer Relations

User Group Contact:
Ellen Gore

ISSCO will feature DISSPLA, TELLAGRAF, CUECHART, and THE DATA CONNECTION — the world's leading data representation graphic software products. ISSCO products guarantee graphics-art quality charts, total design flexibility, ease of use by all employees, machine/device independence, and access to the data in your computer. ISSCO software lets you generate management and scientific line, bar and pie charts, word charts, 3-D surfaces, maps and contours on your computer with output on your devices. ISSCO has over 1,400 product installations worldwide.

Booth 779 **Japan Radio Co., Ltd.**

120 East 56th Street
New York, New York 10022
(212) 355-1180
T. Hayashi
General Manager

User Group Contact:
Raymond Maloney
Assistant General Manager

Japan Radio Co., Ltd. is exhibiting their NWX-235 20″ Color Graphic Display with a Host Computer (PDP-11 or Prime). This Display Terminal is capable of presenting characters, graphics and images with high brilliance and high resolution in multi-layer, multi-color, split and echo modes on the CRT screen. It features powerful interactive capabilities such as picking, rubber-band and dragging, window-viewport conversion, clipping and two-dimensional transformations (zooming/scaling, scrolling, and rotation.) This model can operate as a dedicated processing workstation for CAD/CAM systems using general-purpose computers or minicomputers.

Booth 149 **JUPITER**

2126 Sixth Street
Berkeley, California 94710
(800) 858-9309, in California (415) 644-1024
Jon Peddie
President

User Group Contact:
Peter Harris
Vice-President

JUPITER 7 PLUS is an enhanced and expanded version of the popular color graphics terminal introduced last year. It features 1024 × 780 displayable pixels, anti-aliased characters and many other new capabilities for the sophisticated graphics terminal user and many optional display sizes and formats. There will be special demonstration graphics at our SIGGRAPH exhibit. Jupiter will also show the JUPITER 12 Color Graphics Terminal/Workstation with 1024 × 1024 resolution and other features of special interest for electrical and mechanical CAD/CAM, molecular modeling, VLSI design, and defense applications. End user and OEM configurations.

Booth 271 **KEL, Inc.**

1 World Trade Center, Suite 4811
New York, New York 10048
(212) 524-8319
Harry Takahashi, Vice President, KEL, Inc.
Terry King, Sales Representative

KEL will present the M508 Color Graphic Display Terminal featuring: high display resolution — 512 × 512 to 1024 × 1024; 24-bit color depth — 16 million color shades; FORTRAN callable graphic software stand-alone capability; IO devices optional. The M4135 Intelligent Graphics Printer features: high speed and resolution — 120 LPM and 10 CPI, graphic resolution of 160 dots per inch horizontal, and 162 DPI vertical, serial or parallel interface (RS232 or Centronics), simultaneous graphic and character printing on same page. The I-5000 Image Processing Terminal has the following characteristics: pipeline processor; pixel calculation is possible; 512 × 512 resolution; 24-bit color depth — 16 million color shades. The J-1014 Graphic Display Terminal has the following characteristics: 1024 × 780

viewable resolution; Tektronix 4014 compatible in graphic mode; DEC VT100 compatible in text mode; 8-bit color depth via color module software (J-1014C).

Booth 549 **KMW Systems Corporation**

8307 Highway 71 West
Austin, Texas 78735
(512) 288-1453
Jean Richards
Director, Marketing Administration

KMW will feature its VP30 Series Vector Processors that accept random vectors, symbols, and other graphic information from the host mainframe, reduce it to raster form and output to electrostatic printer/plotters, color graphics cameras and other raster output devices. The VP30 operates in either a dedicated (unattended) mode, or as a fully interactive (programmable) remote graphics workstation. Host input configurations include channel interfaces, magnetic tape and high speed communications protocols.

Booth 270 **KURTA Corporation**

4610 South 35th Street
Phoenix, Arizona 85040
(602) 276-5533
Steven Stine
Vice President of Marketing

The KURTA Corporation will exhibit the low cost KURTA Series 1 tablet and its unique pen arrangement attached to a personal computer which shows its use as an extended graphics menu and keyboard supplement. The Series 1 is customized to the high volume requirements of microcomputer manufacturers.

The KURTA Series 2, a microprocessor-based, highly accurate tablet/digitizer for low cost graphic workstations, will be shown attached to a personal computer.

The high performance KURTA Series 3 precision digitizer will be shown featuring a new lightweight design. The Series 3 includes dual processors and a 16-key cursor with unique vector output and alphanumeric display.

Booth 1143 **Lang Systems, Inc.**

1010 O'Brien Drive
Menlo Park, California 94025
(415) 328-5555
William Cliff
Sales Manager/Graphics Products

User Group Contact:
Seth Neumann
President

VIDEOSLIDE35 offers a quick and low-cost way to generate 35mm slides and Polaroid SX-70® prints of images generated on color raster terminals such as the IBM 3279 or with personal computer systems such as IBM PC and Apple II and III. The product accepts Video input format, including RGB RS-170, NTSC, TTL RGB and others. VIDEOSLIDE35 is connected to video output or in parallel with the monitor used by the the operator. Controls for the table top unit consist of an on-off switch, three thumb-wheel switches for color balance and exposure time control. Additional software is not required for operation. VIDEOSLIDE35 accepts conventional 35mm film or Polaroid's Polachrome™ instant process slide film.

Booth 1117 **Lexidata Corporation**

755 Middlesex Turnpike
Billerica, Massachusetts 01865
(617) 663-8550
John Ricciardone
Marketing Communications Specialist

User Group Contact:
Joyce Anderson
Marketing Communications Specialist

Lexidata manufactures high-performance computer graphics systems used in graphics and imaging applications. Product families include the System 3000 line of high resolution (1280 × 1024) display processors; System 8000 distributed graphics processing systems that combine the features of the System 3400 with a Motorola MC68000 microprocessor, resulting in dual processor architecture; System 2000 MC68000-based PLOT-10™ compatible terminals available in both 1280 × 1024 black and white and color; SOLIDVIEW™, a

technological breakthrough in the display of solid models; and IMAGEVIEW™, a powerful, low-cost, flexible subsystem for imaging applications.

Booth 1017 **LogE/Computer Imaging Systems Companies**

420 So. Fairview Avenue
Goleta, California 93105
(805) 967-2383
Lynell Cameron
Director, Marketing

The LogE/Computer Imaging Systems Companies comprised of LogE/CompuSlide, LogE/Dunn Instruments, LogE/Interpretation Systems, and LogE/Spatial Data Systems will be exhibiting their complete line of products ranging from color graphic recording cameras and computer-assisted slide production systems to stand-alone real-time image processing systems. LogE/CompuSlide will demonstrate a total graphics workstation for the creation and hardcopy output of presentation slides. LogE/Dunn Instruments will exhibit the full line of color graphic recording cameras including the new MicroColor low cost camera and the versatile Model 635; Model 631, ProColor, and VersaColor cameras. LogE/Spatial Data Systems will demonstrate the automated Parts Measurement System and the EyeCom III real-time image processing system.

Booth 605 **Lundy Electronics & Systems Inc.**

One Robert Lane
Glen Head, New York 11545
(516) 671-9000
William Waller
Director, Sales and Marketing

Lundy Electronics is displaying their wide range of computer graphics display terminals, generators and workstations. Specifically the Ultragraf® 3-D intelligent vector refresh workstations, the 5480 series of high resolution (1536 × 1024 pixels) color raster terminals, and the 5470 series of high resolution (1536 × 1024 pixels) monochrome raster terminals. All Lundy raster products feature Tektronix® emulation and virtually instant polygon fill. The Ultragraf® features the largest viewing screen in the industry (15 in. × 19 in. viewing area) and high resolution for large, sharp, precise design with instant response to operator commands.

Booth 1205 **MacDonald Dettwiler and Associates Ltd.**

3751 Shell Road
Richmond, British Columbia, Canada V7X 1A2
(604) 278-3411
Dan Murray
Sales Representative

User Group Contact:
Dave Nims
Program Manager, Electro-optical group

MacDonald Dettwiler and Associates will be presenting their digital film recorder, the Color FIRE 240. Winner of the 1982 I·R 100 award, the Color FIRE 240 records 8000 × 8000 pixel images on roll film in less than 13 minutes. Unique Electroprism™ technology insures wide chromatic range, color fidelity and repeatability. Also on display are sample images produced on the unit for seismological, graphic arts and remote sensing applications. A special highlight of the display will be a 4000 × 4000 pixel computer-generated image from Lucasfilm Ltd.

Booth 370 **Machine Design/Computer-Aided Engineering**

Penton Plaza, 1111 Chester Avenue
Cleveland, Ohio 44114
(216) 696-7000
Orine Wershbale
Communications Manager

COMPUTER-AIDED ENGINEERING AND MACHINE DESIGN are technical journals which feature editorial and advertising directed to the professionals who specify and buy computer-based equipment for design and manufacturing applications.

Booth 1438 **Marinco, Inc.**

11760 Sorrento Valley Road
San Diego, California 92121
(619) 453-5200
Terry Venema
Sales Manager

The Marinco APB-3000 Single Board Array Processor performs integer, full floating point, and complex (real and imaginary) high-speed arithmetic (10 MFLOPS). It is available in Multi-bus, Q-bus, Unibus and IBM PC bus configura-

tions. The APB-3000 is memory mapped and has separate dual-ports to access program memory and data memory. The APB-3000 can plug into any slot on your bus and will appear as extra memory to your host. Marinco is very responsive to the OEM's particular needs and has the flexibility to design a product for a specific OEM's requirement.

Booth 479 **Matra Technology, Inc.**

120C Albright Way
Los Gatos, California 95030
(408) 866-6606
Jacque Huyghe
Marketing Director

Matra Technology, Inc. (MTI) is primarily involved in developing, manufacturing and selling Photogrammetric Instrumentation in the U.S. MTI supplies a full range of instrumentation for photogrammetric applications in both commercial and military applications. All MTI equipment is microprocessor controlled and comes complete with a full range of photogrammetric software.

Booth 571 **Matrix Instruments, Inc.**

230 Pegasus Avenue
Northvale, New Jersey 07647
(201) 767-1750
E.K. Vanderbilt
Marketing Support Manager

Color Film recorders for photographic hard copy of computer generated graphics, at resolutions of up to 4096 × 2732 pixels. Can be used for 16mm, 35mm, 4 × 5 and 8 × 10 film formats.

Booth 234 **Matrox Electronic Systems Ltd.**

5800 Andover Avenue
Montreal, Quebec, Canada H4T 1H4
(514) 735-1182
Gerry Sullivan
Marketing Manager

Matrox will feature the new GXT-1000 color graphics terminal. This intelligent terminal is capable of displaying up to 1280 × 1024 dots on a 19″ color CRT monitor. Matrox will also exhibit the GXB-1000, a two-board 1k × 1k color graphics controller which also acts as the display controller for the GXT-1000 and a 512 × 512 color imaging system for the Multibus. The MSBX-800, an 800 × 600 × 4-bit graphics ISBX multimodule, will also be displayed.

Booth 1048 **Measurement Systems Inc.**

121 Water Street
Norwalk, Connecticut 06854
(203) 838-5561
Donald W. Fisher
Marketing Manager

Measurement Systems manufactures a line of manual controls for positioning and tracking cursors, including joysticks, trackballs, force operated joysticks and a mouse control. Units are available with analog, pulse TTL level, parallel binary or RS232C serial interface.

Booth 527 **Megatek Corporation**

3985 Sorrento Valley Blvd.
San Diego, California 92121
(619) 455-5590
Gerry MacDonald
Marketing Coordinator

User Group Contacts:
Henrik Jonson
Manager, Software Support
Fred Wefer
Manager, TEMPLATE Support and Services

The WHIZZARD® 1645 is a monochromatic, high-resolution, moderately priced desktop engineering terminal. The 1650 is an eight-color desktop moderately priced terminal. The 7245 is a 1K × 1K monochromatic, 3-D raster system. The 7255 is a 1K × 1K 16-color, 3-D raster system. The 7295 is a dual workstation configuration of 3-D monochromatic and 16-color raster terminals.

Booth 1005 **Metheus Corporation**

5289 NE Elam Young Parkway, Bldg. D-600
Hillsboro, Oregon 97123
(503) 640-8000
Gary Romans
Marketing Manager (Graphics Systems)
Bob Behrens
Marketing Communications Manager (VES)

Metheus Corporation is a leading manufacturer of both engineering workstations and display controllers. Workstations include the L750 for logic design, simulation and mask layout, and the L740 for logic design and simulation. Both include color graphics and operate on a stand-alone basis, networked, or connected to a remote host. The Ω500 Display Controller offers 1280 × 1024 × 8 resolution at a 60Hz non-interlaced refresh rate for a bright, flicker-free ergonomic display. This high speed color raster system displays vectors through a parallel host interface at 1.5 million pixels per second. It can be "folded" to operate at 640 × 512 × 32 and also has a full set of RASTER OPS. Metheus will also show the Ω400 Display Controller and the AXIA Graphics Software Package.

Booth 677 **Micro Control Systems, Inc.**

143 Tunnel Rd.
Vernon, Connecticut 06066
(203) 872-0602
Peter H. Smith
President

Micro Control Systems, Inc., located in booth 677, will be featuring the first 3-D CAD System for microcomputers (IBM PC and soon the Apple II & E), the Space Tablet/Advanced Space Graphics. Its capabilities include: drafting — automatically dimensions angles and lengths; color — fills in a two-dimensional area on screen; output — to printer and plotters; editing; transformations — scaling, rotating, moving, "rubber banding". It draws rings, mirror-images and arc. Applications include architecture, engineering and medicine. College students are using the Space Tablet/Advanced Space Graphics both as a conceptual tool to acquaint themselves with computer-aided design and as an analytical tool in instances such as molecular modeling, cell structure analysis, mathematics or medical mapping.

Booth 1342 **Micro-Term, Inc.**

1314 Hanley Industrial Court
St. Louis, Missouri 63144
(314) 968-8151
Kaye Sutton
National Sales Manager

Micro-Term will exhibit its new ERGO 201 and ERGO 301 computer terminals. These terminals emulate popular DEC, Hazeltine, ADDS, and Televideo terminals. Both terminals hold Micro-Term add-on graphics boards that are Tektronix 4010 and ReGIS compatible.

Booth 1243 **Microtex Corporation**

80 Trowbridge Street
Cambridge, Massachusetts 02138
(617) 491-2874
Nicholas Bedworth
President

Microtex Corporation specializes in DEC-compatible digital imaging systems for scientific and commerical applications. Microtex digital imaging systems allow high performance data acquisition using a wide variety of CCD sensors, and offer resolutions as high as 1728 × 2592 pixels with a scan time of five seconds or less. All Microtex products can be delivered complete with a sensor and host software for the DEC RT, RSX and VMS operating systems.

Booth 144 **Mini-Micro Systems**

221 Columbus Avenue
Boston, Massachusetts 02116
(617) 536-7780
Richard Dalrymple
Director of Marketing
Robert T. Singer
National Sales Manager

Mini-Micro Systems is edited for both OEM systems personnel who design and/or apply mini-microcomputer related equipment in their systems and sophisticated end users configuring their own mini or micro systems. Coverage includes applications for minicomputers, microcomputers, memory systems, peripheral equipment, data communications, distributed data processing and other mini-based systems.

Booth 249 **Modgraph, Inc.**

1393 Main Street
Waltham, Massachusetts 02154
(617) 890-5764
Henry R. Kunicki, Jr.
Vice President, Marketing and Sales

Modgraph will show the GX-100 Graphics Terminal with TEK 4010/4014 and DEC VT 100/52 emulation. It has a 15″ screen, P-39 phosphor, and dedicated text and graphics functions keys. Software features include access to two independent screens in both graphics and text modes. The graphics write modes allow addition, subtraction, and inversion of information on the two graphics screens.

The Graphics Color Camera provides crisp high-resolution color film output from most RGB graphics terminal systems. Film formats include 35mm roll film and Polaroid instant SX-70, 4″ × 5″, 8″ × 10″, Kodamatic PR-10, and black and white film.

The Modgraph Graphic Generator offers a low cost, one board graphics unit with resolutions from 256 × 256 to 512 × 512. Power supply and chassis are available for combining up to 16 boards in parallel to create economical grey scale or color systems.

Booth 902 **Moniterm Corporation**

7180 Shady Oak Road
Eden Prairie, Minnesota 55344
(612) 941-8383
Ward C. Johnson
President

Moniterm will exhibit the VR-Series high resolution CRT monitors, full page interlaced or non-interlaced displays for word processing and office automation. Also available from Moniterm are 64-68 KHz monitors which generate a 1024 × 1024 non-interlaced display for CAD/CAM and computer-aided graphics. All monitors are available with 12″, 15″, 17″ or 19″ screens in either the "portrait" or "landscape" configuration. A variety of phosphors are available.

Booth 1338 **NEC Information Systems, Inc.**

5 Militia Drive
Lexington, Massachusetts 02173
(617) 862-3120
Peggy Kinton
Marketing Communications Coordinator

NEC Information Systems, Inc. will be demonstrating the NEC APC 16-bit microcomputer supporting the NEC μpd7220 Graphic Display Controller. The graphic resolution provided is 1024 × 1024 pixels, of which a movable 640 × 475 pixel "window" can be displayed. Development tools, scientific and business graphic applications running under CP/M-86™, MSDOS, and the UCSD p-system with peripheral support of dot matrix and ink jet color printers, plotters and 35 mm camera will be shown. Digitizer, mouse and keyboard input is supported.

Booth 435 **Nicolet Zeta Corporation**

2300 Stanwell Drive
P.O. Box 4003
Concord, California 94524
(415) 671-0600
Bill Manos
Product Manager

User Group Contact:
Beverly Aquino
Marketing Administrator

Nicolet Zeta Corporation manufactures a full line of high-performance, intelligent hard copy color graphics output devices. They range in size from a desktop 12-inch model all the way up to a stand alone offline plotting workstation with 54-inch wide hard copy output. Our latest models include a 12-inch, 8-pen device capable of running in an IBM SNA/SDLC environment; and a 22-inch, 8-pen device.

Booth 955 **Nippon Computer Co., Ltd.**

Naito Blg., Nihonbashi Hamacho 2-25-1,
Chuo-Ku
Tokyo 103, Japan
03-669-3066
David W. Winchester
International Trade Division

NCC will display its complete line of graphics products for business graphics, graphics information retrieval and CAD/CAM/CAE applications. Products displayed will include: 1) the NJC-M1401 graphics display, a low-cost desktop terminal with features including 1032 × 780 dot resolution, 14″ non-glare CRT, 800ns/dot drawing speed, Tektronix 4010/4014 and DEC VT100 emulation. 2) the NJC-C1421 Color Graphics Terminal, a desktop unit featuring a 0.21mm pitch 14″ CRT, 1024 × 780 dot resolution, 800ns/dot drawing speed, 16 of 27 color display, Tektronix 4010/4014 and DEC VT100 emulation. NCC will also introduce several new products at SIGGRAPH '83, including a high cost-performance color graphics terminal with integral 19″ monitor.

Booth 1109 **Nissei Sangyo America, Ltd.**

40 Washington Street
Wellesley Hills, Massachusetts 02181
(617) 237-9643
Kevin Bowler
Marketing Manager

User Group Contact:
Dominic Cuce

Nissei Sangyo America Limited will display Hitachi color monitors including 12″, 13″ and 19″ picture tubes which range from 560 × 240 (non-interlaced) resolution to 720 × 416 (non-interlaced) resolution. These low cost TTL and analog color monitors are for use in color graphic systems and terminals.

Booth 1242 **Number Nine Computer Engineering Inc.**

P.O. Box 1802
Hartford, Connecticut 06144
(203) 233-8134
Andrew Najda
Vice President Marketing

User Group Contact:
Stanley Bialek
Vice President Operations

Number Nine Computer Engineering Inc. is the manufacturer of a low cost, single card graphics system for the Apple II and IBM personal computers. The system offers high resolution colors with up to 1024 × 1024 pixels and up to 256 simultaneous colors with an optional 16 million color palette. Its features include hardware drawing of vectors, arcs, rectangles and area fill, as well as pan, scroll, zoom, and multiple windows. Software support includes a graphics interpreter for Pascal, BASIC, FORTH, and the assembly languages for the Apple II/IIe and IBM PC, and I/O device drivers such as plotter, graphics tablet, printer, digitizer, and light pen, etc. Number Nine also manufactures a booster card for the Apple II/IIe which executes Apple programs 3.5 times faster.

Booth 570 **Numonics Corporation**

418 Pierce Street
Lansdale, Pennsylvania 19446-2498
(215) 362-2766
Rolland H. Henderson
Marketing Manager

User Group Contact:
Morris B. Bowles
Eastern Regional Sales Manager

Numonics manufactures a complete line of free-cursor and restrained cursor digitizers for the OEM and the end user. The MODEL 2200 is a low-cost, compact electromagnetic tablet with user-specification of output data in absolute measurement or number of user-defined minimum increments. It also includes firmware for self-diagnostics, matrix menuing and host override of switch settable functions. The MODEL 2300 is a competitively priced digitizer/tablet for large-volume users and single-unit users with their own graphics software. The MODEL 2400 is an application-oriented digitizer/tablet with area, length and an extensive application program library. The SERIES 5400 is a competitively priced microprocessor-based plotter with ASCII control commands, embossed roller design for low-inertia paper transport and the ability to produce exceptionally high line quality.

Booth 135 **OCLI-Optical Coating Laboratory, Inc.**

2789 Northpoint Parkway
Santa Rosa, California 95401
(707) 525-7540
Bill Grenawalt
Display Products Sales Manager

OCLI will exhibit their unique visual display products and coatings that improve the viewability of CRT terminals by enhancing contrast and minimizing glare without degrading resolution. New product introductions demonstrated on color terminals will be exhibited.

Booth 1208 **Omni Graphics Corporation**

7670 Woodway, Suite 248
Houston, Texas 77063
(713) 780-1231
Anthony G. Masraff
President

The new Omni 1000 GDC is a single board, 1024 × 1024 resolution, 256 color (from a palette of 4096), graphics display controller. Included are 1024KB video RAM, 256KB list and image processing RAM, and 64KB EPROM for program storage, in addition to high and low speed parallel and serial interfaces.

Other design features provide parallel reading of pixel data; simultaneous writing into any or all graphics memory planes; programmable read and write masks to enable various planes; high speed logical plane operations including AND, OR, and XOR allow one plane to be logically combined with one or more other planes.

Booth 560 **Optronics International Inc.**

7 Stuart Road
Chelmsford, Massachusetts 01824
(617) 256-4511
Les Silvern
Vice President, Marketing

User Group Contact:
James Deigan
Technical Manager

Optronics International, Inc., a leader in manufacturing image processing systems, offers a complete line of scanning microdensitometers and film plotters. Optronics' systems digitize, enhance, manipulate, and reconstruct imagery at high speeds with high resolution, and accept formats from 10″ × 10″ to 40″ × 40″ in black and white or color. They typically offer sequential pass color separation capability, data compression, a programmable microprocessor, and/or standard interfaces. Some of the many applications with which Optronics is presently involved include, remote sensing, reconnaissance, oil and gas exploration, cartography, medical and industrial radiography, nondestructive testing, quality control, and PC artwork generation. We look forward to the opportunity to discuss your image processing needs and will provide additional technical information.

Booth 705 **Orcatech Inc.**

2680 Queensview Drive
Ottawa, Ontario, Canada K2B 8H6
(613) 820-9602
John Lugsdin
Vice President, Marketing

The Orcatech family of products, the Orca1000, Orca2000 and Orca3000, combine the fastest of high resolution raster graphics with the application processing power to handle even the most demanding of user application programs. In particular, the Orca3000 is designed to support the development and execution of large CAD applications and to provide a fully integrated, high speed graphics system. Features include: application processing based on the MC68000/68010, giving an address range of 16Mb and real local memory capacity of up to 8Mb; a full UNIX software environment, providing support for the C, Pascal, FORTRAN '77, FORTRAN IV and Mainsail compilers; full support for local peripherals, including floppy and hard disks, digitizers, printers and plotters.

Booth 1069 **J. Osawa & Company, Ltd.**

2-8 Shibaura 4-chome, Minatoku
Tokyo 108, Japan
03-455-0111
Hideo Osato
Product Manager

Oscon Gradimate Data Tablet/Digitizer
- operates under electromagnetic induction system
- assures low cost and high stability
- connects to any computer
- provides varied operating modes

Yec/Photron FS-1000 Frame Sync/Encoder
- converts continuous RGB computer outputs into broadcast-standard video
- stores two TV frames
- has a standard genlock/internal sync generator
- permits mixing of the encoded video with external video input

Booth 130 **Panasonic Industrial Co.**

P.O. Box 1503 — ECD
Secaucus, New Jersey 07094
(201) 348-5278
Marge Lopez
Sales Correspondent

Ultra high-resolution color cathode ray tubes for CAD/CAM and business graphic displays. Preconverged in-line cathode ray tubes and delta gun cathode ray tubes will be on display.

Booth 1055 **Panasonic Industrial Co., Industrial Sales Division-Information Systems Group**

One Panasonic Way
Secaucus, New Jersey 07094
(201) 348-7935
Eli Spater
Product Manager

Personal computers, serial matrix printers, multi-color digital plotters.

Booth 1055 **Panasonic Industrial Co., Special Products Division**

One Panasonic Way
Secaucus, New Jersey 07094
(201) 348-5399
Mitch Kolesaire
Product Manager

Panacopy Instant Slide Systems producing color and black and white slides from computer graphic hardcopy will be shown.

Booth 877 **Parallax Systems Inc.**

1030 East Duane Avenue, Suite #H
Sunnyvale, California 94086
(408) 720-1600
Jim MacKnight
Vice President Marketing

User Group Contact:
Bob Goodwin
Vice President Engineering

The Rampage 4 single-board color graphics controller provides a high-performance, cost-effective OEM graphics solution. It is ideally suited for embedded applications in CAD/CAM, process control and business graphics. Rampage 4 is plug compatible with either Q-bus or Multibus back planes and has 640 × 480 resolution, 16 colors, 12 million pixel/sec. solid or patterned object generation, on board alpha-numerics and many other standard features.

Booth 272 **Peritek Corporation**

5550 Redwood Road
Oakland, California 94619
(415) 531-6500
Pat Markovich-Treece
Marketing/Sales Manager

User Group Contact:
Pat Markovich-Treece
Marketing/Sales Manager

Peritek Corporation manufactures performance-oriented hardware and software products for adding-in or adding-on to Q-Bus and Unibus systems. Products include dual-height single color dot graphics boards (up to 8-bits of color), color alphagraphics, monochrome 1024 × 1024 dot and alphagraphics, multi-processor links, floppy and Winchester disk storage interfaces, monitors, keyboards, and other items related to Raster Graphics Applications. Peritek addresses the OEM and quantity end-user with its modular assemblies and also offers custom intelligent display systems for 'turnkey' users.

Booth 141 **Phoenix Data Systems, Inc.**

80 Wolf Road
Albany, New York 12205
(518) 459-6202
Mark Thurman
Manager, Marketing Communications

User Group Contact:
Rakesh Kumar
General Sales Manager

Phoenix Data Systems, Inc. will introduce the revolutionary INSIGHT™ System, industry's first real-time solid modeler. Based on modular, proprietary hardware processors, INSIGHT allows for the interactive manipulation, analysis and display of arbitrary 3-D objects acquired from solid primitives, voxel, surface or other 3-D formats.

Application areas include medical display and analysis, CAD/CAM, simulation and cinematography.

On display will be the INSIGHT MARK II Image Generator. Medical and CAD/CAM objects will be displayed interactively with surface shading, complete hidden-surface removal and surface texture. A 3-D trackball is used to control the following (all in 3-D): translation, scaling, rotation, randomly positioned cut planes, dynamic density selection (medical), and pseudocolor.

Booth 376 **Photonics Spectra**

Berkshire Common
Pittsfield, Massachusetts 01201
(413) 499-0514
Wendy Laurin
Director of Marketing

Photonics Spectra is the international magazine for photonics technology, covering optics, electro-optics, lasers, fiber optics and vacuum technology. Circulation of over 42,000 is distributed monthly to scientists, engineers, designers and managers involved in this technology. Includes 21 monthly departments, plus special feature articles.

Booth 169 **Photonics Technology**

Box 432
Luckey, Ohio 43443
(419) 666-0033
Donald K. Wedding, Sr.
Vice President, Marketing

User Group Contact:
Donald K. Wedding, Sr.
Vice President Marketing

Photonics Technology manufactures standard and custom size display terminals, including the world's largest non-projected display — a flat, ½-inch thick, transparent, meter-diagonal, AC gas discharge (plasma) display panel with a viewing area of over 5.3 square feet and a resolution of over 2500 pixels per square inch. Smaller area displays range in size from a few centimeters up to one meter. Larger displays up to three meters are being developed. Display resolutions range up to 10,000 pixels per square inch or more.

Booth 1341 **Pick Computing Machinery, Inc.**

57 North Main Street
Hartford, Wisconsin 53027
(800) PICK-CMI
Donald D. Woelz
General Manager

PCM manufactures PCB layout systems including color graphics, digitizing tablets, plotters, and a combination 32-bit proprietary graphics computer with a DEC LSI-11 compatible front end. The system utilizes floppy disk, 20M byte Winchester disk, and 2M bytes of picture display memory.

Booth 555 **Polaroid Corporation**

575 Technology Square
Cambridge, Massachusetts 02139
(617) 577-3016
Alan S. Barrett
Marketing Manager Computer Graphics

User Group Contact:
Alan S. Barrett
Marketing Manager Computer Graphics

The Polaroid/VideoPrinter and Palette color film recorders yield instant and rapid-access full-color hard copy photographic prints and transparencies in formats from 35mm to 8 × 10 inches from computer graphics systems and video sources. The display-driven VideoPrinter 8 digitizes computer-sourced RGB signals for presentation quality 8 × 10 prints and overhead transparencies. The new interactive Palette computer image recorder, compatible with IBM PC, Compag, Apple IIe and Apple II Plus computers, associates with "Graphwriter" and "Chartmaster" software graphics packages to provide 35mm graphics slides in minutes using the new Polaroid 35mm Autoprocess system.

Booth 1027 **Precision Visuals, Inc.**

6260 Lookout Road
Boulder, Colorado 80301
(303) 530-9000
Don Van Dyken
Vice President, Marketing

User Group Contact:
Scott Allman
Manager, Customer Services

Precision Visuals, Inc. develops, markets, and supports general purpose, device- and machine-independent graphics software tools. Products include: DI-3000 — device-independent subroutine system based on the GSPC CORE standard with 3-D, full color, graphics input, graphics data structures, real-time image manipulation; GRAFMAKER — a data presentation subroutine system for producing bar graphs, line graphs, pie charts and has extensive business graphics vocabulary; GRAFMASTER — a "user-friendly" interactive package to generate both simple and sophisticated presentation graphics; Contouring System — a specialized graphics subroutine set for rendering either gridded or random 3-D geophysical data; Metafile System — a device-independent picture library and picture editor.

Booth 124 **PrintaColor Corporation**

5965 Peachtree Corners East
Norcross, Georgia 30071
(404) 448-2675
J. Daniel Byford
Sales Promotion Manager

The TC1040 supercedes PrintaColor's previous printer line, greatly improving the color quality, resolution, speed and flexibility of operation. The TC1040 color printer can produce 4,913 different hues on various pinfeed media in user-selectable widths. The TC1040 employs a software-selectable lookup table to provide a convenient method of specifying the exact color shades to be used in its built-in ordered dithering pattern. Horizontally, the TC1040 prints either of two resolutions: 85 or 120 dots per inch; it prints vertically at a resolution of 85 dots per inch. Print time is dependent upon the amount of activity in the image since the unit has full image-seeking capability. The TC1040 interfaces via either a RS-232C or Centronics-type I/O port.

Booth 1149 **Quality Micro Systems, Inc.**

57 S. Schillinger Rd.
Mobile, Alabama 36608
(205) 633-4300
Lisa Busby
Show & Exhibits Coordinator

The Lasergrafix 1200 is a 12-page per minute, non-impact page printer, with a resolution of 90,000 dots per square inch, on plain paper with dry toner. It is capable of extensive industrial and business graphics applications. The MAGNUM Series Controllers are microprocessor-based interfaces for dot matrix printer/plotters which are suitable for printing industrial and business graphics applications. The WedgeBox is a modular approach to printer interfacing, housing mother/daughter board and power supply. The mother board is printer dependent while the daughter boards, providing host interfacing, are printer independent. It interfaces most printers to most computer systems.

Booth 577 **Quantex Corporation**

252 N. Wolfe Road
Sunnyvale, California 94086
(408) 733-6730
Peter Bliven
National Sales Manager

QUANTEX introduces a new generation in high-speed image processing and computing — the model QX-2000. Beginning with an ergonomically designed control console which includes a color touch-screen control monitor with self-instructing branching menus, the system has multiple memories, one or two point processors, selectable aspect ratios, advanced analysis algorithms, eight independent graphics bit planes, and necessary system peripherals.

Booth 717 **Ramtek Corporation**

2211 Lawson Lane
Santa Clara, California 95050
(408) 988-2211
Robert Varga
Director of Product Marketing

Ramtek will be exhibiting an entire family of colorgraphic display generators, terminals and peripherals. Featured will be several new products including a new graphics display system, which is a sophisticated OEM graphics/imaging system with 1280 × 1024 resolution and pixel write speeds of 37 ns per pixel. The system is suited for command and control, simulation, and CAD/CAM/CAE applications. In addition, the new RM-9465 deskside graphics display system offers the high resolution of the standard RM-9460 — at the price of low resolution — for CAD/CAM, business graphics, medical or seismic imaging, and process control. Also recently introduced is the RM-6221, which combines VT100 capabilities with a quality colorgraphics terminal. The 6221 surpasses standard VT100 text attributes with a color character selection and more pages and page formats. The family of products displayed includes the RM-9460 graphic workstations, colorgraphic printers and video film recorder.

Booth 849 **Raster Technologies, Inc.**

9 Executive Park Drive
North Billerica, Massachusetts 01862
(617) 667-8900
Diana M. Dickinson
Marketing Communications

Raster Technologies designs and manufactures high-performance intelligent color graphics controllers, stressing ease of use and simplified program development. The Model One family includes the Model One/25 with resolution of 512 × 512 with up to 24-bit planes, the Model One/40 with resolution of 1024 × 1024 with up to 6-bit planes, and the flicker-free, 60 Hz Model One/60 at 768 × 576 with image memory of 1024 × 1024 × 6. The Model One family includes over 100 firmware graphics primitive commands including a complete display list capability.

Booth 148 **Recognition Concepts, Inc.**

924 Incline Way, Box 8510
Incline Village, Nevada 89450
(702) 831-0473
John Sample
Marketing Manager

User Group Contact:
Harry Aine
Senior Systems Analyst

Recognition Concepts is a manufacturer of real-time image processing systems featuring single or multi-channel image display resolutions from 512 × 512 to 1024 × 1024 × 16-bits and features real-time acquisition to 8- or 10-bits and up to 1024 × 1024 resolution.

Booth 1305 **Ridge Computers**

586 Weddell Drive
Sunnyvale, California 94086
(408) 745-0400
Carol Byram
Marketing Communications

Ridge ThirtyTwo is a 32-bit high-performance computer for CAD, scientific and engineering applications, consisting of a CPU containing an instruction fetch unit (with branch prediction and

an instruction cache) and an execution unit (with 32-bit ALU and 32-bit barrel shifter), a 60M byte Winchester disc, 1M byte to 8M byte main memory and a double density floppy disc. The system also provides up to four 1000 × 800 pixel graphics displays, Pascal, C and FORTRAN compilers and Ridge assembler. A mass storage companion unit is also available consisting of any combination of the following: an 800/1600 BPI, 1/2″ stop-start/streaming tape drive, up to two 430MB formatted disc drives and power control module.

Booth 132 **SAS Institute Inc.**

Box 8000
Cary, North Carolina 27511-8000
(919) 467-8000
Software Sales

SAS Institute will exhibit SAS/GRAPH, device-intelligent color graphics software. Procedures are available for: plotting; displaying bar, pie, star, and block charts; projecting statistical data to choropleth, surface, prism, and block maps; making slides; and replaying stored results for management presentations. SAS/GRAPH users must have SAS; SAS runs under OS, VM/CMS, DOS/VSE, SSX, TSO, and ICCF on IBM 370/30xx/43xx and compatible machines; on Data General Corp.'s ECLIPSE MV series under AOS/VS; on Digital Equipment Corp.'s VAX 11/7xx series under VMS; and on Prime Computer, Inc.'s 50 series under PRIMOS.

Booth 709 **Scientific Calculations, Inc.**

7635 Main Street
Fishers, New York 14453
(716) 924-9303
Tim Kerwin (West)
Brian Pitre (East)
Steve Testa (Central)
Regional Managers

User Group Contact:
Gus Taft
Manager-Marketing Communications

Scientific Calculations, Inc. is a turnkey vendor of design automation systems for PCB and IC design.

- **SCICARDS™ Program — An automated tool for the PCB designer providing comprehensive capabilities for the interactive design of single-sided, double-sided, and multilayer printed circuit boards.**

- **SCHEMACTIVE® — An automated, interactive schematic design system by which a user may define a schematic on a CRT, bulk capture a previously hand drawn schematic or create a schematic interactively on a CRT.**

- MEDS™ — An automated, integrated circuit design system for both MOS and BIPOLAR markets. It enhances productivity for all design approaches including hand-crafted, cell based and gate array.

Booth 1227 **Seiko Instruments U.S.A., Inc.**

1623 Buckeye Drive
Milpitas, California 95035
(408) 727-0768
Cheryl Landman
Manager — Marketing Communications

SEIKO will exhibit the D-SCAN Series display devices featuring color graphics terminals and color hard copiers.

The D-SCAN intelligent graphic terminal is based on a dual processor architecture offering SEIKO's unique "built-in" hardware anti-aliasing, two-dimensional transformation capability and 1024 × 780 resolution.

The D-SCAN copier produces high resolution (150 dot/inch) crisp color copies with the ease of conventional office copiers. Blending the concepts of color printing and thermal image transfer technology, this desktop unit uses normal grade paper to produce fast inexpensive full color copies.

Booth 1249 **Seillac Company Limited**

Ginzaohno Bldg., 1-17, Tsukiji 4-chome
Chuo-ku, Tokyo 104, Japan
03-545-2077
Toshio Yoshiga
General Manager, Marketing and Sales

The Seillac Company of Tokyo was founded solely to produce the world's most advanced graphic devices. To attain this objective, efforts have been directed at analyzing problems related to, and in determining various features being demanded of, graphic stations to satisfy various applications. This has resulted in the production of Seillac's 3-D Real-time Color Graphic Terminal Systems including plotters, co-processors and GSP, introducing the most advanced technologies in hardware and software, developed by Seillac. New features and improvements provide image quality, speed, versatility, etc. Seillac's products are indeed the world's most advanced. Many more innovations are forthcoming in the future.

Booth 355 **Selanar Corporation**

4212 North Freeway Blvd.
Sacramento, California 95834
(916) 921-9700
Amber L. Penman
Administrative Assistant, Marketing/Sales

Selanar is a manufacturer of low-cost graphics upgrades for DEC, TeleVideo, and Lear Seigler terminals which are Tektronix Plot 10 compatible and emulate the Tektronix 4010/4014. Options are available for various printer interfaces and Selanar's Digital Cross-Hair Cursor. We will be introducing Selanar's new product, the SG120V for DEC's LA120 printer. This will allow the LA120 to act as a stand-alone Tektronix 4010/4014 vector graphics terminal.

Booth 800 **SIGGRAPH '84 and SIGGRAPH Local Groups**

SIGGRAPH '84 Conference Office
111 East Wacker Drive
Chicago, Illinois 60601
(312) 644-6610

Conference co-chairs
Richard Mueller
Richard Weinberg

Local Groups Coordinator
Ron Lusen
Princeton University
Plasma Physics Laboratory
P.O. Box 451
Princeton, New Jersey 08540
(609) 683-2544

SIGGRAPH '84, the Eleventh Annual Conference on Computer Graphics and Interactive Techniques, meets July 23 - 27, 1984 in Minneapolis, Minnesota, the City of Lakes. The city's eminent computer industry, university and colleges, central location, natural beauty and cultural events make it an ideal host. The conference continues SIGGRAPH's tradition of presenting the latest and best throughout the field of computer graphics. In the call for participation at the end of this program, we invite your contribution to making 1984's conference another success.

Sponsored by the Association for Computing Machinery's Special Interest Group on Computer Graphics in cooperation with the IEEE Technical Committee on Computer Graphics, Eurographics, the Minneapolis College of Art and Design, the University of Minnesota and the Science Museum of Minnesota.

Local groups of SIGGRAPH currently exist in eight cities. Visit with booth staff and learn how you can become a member of an existing SIGGRAPH local group or begin a new group in your area.

Booth 1067 **Software News**

5 Kane Industrial Drive
Hudson, Massachusetts 01749
(617) 562-9308
Jean E. Gallant
Marketing Services

Bonus distribution copies of the June, 1983 issue of Software News will be handed out at our booth, along with free subscription applications.

Booth 1431 **J. S. Staedtler, Inc./MARS CAD Division**

21034 Osborne Street
Canoga Park, California 91304
(213) 882-6000
William R. Nichols
General Manager, MARS CAD Division

Staedtler MARS CAD is the professional computer-aided drafting system that's really affordable. MARS CAD is a sophisticated turn-key system for a fraction of the price you'd expect to pay. It can be used in architectural, mechanical, or schematic drafting applications. MARS CAD is so easy to use, it can be mastered in a few days. With MARS CAD's unique software package, you can draw lines and shapes instantly, select pre-drawn symbols, add crosshatching and dimensions, rotate objects, add text, zoom in, and maintain up to 63 levels at a time.

Booth 166 **Sumitomo Corporation of America**

606 So. Olive St.
Los Angeles, California 90014
(213) 627-4783
Ken Fujii
Manager, Electronics Department

User Group Contact:
Ken Fujii

Sumitomo Corporation is introducing a new product for application in the CAD/CAM field, called FINEGRAPH. The FINEGRAPH is a high-speed, raster scan, color graphic display. It provides high-speed processing for interactive functions and a 2-D/3-D processing, operations which are performed by the host computer. It is perfectly suited for application in the CAD/CAM field.

Booth 427 **Summagraphics Corporation**

35 Brentwood Avenue
Fairfield, Connecticut 06430
(203) 384-1344
Kathy Dunn
Marketing Communications Manager

Summagraphics, the world's leading supplier of digitizers, now emerges as the leading supplier of graphic input devices. This comprehensive, fully compatible product offering includes the new, highly reliable, optical SummaMouse, MM Series digitizers and a new full family of high resolution, high accuracy digitizers. With these new products, Summagraphics now offers the broadest spectrum of graphic input devices available from any manufacturer.

Booth 255 **SUN Microsystems, Inc.**

2550 Garcia Avenue
Mountain View, California 94043
(415) 960-1300
Lloyd Fugate
Vice-President, Marketing

SUN Microsystems is displaying the Sun Workstation, a high-performance desktop computer that supports a wide range of scientific and engineering applications.

The workstation is based on the MC68010 processor with a proprietary memory management unit providing 16M bytes of virtual memory per process.

The Sun operating system is UNIX 4.2bsd: UNIX enhanced with support for virtual memory through demand paging, a high-performance file system, networking, and an advanced user interface which includes a "window" screen management package and an optical "mouse" pointing device.

The Sun Workstation operates in a distributed environment, where a number of diskless Sun workstations are linked via a 10 Mbps Ethernet to share file servers, print servers and other peripherals.

Booth 441 **Superset, Inc.**

11035 Roselle Street
San Diego, California 92121
(619) 452-8665
Jerry Donaldson
Director, Marketing and Customer Relations

Superset, Inc. manufactures the PGM (Portable Graphics Mainframe), a graphics-based distributed processor, controller or stand-alone computer. 48-bit precision and virtual memory architecture for efficient compilation, linking and execution of massive FORTRAN programs beyond the reach of minicomputers. Cost effective for interactive applications or software development. New products this year include: DOC — document processor capable of mixing text and graphics; Video Synthesizer — allows color graphics to be mixed with any RGB signal up to 1024 × 768 resolution; NTSC video output; and animation software.

Booth 860 **Symbolics, Inc.**

243 Vassar Street
Cambridge, Massachusetts 02139
(617) 864-4660
Abe Hirsh
Product Manager

Symbolics manufactures powerful Lisp-based computers for artificial intelligence, CAD, VLSI design, simulation training, and command and control applications. These computers are 36-bit minicomputer based workstations complete with high resolution B & W and color graphics, local area networks and large hard disk file systems. Symbolics' strengths are very sophisticated interactive display software, a full complement of local networking facilities, high performance Lisp-based (FORTRAN 77 available) computing and AI expertise. Symbolics' Laser Graphics Printer features high resolution (240 X 240 DPI) for text, graphics, and typography; embedded MC68000 controller, software, and 1M byte memory. It interfaces with most computer systems.

Booth 1077 **Symtec, Inc.**

15933 West Eight Mile Road
Detroit, Michigan 48235
(313) 272-2950
Paul Ambrose
Marketing Manager - Vice President

The Professional Graphics System (PGS) by Symtec is a low-cost, versatile broadcast-quality graphics generator for use in broadcast, post production, business presentations and interactive video training. Featuring an NTSC RS170A output with 16 colors selectable from 4096, the Symtec unit will generate text, graphics and animation. PGS is a downstream keyer as well and will genlock and overlay text and graphics on a background video feed. A new frame grab option will digitize a video frame in 16 grey levels and allow frame manipulation such as colorizing, text overlay or frame manipulation. Retail price includes text, graphics and animation software. RGB output available.

Booth 1339 **Systems Research Laboratories, Inc.**

2800 Indian Ripple Road
Dayton, Ohio 45440
(513) 426-6000
Susan D. Lehman
Manager, Product Support

User Group Contact:
Herb L. Hirsch
Manager, 2106 Product Office

The SRL Model 2106 Color Display (1280 × 1024) has 100MHz video bandwidth and switch selectable multiple line/frame rates (16 ranges) for today's high resolution graphics systems.

The SRL Model 2110 (64kHz horizontal frequency) Color Display (1280 × 1024) has 100 MHz video bandwidth for flicker free 1000-line presentation and switch selectable multiple line/frame rates (16 ranges).

Typical applications include computer graphics, CAD/CAM/CIM, training and simulation, and C^3I.

Booth 468 **Technology & Business Communications, Inc.**

730 Boston Post Road - Suite 25
Sudbury, Massachusetts 01776
(617) 443-4671
Robert A. Stiefel
Marketing Manager
Lisa A. Senio
Assistant to the President/Publisher

The S. Klein family of computer graphics information products includes: (1) a twice monthly briefing service covering news and interpretation; (2) a definitive, 128-page suppliers directory covering hardware, software, systems and services offered by 300 computer graphics suppliers serving CAD/CAM, business graphics, image processing, etc.; (3) a specialized computer graphics postcard deck that contains important buyers' leads to some 50 product offerings; (4) and a list of 50,000 computer graphics and CAD/CAM professionals available for rental by the CG community.

Booth 617 **Tektronix, Inc.**

P.O. Box 500
Beaverton, Oregon 97077
(503) 685-3772
Kevin Van Hoomissen
Marketing Communications

Tektronix, Inc., the leading manufacturer of computer graphics products for engineering and scientific markets will feature color graphics terminals in workstation configurations directed at the computer-aided design and technical data analysis application areas. Featured products in the booth include: 4110 Series Computer Display Terminals; 4100 Series Computer Display Terminals; and Color Hard Copy Units. The 4115 Computer Display Terminal is a high-resolution 60Hz non-interlaced color raster display. The 4105 Computer Display Terminal is a low cost 60Hz non-interlaced color raster display with resolution with 480 × 360 pixels and a coordinate space of 4096 × 4096 addressable points. The 4695 Color Hard Copy Unit uses on-demand ink jet technology, to produce 8-color copies from computer graphics displays.

Booth 805 **Terak Corporation**

14151 N. 76th St.
Scottsdale, Arizona 85260
(602) 998-4800
Daniel R. Traxler
Director, Product Marketing

User Group Contact:
Daniel R. Traxler

Microcomputer graphics systems support low-cost CAD/D applications including mechanical, electronic design, architectural engineering and facilities management. The Model 8510B/C graphics systems support the Design Graphix and Minn-Draft CAD/D packages and necessary peripherals.

Booth 1252 **Terminal Display Systems**

1901 Royal Lane, Suite 100
Dallas, Texas 75229
(214) 869-0000
John Donald
Executive Vice President

User Group Contact:
Dale Wilcox
Vice President, Engineering

The TDS EASY TRAK, a self-contained intelligent trackball, provides the user with the most practical and comprehensive control device for graphics displays. Microprocessor-based and employing optical and encoding techniques for high precision, EASY TRAK overcomes the limitations of conventional trackballs. Major features are: built to military specs, three tracking rates, user selectable function keys, four cursors, relative or absolute addressing, serial or parallel interfaces, ASCII data streams including point or stream modes, LCD X/Y axis displays.

Booth 1317 **Texas Instruments, Semiconductor Group**

P.O. Box 401560
Dallas, Texas 75240
(713) 879-2355
Sharon Crook
Merchandising Manager

Texas Instruments markets advanced semiconductors for graphics applications, including video display processors, signal processors, graphics controllers, minicomputers, video memories, DRAM controllers, 64K DRAMs in by 4 and by 1 configurations and DRAMs in chip carrier packages.

Booth 949 **3M-Audio Visual Division**

3M Center 225-3NE
St. Paul, Minnesota 55144
(612) 733-3319
Mary Fish
Marketing Communications Coordinator

3M will exhibit a photographic transparency maker, an infrared transparency maker, a lettering system, overhead projectors, a stand-alone minicomputer, and projectable films for the above equipment.

Booth 1327 **Three Rivers Computer Corporation**

720 Gross Street
Pittsburgh, Pennsylvania 15224
(412) 621-6250
Carol Geyer
Marketing Communications Specialist

Three Rivers Computer Corporation will demonstrate the new PERQ 2 — the next generation of their definitive graphics workstation. Hardware enhancements to be shown include a 1024 × 1068 color display, offering 256 colors at a time (from a choice of 16 million), and an optional landscape display with 100 dots/inch resolution on a 19″ diagonal. Application software for the PERQ 2 includes GINO — a portable, CORE standard, vector graphics package, DOGS — a 2-D drafting system, SYSTEM D/L — a logic design system, and many other packages addressing the fields of architecture, electronic publishing, and graphics programming.

Booth 155 **Totoku Electric Co., Ltd.**

3-21, Okubo 1-Chome Shinjuku-ku
Tokyo, Japan
03-202-2121
Isao Okada
Manager, Foreign Trade Department

Totoku will exhibit its high-performance CRT display modules, which feature excellent deflection yokes to utilize the capacity of its CRT displays to the limit. They include high-resolution monochrome displays for computer graphics and workstations, high-resolution in-line color displays of trio-dot pitch 0.21mm and 0.31mm for computer graphics, and random scan displays for computer graphics.

Booth 1043 **Trillium Corporation (formerly Image Dynamics, Inc. of New Jersey)**

P.O. Box 530
Little Ferry, New Jersey 07643
(201) 288-7670;
(800) 222-0745 out of New Jersey
Greg Gustin
Vice President, Marketing

Technical Contact:
Ron Swallow
President, Vice President, Engineering

Trillium Corporation will be exhibiting their high-performance real-time image generator. The features of this hardware system include: 3-D to 2-D, hidden surface solution, smooth shaded color, fog, shiny surfaces, and intersections. Images containing between 10,000 and 15,000 edges can be processed in real-time, at a resolution of 640 × 480. The system can also operate out of real-time, allowing the user to generate images of much higher complexity. For example, an image of 300,000 edges can be generated in one second.

Booth 1052 **Universal Technical Graphics**

5462 Research Dr.
Huntington Beach, California 92649
(714) 898-3584
Robert Ball
Director

User Group Contact:
Robert Ball

Universal Technical Graphics will demonstrate pen plotters and controllers with an emphasis on cost-effective refurbished equipment for the Computer Graphics Industry. UTG also has its own multiple location Field Engineering Organization specializing in the repair and service of plotting equipment. UTG's parent company, Graphic Resources Corp., will be exhibiting the industry's largest array of plotting media, pens, inks and accessories developed and manufactured specifically for use on all pen and electrostatic plotters.

Booth 939 **Vector Automation, Inc.**

Village of Cross Keys
Baltimore, Maryland 21210
(301) 433-4202
Phillip A. Adams
Vice President of Marketing

Vector Automation manufactures the following products: (1) the CADMAX-II computer-aided design/drafting system for 2-D mechanical, electrical schematic and architectural applications using stroke refresh terminal technology; (2) the GRAPHICUS-80 stroke writer refresh display, designed for 2-D and 3-D graphics applications requiring high resolution via a host and capable of displaying 66,000 short vectors flicker free.

Booth 977 **Vectrix Corporation**

1416 Boston Road
Greensboro, North Carolina 27407
(919) 294-6640
Michael Gold
Vice President, Finance and Marketing

Vectrix Corporation manufactures a line of color graphics machines which features the VX384. Designed to be used as a co-processor with a host computer, the VX384 interfaces via either an RS-232 serial or a Centronics parallel port. It offers: resolution of 672H × 480V; 512 colors per pixel out of 16.8 million; 384K graphics RAM; 9-bit planes. Internal processors are Intel 8088 (5MHz) and NEC 7220. Pixel drawing time is 1600 nanoseconds. Software features encoded on PROM include point, line, arc and polygon primatives in 2-D and 3-D; solid polygons with pattern fill; color lookup table commands; character generation with slant, magnification, and spacing parameters; bi-directional DMA access to the graphics RAM; and 3-D commands for rotation, scaling, translation, perspective, clipping and viewporting.

Booth 639 **Versatec Inc.**

2710 Walsh Avenue
Santa Clara, California 95051
(408) 988-2800
Cliff Eppard
Advertising Manager

Versatec is the world's leading manufacturer of electrostatic plotting equipment. See our electrostatic color plotter electronically produce a full-color E-size drawing in eight minutes. Our multi-media plotter, available in 22 to 44-inch models, combines a selection of output media with the high speed and reliability of electro-

static plotting. Versatec's multi-media desktop V-80 11-inch printer/plotter prints 1000 lines per minute at 200 point per inch resolution. Take a look at our micrographics products — ACRIS and IMPRES 500. ACRIS allows the high speed digitization and local or remote plotting of aperture card images. It is also a component of the Versatec IMPRES 500 scan/edit/plot system, which allows drawings to be edited and updated before plotting.

Booth 227 **Via Video Inc.**

5155 Old Ironsides Drive
Santa Clara, California 95050
(408) 980-8009
Jim McBurney
Vice President, Marketing

The Via Video System One™ Picture Processing System provides full range flexibility for artistic design and video applications. The basic System One comes complete and ready to use with all hardware and software, and includes training. System One is designed to be a creative tool for non-computer oriented professionals. It can create, illustrate, digitize, animate and generate any hand-drawn or existing visual image.

System One supports a variety of output formats, including NTSC video, full color photographs, transparencies, gray scale copies and read/write laser discs.

Booth 960 **Vicom Systems, Inc.**

2307 Bering Drive
San Jose, California 95131
(408) 946-5660
D. F. McCook
Vice President Marketing

User Group Contact:
Richard A. Pendergrass
Marketing Support Analyst

Vicom Systems, Inc. is an original equipment manufacturer of general purpose, high-performance image processing systems. The system includes the Motorola MC68000 microcomputer, plus a unique extended multiple-bus architecture to utilize the 68000's

24-bit address capability. The VICOM features such options as disk storage and operation, array processors, point processors, video digitizers, intelligent graphics generators, 8M bytes of refresh memory and a variety of system peripherals. All systems feature an extensive library of image processing routines.

Booth 1142 **VMI**

One Main Street, P.O. Box 236
Winooski, Vermont 05404
(802) 655-3800
Jim Richards
Marketing Director

User Group Contact:
John Cushman
Engineering

Single-card color graphics engines, multi-card graphics systems, and packaged workstations will be exhibited by VMI. Each of these raster-scan graphics product families offers unique cost/performance factors to the OEM, systems integrater, and end user. Products with resolution to 1K × 1K, and performance to 80 nanoseconds per pixel will be demonstrated.

Booth 1248 **Watanabe Instruments Corp.**
(Western Graphtec, Inc. as of July 1)

12 Chrysler Street
Irvine, California 92714
(714) 770-6010
Annette Comeau
Manager, Advertising and Promotion

Multi-pen and single-pen intelligent plotters and drum plotters will be exhibited.

Booth 1254 **Westward Technology Inc.**

5 Cambridge Center
Cambridge, Massachusetts 02142
(617) 492-1890
J. Roberts, Sales Development Manager
B. Jolly, Technical Service Manager

Westward will be launching their entire range of high-performance graphic terminals into the US market at SIGGRAPH '83. Having started direct sales in 1982, Westward is a UK manufacturer

who has gained $7.5 million share of the European raster graphic display market in just over 12 months. A unique combination of ergonomic styling, competitive prices and a high quality display are the keynotes of Westward's success.

Booth 1420 **WICAT Systems**

1875 South State Street
Orem, Utah 84057
(801) 224-6400
Glenn Stewart
Industry Marketing Manager

User Group Contact:
Margo Walters
Public Relations Manager

WICAT Systems provides fully integrated engineering workstations for the mechanical and civil engineering marketplace. These systems incorporate pre and post processing graphics along with NASTRAN and STRUDL analysis programs. These programs incorporate imbedded training utilizing WISE (a proprietary WICAT training language) to provide easy-to-use, low cost workstations.

Booth 649 **Xerox Corporation — Printing Systems Group**

880 Apollo Street
El Segundo, California 90245
(213) 536-7000
Follett Carter
Product Manager, Electronic Printing Systems

User Group Contact:
Bruce Rider

Xerox will be exhibiting the 9700 Electronic Printing Systems with 150 Graphic Input Station.

Also, software specifically for graphics and publishing will be demonstrated.

In addition, the Xerox 6500 Color Graphics Printer will be on display.

Booth 1443 **Zentec Corporation**

2400 Walsh Avenue
Santa Clara, California 95050
(408) 727-7662
Colleen Latcham
Systems Publicist

User Group Contact:
Mason Killebrew
Product Manager, Terminals

Zentec designs, manufactures and markets terminals, workstations and small business computer systems to the OEM and end user marketplace. The Zentec product family includes the Series 2000, a powerful business system which can easily be configured for one to six users. Based upon the XENIX operating system, the Series 2000 combines a high performance 16-bit CPU with intelligent workstations.

The Zentec terminal family includes color graphics and a range of intelligent monochrome alphanumeric terminals, versions of which are also available as Series 2000 workstations.

Zentec's products are available to the OEM and end user markets through Zentec direct sales and authorized SHASTA dealerships.

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827	Digital Equipment Corporation
627	Hewlett-Packard Company
739	IBM Corporation
839	Intecolor Corporation
527	Megatek Corporation
249	Modgraph, Inc.
1338	NEC Information Systems, Inc.
955	Nippon Computer Co., Ltd.
1305	Ridge Computers
255	SUN Microsystems, Inc.
617	Tektronix, Inc.
805	Terak Corporation
1443	Zentec Corporation

Booth	Drafting systems
1211	Computer Graphics Lab, Inc.
455	Data Design Logic Systems, Div. of United Scientific Corporation
152	Design Aids, Inc.
627	Hewlett-Packard Company
1117	Lexidata Corporation
677	Micro Control Systems, Inc.
1341	Pick Computing Machinery, Inc.
1431	J.S. Staedtler, Inc./MARS CAD Division
427	Summagraphics Corporation
441	Superset, Inc.
1339	Systems Research Laboratories, Inc.
617	Tektronix, Inc.

805	Terak Corporation
1252	Terminal Display Systems
1327	Three Rivers Computer Corporation
939	Vector Automation, Inc.

Booth	Electrical/electronic systems
1105	ARTEL Communications Corporation
1425	Celco
152	Design Aids, Inc.
1153	DYNAIR Electronics, Inc.
655	Gould, Inc., DeAnza Imaging and Graphics Division
1304	IMTEKS Inc.
779	Japan Radio Co., Ltd.
141	Phoenix Data Systems, Inc.
1341	Pick Computing Machinery, Inc.
577	Quantex Corporation
1339	Systems Research Laboratories, Inc.

Booth	Ergonomics
917	Advanced Electronics Design, Inc.
379	CIE Terminals, Inc.
969	Engineering Automation Systems, Inc.
605	Lundy Electronics & Systems Inc.
1048	Measurement Systems, Inc.
1339	Systems Research Laboratories, Inc.
1254	Westward Technology Inc.

Booth	Ergonomics — hardware
379	CIE Terminals, Inc.
1048	Measurement Systems, Inc.
1254	Westward Technology Inc.

Booth	Ergonomics — workstations
917	Advanced Electronics Design, Inc.
969	Engineering Automation Systems, Inc.
605	Lundy Electronics & Systems Inc.
255	SUN Microsystems, Inc.
1339	Systems Research Laboratories, Inc.
1254	Westward Technology Inc.

Booth	Graphic digitizers
471	ALTEK Corporation
360	Bausch & Lomb Houston Instrument Division
727	CalComp
379	CIE Terminals, Inc.
463	Datacopy Corporation
377	Datacube, Inc.
152	Design Aids, Inc.
172	Elographics, Inc.
366	EQS Systems
341	Grinnell Systems Corporation
1415	GTCO Corporation
627	Hewlett-Packard Company
763	ImagiTex, Inc.
1304	IMTEKS Inc.
839	Intecolor Corporation
270	KURTA Corporation
677	Micro Control Systems, Inc.
570	Numonics Corporation
1069	J. Osawa & Company, Ltd.
1341	Pick Computing Machinery, Inc.
1149	Quality Micro Systems, Inc.
1227	Seiko Instruments U.S.A., Inc.
1249	Seillac Company Limited
1431	J.S. Staedtler, Inc./MARS CAD Division
427	Summagraphics Corporation
617	Tektronix, Inc.
1252	Terminal Display Systems
227	Via Video Inc.
649	Xerox Corporation, Printing Systems Group

Booth	Graphic displays
817	Adage, Inc.
1343	Ann Arbor Terminals
961	Apollo Computer, Inc.
539	Aydin Controls
360	Bausch & Lomb Houston Instrument Division
727	CalComp
463	Datacopy Corporation
377	Datacube, Inc.
811	Data General Corporation
1419	Datagraph, Inc.
1437	Data Type Inc.
241	Digital Engineering, Inc.
827	Digital Equipment Corporation
979	Dimension Research, Inc.
1063	DISER, Inc.
230	Elector USA Inc.
1255	Electronic Systems Products, Inc.
969	Engineering Automation Systems, Inc.
366	EQS Systems

655	Gould, Inc., DeAnza Imaging and Graphics Division
1001	Graphic Strategies, Inc.
341	Grinnell Systems Corporation
1311	GTI Corporation, Computer Graphics Division
627	Hewlett-Packard Company
739	IBM Corporation
1421	ID Systems Corporation
905	Ikegami Electronics (USA), Inc.
268	Ikier Technology, Inc.
1304	IMTEKS Inc.
839	Intecolor Corporation
1239	Intelligent Software Systems
779	Japan Radio Co., Ltd.
149	Jupiter
271	KEL, Inc.
1117	Lexidata Corporation
605	Lundy Electronics & Systems Inc.
479	Matra Technology, Inc.
234	Matrox Electronic Systems Ltd.
527	Megatek Corporation
1005	Metheus Corporation
1342	Micro-Term, Inc.
249	Modgraph, Inc.
902	Moniterm Corporation
1338	NEC Information Systems, Inc.
955	Nippon Computer Co., Ltd.
877	Parallax Systems, Inc.
272	Peritek Corporation
141	Phoenix Data Systems, Inc.
169	Photonics Technology
1341	Pick Computing Machinery, Inc.
717	Ramtek Corporation
849	Raster Technologies, Inc.
1305	Ridge Computers
1227	Seiko Instruments U.S.A., Inc.
1249	Seillac Company Limited
355	Selanar Corporation
255	SUN Microsystems, Inc.
441	Superset, Inc.
860	Symbolics, Inc.
1339	Systems Research Laboratories, Inc.
617	Tektronix, Inc.
155	Totoku Electric Co., Ltd.
939	Vector Automation, Inc.
977	Vectrix Corporation
227	Via Video Inc.
960	Vicom Systems, Inc.
1142	VMI
1254	Westward Technology Inc.
1420	WICAT Systems
1443	Zentec Corporation

Booth	Graphics aided drafting
1105	ARTEL Communications Corporation
361	Bausch & Lomb
1211	Computer Graphics Lab, Inc.
1238	Cubic Systems
455	Data Design Logic Systems, Div. of United Scientific Corporation
1255	Electronic Systems Products, Inc.
172	Elographics, Inc.
366	EQS Systems
1001	Graphic Strategies, Inc.
627	Hewlett-Packard Company
1421	ID Systems Corporation
1304	IMTEKS Inc.
605	Lundy Electronics & Systems Inc.
677	Micro Control Systems, Inc.
1338	NEC Information Systems, Inc.
1341	Pick Computing Machinery, Inc.
555	Polaroid Corporation
1149	Quality Micro Systems, Inc.
1305	Ridge Computers
355	Selanar Corporation
427	Summagraphics Corporation
441	Superset, Inc.
1339	Systems Research Laboratories, Inc.
617	Tektronix, Inc.
1327	Three Rivers Computer Corporation
939	Vector Automation, Inc.

Booth	Hardcopy — photographs
1425	Celco
979	Dimension Research
627	Hewlett-Packard Company
839	Intecolor Corporation
1143	Lang Systems, Inc.
1017	LogE/Computer Imaging Systems Companies
1205	MacDonald Dettwiler and Associates Ltd.
571	Matrix Instruments, Inc.
249	Modgraph, Inc.
560	Optronics International Inc.
555	Polaroid Corporation
949	3M — Audio Visual Division
227	Via Video Inc.
649	Xerox Corporation, Printing Systems Group

Booth	Hardcopy — slides
1425	Celco
1304	IMTEKS Inc.
839	Intecolor Corporation

1143	Lang Systems, Inc.
1017	LogE/Computer Imaging Systems Companies
1205	MacDonald Dettwiler and Associates Ltd.
571	Matrix Instruments, Inc.
249	Modgraph, Inc.
1338	NEC Information Systems, Inc.
1055	Panasonic Industrial Co., Special Products Division
555	Polaroid Corporation
717	Ramtek Corporation
227	Via Video Inc.
649	Xerox Corporation, Printing Systems Group

Booth — Hardcopy — video paper

1139	Advanced Color Technology, Inc.
1304	IMTEKS Inc.
1205	MacDonald Dettwiler and Associates Ltd.
955	Nippon Computer Co., Ltd.
1227	Seiko Instruments U.S.A., Inc.
1249	Seillac Company Limited
617	Tektronix, Inc.
227	Via Video Inc.

Booth — High performance graphics processors

127	AMF Logic Sciences, Inc.
961	Apollo Computer, Inc.
727	CalComp
861	CSPI
377	Datacube, Inc.
811	Data General Corporation
1063	DISER, Inc.
172	Elographics, Inc.
655	Gould, Inc., DeAnza Imaging and Graphics Division
341	Grinnell Systems Corporation
1311	GTI Corporation, Computer Graphics Division
739	IBM Corporation
268	Ikier Technology, Inc.
763	ImagiTex, Inc.
1039	International Imaging Systems
271	KEL, Inc.
1117	Lexidata Corporation
1017	LogE/Computer Imaging Systems Companies
1438	Marinco, Inc.
234	Matrox Electronic Systems Ltd.
1005	Metheus Corporation
1243	Microtex Corporation
955	Nippon Computer Co., Ltd.

1242	Number Nine Computer Engineering Inc.
1208	Omni Graphics Corporation
705	Orcatech Inc.
877	Parallax Systems, Inc.
272	Peritek Corporation
141	Phoenix Data Systems, Inc.
1341	Pick Computing Machinery, Inc.
1149	Quality Micro Systems, Inc.
577	Quantex Corporation
849	Raster Technologies, Inc.
148	Recognition Concepts, Inc.
1305	Ridge Computers
1227	Seiko Instruments U.S.A., Inc.
1249	Seillac Company Limited
255	SUN Microsystems, Inc.
441	Superset, Inc.
860	Symbolics, Inc.
1339	Systems Research Laboratories, Inc.
1317	Texas Instruments, Semiconductor Group
1327	Three Rivers Computer Corporation
1043	Trillium Corporation
939	Vector Automation, Inc.
977	Vectrix Corporation
960	Vicom Systems, Inc.
1142	VMI
649	Xerox Corporation, Printing Systems Group
1443	Zentec Corporation

Booth — High resolution graphic display systems

817	Adage, Inc.
917	Advanced Electronics Design, Inc.
127	AMF Logic Systems, Inc.
1343	Ann Arbor Terminals
961	Apollo Computer, Inc.
1105	ARTEL Communications Corporation
539	Aydin Controls
727	CalComp
1211	Computer Graphics Lab, Inc.
1238	Cubic Systems
855	Cullinet Software
811	Data General Corporation
1437	Data Type Inc.
979	Dimension Research
1063	DISER, Inc.
230	Elector USA Inc.
1255	Electronic Systems Products, Inc.
172	Elographics, Inc.
366	EQS Systems
158	Florida Computer Graphics
655	Gould Inc., DeAnza Imaging and Graphics Division

1001	Graphic Strategies, Inc.
341	Grinnell Systems Corporation
739	IBM Corporation
1421	ID Systems Corporation
268	Ikier Technology, Inc.
763	ImagiTex, Inc.
1304	IMTEKS Inc.
839	Intecolor Corporation
1039	International Imaging Systems
149	Jupiter
271	KEL, Inc.
1117	Lexidata Corporation
1017	LogE/Computer Imaging Systems Companies
479	Matra Technology, Inc.
234	Matrox Electronic Systems Ltd.
1005	Metheus Corporation
249	Modgraph, Inc.
902	Moniterm Corporation
1338	NEC Information Systems, Inc.
955	Nippon Computer Co., Ltd.
1242	Number Nine Computer Engineering Inc.
1208	Omni Graphics Corporation
705	Orcatech Inc.
272	Peritek Corporation
141	Phoenix Data Systems, Inc.
169	Photonics Technology
1341	Pick Computing Machinery
555	Polaroid Corporation
717	Ramtek Corporation
849	Raster Technologies, Inc.
1305	Ridge Computers
1227	Seiko Instruments U.S.A., Inc.
1249	Seillac Company Limited
355	Selanar Corporation
1431	J.S. Staedtler, Inc./MARS CAD Division
255	SUN Microsystems, Inc.
441	Superset, Inc.
860	Symbolics, Inc.
1339	Systems Research Laboratories, Inc.
617	Tektronix, Inc.
1043	Trillium Corporation
939	Vector Automation, Inc.
977	Vectrix Corporation
227	Via Video Inc.
960	Vicom Systems, Inc.
1142	VMI
1254	Westward Technology Inc.
1420	WICAT Systems
1443	Zentec Corporation

Booth	Interactive graphics terminals
817	Adage, Inc.
917	Advanced Electronics Design, Inc.
1343	Ann Arbor Terminals
961	Apollo Computer, Inc.
539	Aydin Controls
379	CIE Terminals, Inc.
1211	Computer Graphics Lab, Inc.
1238	Cubic Systems
455	Data Design Logic Systems, Div. of United Scientific Corporation
811	Data General Corporation
1437	Data Type Inc.
241	Digital Engineering, Inc.
1063	DISER, Inc.
172	Elographics, Inc.
969	Engineering Automation Systems, Inc.
911	Envision
158	Florida Computer Graphics
341	Grinnell Systems Corporation
1311	GTI Corporation, Computer Graphics Division
627	Hewlett-Packard Company
739	IBM Corporation
1421	ID Systems Corporation
268	Ikier Technology, Inc.
763	ImagiTex, Inc.
839	Intecolor Corporation
1039	International Imaging Systems
779	Japan Radio Co., Ltd.
149	Jupiter
271	KEL, Inc.
270	KURTA Corporation
1117	Lexidata Corporation
605	Lundy Electronics & Systems Inc.
234	Matrox Electronic Systems Ltd.
527	Megatek Corporation
1005	Metheus Corporation
1342	Micro-Term, Inc.
249	Modgraph, Inc.
1338	NEC Information Systems, Inc.
955	Nippon Computer Co., Ltd.
1208	Omni Graphics Corporation
705	Orcatech Inc.
169	Photonics Technology
1341	Pick Computing Machinery, Inc.
555	Polaroid Corporation
849	Raster Technologies, Inc.
1249	Seillac Company Limited
355	Selanar Corporation
166	Sumitomo Corporation of America
255	SUN Microsystems, Inc.
441	Superset, Inc.
860	Symbolics, Inc.
1339	Systems Research Laboratories, Inc.

617	Tektronix, Inc.
1043	Trillium Corporation
939	Vector Automation, Inc.
977	Vectrix Corporation
1142	VMI
1254	Westward Technology Inc.
1443	Zentec Corporation

Booth — Low-cost graphics systems

917	Advanced Electronics Design, Inc.
1343	Ann Arbor Terminals
961	Apollo Computer, Inc.
539	Aydin Controls
361	Bausch & Lomb
861	CSPI
1238	Cubic Systems
377	Datacube, Inc.
811	Data General Corporation
1437	Data Type Inc.
241	Digital Engineering, Inc.
1063	DISER, Inc.
1255	Electronic Systems Products, Inc.
172	Elographics, Inc.
158	Florida Computer Graphics
655	Gould, Inc., DeAnza Imaging and Graphics Division
1001	Graphic Strategies, Inc.
1415	GTCO Corporation
627	Hewlett-Packard Company
1421	ID Systems Corporation
268	Ikier Technology, Inc.
136	Imaging Technology, Inc.
839	Intecolor Corporation
1039	International Imaging Systems
271	KEL, Inc.
1117	Lexidata Corporation
1017	LogE/Computer Imaging Systems Companies
605	Lundy Electronics & Systems Inc.
234	Matrox Electronic Systems Ltd.
527	Megatek Corporation
677	Micro Control Systems, Inc.
1338	NEC Information Systems, Inc.
955	Nippon Computer Co., Ltd.
1242	Number Nine Computer Engineering Inc.
1208	Omni Graphics Corporation
705	Orcatech Inc.
877	Parallax Systems, Inc.
272	Peritek Corporation
1341	Pick Computing Machinery, Inc.
555	Polaroid Corporation
1149	Quality Micro Systems, Inc.
717	Ramtek Corporation

132	SAS Institute Inc.
1227	Seiko Instruments U.S.A., Inc.
355	Selanar Corporation
166	Sumitomo Corporation of America
255	SUN Microsystems, Inc.
441	Superset, Inc.
1077	Symtec, Inc.
1339	Systems Research Laboratories, Inc.
617	Tektronix, Inc.
805	Terak Corporation
939	Vector Automation, Inc.
977	Vectrix Corporation
227	Via Video Inc.
1142	VMI
1248	Watanabe Instruments Corp.
1254	Westward Technology Inc.

Booth	Manufacturing systems
1238	Cubic Systems
855	Cullinet Software
739	IBM Corporation
779	Japan Radio Co., Ltd.
1149	Quality Micro Systems, Inc.
1305	Ridge Computers

Booth	Mechanical design systems
1105	ARTEL Communications Corporation
811	Data General Corporation
739	IBM Corporation
779	Japan Radio Co., Ltd.
1117	Lexidata Corporation
605	Lundy Electronics & Systems Inc.
705	Orcatech Inc.
141	Phoenix Data Systems, Inc.
1305	Ridge Computers
1431	J.S. Staedtler, Inc./MARS CAD Division
427	Summagraphics Corporation
441	Superset, Inc.
617	Tektronix, Inc.
805	Terak Corporation
1252	Terminal Display Systems
939	Vector Automation, Inc.
639	Versatec Inc.
1420	WICAT Systems

Booth	Monitors
335	Apple Computer
539	Aydin Controls
230	Elector USA Inc.
240	Electrohome Limited
366	EQS Systems
655	Gould, Inc., DeAnza Imaging and Graphics Division
341	Grinnell Systems Corporation
261	Hitachi America Limited
905	Ikegami Electronics (USA), Inc.
839	Intecolor Corporation
234	Matrox Electronic Systems Ltd.
902	Moniterm Corporation
1109	Nissei Sangyo America, Ltd.
1055	Panasonic Industrial Co., Industrial Sales Division — Information Systems Group
717	Ramtek Corporation
849	Raster Technologies, Inc.
1339	Systems Research Laboratories, Inc.
617	Tektronix, Inc.
155	Totoku Electric Co., Ltd.

Booth	Non glare coatings/materials
135	OCLI-Optical Coating Laboratory, Inc.

Booth	Numerical control (NC, CNC, DNC)
1017	LogE/Computer Imaging Systems Companies

Booth	Piping systems
1238	Cubic Systems
441	Superset, Inc.

Booth	Plotters
943	Analog Technology Corporation
360	Bausch & Lomb Houston Instrument Division
927	Benson, Inc.
727	CalComp
455	Data Design Logic Systems, Div. of United Scientific Corporation

327	Dicomed Corporation
979	Dimension Research
366	EQS Systems
627	Hewlett-Packard Company
839	Intecolor Corporation
779	Japan Radio Co., Ltd.
1205	MacDonald Dettwiler and Associates Ltd.
435	Nicolet Zeta Corporation
570	Numonics Corporation
560	Optronics International Inc.
1055	Panasonic Industrial Co., Industrial Sales Division — Information Systems Group
1149	Quality Micro Systems, Inc.
1249	Seillac Company Limited
1431	J.S. Staedtler, Inc./MARS CAD Division
617	Tektronix, Inc.
949	3M — Audio Visual Division
1052	Universal Technical Graphics
639	Versatec Inc.
1248	Watanabe Instruments Corp.

Booth	Printers
1139	Advanced Color Technology, Inc.
943	Analog Technology Corporation
335	Apple Computer
379	CIE Terminals, Inc.
1437	Data Type Inc.
979	Dimension Research
1063	DISER, Inc.
911	Envision
366	EQS Systems
627	Hewlett-Packard Company
1304	IMTEKS Inc.
839	Intecolor Corporation
271	KEL, Inc.
1055	Panasonic Industrial Co., Industrial Sales Division — Information Systems Group
124	PrintaColor Corporation
1149	Quality Micro Systems, Inc.
717	Ramtek Corporation
1227	Seiko Instruments U.S.A., Inc.
355	Selanar Corporation
860	Symbolics, Inc.
617	Tektronix, Inc.
227	Via Video Inc.
1248	Watanabe Instruments Corp.
649	Xerox Corporation, Printing Systems Group

Booth	Projectors
230	Elector USA Inc.
1255	Electronic Systems Products, Inc.
561	General Electric Company, Projection Display Products Operation
949	3M — Audio Visual Division
227	Via Video Inc.

Booth	Publications
1435	Addison-Wesley Publishing Company
1206	The Anderson Report
144	Business Computer Systems
1071	Computer Decisions
678	Computer Design Publishing Company
1204	Computer Graphics World
1050	Computer Pictures Magazine
843	CW Communications/Inc.
1061	Data Sources
566	Digital Design/Morgan-Grampian Publishing Company
1444	Electronic Engineering Times
566	Electronic Imaging/Morgan-Grampian Publishing Company
1344	Electronic News
171	Government Data Systems Magazine
131	Hardcopy Magazine
370	Machine Design/Computer-Aided Engineering
144	Mini-Micro Systems
376	Photonics Spectra
1067	Software News
468	Technology & Business Communications, Inc.

Booth	Quantizer/line scan cameras
377	Datacube, Inc.
1042	EIKONIX Corporation
1243	Mirtex Corporation

Booth	Robotics
861	CSPI
377	Datacube, Inc.
655	Gould, Inc. DeAnza Imaging and Graphics Division
877	Parallax Systems, Inc.
272	Peritek Corporation
148	Recognition Concepts, Inc.

Booth	Software
961	Apollo Computer, Inc.
335	Apple Computer
539	Aydin Controls
942	AZTEK
927	Benson, Inc.
1002	Charles River Data Systems, Inc.
1211	Computer Graphics Lab, Inc.
855	Cullinet Software
811	Data General Corporation
152	Design Aids, Inc.
827	Digital Equipment Corporation
1063	DISER, Inc.
969	Engineering Automation Systems, Inc.
366	EQS Systems
1321	European Software Contractors A/S
341	Grinnell Systems Corporation
1415	GTCO Corporation
627	Hewlett-Packard Company
739	IBM Corporation
268	Ikier Technology, Inc.
839	Intecolor Corporation
1239	Intelligent Software Systems
749	ISSCO
527	Megatek Corporation
1243	Microtex Corporation
705	Orcatech Inc.
1027	Precision Visuals, Inc.
148	Recognition Concepts, Inc.
132	SAS Institute Inc.
255	SUN Microsystems, Inc.
617	Tektronix, Inc.
1142	VMI

Booth	Stand-alone image processors
127	AMF Logic Sciences, Inc.
539	Aydin Controls
235	Comtal/3M
861	CSPI
1063	DISER, Inc.
1042	EIKONIX Corporation
655	Gould, Inc., DeAnza Imaging and Graphics Division
341	Grinnell Systems Corporation
268	Ikier Technology, Inc.
136	Imaging Technology Inc.
1039	International Imaging Systems
271	KEL, Inc.
1017	LogE/Computer Imaging Systems Companies
479	Matra Technology, Inc.

1243	Microtex Corporation
249	Modgraph, Inc.
560	Optronics International Inc.
141	Phoenix Data Systems, Inc.
577	Quantex Corporation
148	Recognition Concepts, Inc.
166	Sumitomo Corporation of America
1252	Terminal Display Systems
1043	Trillium Corporation
960	Vicom Systems, Inc.
1142	VMI

Booth — Tablets

471	ALTEK Corporation
172	Elographics, Inc.
1415	GTCO Corporation
627	Hewlett-Packard Company
270	KURTA Corporation
677	Micro Control Systems, Inc.
570	Numonics Corporation
1227	Seiko Instruments U.S.A., Inc.
427	Summagraphics Corporation
617	Tektronix, Inc.

Booth — Turnkey systems

127	AMF Logic Sciences, Inc.
942	AZTEK
361	Bausch & Lomb
1211	Computer Graphics Lab, Inc.
235	Comtal/3M
861	CSPI
1238	Cubic Systems
455	Data Design Logic Systems, Div. of United Scientific Corporation
327	Dicomed Corporation
969	Engineering Automation Systems, Inc.
366	EQS Systems
655	Gould, Inc., DeAnza Imaging and Graphics Division
627	Hewlett-Packard Company
839	Intecolor Corporation
661	Intergraph Corporation
1039	International Imaging Systems
1017	LogE/Computer Imaging Systems Companies
1005	Metheus Corporation
272	Peritek Corporation
141	Phoenix Data Systems, Inc.
1341	Pick Computing Machinery, Inc.

577	Quantex Corporation
148	Recognition Concepts, Inc.
1305	Ridge Computers
709	Scientific Calculations, Inc.
1431	J.S. Staedtler, Inc./MARS CAD Division
441	Superset, Inc.
1339	Systems Research Laboratories, Inc.
1043	Trillium Corporation
939	Vector Automation, Inc.
227	Via Video Inc.
1142	VMI
1420	WICAT Systems

Booth	Turnkey systems — hardware
127	AMF Logic Sciences, Inc.
942	AZTEK
361	Bausch & Lomb
1211	Computer Graphics Lab, Inc.
235	Comtal/3M
861	CSPI
1238	Cubic Systems
455	Data Design Logic Systems, Div. of United Scientific Corporation
327	Dicomed Corporation
969	Engineering Automation Systems, Inc.
366	EQS Systems
655	Gould, Inc., DeAnza Imaging and Graphics Division
627	Hewlett-Packard Company
839	Intecolor Corporation
661	Intergraph Corporation
1039	International Imaging Systems
1017	LogE/Computer Imaging Systems Companies
1005	Metheus Corporation
1243	Microtex Corporation
705	Orcatech Inc.
272	Peritek Corporation
141	Phoenix Data Systems, Inc.
1341	Pick Computing Machinery, Inc.
577	Quantex Corporation
148	Recognition Concepts, Inc.
709	Scientific Calculations, Inc.
1431	J.S. Staedtler, Inc./MARS CAD Division
441	Superset, Inc.
1339	Systems Research Laboratories, Inc.
227	Via Video Inc.
1142	VMI
1420	WICAT Systems

Booth	Turnkey systems — software
127	AMF Logic Sciences, Inc.
942	AZTEK
361	Bausch & Lomb
1211	Computer Graphics Lab, Inc.
235	Comtal/3M
861	CSPI
1238	Cubic Systems
455	Data Design Logic Systems, Div. of United Scientific Corporation
327	Dicomed Corporation
969	Engineering Automation Systems, Inc.
366	EQS Systems
655	Gould, Inc., DeAnza Imaging and Graphics Division
627	Hewlett-Packard Company
661	Intergraph Corporation
1039	International Imaging Systems
1017	LogE/Computer Imaging Systems Companies
1243	Microtex Corporation
705	Orcatech Inc.
141	Phoenix Data Systems, Inc.
1341	Pick Computing Machinery, Inc.
148	Recognition Concepts, Inc.
709	Scientific Calculations, Inc.
1431	J.S. Staedtler, Inc./MARS CAD Division
441	Superset, Inc.
227	Via Video Inc.
1142	VMI
1420	WICAT Systems

Booth	Video digitizers and displays
379	CIE Terminals, Inc.
463	Datacopy Corporation
377	Datacube, Inc.
1042	EIKONIX Corporation
172	Elographics, Inc.
655	Gould, Inc., DeAnza Imaging and Graphics Division
341	Grinnell Systems Corporation
136	Imaging Technology Inc.
1304	IMTEKS Inc.
1039	International Imaging Systems
234	Matrox Electronic Systems Ltd.
1243	Microtex Corporation
577	Quantex Corporation
148	Recognition Concepts, Inc.
1339	Systems Research Laboratories, Inc.
977	Vectrix Corporation
227	Via Video Inc.
960	Vicom Systems, Inc.

Booth	Video discs
234	Matrox Electronic Systems Ltd.
227	Via Video Inc.

Booth	Video tape recorders
148	Recognition Concepts, Inc.
227	Via Video Inc.

Booth	Workstation furniture
455	Data Design Logic Systems, Div. of United Scientific Corporation
827	Digital Equipment Corporation

Booth	Miscellaneous
471	ALTEK Corporation APACHE™ electro-optically aided cursor
127	AMF Logic Sciences, Inc. Seismic and well logging plot system
801	Association for Computing Machinery Technical publications
1079	Auscom, Inc. IBM mainframe interfaces for graphics systems
539	Aydin Controls Process control systems, seismic data interpretation
927	Benson, Inc. Controllers, vector to raster converters
277	Conference Book Service Book display
865	Cray Research, Inc. Supercomputers
463	Datacopy Corporation Very high resolution digitizing cameras and displays
811	Data General Corporation Minicomputer systems and software
327	Dicomed Corporation Presentation graphics systems
979	Dimension Research Holographic hardcopy

1063 DISER, Inc.
Modula language computers

1153 DYNAIR Electronics, Inc.
RGB routing switchers

240 Electrohome Limited
Large screen projection systems

969 Engineering Automation Systems, Inc.
Networking (ETHERNET)

561 General Electric Company, Projection Display Products Operation
Video Projectors

369 Graphic Controls Corporation
Plotter media and plotter pens

1415 GTCO Corporation
IBM PC compatible

1049 IEEE Computer Society
Publications and/or societies

136 Imaging Technology, Inc.
OEM image processors

1065 INMOS Corporation
High performance VLSI memories

1239 Intelligent Software Systems
CAE systems

549 KMW Systems Corporation
Controllers for graphics devices

1205 MacDonald Dettwiler and Associates, Ltd.
High resolution film recorders

1438 Marinco, Inc.
Array processors

1048 Measurement Systems, Inc.
Data entry devices and joysticks, trackballs

1005 Metheus Corporation
Engineering workstations

1208 Omni Graphics Corporation
Catering to the OEM and sophisticated end users

560 Optronics International Inc.
Recorders, scanning microdensitometers

1069 J. Osawa & Company, Ltd.
Video frame encoder

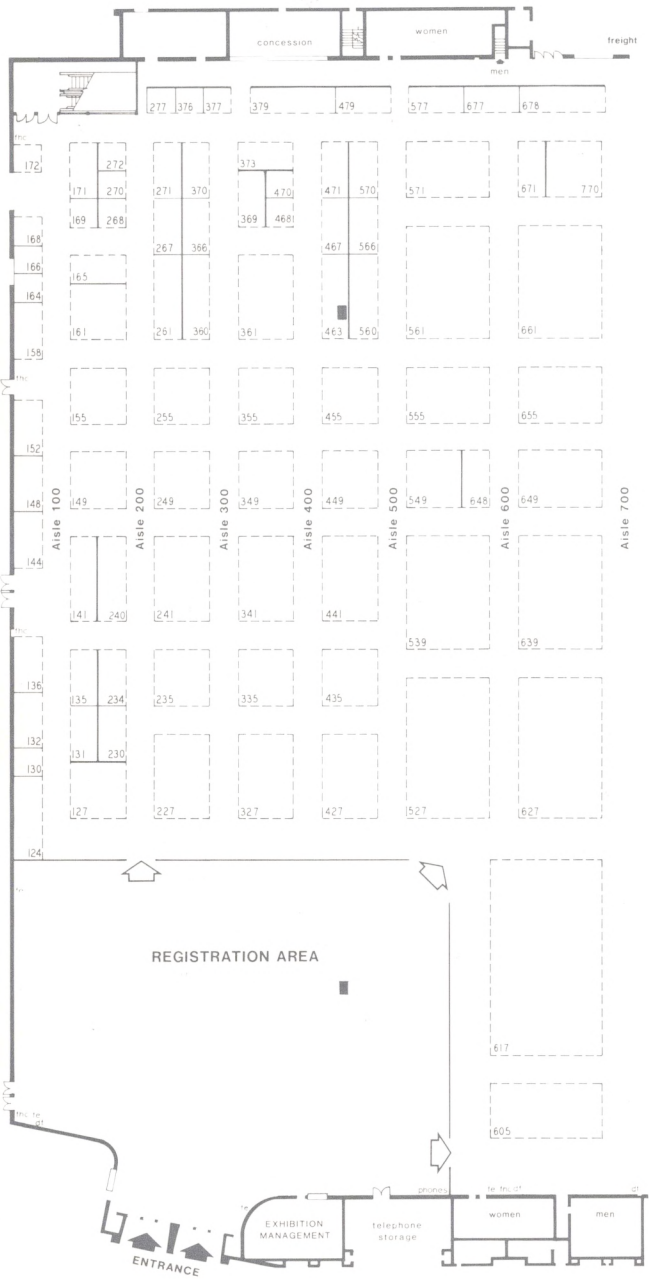
130 Panasonic Industrial Co.
Components OEM

1055 Panasonic Industrial Co., Special Products Division
Automatic slide processing systems

141	Phoenix Data Systems, Inc. Solid modeling systems
555	Polaroid Corporation Computer image recorders/film-video printers
1149	Quality Micro Systems, Inc. Raster-image processors for printing systems
849	Raster Technologies, Inc. Graphics controllers
255	SUN Microsystems, Inc. Engineering workstations
441	Superset, Inc. NTSC video output
860	Symbolics, Inc. LISP machines
1252	Terminal Display Systems Trackballs
1317	Texas Instruments, Semiconductor Group Semiconductors for graphics applications
949	3M — Audio Visual Division Plotter and printer films, color graphics reproduction systems
1043	Trillium Corporation Real-time image generators
1052	Universal Technical Graphics Plotter supplies and accessories
1142	VMI Graphics workstations

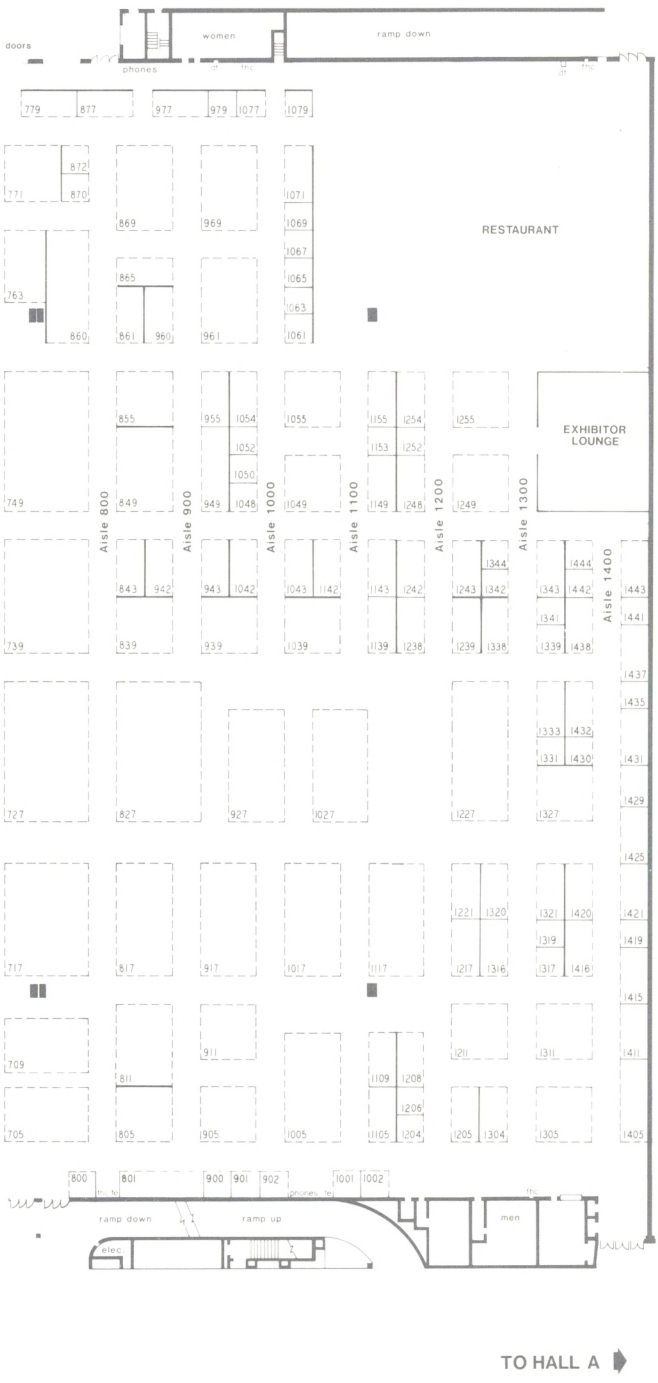
Floor plans

Floor plans



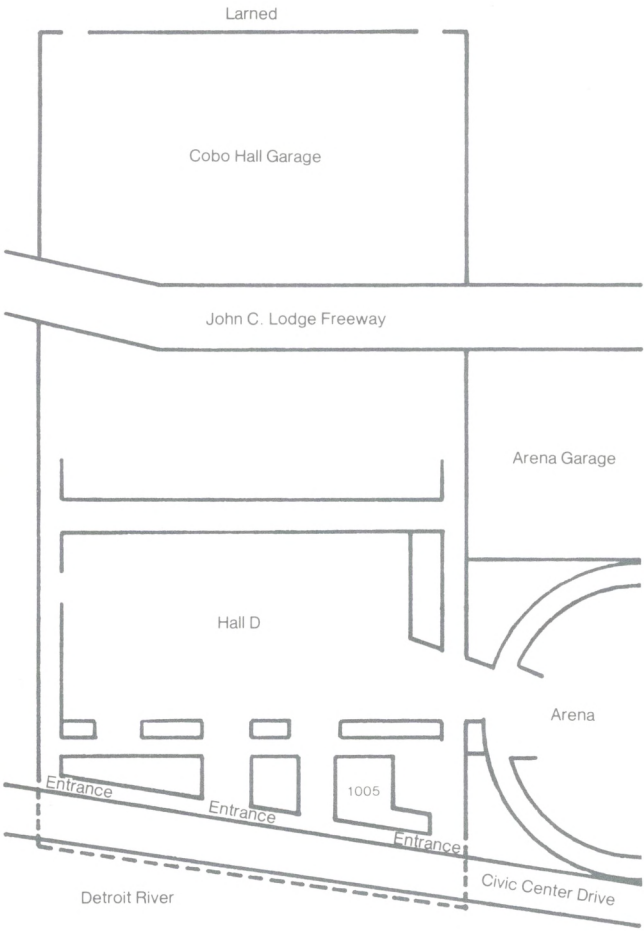
Cobo Hall
Exhibition Floor Plan — Hall C

Floor plans



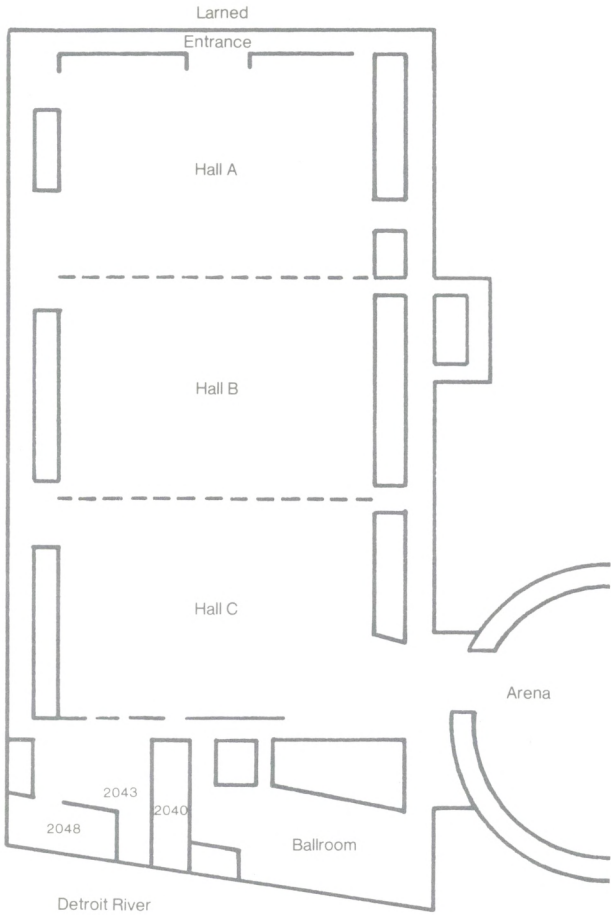
Cobo Hall
Exhibition Floor Plan — Hall B

Floor plans



Cobo Hall Lower Level

Floor plans

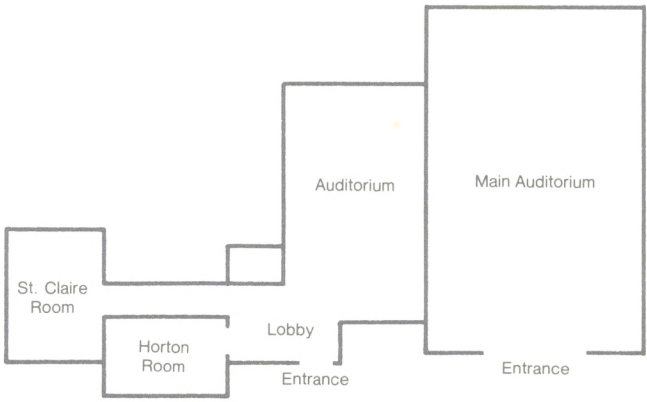


Cobo Hall Main Level

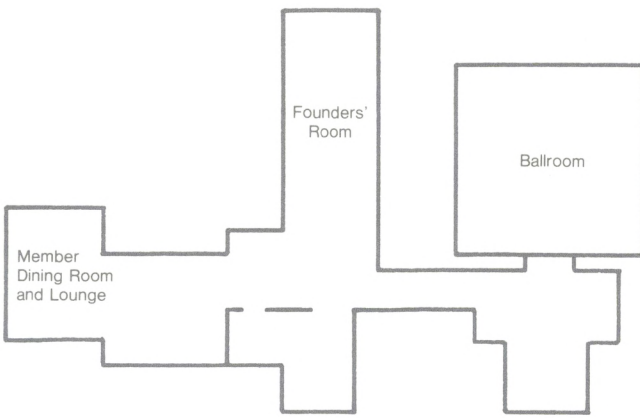
Floor plans

Cobo Hall Upper Level

Floor plans



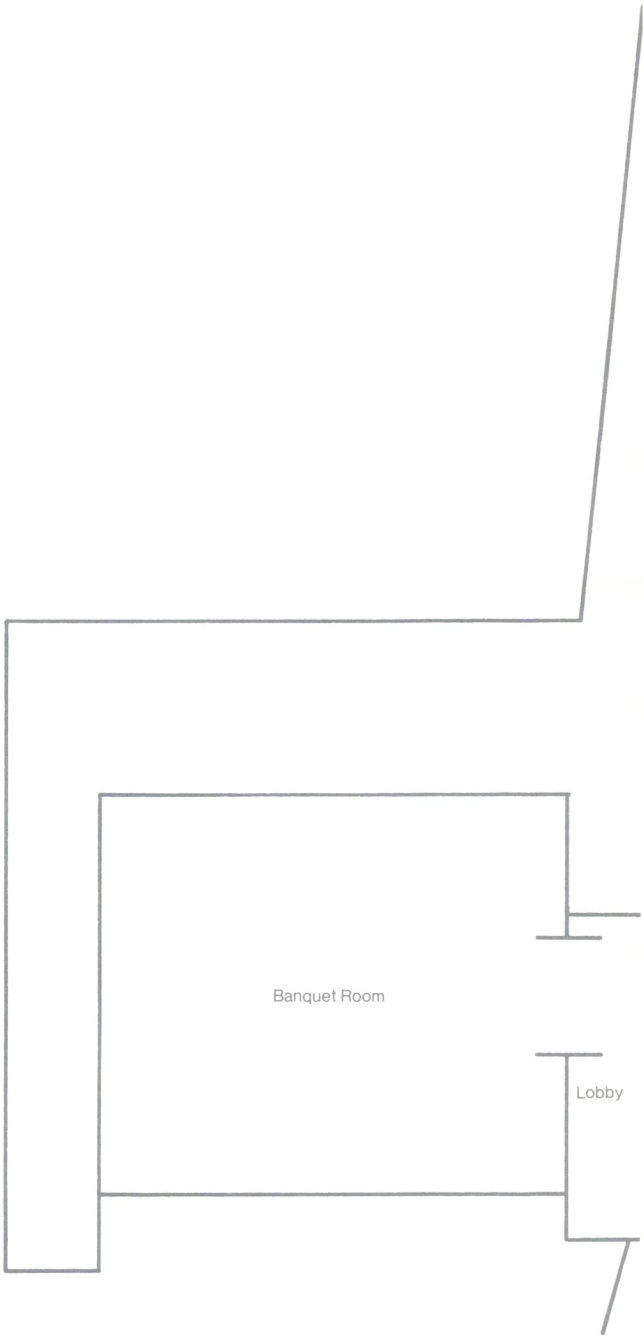
Main Floor



Lower Level

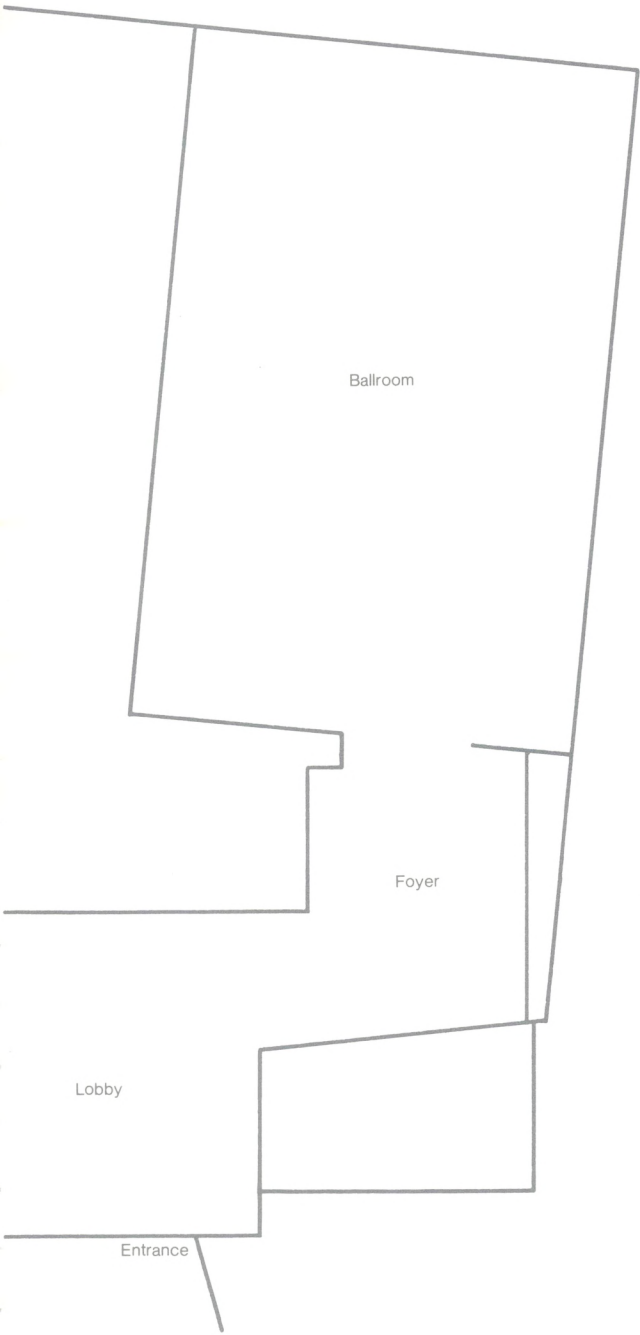
Engineering Society of Detroit

Floor plans

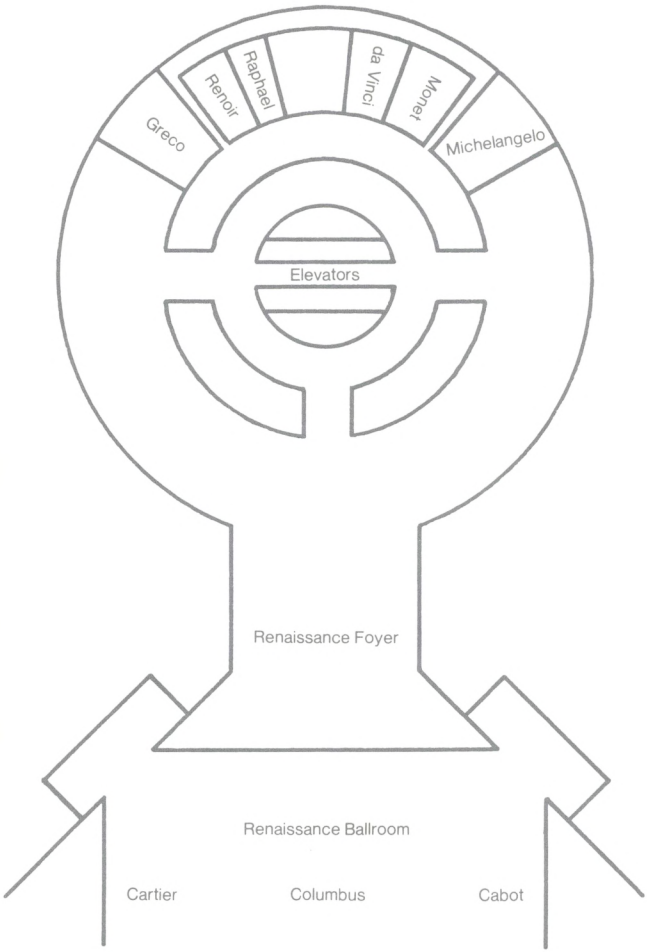


Veterans Memorial Building

Floor plans

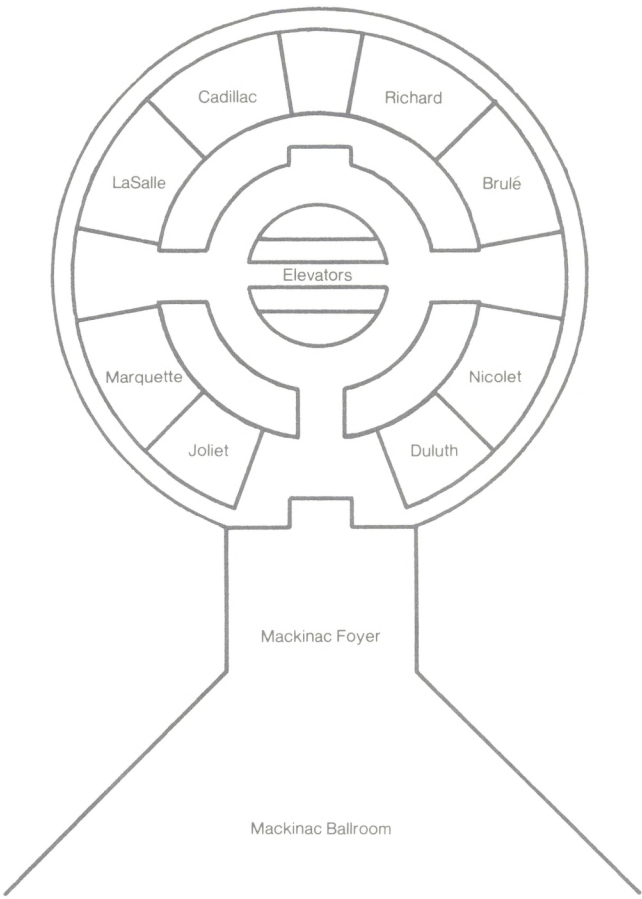


Floor plans



Westin Hotel Level 4

Floor plans



Westin Hotel Level 5

General information

Audio/Visual facilities

A/V headquarters:
The A/V headquarters is in room 3138 of Cobo Hall and provides general audio/visual assistance, including 35mm slide carousels, blank slides and reservations for the attendee screening room. A/V headquarters will be open 9 a.m. to 10 p.m. on Sunday, 8 a.m. to 7 p.m. on Monday through Thursday, and 8 a.m to 6 p.m. on Friday.

Attendee screening room:
The attendee screening room is in room 3137 of Cobo Hall. It will be available to conference attendees for informal sharing of their work with small groups. The room is equipped for 3/4" U-Matic NTSC videotape playback and 16mm sound film projection. Contact A/V headquarters, room 3138 of Cobo Hall, for access and reservations.

Speaker prep rooms:
Two speaker prep rooms will be available in Cobo Hall for rehearsal. Room 3136 is equipped for 35mm slide organization and projection. Room 3124 is equipped for limited 3/4" U-Matic NTSC videotape dubbing, cue-up, and 16mm film projection. Both rooms will be open 9 a.m. to 10 p.m. on Sunday, 8 a.m. to 7 p.m. on Monday through Thursday, and 8 a.m. to 4 p.m. on Friday.

Child care

Babysitting services can be arranged through the following companies:

Birmingham Metropolitan Domestic Service
P.O. Box 802
Birmingham, Michigan
(313) 644-4650
$16.50 for the first four hours; $2.50 for each additional hour.
Birmingham requests one day's notice for babysitters.

Dolly's Babysitting Services
2821 Rochester Road
Royal Oaks, Michigan
(313) 585-3311
$15.00 for the first four hours; $2.50 for each additional hour.
Dolly's requests two day's notice for babysitters.

Although Detroit and Windsor hotels do not have babysitting services in-house, special arrangements can occasionally be made by calling the guest services department in your hotel.

The above company names have been provided as a service to SIGGRAPH '83 registrants. SIGGRAPH '83 makes no representations or warranties regarding the quality or availability of these companies.

General information

Conference office

SIGGRAPH '83 staff will be available in room 3184 of Cobo Hall to assist registrants with any special needs or questions throughout the conference week.

Conference sponsorship

SIGGRAPH '83 is sponsored by the Association for Computing Machinery's Special Interest Group on Computer Graphics in cooperation with the Engineering Society of Detroit, the IEEE Technical Committee on Computer Graphics and Eurographics.

Dress

Casual dress is acceptable at all SIGGRAPH '83 functions. Casual dress is also acceptable at many Detroit dining establishments. However, jackets and ties are required in some locations. The SIGGRAPH '83 conference committee recommends that guests check dress code requirements when restaurant reservations are made.

First aid

A registered nurse will be on duty from Sunday through Friday. The hours will be as follows: 9 a.m. to 10 p.m. on Sunday; 8 a.m. to 10 p.m. Monday through Thursday; Friday from 8 a.m. to 5 p.m. The first aid room is located immediately to the left of the registration area of the exhibition hall complex. The telephone number is 383-4329.

Foodservice

The cafeteria in Cobo Hall, located on the upper level, will be open 8 a.m. to 3 p.m. on Monday, 8 a.m. to 7:30 p.m. on Tuesday, and 8 a.m. to 3 p.m. Wednesday through Friday.

The cocktail lounge in Cobo Hall, located on the main level, will be open Monday through Thursday from 11 a.m. to 7 p.m. Sandwiches are served in the cocktail lounge between 11:30 a.m. and 2:30 p.m.

General information

Hotels

Book Cadillac Hotel
1114 Washington Boulevard
Detroit, Michigan 48226
(313) 256-8000

Detroit Downtown Travelodge
1999 East Jefferson
Detroit, Michigan 48201
(313) 567-888

Holiday Inn Windsor
480 Riverside Drive
Windsor, Ontario, Canada
N9A 5K6
(519) 253-4412

Hotel Pontchartrain
Two Washington Boulevard
Detroit, Michigan 48226
(313) 965-0200

Mariner Hotel
Washington Blvd @ Michigan
Detroit, Michigan 48226
(313) 965-1050

National Traveller Hotel
675 Goyeau Street
Windsor, Ontario, Canada
N9B 1H3
(519) 258-8411

Richelieu Inn
430 Oulette Avenue
Windsor, Ontario, Canada
N9A 1B2
(519) 253-7281

Shorecrest Motel
1316 East Jefferson @ Rivard
Detroit, Michigan 48207
(313) 568-3000

Westin Hotel
Renaissance Center
Detroit, Michigan 48243
(313) 568-8000

Housing assistance

A representative from the Metropolitan Detroit Convention and Visitors Bureau will be available at the housing desk in the registration area in Hall C of Cobo Hall on Monday and Tuesday from 9 a.m. to 5 p.m. to assist registrants in making hotel accommodations in Detroit and Windsor.

SIGGRAPH '83 registrants needing housing assistance Wednesday through Friday can contact the Metropolitan Detroit Convention and Visitors Bureau between 9 a.m. and 5 p.m. at (313) 259-4424.

Information and assistance center

A conference information and assistance center located in the registration area in Hall C of Cobo Hall will be open beginning at 1 p.m. on Sunday, and thereafter during official registration hours.

Luggage check area

A check room area will be available outside Hall B of Cobo Hall for the convenience of SIGGRAPH '83 registrants. This area will be open beginning at 1 p.m. on Sunday, and thereafter during official registration hours.

Merchandise sales

Additional copies of SIGGRAPH '83 proceedings and course notes, T-shirts, exhibition of computer art catalogs, film & video show catalogs, SIGGRAPH slide sets, SIGGRAPH '83 exhibition of computer art slide sets, poster sets as well as merchandise from previous SIGGRAPH conferences may be purchased at the conference.

Coupons are purchased from the registration desk and exchanged for merchandise at the merchandise desk. Both desks are located in the registration area in Hall C of Cobo Hall. The desks will be open beginning at 1 p.m. Sunday, and thereafter during regular registration hours.

Message center

A message center for SIGGRAPH '83 attendees will be located in the registration area in Hall C of Cobo Hall. The message center telephone number is (313) 393-4420.

Message center personnel will accept personal messages from one conference participant to another. The message center will be open beginning at 1 p.m. on Sunday, and thereafter during official registration hours. An answering machine will accept messages after official hours.

Poster credits

Conference

Top: Raster image (2048 × 2048) of Camaro created by David Warn at General Motors Research Laboratories Computer Science Department using GMR AUTOCOLOR and plotted at DICOMED on a DICOMED D148S.

Bottom right: Integral hub and bearing assembly created by Chrysler Corporation's Technical Computer Center staff members Dennis Pontin, Emery Szmrecsanyi, Ron Myszkowski and Terry Farrell using Chrysler's Quickcon-MAGI Synthavision language. Image run by MAGI on a Perkin Elmer 3200 series and rendered on a Celco graphic film recorder (2600 × 1800).

Bottom left: Raster image (4096 × 4096) of piston and connecting rod created by Ford Motor Company research staff members Frank W. Bliss, Gregory A. Burnett, Alan L. Clark, Dan L. Toth and Ronald H. Temple using PADL-2 from the University of Rochester and modified at Ford. The image was plotted at DICOMED on a DICOMED D148S.

Background: Vector plot of Camaro created by David Warn at General Motors Research Laboratories Computer Science Department using GMR AUTOCOLOR and plotted at DICOMED on a DICOMED D148C.

DICOMED plotters: Terry Lambert and Cal Kirchhof

MAGI plotter: Bob Goldstein

Film & video shows

Digital Scene Simulation℠ by Digital Productions, Los Angeles, California, in cooperation with Fuji Photo Film U.S.A., Inc.

Fuji balls are Japanese ornaments, and this storyboard sequence illustrates the creation of these colorful objects from the flowing ribbon of an opened videocassette. The images were generated using Digital Productions' proprietary software and the CRAY-1S/1300 supercomputer. Images were created onto a Ramtek 9400.

Gary Demos and Larry Yaeger, algorithm development; Ron Cobb, art director; Ken Dozier, executive technical director; Ron Moszkowski, technical director; Kevin Rafferty and Claudia Sumner, drafter/encoders; Larry Luther and David Ruhoff, software support.

Exhibition of computer art

"Entropy" copyright 1982, Brad deGraf and Payson R. Stevens.

This work is the result of a collaborative effort between deGraf, a computer scientist, and Stevens, an independent design consultant. "Entropy" was generated at Science Applications Inc. on its VAX 11-780 and DeAnza display system.

For deGraf and Stevens, the computer medium has opened exciting new avenues of exploration utilizing infinite color and form. They have developed solid modeling imagery for commercial applications (ie., Scientific Applications annual reports) and other images, such as "Entropy," which are purely expressions of their individual and collective creativity.

Press briefing

A press briefing is scheduled on Tuesday beginning with a continental breakfast at 8 a.m. in Cobo Hall, room 3045. A short program by SIGGRAPH '83 committee members highlighting conference events will precede an early walk-through of the SIGGRAPH '83 exhibition.

Press rooms

Two rooms in Cobo Hall have been set aside for press activities. The first, room 3196, will be the base of press operations. Press registrations, press kit displays and tools for reporting will be available here. The second, room 3187, will be used for interviews and press conferences of up to 25 people. The press rooms will be staffed 3 p.m. to 8 p.m. on Sunday, 8 a.m. to 6 p.m. Monday through Thursday, and 8 a.m. to noon on Friday.

Registration

Course participants may pick up conference materials in the registration area of Cobo Hall prior to the date of their first scheduled course. Pre-registrants' materials not claimed at Cobo Hall will be available for pickup at the course location beginning at 7 a.m. on the course date. Material for courses scheduled at the Veterans Memorial Building will remain available for pickup at the registration area in Cobo Hall. This applies to advance registrants only.

All on-site registrations will be handled in the registration area of Cobo Hall during regular registration hours.

Registration hours are:

Sunday, July 24	1 p.m. - 11 p.m.
Monday, July 25	7 a.m. - 10 p.m.
Tuesday, July 26	7 a.m. - 8 p.m.
Wednesday, July 27	8 a.m. - 8 p.m.
Thursday, July 28	8 a.m. - 6 p.m.
Friday, July 29	8 a.m. - 3 p.m.

All press registrations will be handled in the press room, room 3196 of Cobo Hall.

General information

Telephones

A/V headquarters
Cobo Hall, room 3138
(313) 393-4250

Conference management office
Cobo Hall, room 3184
(313) 393-4045, 4046, 4047

Emergencies (ambulance, fire, police)
911 or dial 0 for a switchboard operator in your hotel

Exhibition management office
Cobo Hall, room 3188
(313) 393-4040, 4041, 4042, 4043

First aid
Cobo Hall registration area
(313) 393-4239

Housing assistance
Cobo Hall registration area
(313) 393-4241

Information and assistance center
Cobo Hall registration area
(313) 393-4145, 4146

Message center
Cobo Hall registration area
(313) 393-4420, 4421

Metropolitan Detroit Convention and Visitors Bureau
(313) 259-4424

Press room
Cobo Hall, room 3196
(313) 393-4424, 4425

Registration area
Cobo Hall, Hall C
(313) 393-4427

Tours

Guides on things to do and see while in Detroit will be available at the information and assistance center in the registration area of Hall C of Cobo Hall.

Transportation

Complimentary shuttle bus service will be provided for SIGGRAPH '83 attendees during the conference. Throughout the week, buses will run between the following hotels and Cobo Hall.

Route 1	Downtown Detroit Travelodge Shorecrest Motel Westin Hotel
Route 2	Holiday Inn Windsor National Traveller Hotel Richelieu Inn
Route 3	Book Cadillac Hotel Mariner Hotel

The Hotel Pontchartrain is directly across the street from Cobo Hall.

Bus service will be provided during the following hours. Full details on pickup locations and schedules are given on signs in each hotel lobby.

Sunday	Noon - midnight
Monday	7:00 a.m. - 11:30 p.m.
Tuesday	7:00 a.m. - 11:30 p.m.
Wednesday	7:00 a.m. - 11:30 p.m.
Thursday	7:00 a.m. - 11:30 p.m.
Friday	7:00 a.m. - 4:00 p.m.

To accommodate attendees with courses at the Engineering Society of Detroit, the following route will be added on Monday and Tuesday:

Route 4	Cobo Hall to the Engineering Society of Detroit

On Monday, service from Cobo Hall to ESD will begin at 7 a.m. The last major movement of buses will depart from Cobo Hall at 8 a.m. Thereafter, single bus service will be provided between Cobo Hall and ESD at approximately 20 to 30 minute intervals.

On Tuesday, service from Cobo Hall to ESD will begin at 7 a.m. The last major movement of buses will depart from Cobo Hall at 7:30 a.m. Thereafter, single bus service will be provided between Cobo Hall and ESD at approximately 20 to 30 minute intervals.

Future conferences

SIGGRAPH '84 call for participation

Announcing SIGGRAPH '84...

The Eleventh Annual Conference on Computer Graphics and Interactive Techniques
July 23 - 27, 1984
Minneapolis, Minnesota

Sponsored by the Association for Computing Machinery's Special Interest Group on Computer Graphics in cooperation with the IEEE Technical Committee on Computer Graphics, Eurographics, the Minneapolis College of Art and Design, the University of Minnesota and the Science Museum of Minnesota.

The conference
SIGGRAPH '84 will present the frontiers of computer graphics through the technical program, panel sessions, exhibition, courses, film and video shows and the art show. Combined, these functions provide an unparalleled view of the state-of-the-art in computer graphics. We invite you to participate in this extraordinary event by submitting technical papers, panel suggestions, film, video and art for presentation at the conference.

Conference information:
SIGGRAPH '84 Conference Office
111 East Wacker Drive
Chicago, Illinois 60601
(312) 644-6610

Technical papers
The annual SIGGRAPH conference is widely accepted as the leading forum for the presentation of new research and applications in computer graphics. SIGGRAPH '84 invites the submission of previously unpublished papers in all areas of computer graphics and interactive techniques. Appropriate topics include computer graphics hardware, software, languages and systems, display techniques, and interactive techniques. Applications of computer graphics in science, engineering, medicine, resource management, business, education, art and other fields are also appropriate. You may call or write the technical program chair to receive a copy of the "Guide to Authors" or to discuss the appropriateness of any intended submission.

Five copies of each submitted paper should be received by the technical program chair by January 9, 1984. This is an absolute deadline. Papers not in the technical program office by January 9 will not be reviewed. This new deadline, later than previous years, allows the authors more time to complete their papers, but requires an absolute deadline to insure fairness to all authors, and to provide adequate time for the review and publication process.

All submissions should conform to the Communications of the ACM publications standards which were published in the summer of 1982. It is strongly recommended that papers not exceed 5,000 words. Papers must include a 100 to 300 word abstract. Acceptance notification will be made by March 19, 1984, and final, camera-ready papers are due on April 30, 1984.

Technical program chair
Hank Christiansen
Civil Engineering
368CB
Brigham Young University
Provo, Utah 84602
(801) 378-6325

Technical program committee
Hank Christiansen, papers chair
David A. Luther, panels chair

*Brian Barsky
John Brewer
Bruce Brown
Edwin Catmull
James Clark
John Dill
Jose Encarnacao
Richard Gordon
Ian Hirschsohn
Larry McCleary
Richard Riesenfeld
Gary Rogers
Tom Sederberg
Maureen Stone
Turner Whitted

*SIGGRAPH '85 Technical Program Chair

Panel sessions
The SIGGRAPH panel sessions bring industry and academic leaders together with conference attendees. The sessions provide an opportunity to discuss the latest issues in the field in a structured, yet informal, setting. If you wish to form a panel, send two copies of the proposal to the panels chair. Include a description of the topic to be covered and the names of at least three suggested panelists. Proposals must be in the panels office by January 9, 1984. Acceptance notification will be made by March 19, 1984.

Panels chair
David A. Luther
Lexidata Corporation
755 Middlesex Turnpike
Billerica, Massachusetts 01865
(617) 663-8550

Exhibition information
For information about the extensive SIGGRAPH '84 exhibit of computer graphics hardware, software and services to be held July 24-26, please contact:

SIGGRAPH '84 Exhibition Management
Robert T. Kenworthy, Inc.
866 United Nations Plaza
New York, New York 10017
(212) 752-0911

Future conferences

Course information
A wide variety of one and two day courses will be presented at SIGGRAPH '84. These courses range from introductory tutorials to advanced seminars, featuring some of the top lecturers and researchers in the field. For information regarding the courses, please contact the conference office.

Course chair
Michael Bailey

Film and video shows
Each year, the SIGGRAPH film and video shows provide an amazing presentation of the very latest scientific and artistic computer graphics. In 1984, a computer graphics film and video retrospective will present a comprehensive picture of the development of the field. A computer-generated Omnimax film is also being planned for the conference. The submission deadline for film and video is June 24, 1984. Contact the conference office for further information.

Film show chairs
Nelson Max
Maxine Brown

Computer graphics art show
The SIGGRAPH '84 art show will focus on the design arts: visual communications, industrial design and architecture. The show will travel to major museums and exhibition sites throughout the United States, Japan and Europe. The curators of the show are currently seeking works for inclusion. Submissions must be received by January 9, 1984, but earlier submissions are strongly encouraged. Contact the conference office for further information.

Art show chair
Pat Whitney

Conference co-chairs
Richard Mueller
Richard Weinberg

Future conferences

SIGGRAPH '84
July 23-27, 1984
Minneapolis, Minnesota
Richard Mueller, (612) 853-5615
Richard Weinberg, (213) 938-1111

SIGGRAPH '85
July 22-26, 1985
San Francisco, California
Robert Heilman, (408) 988-2211
Pat Cole, (408) 745-2570

SIGGRAPH '86
August 18-22, 1986
Dallas, Texas

SIGGRAPH '87
July 27-31, 1987
Anaheim, California

SIGGRAPH '88
July 25-29, 1988
Atlanta, Georgia

The Tenth Annual Conference on Computer Graphics and Interactive Techniques

SIGGRAPH '03

Sponsored by the Association for Computing Machinery's Special Interest Group on Computer Graphics in cooperation with the Engineering Society of Detroit, the IEEE Technical Committee on Computer Graphics and Eurographics