Microcomputer Graphics Software

Computer applications in decision support have become increasingly important to users as the benefits of improving management efficiency and professional creativity become apparent. One aspect of decision support is the presentation of information in a way which more clearly conveys the meaning of the data and which permits a professional to visualize relationships. The value of charts and graphs in the communication of numeric data has long been recognized, and computer support for these functions can be a key element in effective management of information.

While computer graphics have been available on microcomputers for many years, many such graphics systems required computers or hardware not commonly used in other areas of the business. Few companies could justify the cost of dedicated graphics systems, and the number of products available was thus limited. With the advent of computers using memory-mapped video processing, such as the Apple family and the IBM PC, standard business systems are capable of rich graphics support. This has increased the interest in graphics products and multiplied the number available substantially.

Data Decisions recently completed a survey of graphics software products for microcomputers. In this survey 49 vendors were contacted, representing 60 products. The results of the survey are summarized in the following dot chart, which indicates the major characteristics of each graphics product. More detailed information on each product may be found in the listing of products and vendors which follows.

GRAPHICS SOFTWARE OUTLINE

VENDOR ● PRODUCT	SYSTEM SUPPORTED: IBM PC	IBM PC Compatible	Apple	Other	OPERATING SYSTEM SUPPORTED: MS-DOS	CP/M	Other	BUSINESS GRAPHICS: Spreadsheet Input	Direct Input	Other Input	Bar	Pie	Line	Histogram	Other	Integral Statistical Functions	TEXT GRAPHICS: Special Fonts	Text Manipulation	Shape Support	Block/Area Manipulation	Text/Shape Combination	Draw	Light Pen	Mouse	Tablet
Accupipe Corporation ● Creative Graphics	●	●	—	—	●	—	—	—	—	—	—	—	—	—	—	—	●	●	●	●	●	—	—	—
Analytical Software ● Boardroom Graphics	●	●	—	—	●	—	—	●	●	●	●	●	●	—	●	—	—	●	—	●	—	—	—	—
APS ● APSGraph	●	—	—	—	●	●	—	●	●	●	●	●	●	●	●	—	●	●	—	●	—	—	—	—
Automatic Microsystems ● ABC Design	●	●	—	—	●	—	—	●	—	●	●	—	●	—	—	—	●	—	—	●	●	●	●	—
AZTEC ● PC Chart	●	●	—	—	●	—	—	●	●	●	●	●	●	●	●	—	●	●	—	●	—	—	—	—
Big Tree Software Corp ● Accuchart	●	—	—	—	●	●	—	●	●	●	●	●	●	—	●	●	—	—	—	—	—	—	—	—
Boeing Computer Services ● Bitsgraf	●	—	—	—	—	—	●	●	●	●	●	●	●	●	●	—	●	●	●	—	●	—	—	—
Boeing Computer Services ● Bits Graphics Utilities	●	—	—	—	—	—	●	—	●	—	●	●	●	—	●	—	●	●	—	●	—	—	—	—
Business & Prof Software ● BPS Business Graphics	●	—	●	●	●	—	●	●	●	●	●	●	●	—	●	●	—	—	—	—	—	—	—	—
Chang Labs ● GraphPlan	●	—	—	—	●	●	—	●	●	●	●	●	●	●	●	—	●	●	●	—	—	—	—	—
Cosmos Software Co ● Micrograph	●	—	●	●	●	●	●	—	●	—	●	●	●	●	—	—	●	●	—	—	—	—	—	—
Data Transforms ● Fontrix	—	—	●	—	—	—	●	—	—	—	—	—	—	—	—	—	●	●	—	●	—	●	—	●
Decision Resources ● ChartMaster	●	●	—	—	●	—	—	●	●	—	●	●	●	●	●	—	●	●	—	●	—	—	—	—
Digital Research ● DR Graph	●	—	—	—	—	●	—	●	●	—	●	●	●	●	—	—	●	●	—	●	●	—	—	—
Duncan-Atwell Computerized Technologies ● Lenipen	●	—	—	—	●	—	—	●	●	●	●	●	●	●	—	—	●	●	—	●	●	—	●	—
Enercomp ● Plotware Z	●	—	●	●	●	—	●	—	—	—	—	—	—	—	—	—	●	●	—	●	—	—	●	●
Feith Systems ● Genl Ledger Budgeting w/ Graphics	●	—	—	●	—	—	●	—	●	●	●	—	—	—	●	—	—	—	—	—	—	—	—	—
Ferox Microsystems ● Graph Power	●	●	●	—	—	—	●	●	●	●	●	●	●	●	●	—	—	●	—	●	—	●	—	—
FTG Data Systems ● Emu-Tek	●	—	—	—	●	—	—	—	—	—	—	—	—	—	—	—	●	●	—	●	—	●	●	●
IMSI ● Four Point Graphics	●	●	—	—	●	—	—	●	—	●	●	●	●	●	—	—	—	●	●	●	●	●	●	●

Microcomputer Graphics Software

VENDOR ● PRODUCT	SYSTEM SUPPORTED: IBM PC	IBM PC Compatible	Apple	Other	OPERATING SYSTEM SUPPORTED: MS-DOS	CP/M	Other	BUSINESS GRAPHICS: Spreadsheet Input	Direct Input	Other Input	Bar	Pie	Line	Histogram	Other	Integral Statistical Functions	TEXT GRAPHICS: Special Fonts	Text Manipulation	Shape Support	Block/Area Manipulation	Text/Shape Combination	Draw	Light Pen	Mouse	Tablet
Graphic Communications ● Graphwriter	●	●	—	●	●	—	●	●	●	—	●	●	●	●	●	—	●	●	●	●	—	—	—	—	—
Graphic Software ● Chartman III	●	—	—	—	●	—	—	●	●	—	●	●	●	—	●	—	●	●	—	—	—	—	—	—	—
Graphic Software ● Super-Chartman II	●	—	—	—	●	—	—	●	—	—	●	●	●	—	—	—	●	●	—	—	—	—	—	—	—
Graphic Software ● Chartman IV	●	—	—	—	●	—	—	●	●	—	—	—	—	—	●	●	●	●	—	—	—	—	—	—	—
Graphic Software ● Softplot/BGL	●	—	—	—	●	—	—	—	●	—	—	—	—	—	●	—	—	●	●	—	—	—	—	—	—
Graphicon Software ● Metagraph	●	●	—	—	●	—	—	●	●	●	●	—	●	●	●	—	●	—	●	—	—	—	—	—	—
Great Valley Corporate Center ● Estamacs	●	—	●	—	●	—	—	—	●	—	●	—	—	—	—	●	—	—	—	—	—	—	—	—	—
Houston Instrument ● HIgraph III	●	—	●	●	●	—	—	—	●	●	—	●	—	—	—	—	—	—	—	—	—	—	—	—	—
IHS Systems ● FONTASTIC	●	●	—	—	●	—	—	—	—	—	—	—	—	—	—	—	●	●	●	●	—	—	—	—	—
Infographics ● Design Intelligence	●	—	—	—	●	●	—	●	●	●	●	●	●	●	—	—	—	—	●	—	—	●	—	—	—
Innovative Software ● FAST GRAPHS	●	●	—	—	●	—	—	●	●	●	●	●	●	●	●	—	—	●	●	●	●	—	—	—	—
International Software Marketing ● Graph Magic II	●	—	●	●	●	—	●	●	●	—	●	●	●	—	—	—	—	—	—	—	—	●	—	—	—
International Software Marketing ● Color Magic	●	—	●	●	●	—	●	—	—	—	—	—	—	—	—	—	—	—	●	●	●	●	—	●	●
Lotus Development Corp ● Lotus 1-2-3	●	●	—	●	●	—	—	●	●	●	●	●	●	—	—	—	●	—	—	●	—	—	—	—	—
Lotus Development Corp ● Symphony	●	—	—	—	●	—	—	●	●	●	●	●	●	●	—	—	●	—	—	●	—	—	—	—	—
Metasoft Corp ● Benchmark 1.0	●	—	—	●	●	—	—	●	●	—	●	●	●	—	—	—	●	●	—	●	—	—	—	—	●
Microart Corp ● Image Word/Graphics Processor	—	—	—	●	—	—	—	—	●	●	—	—	—	—	●	—	●	●	—	●	—	—	—	—	—
Micrografx ● PC Draw	●	●	—	—	●	—	—	—	—	—	—	—	—	—	—	—	●	●	●	●	●	●	—	●	●
Micro-Z Company ● MicroGraf/Print-Graf	●	—	—	—	●	—	—	—	●	—	●	—	●	—	●	—	—	—	—	—	—	●	—	—	—
Miracle Computing ● JOYDRAW	●	●	—	—	●	—	—	—	—	—	—	—	—	—	—	—	—	—	—	●	—	●	—	—	—
Miracle Computing ● EASYGRAF	●	●	—	—	●	—	—	—	●	—	—	—	—	—	—	—	—	—	—	—	—	●	—	—	—
Miracle Computing ● EASYLEARN	●	—	—	—	●	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	●	—	—	—
Miracle Computing ● GRAFCALC	●	—	—	—	●	—	—	●	●	—	●	●	—	●	●	—	—	—	—	—	—	●	—	—	—
Miracle Computing ● GRAPHIT	●	●	—	—	●	—	—	●	●	—	●	●	●	●	●	—	—	—	—	●	—	●	—	—	—
Network Consulting ● Turtle Graphics	●	●	—	—	—	—	●	—	—	—	—	—	—	—	—	—	—	—	—	●	—	●	—	—	—
Omicron Software ● Plotrax	●	—	—	—	●	—	—	●	●	●	●	●	●	—	●	●	—	—	—	—	—	—	—	—	—
Pacific Basin Graphics ● PBG 100	●	—	—	—	●	●	●	●	●	●	●	●	●	●	—	●	—	—	—	—	—	—	—	—	—
Peachtree Software ● Business Graphics System	●	●	—	●	●	●	—	●	●	—	●	●	●	●	●	—	●	●	—	—	—	—	—	—	—
Personal CAD Systems ● CAD Plan	●	●	—	—	●	—	—	—	●	—	●	●	●	●	●	—	—	●	●	●	●	●	—	●	—
PrimeSoft Corp ● The Prime Plotter	—	—	●	—	—	—	●	●	●	—	●	●	●	●	●	●	—	●	●	●	●	●	—	●	●
Redding Group ● GrafTalk	●	—	—	●	●	●	—	●	●	●	●	●	●	—	—	—	—	●	●	—	●	●	●	—	—
Savant Corporation ● Graphics Utility	●	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	●	●	—	●	—	—	—
Softkey ● KeyChart Business Graphics Systems	●	●	—	—	●	—	—	●	●	●	●	●	●	●	●	—	—	●	●	●	●	—	—	—	—
Software Publishing Corp ● pfs:Graph	●	—	●	—	●	—	●	●	●	—	●	●	●	—	—	—	—	—	—	—	—	—	—	—	—
Sunshine Computer Software ● The Artist	●	—	—	—	●	—	—	—	—	—	—	—	—	—	—	—	●	●	●	●	●	●	—	—	—
Transparent Data Systems ● UGraf	●	—	—	—	●	—	—	●	●	●	●	●	●	—	●	—	—	●	—	—	—	—	—	—	—
VisiCorp ● VisiTrend/Plot	●	—	●	—	●	—	●	●	●	—	●	●	●	●	—	—	●	●	—	●	—	—	—	—	—
West Coast Consultants ● Curvefit CRT	●	—	●	●	●	—	—	●	●	—	—	—	●	—	●	●	—	—	—	—	—	—	—	—	—
West Coast Consultants ● Curve II CRT	●	—	●	—	●	—	—	●	●	—	●	●	●	●	●	—	●	●	●	●	—	—	—	—	—
West Coast Consultants ● Curve Three-D CRT	●	—	●	●	●	—	●	—	●	●	—	—	—	—	●	—	—	—	—	—	—	—	—	—	—

GRAPHICS SOFTWARE FEATURES

The primary purpose of graphics software is to present visual images of information, on the computer monitor, a printer/plotter, or both. The information presented may be constructed from numeric data and represent graphs or charts of values, or it may be text and symbols used in a more traditional drawing form. The boundaries between text or drawing-oriented applications and chart applications using numeric data are often hazy, and many software products will offer support of both.

Microcomputer Graphics Software

Numeric graphing of information requires that the product accept data values which represent data points or values for a graph. The information may be keyed directly into the product via a form of data entry support, or it may be captured from the output of a product more generally suitable for the entry of numeric data. Spreadsheet programs are the most popular business product for the manipulation of figures, and the output of a spreadsheet program is an ideal source for input to a graphics package. Text-format data produced by sending a print image of information to disk is one way to capture spreadsheet information, but some products will accept the data files of one or more popular spreadsheet packages directly. Most graphic applications require some form of row/column orientation in the input data, the row and column headings providing the labels for the two axes of the graph. Thus, a spreadsheet providing sales totals by month can have a horizontal axis representing the month of the year, and a vertical axis representing sales dollars.

Some types of information may require or benefit from pre-processing within the graphics program before actual graphing takes place. This is especially true when a form of predictive graphing is to be done, such as extending a trend line or fitting a curve to several data points. Not all graphics software has such statistical manipulation capabilities, and those which do may offer users who want visual forms of the popular spreadsheet "what if" features a significant advantage.

Numeric data can often be graphed in more than one form, and most good graphics software will offer users several alternatives. Data which has a clear two-dimensional nature, such as sales trends (dollars versus time) or staffing levels (persons versus time) can be graphed using line or bar charts, while data which represents the distribution of a total population among several groups (number of personal computers by vendor) may be better represented using a pie chart. Data which represents the results of observations (response times) may be charted most effectively using a histogram format. There are many variations on the basic forms of graphs and charts, and some flexibility in selecting the best format is desirable. Excessive format flexibility, however, may complicate the use of the product by giving the user too many options.

Where drawing and text information rather than numeric data is to be presented, the features of graphics software can be divided into the ability to create and manipulate characters of various styles and sizes, and the ability to define, draw, and manipulate symbols. A typical drawing/text application might be the construction of a flow chart which defines the process relationships in the handling of a customer inquiry. The drawing of such a chart would consist of the selection of proper symbols for each "step"—rectangular boxes for process steps and diamonds for decision steps, for example—and the filling in of legends and labels. The size of the symbols and of the text must be controlled to present an attractive picture, and text and symbols must be subject to manipulation either separately or as a group. It is not desirable, for example, to force a user to adjust the size of both text and symbol as different steps when the text resides within the symbol itself.

Either numeric graphs or drawings may be viewed on the screen or transferred to hard copy. Some computer systems have limited display facilities for graphics; the IBM Monochrome Display cannot display graphs without a special controller board, for example. An ideal product should provide the user with a visual image or a hard copy version of a chart, and the process should not limit the resolution or color of one form of output because of the restrictions hardware might impose on the other.

In the following section describing the features of each product, the information presented is grouped into the following classifications:

Application ● an indication of the purpose of the product. Generalized software will be indicated as having both text/drawing and numeric graphing capabilities. If the product has little or no support for one area, this fact will be noted.

Introduction Date ● the date on which the product was first placed in commercial service.

Hardware/Operating System Requirements ● like any other computer program, graphics software will be designed for one or more specific computer environments, and will require some form of specific software. There may also be specific requirements for memory, disk storage, display features, and other hardware characteristics. Such restrictions will be noted in this section. Where IBM or Apple II systems are indicated as being required, the product may also run on compatible systems. Generally the vendor does not warrant operation on such systems, and display compatibility is an area where some so-called "compatible" systems are not in fact sufficiently compatible.

Printing, Plotting & Viewing ● this section summarizes the display and output capabilities of the product, including the printer and plotter support, special display features, and any specific restrictions or limitations.

Text Chart Features ● the text and drawing features of the product are listed in this section. This includes its ability to define and specify multiple type fonts, control type style, and move, size, or rotate text characters. A similar set of features is defined for drawn symbols, and any special drawing device support such as tablet, mouse, or light pen is indicated.

Business or Numeric Graphic Features ● this section defines the features of the product in the production of graphs from numeric data. This includes its facilities for accepting data input, its statistical preprocessing functions, the graphic forms available, and restrictions on the number of points, size of graphs, or other aspects of the product which might affect its usability.

Price ● the retail price of the product.

The following listing of products is in alphabetical order by vendor name, then by product name.

GRAPHICS SOFTWARE SPECIFICATIONS

■ ACCUPIPE CORPORATION

222 West Lancaster Avenue, Paoli, PA 19301 ● 215-296-7376.

□ **Creative Graphics**

Application ● text chart graphics.

Introduction Date ● October 1982.

Hardware/Operating System Requirements ● IBM PC/XT or compatible; Corona; Compaq DOS 2.0; 96K bytes of memory minimum; 2 disk drives; color graphics board of IBM or compatible board.

Printing, Plotting & Viewing ● supports Epson printer; IBM Graphics Printer, IDS Prism; no plotters supported; supports color on screen/printing/plotting ● crosshatch pattern fill available for non-color printing/plotting/viewing; combining graphs to run as a "slide show" is supported, 80-column text is supported.

Text Chart Features ● 80-column text is supported; special text fonts, foreign language fonts; user designed custom fonts supported; text characters can be expanded, shrunk, and rotated ● special symbols predefined by package are: circles, boxes, ellipses, lines; special symbol templates of circuit layout/flow chart are not supported ● user can construct symbol templates from a library; text/symbols combined on the same drawing is supported; text appearing in a symbol is supported; groups of symbols/areas of the drawing being marked and manipulated as a block is supported; user drawing freehand on screen with cursor keys is supported ● light pen/mouse/graphics tablet is not supported ● size of drawing determined by screen size.

Business or Numeric Graphic Features ● not applicable.

Price ● $139.95.

Microcomputer Graphics Software

■ ANALYTICAL SOFTWARE, INC

10939 McCree Road, Dallas, TX 75238 ● 214-340-2564.

☐ Boardroom Graphics 2.0

Application ● numeric business chart graphics.

Introduction Date ● 1983.

Hardware/Operating System Requirements ● IBM PC or compatible; DOS 1.1 with 64K bytes of memory minimum; DOS 2.0 with 128K bytes of memory minimum; 2 disk drives preferred but will work with 1 DS/DD 320K-byte disk drive; color graphics board necessary to plot on the screen.

Printing, Plotting & Viewing ● supports Epson printer and Hewlett-Packard plotter series ● supports color on screen/printing/plotting; crosshatch pattern fill available for non-color printing/plotting/viewing; combining graphs to run as a "slide show" is supported.

Text Chart Features ● 80-column text is supported ● special text fonts, foreign language fonts, user-designed custom fonts not supported ● text characters can be expanded, shrunk, and rotated ● special symbols predefined by package are not supported but package supports symbols from the keyboard; special symbol templates of circuit layout/flow chart are not supported; user construction of symbol templates supported; text/symbols combined on the same drawing are not supported; text appearing in a symbol is not supported; groups of symbols/areas of the drawing being marked and manipulated as a block is not supported; user drawing freehand on screen with cursor keys is not supported; symbols being enlarged/shrunk/rotated is not supported ● light pen/mouse/graphics tablet is not supported.

Business or Numeric Graphic Features ● input data directly or through spreadsheet files; package is compatible with spreadsheet programs using .DIF files, Lotus 1-2-3, VisiCalc, MultiPlan or dBase II; ASCII files, BASIC files, mainframe files from programs can produce data to be graphed ● type of charts produced: pie, bar, line, histograms ● 3-D color graphics; shading charts; linear and curvilinear regression; scattergrams ● charts produced in hard copy or transparencies with plotter; separate data plots supported; number of different lines in a single line chart: 5 or 6 ● location of chart labels is variable; size/style of label's text is not variable on HP plotter; marking plotted points with labels is supported; placing of user text on charts is suppported; special numeric preprocessing prior to making chart is supported in conjunction with Financial Analyst option ● chart created with menu-driven structure; scale of chart automatically determined.

Price ● $115; Financial Analyst plus Boardroom Graphics is $165.

■ APS

270 Madison Avenue, New York, NY 10016 ● 212-725-2442.

☐ APSGraph

Application ● text/numeric chart graphics.

Hardware/Operating System Requirements ● IBM PC; CP/M-80 requires 64K bytes of memory; 1 disk drive ● CP/M-86 requires 128K bytes of memory; 2 disk drives ● PC-DOS version to be implemented and can use color monitor ● UNIX version planned for Summer 1984 ● runs on many CP/M computers.

Printing, Plotting & Viewing ● supports Epson printer, Okidata, Mannesman Tally; supports Hewlett-Packard plotter series, Strobe plotters, Mannesman Tally plotters; supports color on printing/plotting; crosshatch pattern fill available for non-color printing/plotting ● graphs cannot be combined to run as a slide show; only TeleVideo will support non-color viewing.

Text Chart Features ● 80-column text is supported; special text fonts; foreign language fonts not supported; user-designed custom fonts supported through programming; text characters can be expanded, shrunk, and rotated ● special symbols predefined by package are: circles, boxes, others; special symbol templates of circuit layout/flow chart are not supported; user construction of symbol templates supported via programming; text/symbols combined on the same drawing is supported; text appearing in a symbol is not supported; groups of symbols/areas of the drawing

being marked and manipulated as a block is supported; symbols being enlarged/shrunk/rotated is supported; user drawing freehand on screen with cursor keys is not supported; light pen/mouse/graphics tablet is not supported ● size of drawing determined by plotter's page size.

Business or Numeric Graphic Features ● input data directly or through spreadsheet files; package is compatible with spreadsheet programs using .DIF files, Lotus 1-2-3, VisiCalc, MultiPlan, dBase II, ASCII files; type of charts produced: pie, bar-stacked/horizontal/floating/vertical, line; histograms; scatter ● separate data plots supported; number of different lines in a single line chart is 40; location of chart labels is variable; size/style of label's text is variable ● marking plotted points with labels is supported; placing of user symbols on charts is supported; special numeric preprocessing prior to making chart is not supported ● chart created with menu-driven structure; scaling of the chart is automatically determined but user can override the scale; chart image can be saved to disk once drawn.

Price ● $295.

■ AUTOMATIC MICROSYSTEMS, INC

1089 25th Avenue SE, Minneapolis, MN 55414 ● 612-379-1354.

☐ ABC Design

Application ● text/numeric chart graphics.

Introduction Date ● April 1984.

Hardware/Operating System Requirements ● IBM PC and PC compatibles; DOS 2.0 or 2.1; 128K bytes of memory minimum; 2 disk drives but hard disk is handy; color graphics board, additional RAM-ROM board will permit viewing of the 4,000 characters supported.

Printing, Plotting & Viewing ● supports Epson printer, IBM graphics printer, Color Transtar 315 ● color plotters supported in the future ● color supported on the screen; non-color printing and viewing supported with crosshatch and any other design available pattern fill; graphs cannot be combined to present a slide show.

Text Chart Features ● 80-column text is supported ● special text fonts, foreign language fonts not supported; user-designed custom fonts supported ● text characters can not be expanded, shrunk, and rotated; special symbols predefined by package are circles, boxes, others; special symbol templates of circuit layout/flow chart are supported; user construction of symbol templates supported; text/symbols combined on the same drawing is supported; text appearing in a symbol is supported; groups of symbols/areas of the drawing being marked and manipulated as a block is supported; symbols being enlarged/shrunk/rotated is not supported; user drawing freehand on screen with cursor keys is supported for straight lines; light pen/mouse is supported ● size of drawing determined by printer's page size.

Business or Numeric Graphic Features ● data is inputted through print-image files and text files like those of Lotus 1-2-3 ● type of charts produced: pie, bar-stacked/horizontal/hanging/vertical line; separate data plots supported; as many lines as possible may be plotted in a single line plot as long as the lines do not cross at any point—no 2 lines can have a single point in common ● location of chart labels is variable; size/style of label's text is not variable ● marking plotted points with symbols/labels is supported but manually; placing of user text/symbols on charts is supported; special numeric preprocessing prior to making chart is supported through linear scaling process; chart created with prompt-driven structure, single key or light pen ● scaling of the chart is determined by user; grid scale being drawn under the chart is supported; chart image can be saved to disk once drawn ● nature of program is uniquely character graphics with 16 colors.

Price ● $10 for 2 disks; registration is $5 to $100 depending upon how much support is required.

■ AZTEC, INC

23625 South Points Drive, Laguna Hills, CA 92653 ● 714-770-8406.

Microcomputer Graphics Software

☐ PC Chart

Application ● text/numeric chart graphics.

Introduction Date ● May 1984.

Hardware/Operating System Requirements ● IBM PC or PC compatibles; DOS 1.1; 256K bytes of memory minimum; 2 disk drives; color graphics board.

Printing, Plotting & Viewing ● supports Epson printer; supports Hewlett-Packard plotter series; supports color on screen/printing/plotting ● crosshatch pattern fill available for non-color printing/plotting/viewing; combining graphs to run as a "slide show" is supported; high-resolution graphics downloading to slide system with 4,000-line resolution is possible; program is device independent.

Text Chart Features ● 80-column text is supported; special text fonts are supported; foreign language fonts and user-designed custom fonts not supported ● text characters can be expanded, shrunk, and rotated; special symbols predefined by package are circles, boxes, others; special symbol templates of circuit layout/flow chart are not supported; user construction of symbol templates not supported; text/symbols combined on the same drawing is supported; text appearing in a symbol is supported; groups of symbols/areas of the drawing being marked and manipulated as a block is not supported; symbols being enlarged/shrunk/rotated is supported; user drawing freehand on screen with cursor keys is not supported; light pen/mouse/graphics tablet is not supported ● size of drawing determined by screen size/plotter's page size.

Business or Numeric Graphic Features ● input data directly or through spreadsheet files; package is compatible with spreadsheet programs using .DIF files, Lotus 1-2-3, VisiCalc, MultiPlan ● type of charts produced: pie, bar-stacked/horizontal/hanging/vertical, line histograms, area charts, curve fitting charts, 3-D bar/symbol charts; over 320 styles of charts ● separate data plots supported; no limit to the number of different lines in a single line chart; 20,000 data points per line ● location of chart labels is variable; size/style of label's text is variable ● marking plotted points with symbols/labels is supported; placing of user text/symbols on charts is supported; special numeric preprocessing prior to making chart is not supported; chart created with command language is supported ● scaling of the chart is automatically determined but user can override the scale; grid scale being drawn over the chart is supported ● chart image can be saved to disk once drawn; program has built-in text editing and telecommunications for interface over modem with Aztec slide enhancement, high-resolution slide systems.

Price ● $995.

■ BIG TREE SOFTWARE CORP

728 Highway Four, Suite Z, P.O. Box D, Arnold, CA 95223-1158 ● 209-795-5104.

☐ Accuchart

Application ● numeric chart graphics.

Hardware/Operating System Requirements ● IBM PC; DOS 1.1 requires 128K bytes of memory minimum; 2 disk drives recommended ● DOS 2.0 requires 128K bytes of memory minimum, 2 disk drives ● IBM PC with CP/M-80/86 also runs this program.

Printing, Plotting & Viewing ● supports Epson printer; supports Hewlett-Packard plotter series; supports 70 different daisy wheel, dot matrix, and Tektronic printers; supports color in printing/plotting ● crosshatch pattern fill available for non-color printing/plotting; graphs cannot be combined to run as a slide show.

Text Chart Features ● not applicable.

Business or Numeric Graphic Features ● input data directly or through spreadsheet files; comma-delimited ASCII files also can provide data to be graphed by this program ● type of charts produced: pie, bar-stacked/horizontal/vertical, line, histograms, floating high-low bar charts, scatterplots ● separate data plots supported; number of lines plotted in a single line chart is 5 ●

location of chart labels is variable; size/style of label's text is not variable ● marking plotted points with symbols is supported in scatterplot; placing of user text/symbols on charts is not supported; special numeric preprocessing prior to making chart is supported with linear regression and trend analysis ● chart created with menu-driven structure; scaling of the chart is automatically determined but user can override this option; grid scale being drawn over chart is supported; ● chart image can be saved to disk once drawn.

Price ● $295.

■ BOEING COMPUTER SERVICES COMPANY

2800 160th Avenue SE, Bellevue, WA 98009 ● 206-763-5636.

☐ Bitsgraf

Application ● text/numeric chart graphics.

Introduction Date ● Fall 1982.

Hardware/Operating System Requirements ● IBM PC; UCSD p-System with 64K bytes of memory minimum; 2 disk drives; graphics monitor for screen graphics, on PC, color graphics board for color viewing.

Printing, Plotting & Viewing ● supports Epson printer; supports Hewlett-Packard plotter series 7221/7470; supports letter-quality printers; supports color on screen/printing/plotting ● crosshatch pattern fill available for non-color printing/plotting/viewing; combining graphs to run as a "slide show" is supported with utilities.

Text Chart Features ● 80-column text is supported; special text fonts are Greek, Roman, Gothic, Script, and Block; foreign language fonts not supported unless customized; user designed custom fonts supported; text characters can be expanded, shrunk, and rotated ● special symbols predefined by package are circles, boxes, others ● any symbols stored in library with line strokes can be added; special symbol templates of circuit layout/flow chart are supported; user construction of symbol templates supported; text/symbols combined in same drawing is supported; text appearing inside a symbol is supported; groups of symbols/areas of drawing being marked and manipulated as a block is not supported; symbols being enlarged/shrunk/rotated is supported; user drawing freehand on screen with cursor keys is not supported; light pen/mouse/graphics tablet is not supported ● size of drawing determined by output media.

Business or Numeric Graphic Features ● input data directly or through spreadsheet files; almost any spreadsheet program can produce files for graphing in this program but Boeing has BitsCalc spreadsheet program; standard text files can also produce data for graphing; almost any program that can produce XYZ or 3-D files can input data for graphing in this program ● type of charts produced: pie, bar, line, histograms ● tables/symbols charts ● separate data plots supported; no limit to the number of lines plotted in a single line chart; screen or disk storage is only limit ● location of chart labels is variable; size/style of label's text is variable ● marking plotted points with symbols/labels is supported; placing of user text/symbols on charts is supported; special numeric preprocessing prior to making chart is not supported; chart created with menu-driven structure/command language ● scaling of the chart is automatically determined but user can override this option; grid scale being drawn over chart is supported ● chart image can be saved to disk once drawn.

Price ● $600.

☐ Bits Graphics Utilities

Application ● special business charts.

Introduction Date ● October 1982.

Hardware/Operating System Requirements ● UCSD p-System, IBM PC with 64K bytes of memory; 2 disk drives; color graphics board for screen graphics.

Printing, Plotting & Viewing ● supports Epson printer with Graftrax; supports Hewlett-Packard plotter series 7221/7470;

Microcomputer Graphics Software

supports color on screen/printing/plotting ● crosshatch pattern fill available for non-color printing/plotting/viewing; combining graphs to run as a "slide show" is not supported.

Text Chart Features ● 80-column text is supported; special text fonts, foreign language fonts, user-designed custom fonts not supported ● text characters cannot be expanded, shrunk, and rotated; special symbols not predefined by the package; special symbol templates of circuit layout/flow chart are not supported; text/symbols combined in same drawing is not supported; text appearing inside a symbol is not supported; groups of symbols/areas of drawing being marked and manipulated as a block is not supported; symbols being enlarged/shrunk/rotated is not supported; user drawing freehand on screen with cursor keys is not supported; light pen/mouse/graphics tablet is not supported ● drawing size is unlimited.

Business or Numeric Graphic Features ● data is inputted directly from the keyboard; any standard data file can be used for input; files can come from any standard screen or text editor; any disk file can be used for data input ● type of charts produced: pie, bar, line, histograms, viewfoils, overhead transparencies, bullet foils, Gantt charts; separate data plots supported; number of lines plotted in a single line chart is basically unlimited ● locations of chart labels are fixed; plotted points can be marked with symbols but not with labels; user text/symbols cannot be placed on the charts; no numeric pre-processing available ● pie, bar, and line charts are menu driven; edit file is required for the other types of charts ● scale of the chart is automatic but user can override this scaling; a grid scale can be drawn over the chart; chart image can be saved to disk once drawn.

Price ● $300 for all 7 utilities.

■ BUSINESS & PROFESSIONAL SOFTWARE
143 Binney Street, Cambridge, MA 02142 ● 617-491-3377.

□ BPS Business Graphics

Application ● numeric chart graphics.

Hardware/Operating System Requirements ● IBM PC/XT with DOS 1.1 or 2.1; 128K bytes of memory, 2 double-sided, double-density (DS/DD) disk drives or a hard disk; color graphics board, and a color monitor for color graphics viewing ● TI PC with DOS 2.0, 128K bytes of memory, 2 DS/DD drives or a hard disk, and a color monitor for color viewing ● Apple II with Apple DOS, 64K bytes of memory, 2 floppy disk drives ● Apple III with 128K bytes of memory, 2 floppy disk drives or hard disk profile system.

Printing, Plotting & Viewing ● over 31 dot-matrix printers supported; supports Hewlett-Packard plotter series (5) and the following other plotters: Apple Color Plotter, Houston Instruments Plotters (6), IBM XY 749/750, Mannesman Tally P1XY1/P1XY2, Panasonic, Strobe 100, Sweet P, Watanabe (8); letter-quality printers also supported: Diablo (7), Qume (2), Xerox (6), NEC Spinwriter 3510 ● supports color on screen/printing/plotting; crosshatch pattern fill available for non-color printing/plotting/viewing; graphs cannot be run together to make a slide show.

Text Chart Features ● not applicable.

Business or Numeric Graphic Features ● input data directly or through spreadsheet files; also input data through .SYLK files or print-image files; almost any spreadsheet program can produce data files—especially MultiPlan; database programs and word processors can also produce input data files for graphs ● type of charts produced: pie, bar-stacked/horizontal/hanging/vertical, line, scatterpoint charts, all combinations of line-bar-point charts ● separate data plots supported; number of lines plotted in a single line chart is unlimited ● location of chart labels is variable; size/style of label's text is variable ● marking plotted points with symbols/labels is supported; placing of user text/symbols on charts is supported; special numeric preprocessing prior to making chart is supported with basic calculator processing—5 types of least squares processing, curve fitting, and moving averages ● chart created via command language ● scaling of the chart is automatically determined but user can override this option; grid scale being drawn over chart is supported

horizontally, vertically, or both; chart image can be saved to disk once drawn.

Price ● $350.

■ CHANG LABS
5300 Stevens Creek Boulevard, San Jose, CA 95129 ● 408-246-8020.

□ GraphPlan

Application ● text/numeric business chart graphics.

Introduction Date ● 1982.

Hardware/Operating System Requirements ● IBM PC with DOS, 128K bytes of memory; 2 drives possibly 1; color graphics board otherwise monochrome ● DEC Rainbow with CP/M-80/86; North Star Advantage; NEC APC.

Printing, Plotting & Viewing ● supports Epson printer and most dot-matrix printers; supports Hewlett-Packard plotter series 7470A/7475; supports color on screen/plotting ● crosshatch pattern fill available for non-color printing/plotting/viewing; combining graphs to run as a "slide show" is not supported.

Text Chart Features ● 80-column text is supported; 132-column text is also supported ● special text fonts/foreign language versions of package are available ● text characters can be expanded/shrunk; special symbols predefined by package are boxes; special symbol templates of circuit layout/flow chart are not supported; user construction of symbol templates not supported; text/symbols combined in same drawing is supported; text appearing inside a symbol is supported; groups of symbols/areas of drawing being marked and manipulated as a block is supported; symbols being enlarged/shrunk is supported; user drawing freehand on screen with cursor keys is not supported; light pen/mouse/graphics tablet is not supported ● size of drawing determined by plotter's page size or printer's page size.

Business or Numeric Graphic Features ● input data directly or through spreadsheet files; program has built-in integrated spreadsheet: MicroPlan; ASCII files also can be used as data files ● type of charts produced: pie, bar-stacked/horizontal/vertical, line, histograms, time plot series, scattergrams, bar and line charts, stacked and horizontal bar charts ● separate data plots supported; number of lines plotted in a single line chart is 6 lines with total of 100 data points for all 6 lines ● location of chart labels is variable; size/style of label's text is not variable ● marking plotted points with symbols/labels is supported; placing of user text on charts is supported; special numeric preprocessing prior to making chart is supported ● chart created with menu-driven structure/command language; scaling of the chart is automatically determined but user can override this option; grid scale being drawn over chart is supported; chart image can be saved to disk once drawn.

Price ● $295.

■ COSMOS SOFTWARE COMPANY
5119 Stevendal Drive, Pensacola, FL 32506 ● 904-455-2905.

□ Micrograph

Application ● text/numeric chart graphics.

Hardware/Operating System Requirements ● IBM PC with DOS 1.1, 64K bytes of memory, and 2 floppy disk drives; CP/M computers; Apple computers with Apple DOS.

Printing, Plotting & Viewing ● supports Hewlett-Packard plotter series; HI plotters supported; color supported only in plotting; crosshatch pattern fill for non-color printing/plotting/viewing is not supported; with Microfont, transparencies can be produced.

Text Chart Features ● 80-column text is possible to support; special text fonts depend on the computer-plotter combination ● foreign language fonts are not available; user cannot custom design his own fonts; text characters can be expanded and shrunk but not rotated ● special symbols predefined by package are: circles, boxes, others ● special symbol templates of circuit layout/flow chart are not supported; user construction of symbol templates

Microcomputer Graphics Software

not supported; text/symbols combined in same drawing is not supported; text appearing inside a symbol is not supported; groups of symbols/areas of drawing being marked and manipulated as a block is not supported; symbols being enlarged/shrunk/rotated is not supported; user drawing freehand on screen with cursor keys is not supported; light pen/mouse/graphics tablet is not supported • drawing size limited by output media.

Business or Numeric Graphic Features • data is entered only directly; package is not compatible with spreadsheet programs • type of charts produced: pie, bar-stacked/hanging/vertical, line, histograms, area charts; separate data plots supported; number of lines plotted in a single line chart is 4 • location of chart labels is not variable; size/style of label's text is not variable; marking plotted points with symbols/labels is not supported; placing of user text on charts is supported; special numeric preprocessing prior to making chart is not supported • chart created with menu-driven structure; scaling of the chart is automatically determined but user can override this option via data entry; grid scale being drawn over chart is not supported • chart image can be saved to disk once drawn.

Price • $299.95.

■ DATA TRANSFORMS

616 Washington Street, Suite 106, Denver, CO 80203 • 303-832-1501.

□ Fontrix

Application • text chart graphs.

Introduction Date • 1983.

Hardware/Operating System Requirements • Apple II+/IIe/III with DOS 3.3, 48K bytes of memory, 1 floppy disk drive but 2 is more convenient.

Printing, Plotting & Viewing • 37 different printers, does not support color on screen/printing/plotting • crosshatch pattern fill not available for non-color printing/plotting/viewing; graphs cannot be run together for a slide show • Fontrix 2.0 with Dum-Fix, to be released in 1984, will print color graphics.

Text Chart Features • 40-column text supported; special text fonts, foreign language fonts, user-designed custom fonts supported; with Fontak modules, 41 different text fonts are available; by May 1984, Hebrew, Arabic, Cyrillic, and some Japanese text fonts will be released; user can custom design type fonts • text characters can be expanded, shrunk with print magnification • special symbols predefined by package are: circles, boxes, others including triangles, math, Greek, music symbols, and even more symbols with Fontak Vol. 2 • special symbol templates of circuit layout/flow chart are supported with Fontak Vol. 2; user construction of symbol templates supported; text/symbols combined in same drawing is supported; text appearing inside a symbol is supported; groups of symbols/areas of drawing being marked and manipulated as a block is not currently supported; symbols being enlarged/shrunk/rotated is not supported; user drawing freehand on screen with cursor keys is supported; mouse/graphics tablet/joy stick/ball is supported • printed page defines drawing's size.

Business or Numeric Graphic Features • not applicable.

Price • $75; Fontak volumes are $20 apiece.

■ DECISION RESOURCES

21 Bridge Square, Westport, CT 06880 • 203-222-1974.

□ ChartMaster

Application • text/numeric business graphics.

Introduction Date • 1983.

Hardware/Operating System Requirements • IBM PC and many compatibles; PC-DOS 1.1 or 2.0; 192 bytes of memory required for plotter; 256K bytes of memory required for Polaroid Palette; 2 floppy disk drives; color graphics card or Hercules board.

Printing, Plotting & Viewing • 13 different printers supported including the Epsons, Prism color and monochrome, IBM color and monochrome; supports Hewlett-Packard plotter series and 34 other brands of plotters, such as, IBM, Sweet P, CalcComp, HI, Panasonic, and Strobe; supports color on screen/printing/plotting; crosshatch pattern fill available for non-color printing/plotting/viewing; combining graphs to run as a "slide show" is not supported.

Text Chart Features • 80-column text is supported; special text fonts, foreign language fonts of Swedish/German, user designed custom fonts soon supported • text characters can be expanded, shrunk, but not rotated • special symbols predefined by package are: circles, boxes, others, including triangles, squares, some open or filled-in; special symbol templates of circuit layout/flow chart are soon supported; user construction of symbol templates not supported; text/symbols combined in same drawing is supported; text appearing inside a symbol is not supported; groups of symbols/areas of drawing being marked and manipulated as a block is not supported; symbols being enlarged/shrunk/rotated is not supported; user drawing freehand on screen with cursor keys is not supported; light pen/mouse/graphics tablet is not supported • plotter defines limit of perimeter of drawing.

Business or Numeric Graphic Features • input data directly or through spreadsheet .DIF files like Lotus 1-2-3, VisiCalc, and SuperCalc; other kinds of package cannot produce data for this program to graph • separate data plots supported; number of lines plotted in a single line chart is 24 lines with 6,000 data points each • type of charts produced: pie, bar-stacked/horizontal/hanging/vertical, line, histograms, scatter charts, high-low closed bar charts, proportional pie charts • location of chart labels is variable; size/style of label's text is not variable • marking plotted points with symbols/labels is supported; placing of user text on charts is somewhat supported; special numericpreprocessing prior to making chart is not supported; chart created with menu-driven structure • scaling of the chart is automatically determined but user can override this option; grid scale being drawn over chart is supported • chart image can be saved to disk once drawn but to reconstruct the chart, one must retrieve the data, select chart type and have computer recalculate the chart.

Price • $375.

■ DIGITAL RESEARCH

P.O. Box 579, Pacific Grove, CA 93950 • 408-649-3896/800-227-1617 Ext 400.

□ DR Graph

Application • numeric chart graphics.

Introduction Date • 1983.

Hardware/Operating System Requirements • IBM with CP/M-86, 192K bytes of memory, 2 floppy disk drives, color graphics board is recommended • PC-DOS version to be released soon; CP/M and GSX provide wide range of computers and peripherals that support the package.

Printing, Plotting & Viewing • supports Epson printer; supports Hewlett-Packard plotter 7470A 2 pen; supports quite a few printers and plotters that work with CP/M-86 and Digital Research's Graphics System Extension (GSX) • supports color on screen/printing/plotting; crosshatch pattern fill available for non-color printing/plotting/viewing; combining graphs to run as a "slide show" will be supported in the future.

Text Chart Features • 80-column text is supported; 5 special text fonts available; foreign language fonts/user designed custom fonts not supported • text characters can not be expanded, shrunk, and rotated; special symbol templates of circuit layout/flow chart are not supported; special symbols predefined by package are: circles, boxes; user construction of symbol templates not supported; text/symbols combined in same drawing is supported; text appearing inside a symbol is supported; groups of symbols/areas of drawing being marked and manipulated as a block is not supported; symbols being enlarged/shrunk/rotated is not supported; user drawing freehand on screen with cursor keys is not supported; light pen/mouse/graphics tablet is not supported

Microcomputer Graphics Software

● size of drawing determined by screen size; text chart features can be found in companion package of DR Draw.

Business or Numeric Graphic Features ● input data directly or through spreadsheet files; uses .DIF format compatible with VisiCalc and .SDI format of SuperCalc ● PC-DOS version will take input data from Multiplan ● type of charts produced: pie, bar-stacked/horizontal/paired/negative and positive/vertical, line, histograms; separate data plots supported; number of lines plotted in a single line chart is 5 with 75 data points per line ● location of chart labels is not variable; size/style of label's text is user chosen ● marking plotted points with symbols/labels is supported; placing of user text/symbols on charts is supported; special numeric preprocessing prior to making chart is not supported; chart created with menu-driven structure; scaling of the chart is automatically determined but user can override this option; chart image can be saved to disk once drawn.

Price ● $195.

■ DUNCAN-ATWELL COMPUTERIZED TECHNOLOGIES

924 Worth Avenue, #B-2, Linden, NJ 07036 ● 201-355-1609.

☐ Lenipen

Application ● text/numeric chart graphics.

Introduction Date ● information not available.

Hardware/Operating System Requirements ● IBM PC; DOS 2.0 recommended; 128K bytes of memory; 1 or 2 disk drives or hard disk; color graphics board and monitor.

Printing, Plotting & Viewing ● works with any IBM-compatible black and white dot-matrix printer, Epson, etc; IBM color printer supported; supports color on screen, printing, plotting ● crosshatch pattern fill available for non-color viewing; combining graphs to run as a "slide show" is supported.

Text Chart Features ● 80-column text is supported; special text fonts/foreign language fonts planned/user designed custom fonts supported ● text characters can be expanded, shrunk, and rotated; special symbols predefined by package are: circles, boxes, angles; special symbol templates of circuit layout/flow chart are supported; user construction of symbol templates supported; text/symbols combined in same drawing is supported; text appearing inside a symbol is supported; groups of symbols/areas of drawing being marked and manipulated as a block is supported; symbols being enlarged/shrunk/rotated is supported; user drawing freehand on screen with cursor keys is supported; light pen/mouse/graphics tablet/joystick is supported ● size of drawing determined by screen size; animation feature; pixel drawing; built-in word processing and text editing; drawing flexibility.

Business or Numeric Graphic Features ● input data directly or through spreadsheet files; package is compatible with spreadsheet programs using any .DIF files; program is compatible with other programs using any .DIF, any .SYLK, any ASCII files, word processing files, anything that is compatible with the IBM PC ● type of charts produced: pie, bar-stacked/horizontal/vertical, line, histograms; user can make almost any chart; separate data plots supported; number of lines plotted in a single line chart is unlimited ● location of chart labels is variable; size/style of label's text is variable ● marking plotted points with symbols/labels is supported; placing of user text/symbols on charts is supported; special numeric preprocessing prior to making chart is supported; chart created with extensive menu-driven structure/command language ● scaling of the chart is automatically determined but user can override this option; grid scale being drawn over chart is supported including "v" shaped; chart image can be saved to disk once drawn.

Price ● $495; $695 for IBM XT version.

■ ENERCOMP

1978 South Garrison, #7, Lakewood, CO 80226 ● 303-988-1648.

☐ Plotware Z

Application ● text/numeric chart graphics.

Introduction Date ● 1978.

Hardware/Operating System Requirements ● runs on CP/M-80 computers from Access to Zenith; 64K bytes of memory required; 2 disk drives ● IBM PC; MS-DOS; 128K bytes of memory; color graphics board ● CP/M-86 version coming soon; Apple computers supported; supports many graphics cards; Eagle; supports built-in screen of TeleVideo CP/M computers.

Printing, Plotting & Viewing ● supports most dot-matrix printers and plotters; will provide support to install program for any printer or plotter by modifying source codes for off-brand plotters and printers; supports color on screen/printing/plotting ● crosshatch pattern fill available for non-color printing/plotting/viewing; combining graphs to run as a "slide show" is supported.

Text Chart Features ● 80-column text is supported; special text fonts (3 with standard package/13 additional fonts with separate package); foreign language fonts/Hebrew/Russian/Greek/etc; user designed custom fonts supported ● text characters can be expanded, shrunk, and rotated; special symbols predefined by package are: circles, boxes, diamonds, triangles, math symbols and others ● special symbol templates of circuit layout/flow chart are not supported; user construction of symbol templates supported; text/symbols combined in same drawing is supported; text appearing inside a symbol is supported; groups of symbols/areas of drawing being marked and manipulated as a block is supported; symbols being enlarged/shrunk/rotated is supported; user drawing freehand on screen with cursor keys is not supported ● user can draw freehand with Bausch and Lomb digitizer or with a mouse; drawing size is not limited ● can do plot 20 feet long.

Business or Numeric Graphic Features ● data is put into the program directly with print-image files with spreadsheet files ● package uses spreadsheet files of SuperCalc, dBase II ● any ASCII 2 print-image files or format is compatible with program such as word processing files like WordStar ● program supports files written in COBOL/FORTRAN/BASIC/other high-level languages ● type of charts produced: pie, bar-stacked/horizontal/hanging/vertical, line, histograms, rotated bar charts, exploded view bar charts, architectural drafting 3-D/charts, color dimensional charts, X-Y charts ● separate data plots supported; number of lines plotted in a single line chart is 20 ● location of chart labels is variable; size/style of label's text is variable ● marking plotted points with symbols/labels is supported; placing of user text/symbols on charts is supported ● chart created with menu-driven structure/command language; scaling of the chart is automatically determined but user can override this option; grid scale being drawn over chart is supported using linear or logarithmic scaling ● chart image can be saved to disk once drawn ● package written in assembler with 30% in FORTRAN and 7 years of refinement.

Price ● $399.

■ FEITH SYSTEMS & SOFTWARE INC

1 Bala Cynwyd Plaza, Suite E133, Bala Cynwyd, PA 19004 ● 215-667-5575.

☐ General Ledger Budgeting with Graphics

Application ● text/numeric accounting chart graphics.

Hardware/Operating System Requirements ● IBM PC/XT; 48K bytes of memory minimum; 10 to 20M-byte hard diskrecommended ● Altos; Dynabyte; Oasis, Oasis/16 multiuser system; 48K bytes of memory; terminals ● UNIX 48K bytes of memory.

Printing, Plotting & Viewing ● works with all generic 132-column dot-matrix printers; Okidata 92 ● color not supported on screen/printing/plotting; pattern fill available for non-color printing/plotting/viewing; graphs cannot be combined to run as a slide show.

Text Chart Features ● supports 132-column text; special text fonts/foreign language fonts/user designed fonts not supported ● text characters cannot be expanded or rotated but they can be shrunk to 132 columns ● no special symbols predefined by the package; no special or custom templates available; user

Microcomputer Graphics Software

construction of symbol templates not supported; text/symbols combined in same drawing is not supported; text appearing inside a symbol is not supported; groups of symbols/areas of drawing being marked and manipulated as a block is not supported; freehand drawing/lightpen/mouse/digitizer not supported • drawing of 8.5x14 inches is the limit.

Business or Numeric Graphic Features • enter data directly through keyboard; package is not compatible with any spreadsheet programs • Barco wand reader can be used to enter data • vertical bar charts can be produced; balance sheets/income statements/comparative income statement charts produced • separate data plots supported; number of lines plotted in a single line chart is 2 lines of actual versus budget for 12 months of data • location of chart labels is fixed; size and style of text of chart labels is variable • plotted points cannot be marked with labels/symbols; user text/symbols cannot be placed on charts • 95% of program is numeric pre-processing prior to making the chart; menu-driven interface and command language interface • scale of chart is automatic but user can override; chart can be saved to disk once drawn; one of few accounting packages with general ledger and graphics.

Price • $750 for IBM XT; $1500 on Oasis multiuser systems.

■ FEROX MICROSYSTEMS

1701 North Fort Meyer Drive, 6th floor, Arlington, VA 22209 • 703-841-0800.

☐ Graph Power

Application • text/numeric chart graphics.

Introduction Date • 1981.

Hardware/Operating System Requirements • with Apple computers screen previewing is not supported • IBM PC and compatibles; UCSD p-System; 128K bytes of memory minimum; 1 disk drive; hard disk supported; IBM color graphics card or Plantronics color card.

Printing, Plotting & Viewing • supports Hewlett-Packard plotter series-2 pin: 7220 and 8 pin: 7470A; supports color on screen/printing/plotting; crosshatch pattern fill available for non-color printing/plotting/viewing; combining graphs to run as a "slide show" is supported.

Text Chart Features • 80-column text is supported; special text fonts/foreign language fonts/user-designed custom fonts not supported • text characters can be expanded, shrunk, and rotated; special symbols predefined by package are: circles, boxes, triangles, squares, others; special symbol templates of circuit layout/flow chart are not supported; user construction of symbol templates supported; text/symbols combined in same drawing is supported; text appearing inside a symbol is not supported; groups of symbols/areas of drawing being marked and manipulated as a block is not supported; symbols being enlarged/shrunk/rotated is not supported; user drawing freehand on screen with cursor keys is supported; light pen/mouse/graphics tablet is not supported • size of drawing determined by plotter's size.

Business or Numeric Graphic Features • input data directly or through spreadsheet files/print-image files; supports spreadsheet programs with .DIF file interface such as Lotus 1-2-3 • type of charts produced: pie, bar-stacked/horizontal/vertical, line, histograms, side-by-side bar charts • separate data plots supported; number of lines plotted in a single line chart is 8 different lines with 260 data points per line • location of chart labels is variable; size/style of label's text is not variable • marking plotted points with symbols/labels is not supported; placing of user text/symbols on charts is supported; special numeric preprocessing prior to making chart is supported with simple calculations • menu-driven structure • grid scale cannot be drawn over chart; chart image can be saved to disk once drawn.

Price • $295 for 2-pin plotter version; $495 for 8-pin plotter version.

■ FTG DATA SYSTEMS

P.O. Box 615, #M-2, Station, CA 90680 • 714-995-3900.

☐ Emu-Tek

Application • graphics terminal emulation program.

Introduction Date • 1983.

Hardware/Operating System Requirements • IBM PC/XT; DOS with 256K bytes of memory; 1 floppy disk drive; color graphics board.

Printing, Plotting & Viewing • supports Epson printer; supports Hewlett-Packard plotter series; does not support color on screen/printing/plotting; crosshatch pattern fill not available for non-color printing/plotting/viewing; graphs can be combined to run as a slide show.

Text Chart Features • 80-column text is supported; supports 35 different types of line fonts; foreign language and custom designed fonts are not supported • text characters cannot be expanded, shrunk, and rotated; special predefined symbols must come from package on mainframe; templates must come from mainframe • text/symbols combined in same drawing is supported; text appearing inside a symbol is supported; groups of symbols/areas of drawing being marked and manipulated as a block is not supported; symbols being enlarged/shrunk/rotated is supported; user cannot draw freehand on the screen; light/pen and mouse is supported but not digitizer.

Business or Numeric Graphic Features • data entry and charts are produced by the mainframe's graphics package; location of chart labels is variable; size/style of label's text is variable; marking plotted points with symbols/labels is supported; user text can be placed on charts but not symbols • no numeric pre-processing available prior to chart construction; menu-driven • user can override scale of chart; chart image can be saved to disk once drawn.

Price • $395; screen dumps and advanced communications is $65; light pen support is $159.95; zoom/pan/plot is $45.

■ GRAPHIC COMMUNICATIONS, INC

200 Fifth Avenue, Waltham, MA 02254 • 617-890-8778.

☐ Graphwriter

Application • text/numeric business chart graphics.

Introduction Date • 1983.

Hardware/Operating System Requirements • IBM PC/XT; DOS 1.1 • 128K bytes of memory minimum; 256K bytes of memory minimum required when used with Polaroid Palette Image Recorder; 2 double-sided, double-density drives (320K bytes); optional color graphics board and monitor • UCSD p-System PC compatible/Compaq/Columbia/Corona; NEC APC; DEC Rainbow 100/100+ coming soon; Burroughs ET 2000; Hewlett Packard 150.

Printing, Plotting & Viewing • no printer support; supports Hewlett-Packard plotter series 7470A/7475A/7220, IBM XY/749 and 750, Calcomp M84, Enter Sweet-P, Zeta-8, Mannesman Tally Pixy 3 • supports color on screen/plotting; crosshatch pattern fill available for non-color plotting/viewing • graphs cannot be combined to run as a slide show although actual slide can be made with Polaroid Palette.

Text Chart Features • 36-column text supported • 6 special text fonts: Standard/Italic/Bold/Expanded/Bold Italic/Bold Expanded; foreign language fonts not supported; user cannot custom design fonts • text characters can be expanded and shrunk, but not rotated; special symbols predefined by package are: circles, boxes, triangles, diamonds, rectangles, squares • special template of flow organizational chart available with Extension Set; text/symbols combined in same drawing is supported; text appearing inside a symbol is supported; groups of symbols/areas of drawing being marked and manipulated as a block is supported; user drawing freehand on screen with cursor keys is not supported; light pen/mouse/graphics tablet is not supported • plotter's size determines drawing's size.

Business or Numeric Graphic Features • input data directly or through spreadsheet files; package is compatible with spreadsheet

Microcomputer Graphics Software

programs using .DIF files-Lotus 1-2-3, VisiCalc, SuperCalc ● type of charts produced: pie, bar-stacked/horizontal/hanging/vertical, line, histograms, vertical column chart, horizontal and vertical segmented bar charts, horizontal and vertical clustered bar charts, scatter regression plots, bar-line combinations, text/word charts, overlays; Extension Set adds the following charts: Gantt, Organization, Bubble, Table, Pie-Bar, Surface Line, Line-Table, Double Stacked Bar, Grouped Bars, Range Bar Charts, Paired Bar, Horizontal Bars with inset labels ● separate data plots supported; number of lines plotted in a single line chart is 8 lines with 100 data points per line ● location of chart labels is variable; size/style of label's text is not variable ● marking plotted points with symbols/labels is supported; placing of user text/symbols on charts is supported ● special numeric preprocessing prior to making chart is not supported; chart created with menu-driven structure ● scaling of the chart is determined by the user; chart image can be saved to disk once drawn ● labels can be slanted or rotated somewhat.

Price ● $395; Extension Set is $395; Graphwriter and Graphwriter Extension Set is $595; Polaroid Palette is $1,500; Polaroid Palette, Graphwriter, and Graphwriter Extension Set (Graphwriter Combination Set) is $1,895.

■ GRAPHIC SOFTWARE, INC

1972 Massachusetts Avenue, Cambridge, MA ● 617-491-2434.

□ Chartman III

Application ● text/numeric chart graphics.

Introduction Date ● original version shipped in 1982.

Hardware/Operating System Requirements ● IBM PC with DOS 1.1 requiring 128K bytes of memory and DOS 2.0 requiring 256K bytes of memory minimum, 1 single-density disk drive, and color graphics board if screen viewing is desired.

Printing, Plotting & Viewing ● Epson MX-80 and MX-100 printers; HP 7470 and 7220 plotters supported ● color supported in plotting graphs ● crosshatch fill for non-color viewing supported; graphs can be run together for a slide show.

Text Chart Features ● 60- to 72-column text supported with own text editor ● Helvetica special text font available; text characters can be shrunk or expanded; only special symbols pre-defined by the package are those already found on the keyboard ● groups of symbols or areas of the drawing can be zoomed; size of plotter determines size of drawing.

Business or Numeric Graphic Features ● input of data is through spreadsheet files; data also inputted directly; .DIF files of Lotus 1-2-3, VisiCalc, SuperCalc, and other programs provide input data files ● pie, bar-stacked/vertical/and vertical clustered bar charts, line, histograms, 3-dimensional charts ● maximum number of lines plotted per line chart is 6 ● location of chart's labels are variable; size and style of label's text are variable as long as the label is also the title ● plotted points cannot be marked with symbols/labels; user text/symbols cannot be placed on the charts; menu-driven via fill in the blank forms for easy input ● chart's scaling is automatic but user can override; grid scale may be drawn over chart; chart image can be saved to disk once drawn.

Price ● $199.

□ Chartman IV

Application ●/text/numeric chart graphics.

Introduction Date ● 1982 first version of Chartman.

Hardware/Operating System Requirements ● IBM PC or XT with DOS 2.0; 256K bytes of memory minimum, 1 disk drive, and color graphics board.

Printing, Plotting & Viewing ● Epson MX-80 and MX-100 and IBM Graphics printers supported; HP 7470 and 7220 /Sweet P plotters are supported ● color viewing/printing/plotting supported; crosshatch pattern fill available for non-color viewing/printing/viewing; graphs can be run together for a slide show.

Text Chart Features ● 60- to 72-column text supported ● Helvetica special font available; text character can be expanded

or shrunk but not rotated; organizational chart has predefined boxes but only special symbols are those already found on the keyboard; text/symbols can be combined in same drawing but only in the organizational chart; text can appear inside a symbol but only in the organizational chart; possible to zoom in on a spot in the chart but this is the only block manipulation possible; groups of symbols/areas of drawing cannot be manipulated as a block; symbols cannot be enlarged/shrunk/rotated ● plotter size defines how large a drawing may be accomplished.

Business or Numeric Graphic Features ● data inputted directly, through input forms, or through spreadsheet files, such as the .DIF files of Lotus 1-2-3, VisiCalc, SuperCalc, etc ● pie and other ordinary charts are not possible unless program linked to Super-Chartman II, Gantt/organizational/area fill with lines/scatter-grams/statistical curve fitting/linear regression/power curves are the charts possible with this program ● maximum number of lines plotted per line chart is 6 ● locations of labels are fixed ● can alter size, shape, and color of labels only when they are titles or footnotes; plotted points may be marked with symbols/labels but only in scattergrams and line charts with area fill; user's text/symbols may be placed on charts but only in line charts with area fill and in floating user title labels; menu-driven via fill in the blanks of the input forms ● chart's scaling is automatic but user can override; grid scale may be drawn over chart; chart image can be saved to disk once drawn ● one button pushing output for screen or plotter.

Price ● $300 for Chartman IV; Super-Chartman II is $500.

□ Softplot/BGL

Application ● device independent graphics.

Introduction Date ● October 1983.

Hardware/Operating System Requirements ● IBM PC with DOS 1.1, M BASIC, and MS BASIC; 64K bytes of memory; 1 disk drive, and optional color graphics board.

Printing, Plotting & Viewing ● supports anything as long as drivers are written ● supports 10 plotters and 20 different printers; color viewing/printing/plotting supported; crosshatch pattern fill available for non-color viewing/printing/plotting.

Text Chart Features ● 80-column text supported; programming necessary for custom design fonts ● characters can be rotated ● special symbols are predefined by the package: circles, boxes, and chart axes; user can construct own templates using basic; text/symbols can be combined in same drawing; text can appear inside a symbol if programmed; with programming, symbols can be enlarged, shrunk, or rotated; screen size determines drawing's size.

Business or Numeric Graphic Features ● data is inputted though programming; ● x-y axis is given but types of charts must be programmed; there is no maximum number of lines plotted per line chart ● location of chart's labels are variable; size and style of label's text are variable depending on the programming; plotted points may be marked with symbols/labels via programming; user's text/symbols may be placed on charts via programming ● command language; grid scale can be programmed over chart; chart image can be saved to disk once drawn ● device independent library that runs in BASIC and is not canned for custom designing.

Price ● $99.

■ GRAPHICON SOFTWARE

399 Sherman Avenue #10, Palo Alto, CA 94306 ● 415-329-1791.

□ Metagraph

Application ● text/numeric chart graphics.

Introduction Date ● April 1983.

Hardware/Operating System Requirements ● Compaq, IBM PC with DOS 1.1 or 2.0; 192K bytes of memory; 1 drive; and color graphics board.

Printing, Plotting & Viewing ● IBM Graphics printer or Epson; HP 7470, IBM XY/749, Calcomp and NEC plotters supported

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• color viewing/printing/plotting supported; crosshatch pattern fill available for non-color viewing/printing/plotting; graphs may be run together for a slide show effect.

Text Chart Features • 80-column text supported; italic text font available; special predefined symbols are planned for the future; special templates of symbols are not available • user can construct symbol templates; text/symbols can be combined in same drawing; text can appear inside a symbol; groups of symbols/areas of drawing manipulated as a block • symbols can be enlarged/shrunk/rotated; user can draw freehand on the screen using cursor keys or a graphic tablet; drawing size limited by screen size.

Business or Numeric Graphic Features • data inputted directly via ASCII files or through spreadsheet files, like the .DIF files of SuperCalc, dBase II, VisiCalc, and so forth; pie, bar-stacked/horizontal/hanging/vertical, line, histograms, area, scatter map charts • maximum number of lines plotted per line chart is 10 • location of chart's labels are variable; size and style of label's text are fixed • plotted points may be marked with symbols/labels; user's text/symbols may be placed on charts; menu-driven user interface • chart's scaling is automatic but user can override; grid scale may be drawn over chart; chart image can be saved to disk once drawn • free form art is integrated with business graphics; up to 128 data points in a plotted line.

Price • $299.

■ GREAT VALLEY CORPORATE CENTER

P.O. Box 826, Valley Forge, PA 19482 • 215-648-0730.

□ Estamacs

Application • financial software project estimator with graphics.

Introduction Date • 1982.

Hardware/Operating System Requirements • IBM PC or Apple II with respective DOS operating system; 64K bytes of memory; 2 disk drives, and color graphics board with color monitor.

Printing, Plotting & Viewing • IBM Graphics Printer and HP plotters supported; color viewing/printing/plotting supported; slide show not possible.

Text Chart Features • not applicable.

Business or Numeric Graphic Features • input data directly • charts include: pie, bar-stacked/horizontal/vertical • many different lines in a single line plot chart; locations of the labels are fixed but the size and style of the label's text are variable; plotted points cannot be marked with symbols/labels • user text/symbols cannot be placed on the charts • estimation is numeric processing available prior to making the chart, namely, min-max, 25 questions concerning the relationship between inputting, forecasting, maintenance, staff, costs, development costs, etc for mainframe software development • command language; chart's scaling is automatic but user can override; grid scale cannot be drawn over the chart; chart image can be saved to disk once drawn.

Price • $15,000 to $25,000.

■ HOUSTON INSTRUMENTS

Division of Bausch and Lomb, 8500 Cameron Road, Austin, TX 78753 • 512-835-0900.

□ HIgraph III

Application • text/numeric chart graphics.

Introduction Date • May 1983.

Hardware/Operating System Requirements • Apple IIe, Victor, CP/M computers, IBM PC using MS-DOS with 64K bytes of memory, 1 drive, 1 serial port and Houston Instruments (HI) plotters: DM/PL, DM/PL+, DM/PL III, or DM/PL IV.

Printing, Plotting & Viewing • supports all HI plotters; color supported in plotting • non-color pattern fill, three types, available for plotting.

Text Chart Features • 80-column text supported; 8.5x11 inch is drawing size.

Business or Numeric Graphic Features • input data directly through keyboard • pie, vertical and horizontal bar charts; line charts; up to 10 lines per line chart may be plotted; locations of the chart labels are fixed; plotted points cannot be labeled; user text/symbols cannot be placed on the charts • menu driven or command language; grid scale or overlays are possible; chart image can be saved to disk once drawn; simple program to get people started plotting.

Price • $25.

■ IHS SYSTEMS

4718 Meridian Avenue, #211, San Jose, CA 95118 • 408-265-5503.

□ FONTASTIC

Application • text/special font graphics.

Introduction Date • June 1983.

Hardware/Operating System Requirements • IBM PC and compatibles; PC-DOS 1.1 or later; 128K bytes of memory • 1 single-sided, double-density disk drive • not copy protected so can be put on a hard disk.

Printing, Plotting & Viewing • printers supported include Epson, IBM Graphics Printer, Gemini 10X and 15X, C. Itoh 8510, and Okidata 92 and 93 with Plug 'n Play IBM chip; color viewing/printing/plotting supported; crosshatch pattern fill not available for non-color viewing/printing/plotting; graphs cannot be viewed in a slide show fashion.

Text Chart Features • 80-column text supported; special text fonts available like Roman, Gothic, Script, etc, but they only print out and are not available for screening; Hebrew, Russian, foreign accents fonts available; user can custom design type fonts • some characters can be expanded; text characters can be rotated; user can create special symbols for scientific fonts; user can create by drawing special templates of symbols and juxtapositioning of symbols and text and placement of such, for example, text within a symbol; no block manipulation; symbols can be enlarged, shrunk and rotated; user cannot draw freehand on the screen; light pen, mouse, and graphic tablet is not supported • drawing size limited by printer.

Business or Numeric Graphic Features • no special support for business or numeric graphics.

Price • $125.

■ IMSI

633 Fifth Street, San Rafael, CA 94901 • 415-545-7107.

□ Four Point Graphics

Application • text/numeric chart graphics.

Introduction Date • October 1983.

Hardware/Operating System Requirements • IBM PC; Eagle; Hyperion; most PC compatibles • 128K bytes of memory minimum for DOS 1.1; 192K bytes of minimum memory for DOS 2.0; 1 disk drive; color graphics board.

Printing, Plotting & Viewing • supports Epson printer; supports Hewlett-Packard plotter HP 7470, Mannesman Tally, Sweet P, Roland DXY 800; Diablo C Ink Jet; Quad Quad Jet • supports color on screen/printing/plotting; crosshatch pattern fill available for non-color printing/plotting/viewing; combining graphs to run as a "slide show" is supported.

Text Chart Features • 80-column text is supported; special text fonts/foreign language fonts/user designed custom fonts not supported • text characters can be expanded, shrunk, and rotated; special symbols predefined by package are: circles, boxes, ellipses, others to be included in library of icons with update • special symbol templates of circuit layout/flow chart will be supported in update; user construction of symbol templates supported; text/symbols combined in same drawing is supported; text appearing inside a symbol is supported; groups of symbols/areas of drawing being marked and manipulated as a block is supported; symbols being enlarged/shrunk/rotated is supported; user drawing freehand on screen with cursor keys is supported;

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light pen/mouse/graphics tablet is supported; size of drawing determined by screen size.

Business or Numeric Graphic Features • input data directly or through spreadsheet files; compatible with spreadsheet program—Lotus 1-2-3, SuperCalc; will work with almost any spreadsheet or graph program that produces graphs • type of charts produced: pie, bar-stacked/horizontal/hanging/vertical, line, histograms • can draw charts freehand and can make any kind of charts; separate data plots supported; number of lines plotted in a single line chart is 50 • location of chart labels is variable; size of label's text is variable • marking plotted points with symbols/labels is supported; placing of user text/symbols on charts is supported; special numeric preprocessing prior to making chart is not supported; chart created with command language • scaling of the chart is automatically determined; grid scale being drawn over chart is supported; chart image can be saved to disk once drawn • fluid or smooth animation; utility programming.

Price • $195.

■ INFOGRAPHICS

201 Shipyard Way, Newport Beach, CA 92663 • 714-675-4385.

□ Design Intelligence

Application • text/numeric chart graphics.

Introduction Date • 1984.

Hardware/Operating System Requirements • IBM PC with MS-DOS, 128K bytes of memory; 2 drives • CP/M-80, 64K bytes of memory; 2 drives • CP/M-86, 128K bytes of memory and 2 drives.

Printing, Plotting & Viewing • 24 different printers and plotters supported; color viewing/printing/plotting supported; crosshatch pattern fill available for non-color viewing/printing/plotting; graphs can be run together to form a slide show.

Text Chart Features • 80-column supported; different language versions available for French, German, Arabic, and Japanese; font versatility can be found in sister programs of Free Form or Design Constructs; text/symbols can be combined in same drawing; drawing freehand and enlarging, shrinking, rotating the symbols available in a sister program called Free Form; Free Form also supports use of light pen, mouse, or graphic tablet can be found in sister program of Free Form; 8.5x10 inches defines drawing size.

Business or Numeric Graphic Features • data is input directly or through .SYLK, .DIF, .SDIC, or ASCII files; package is compatible with following spreadsheet programs of CalcStar, PeachText, MicroPlan, MultiPlan, VisiCalc, Lotus 1-2-3, Advanced VisiCalc, SuperCalc, and database programs like dBase II, accounting packages of mini and mainframes • pie, bar-stacked/horizontal/ hanging/vertical, line, histograms, scattergrams, and area charts • maximum number of lines plotted per line chart is 12; location of chart's labels are variable; size and style of label's text are variable; plotted points cannot be marked with symbols/labels; user text/symbols cannot be placed on the charts; analysis according to range is numeric; processing available prior to chart construction • menu driven; chart's scaling is automatic but user can override; grid scale may be drawn over chart; chart image can be saved to disk once drawn; automatically analyzes and designs charts.

Price • $395.

■ INNOVATIVE SOFTWARE, INC

9300 West 110th Street #380, Overland Park, KS 66210 • 913-383-1089.

□ FAST GRAPHS

Application • text/numeric chart graphics.

Introduction Date • 1983.

Hardware/Operating System Requirements • IBM PC, Compaq, Columbia, or almost any PC compatible; 1.1 or 2.0 DOS require 128K bytes of memory, 2 drives, and color graphics board.

Printing, Plotting & Viewing • many dot-matrix printers supported including all the Okidatas, all the Epsons, C. Itoh 8510, Star Gemini's, Centronics 353, Toshiba P1350, IBM Graphics printer; for color printing, the Diablo and IDS Prism are supported; many plotters are also supported including the HP 7470A and 7475A, Houston Instruments DMP: 4,5,7,9, and 29, Strobe single and multipen plotters, IBM XY/749, Sweet P, Calcomp 84, Panasonic, and MPlot 2; color viewing/printing/plotting supported; crosshatch pattern fill available for non-color viewing/ printing/plotting; graphs may be combined to run as slide show.

Text Chart Features • 80-column text supported; special text fonts are not available; text characters can be expanded or shrunk, but not rotated; special symbols such as circles, boxes, lines, radii, circles, and arcs are predefined by the package; user can construct own templates; text/symbols can be combined in same drawing; text can appear inside a symbol; no block manipulaton or changing of symbols; user can draw freehand on the screen using cursor keys and pixel addresses; screen size determines drawing's size.

Business or Numeric Graphic Features • data is input directly or through spreadsheet files like Lotus 1-2-3, VisiCalc, SuperCalc, PerfectCalc, Multiplan, or any program saving in a .DIF or ASCII file; pie, bar-stacked/horizontal/hanging/vertical, line,histograms, and scatter charts, point-line charts available • maximum number of lines plotted per line chart is 6; location of chart's labels are variable; size and style of label's text are fixed; plotted points may be marked with symbols but not with labels; user's text/symbols may be placed on charts • menu-driven, chart's scaling is automatic but user can override; grid scale may be drawn over chart; chart image can be saved to disk once drawn.

Price • $350.

■ INTERNATIONAL SOFTWARE MARKETING

120 East Washington Street, University Building #21, Syracuse, NY 13202 • 315-474-3400.

□ Graph Magic II

Application • text/numeric chart graphs.

Introduction Date • 1982 original version; 1984 2nd version.

Hardware/Operating System Requirements • IBM PC with 1.1 or 2.0 DOS; DEC, or Wang; 128K bytes of memory; 1 disk drive, color graphics board • Apple II with Apple DOS requires 64K bytes of memory and 1 drive.

Printing, Plotting & Viewing • supports all plotters; universal interface; for color viewing one needs Color Magic; crosshatch pattern fill available for non-color printing, plotting, and viewing.

Text Chart Features • 80-column text supported; special fonts not available; text characters cannot be manipulated; special symbols such as circles, boxes, triangles, and 3-D symbols are predefined by the package; special templates are not available; text cannot be combined with symbols on the same package; text can appear inside a symbol; groups of symbols/areas of drawing manipulated as a block; symbols cannot be enlarged/ shrunk/or rotated; user cannot draw freehand on the screen or use any such support devices; drawing size is limited by either screen size or plotter size.

Business or Numeric Graphic Features • data is put in directly or through .DIF or .SYLK files found in such spreadsheet programs as MultiPlan, SuperCalc, PeachCalc, Lotus 1-2-3, VisiCalc, and dBase II • charts available include pie, bar-stacked/horizontal/ vertical, line, and pyramid charts • maximum number of lines plotted per line chart is 100; location of chart's labels are variable; size and style of label's text are variable; plotted points may be marked with symbols/labels; user text can be placed on the charts; menu-driven • scale of the chart must be normal or logarithmic; grid scale may be drawn over chart; chart image can be saved to disk once drawn • supports anything, accesses many different types of files because written in assembler.

Price • $89.95 for IBM and Wang; $99.95 for DEC.

Microcomputer Graphics Software

☐ Color Magic

Application • text chart graphs.

Introduction Date • July 1983.

Hardware/Operating System Requirements • DEC, Wang, and IBM with 2.0 DOS; 128K bytes of memory, 1 disk drive, and color graphics board • Apple with Apple DOS requires 64K bytes of memory and 1 disk drive.

Printing, Plotting & Viewing • supports various graphics printers; color viewing/printing/plotting supported; crosshatch pattern fill available for non-color viewing/printing/plotting; graphs can be run together to form a slide show.

Text Chart Features • 80-column text supported; 3 different size text fonts are available; no foreign language fonts; user can custom design his own fonts; text characters cannot be shrunk or enlarged but they can be rotated; user creates any special predefined symbols; user can construct symbol templates; text can appear inside a symbol; groups of symbols/areas of drawing manipulated as a block; symbols cannot be enlarged, shrunk, or rotated; user can draw freehand with joy stick, mouse, or graphic tablet; screen size is drawing's size on DEC, can have 16 colors out of 4,000.

Business or Numeric Graphic Features • no special support for business or numeric graphics.

Price • $149.95 for IBM and Wang; $199.95 for DEC.

■ LOTUS DEVELOPMENT CORPORATION
161 First Street, Cambridge, MA 617-494-1192.

☐ Lotus 1-2-3

Application • basically numeric chart graphics.

Hardware/Operating System Requirements • IBM PC, PC/XT, Compaq portable with PC-DOS, TI Professional, Bytex Hyperion, Zenith 100, Wang Professional and Columbia PC with BIOS version 2.11 or later; DEC Rainbow, Compass portable and Victor 9000 are in development; 196K bytes of memory; 2 double-sided disk drives or 1 double-sided disk drive and 1 hard disk, a monochrome display or color graphics board or Hercules board.

Printing, Plotting & Viewing • supports dozens of printers including Epson FX-80, MX-80 and MX-100 with Graftrax, Okidata Microline series, Integral Data Systems Prism Printers and IBM Graphics Printer; supports Hewlett Packard HP 7470A plotter and Sweet Pea and Stroke plotters • color printing/plotting supported; crosshatch pattern fill available for non-color viewing/printing/plotting; graphs can be combined to run as a slide show; 80-column text supported; special text fonts are available; text/symbols can be combined in same drawing • monitor size determines drawing's size.

Text Chart Features • no special support for non-numeric charts or graphs.

Business or Numeric Graphic Features • data inputted directly or through spreadsheet files, like Lotus or VisiCalc .DIF files or ASCII files • charts available include pie, bar-stacked/vertical, line, histograms, and scatter charts • maximum number of lines plotted per line chart is 6; location of chart's labels are variable; size and style of label's text are variable; plotted points may be marked with symbols/labels; user's text/symbols may be placed on charts; spreadsheet functions of Lotus are available prior to making the chart • command language or menu driven; chart's scaling is automatic but user can override; grid scale may be drawn over chart; chart image can be saved to disk once drawn.

Price • $495.

☐ Symphony

Application • spreadsheet/word processing/communications/graphics.

Introduction Date • Summer 1984.

Hardware/Operating System Requirements • IBM PC with PC-DOS; 192K bytes of memory, 2 disk drives preferred; color graphics card or Hercules board.

Printing, Plotting & Viewing • dozens of dot-matrix printers supported; HP and other plotters supported; color printing and plotting supported • crosshatch pattern fill available for non-color viewing/printing/plotting; graphs can be combined to run as a slide show.

Text Chart Features • 80-column text supported; special text fonts available; text/symbols can be combined in same drawing; monitor determines drawing's size.

Business or Numeric Graphic Features • data is inputted directly or through spreadsheet files of Lotus or VisiCalc; .DIF files or ASCII files of other programs can also be inputted for data; charts available include pie, bar-stacked/hanging/vertical, line, histograms, area graphs, shaded and exploded pie charts; open-close high-low graph charts to illustrate stock market activity • option of log axes • maximum number of lines plotted per line chart is 6; location of chart's labels are variable; size and style of label's text are variable; plotted points may be marked with symbols/labels; user's text/symbols may be placed on charts; spreadsheet functions are available prior to making the chart • command language and menu driven • chart's scaling is automatic but user can override; grid scale may be drawn over chart; chart image can be saved to disk once drawn; word processsing and communications are also part of this package.

Price • $695.

■ METASOFT CORPORATION
711 East Cottonwood, Suite E, Casa Grande, AZ 85222 • 602-961-0003.

☐ Benchmark 1.0

Application • text/numeric chart graphics.

Introduction Date • 1983.

Hardware/Operating System Requirements • IBM PC; MS-DOS with 128K or 256K bytes of memory, 1 disk drive, color graphics board • NEC APC; MS-DOS with 256K bytes of memory, 1 disk drive, color graphics board if color supported.

Printing, Plotting & Viewing • dot-matrix printers such as the Epsons and IBM graphics printer; plotters are also supported; color viewing supported; crosshatch pattern fill available for non-color viewing/printing/plotting.

Text Chart Features • 80-column text supported; double height and width text fonts available; user can custom design own fonts; text characters can be expanded, shrunk, or rotated • special symbols predefined by the package include circles, boxes, arcs, rectangles and others; user can construct own special templates but none already available in package • text/symbols can be combined in same drawing; text can appear inside a symbol; groups of symbols/areas of drawing manipulated as a block; symbols enlarged/shrunk/or rotated; user can draw freehand using cursor keys or graphic tablet.

Business or Numeric Graphic Features • input data directly or through built-in spreadsheet functions • charts available include pie, bar-stacked/horizontal/vertical, line, or charts the user enters • maximum number of lines plotted per line chart is unlimited • location of chart's labels are variable; size and style of label's text are fixed; plotted points may be marked with symbols/labels; user's text/symbols may be placed on charts; spreadsheet numeric processing available by package prior to making the chart • package is command as well as menu driven • chart's scaling is automatic but user can override; grid scale may be drawn over chart; chart image can be saved to disk once drawn.

Price • $699.

■ MICROART CORPORATION
200 Market Building, Suite 961, Portland, OR 97201 • 800-642-7627.

☐ Image Word/Graphics Processor

Application • text chart graphics.

Introduction Date • June 1982.

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Hardware/Operating System Requirements ● Zenith and TeleVideo with CP/M-80; 64K bytes of memory, 2 disk drives ● DEC with CP/M-86, 128K bytes of memory, 2 disk drives.

Printing, Plotting & Viewing ● NEC, C. Itoh, Zenith, Diablo and compatibles, DEC LA 50/100 printers are supported; color viewing/printing; crosshatch pattern fill available for non-color viewing/printing; graphs cannot be combined to run as slide show.

Text Chart Features ● 80-column text supported; special bold font supported; text characters can be expanded, shrunk, but not rotated; special symbols predefined by the package include boxes ● user can construct symbol templates; text/symbols can be combined in same drawing; text can appear inside a symbol; groups of symbols/areas of drawing manipulated as a block; symbols not enlarged/shrunk/rotated; user can draw freehand on the screen with cursor keys; page size determines drawing size.

Business or Numeric Graphic Features ● input data directly through keyboard; ASCII files from programs like WordStar can produce image files to make charts; organizational charts; form and flow charts miscellaneous graphics; user's text/symbols may be placed on charts ● command language or menu driven ● chart image can be saved to disk once drawn; windowing capabilities; 50 functions along with word processor.

Price ● $295; demo disk is $15.

■ MICROGRAFX

8526 Vista View Drive, Dallas, TX 75243 ● 214-343-4338.

□ PC Draw

Application ● text/drawing chart graphics.

Introduction Date ● 1982.

Hardware/Operating System Requirements ● IBM PC and compatibles with DOS 1.1 to 2.1; 128K bytes of memory minimum; 2 double-sided double density drives, IBM color graphics board or compatible, like Plantronics or Amdek, which can give high-resolution mode.

Printing, Plotting & Viewing ● Epson or printers code compatible with Epson such as Gemini 10X and 15X; Okidata, Mannesman Tally, IBM graphics printer, IDS Prism; HP 7470A and 7745A plotters ● color viewing/printing/plotting supported; crosshatch pattern fill available for non-color viewing and plotting; graphs cannot be run together for a slide show.

Text Chart Features ● 80-column text supported or more columns if desired; special text fonts available; user can custom design own fonts; text characters can be expanded, shrunk, or rotated ● special symbols are predefined by the package such as circles, boxes, and others; there are 3 templates, each template holding a total of 21 special symbols; a grand total of over 100 predefined special symbols available to the user, including other predefined symbols; special templates available such as flow charts and electrical layout; also a text template instead of the IBM's ROM ● user can construct symbol templates ● text/symbols can be combined in same drawing; text can appear inside a symbol; groups of symbols/areas of drawing manipulated as a block; symbols enlarged/shrunk/or rotated ● user can draw freehand using cursor arrow keys or a light pen (mouse and graphic tablet are in development) ● a drawing as large as 99 pages long may be defined at one time; any 2-dimensional drawing is possible ● flow and organizational charts of large corporations are possible; architectural drawings also feasible; a low-end CAD package ● interface with Lotus 1-2-3 planned.

Price ● $295.

■ MICRO-Z COMPANY

P.O. Box 2426, Rolling Hills, CA 90274 ● 213-377-1640.

□ MicroGraf/Print-Graf

Application ● screen dump/graphics.

Introduction Date ● May 1982.

Hardware/Operating System Requirements ● IBM PC with PC-DOS 1.1 to 2.0; 48K bytes of memory needed; 1 drive, color graphics board.

Printing, Plotting & Viewing ● IBM graphics printer or Epson with Graftrax; color is supported on the screen; program uses dot densities for pattern fill for non-color printing and viewing.

Text Chart Features ● 80-column text supported; a drawing as large as 640x200 pixels (8.5x11 inches) may be defined at one time.

Business or Numeric Graphic Features ● data is input directly via X-Y files/numeric decimal ● vertical and hanging bar charts, line charts, fill below the line/shadow charts ● 1 set of lines may be supported in 1 line plot ● the location of the labels are variable but the size and style of the label's text is fixed; plotted points may be marked with symbols but not labeled; user text/symbols cannot be placed on charts; no prior numeric processing; command language; chart's scaling is automatic but user can override; grid scale cannot be drawn over the chart; chart image can be saved to disk once drawn.

Price ● $79.50.

■ MIRACLE COMPUTING

313 Clayton Street, Lawrence, KS 66044 ● 913-843-5863.

□ JOYDRAW

Application ● text chart graphics.

Introduction Date ● June 1983.

Hardware/Operating System Requirements ● IBM PC/XT or compatibles; DOS 1.1 or later version; 64K bytes of memory and 1 disk drive; color graphics board.

Printing, Plotting & Viewing ● Epson MX 80 printers; color viewing/printing/plotting supported; crosshatch pattern fill available for non-color viewing/printing/plotting.

Text Chart Features ● 80-column text supported; special text font and symbol manipulation is not possible; user draws own special symbols; user constructs symbol templates; text/symbols can be combined in same drawing; text can appear inside a symbol; groups of symbols/areas of drawing cannot be manipulated as a block; symbols cannot be enlarged, shrunk, or rotated ● user can draw freehand on screen with a joystick; screen size determines drawing's size.

Business or Numeric Graphic Features ● no special support for business or numeric graphics.

Price ● $23.

□ EASYGRAF

Application ● dot addressable graphics.

Introduction Date ● June 1983.

Hardware/Operating System Requirements ● IBM PC/XT or compatibles with DOS 1.1 or later; 64K bytes of memory; 1 disk drive; color graphics board.

Printing, Plotting & Viewing ● Epson MX 80 with Graftrax; color viewing/printing/plotting supported; crosshatch pattern fill available for non-color viewing/printing/plotting.

Text Chart Features ● 80-column text supported; special text fonts not available; text characters cannot be enlarged, shrunk, or rotated; special symbols not predefined by the package; user cannot construct symbol templates; text and symbols cannot be combined on the same drawing; text can appear inside a symbol; groups of symbols/areas of the drawing cannot be manipulated and marked as a block; symbols cannot be enlarged, shrunk, or rotated; user cannot draw freehand on the screen; a light pen, mouse, or graphic tablet is not supported ● full screen size is how large a drawing can be defined at one time.

Business or Numeric Graphic Features ● cursor and function keys input data directly into the program; no spreadsheet programs or any other programs can produce data to be graphed by this package; program can draw anything user inputs since

Microcomputer Graphics Software

the program addresses individual dots; charts available include pie, all kinds of bar, line, and histograms; as many lines as can be drawn are possible in a single line plot; chart labels have no fixed locations; size and style of chart labels is variable; plotted points may be marked with symbols/labels; user's text/symbols may be placed on charts; no numeric pre-processing available prior to making the chart • menu driven • chart's scaling is automatic but user can override; grid scale may be drawn over chart; chart image can be saved to disk once drawn.

Price • $38.

☐ EASYLEARN

Application • universal driver/tutor/graphics interfacer.

Introduction Date • June 1982.

Hardware/Operating System Requirements • IBM PC/XT; DOS 1.1 or later; 128K bytes of memory minimum; 2 double-sided, double-density disk drives or hard disk; monochrome card or color graphics card or both cards.

Printing, Plotting & Viewing • IBM graphics printer and Epsons are supported; color viewing/printing/plotting supported; graphs can be run together to make a real slide show.

Text Chart Features • user can draw freehand on the screen with the proper device; for example, light pen, mouse, or graphic tablet may be attached to the computer for drawing • for education or construction; can drive slides, video disks, video tapes, printers, whatever graphics peripherals are available to the PC • program is also a tutorial; program will prepare graphics slide presentations • universal user interface via the BASIC programming; computer assisted instruction • sound, graphics, and monochrome are used separately or together; build, change, and print outlines and screens; dynamic interactive text and graphics • menu driven • VORTRAX personal speech system supported.

Price • $250; demonstration package, including complete set of documentation is $25; documentation is $20; yearly support provided for fee of $30 plus $1 per minute (15-minute minimum).

☐ GRAFCALC

Application • text/numeric chart graphics.

Introduction Date • June 1983.

Hardware/Operating System Requirements • IBM PC/XT with DOS 1.1 or later; 64K bytes of memory minimum; 1 disk drive; color graphics board.

Printing, Plotting & Viewing • Epson MX 80 printer supported; HP/P-Series and IDS plotters supported; color viewing/printing/plotting supported; crosshatch pattern fill available for non-color viewing/printing/plotting.

Text Chart Features • 80-column text supported; special text fonts not available; text characters cannot be expanded, shrunk, or rotated; special symbols predefined by the package include circles, boxes, lines, and fill-ins; special map templates are available; user can construct symbol templates; text/symbols can be combined in same drawing; text can appear inside a symbol; groups of symbols/areas of drawing cannot be manipulated as a block; symbols cannot be enlarged, shrunk, or rotated; user can draw freehand on the screen with joystick or cursor keys; light pen, mouse, or digitizer (graphic tablet) is not supported • size of screen determines how large a drawing may be defined at one time.

Business or Numeric Graphic Features • data is inputted directly into the program or through .DIF spreadsheet files as found in Lotus 1-2-3, SuperCalc, and so forth; no other kinds of programs can produce data to be graphed into the package • charts available include pie, bar-stacked/side by side bar/vertical, histograms, area charts, and dot plots • graphs can be modified by going inside the area of the graphs • maximum number of lines plotted per line chart is 3 lines of 36 segments each representing 3-year time span • size and style of text labels is fixed; plotted points may be marked with symbols/labels; user's text/symbols may be placed on charts; no numeric pre-processing available in this package • package is menu driven • chart's scaling is automatic but user can override; grid scale may be

drawn over chart; chart image can be saved to disk once drawn; can type over anything after the chart is created.

Price • $400.

☐ GRAPHIT

Application • dot addressable numeric charts.

Introduction Date • June 1983.

Hardware/Operating System Requirements • IBM PC/XT or compatible with DOS 1.1 or later; 64K bytes of memory minimum; 1 disk drive; color graphics board.

Printing, Plotting & Viewing • Epson with Graftrax; color viewing/printing/plotting supported; crosshatch pattern fill available for non-color viewing/printing/plotting.

Text Chart Features • 80-column text supported; text characters cannot be enlarged, shrunk, or rotated; no special fonts available; special symbols predefined by the package include circles and boxes; no special symbol templates; user cannot construct custom templates • text/symbols can be combined in same drawing; text cannot appear inside a symbol; groups of symbols and areas of the drawing cannot be manipulated as a block; symbols cannot be enlarged, shrunk, or rotated; user cannot draw freehand on the screen; light pen, mouse, digitizer is not supported • screen's size determines size of the drawing.

Business or Numeric Graphic Features • input data directly through keyboard or through spreadsheet .DIF files from Lotus 1-2-3, VisiCalc, or Multiplan; other kinds of programs cannot input data into package • charts available include pie, bar-stacked/vertical/side by side bar, line, histograms, dot plots, overlays, area charts • maximum number of lines plotted per line chart is 3 lines of 36 segments each; location of chart's labels are variable; size and style of label's text are variable; plotted points cannot be marked with symbols/labels; user text/symbols cannot be placed on the charts; no numeric pre-processing prior to chart production • menu driven • chart's scaling is automatic but user can override; grid scale may be drawn over chart; chart image can be saved to disk once drawn.

Price • $70.

■ NETWORK CONSULTING INC

Discovery Park #110, 3700 Gilmore Way, Burnaby, BC V5G 4MI • 604-430-6448.

☐ Turtle Graphics

Application • graphics.

Introduction Date • 1980.

Hardware/Operating System Requirements • IBM PC, Corona, or Columbia; p-System NCI; 128K bytes of memory minimum; 1 drive but 2 disk drives are preferred; color graphics board.

Printing, Plotting & Viewing • color supported on the screen but not in printing or plotting; crosshatch pattern fill not available for non-color printing, plotting or viewing; graphs can be combined to run as slide show.

Text Chart Features • 80-column text supported; special text fonts are not available; text characters cannot be expanded, shrunk, or rotated; special symbols are not predefined by the package; special symbol templates are not available; text/symbols can be combined in same drawing; text can appear within a symbol; symbols cannot be enlarged, shrunk, or rotated; user cannot draw freehand on the screen; light pen, mouse, or graphic tablet is not supported • size of screen determines how large a drawing can be.

Business or Numeric Graphics • no special support for business or numeric graphics.

Price • $845.

■ OMICRON SOFTWARE

57 South Executive Park, Atlanta, GA • 404-325-0770.

☐ Plotrax

Application • text/numeric chart graphics.

Microcomputer Graphics Software

Introduction Date ● 1981.

Hardware/Operating System Requirements ● IBM PC with any PC-DOS; 256K bytes of memory; 1 double-sided, double-density or 2 single-sided, double-density drives/or hard disk; color graphics board.

Printing, Plotting & Viewing ● Okidata, Epsons, IBM graphics printer, IDS, Mannesman Tally printers are supported; HP 7470A plotter is supported; with Version 2.1, any plotter is supported; color viewing/plotting supported; crosshatch pattern fill available for non-color viewing/printing/plotting.

Text Chart Features ● 80-column text supported; special text fonts are not supported; text characters cannot be expanded, shrunk, or rotated; special symbols predefined by the package include circles, boxes, rectangles, triangles, diamonds, squares, and others for a total of 9; user can construct symbol templates for output to the plotter; no special templates available in the package; text/symbols can be combined in same drawing in graphics output; text cannot appear inside a symbol; groups of symbols/areas of the drawing cannot be marked and manipulated as a block; symbols cannot be enlarged/shrunk/rotated; user cannot draw freehand; light pen, mouse, and digitizer are not supported ● drawing size is 8.5 x 11 inches.

Business or Numeric Graphic Features ● data is input directly through ASCII print files; if data is in form of .DIF spreadsheet files (Lotus/dBase II/VisiCalc), then program has built-in converter to change these files into ASCII ● charts available include pie, bar-stacked/horizontal/hanging/vertical, line, 3-D bar charts; regression, linear and curvilinear, plotting up to 8 variables ● maximum number of lines plotted per line chart is 8 lines of 4,000 data points ● location of chart's labels are variable; size and style of label's text are variable; plotted points may be marked with symbols/labels ● user's text/symbols may be placed on charts; statistical numeric processing is available prior to making the chart; menu driven interface with user ● chart's scaling is automatic but user can override; grid scale may be drawn over chart; chart image can be saved to disk once drawn ● advanced statistical functions, exponential functions, log functions, inverse line X-Y, predictions with F, R Squared, multiple regression, 8th polynomial solved, residuals plotted, ANOVA with degrees of freedom, and matrix inversion are available.

Price ● $340.

■ PACIFIC BASIN GRAPHICS

750 York Street, Suite 5, San Francisco, CA 94110 ● 415-824-4910.

□ PBG 100

Application ● numeric chart graphics.

Hardware/Operating System Requirements ● IBM PC; any DOS, CP/M, or Unix system; 128K bytes of memory minimum; use of 1 diskette is possible, hard disk is preferred; high-resolution graphics terminal is required for high-resolution presentation-quality graphics.

Printing, Plotting & Viewing ● Okidata, Printronix, Epson, and C. Itoh printers supported; HP, Bausch and Lomb, Strobe, and Calcomp plotters supported; color is supported in printing/plotting graphs and on screen with Ram Tech graphics system; crosshatch pattern fill is available for non-color printing/plotting/viewing; graphs can be combined to run as a slide show.

Business or Numeric Graphic Features ● data is entered directly or through spreadsheet files via Lotus 1-2-3 or any generic .DIF format spreadsheet files such as dBase II or VisiCalc; command tab-delimited ASCII files from other programs can also be used to generate graphs in this package ● charts include pie, bar-stacked/horizontal/vertical, line, scattergrams, clustered and 3-D bar charts ● maximum number of lines plotted per line chart is 6 with 240 data points per line; location and size/style of chart labels are fixed; plotted points may be marked with symbols/labels; user text/symbols cannot be placed on charts; no special numeric pre-processing ● menu-driven; scale of chart is automatic and cannot be overridden by user; grid scale is automatically drawn only over 3-D chart; chart image can be saved to disk

once drawn ● for large customer with OEM quantities, firm will customize the package ● exotic character generator.

Price ● $295.

■ PEACHTREE SOFTWARE, INC

3445 Peachtree Road, Atlanta, GA 30036 ● 404-239-3000.

□ Business Graphics System

Application ● text/numeric business chart graphics.

Introduction Date ● 1984.

Hardware/Operating System Requirements ● IBM PCs and compatibles require PC-DOS 1.1 or later with 128K bytes of memory, 2 disk drives, and color graphics board ● CP/M business computers requires CP/M with 64K bytes of memory and 2 disk drives ● MS-DOS computers require MS-DOS, 128K bytes of memory, 2 disk drives; Zenith Z-100 requires Z-DOS, 128K bytes of memory, and 2 disk drives ● graphics printer, plotter, or color graphics adapter are optional.

Printing, Plotting & Viewing ● most dot-matrix printers are supported including Epson MX80, MX100 with Graftrax internal firmware, IBM graphics printer, etc; most multipen plotters are supported including HP 7220T, 7470A, 7475, HI DMP, Strobe S100, etc ● color viewing/printing/plotting supported; crosshatch pattern fill available for non-color viewing/printing/plotting; graphs can be combined to run as a slide show.

Text Chart Features ● 80-column text supported ● 7 different text fonts are supported; Euro, Gothic, Little, Mathematics, Script, Simplex, and Triplex; user cannot custom design own fonts; text characters can be expanded, shrunk, or rotated 45 degrees right or left ● special symbols predefined by the package include squares, triangles, diamonds in different colors as well as outlined or filled in solid ● text/symbols can be combined in same drawing; user cannot construct symbol templates and special templates are not available; no block manipulations of the drawing; symbols cannot be enlarged/shrunk/rotated; user cannot draw freehand on the screen and mouse/light pen/graphic tablet not supported ● printer size determines drawing size.

Business or Numeric Graphic Features ● data is entered directly or through spreadsheet files which have a .PRN extension like PeachCalc, SuperCalc, and Lotus 1-2-3; word processors also generate files which can be entered into the program, like Peach Text ● charts available include pie, bar-stacked/horizontal/hanging/vertical, line, histograms, area, scatter charts with linear regression, critical ratio charts, single and double sided bar charts, graphic art text of font/sign charts ● maximum number of lines plotted per line chart is 5 data groups or lines in a line chart with 12 points maximum per line ● location of chart's labels are variable; size and style of label's text are fixed; plotted points may be marked with symbols but not labels in business graphics; with some data groups, user text can be placed in the chart's titles and legends; symbols can be placed only for data points; no numeric pre-processing prior to chart making ● menu driven ● chart's scaling is automatic but user can override min-max range of automatic scaling; grid scale may be drawn over chart; chart image can be saved to disk once drawn ● on-screen help available.

Price ● $295; $195 on the Osborne.

■ PERSONAL CAD SYSTEMS

981 University Avenue, Los Gatos, CA 95030 ● 408-354-7193.

□ CAD Plan

Application ● text/CAD chart graphics.

Introduction Date ● 1983.

Hardware/Operating System Requirements ● IBM PC or PC compatible with DOS 1.1 or 2.0; 320K bytes of memory minimum; 2 disk drives, color graphics board and monitor.

Printing, Plotting & Viewing ● supports various printers and plotters; color supported on screen and in plotting; non-color printing, plotting, and viewing is supported with crosshatch pattern filling.

Microcomputer Graphics Software

Text Chart Features • 80-column text supported; currently the program does not support font variations; user designed text fonts; text characters can be expanded, shrunk, or rotated • special symbols predefined by the package include circles, boxes, arcs, rectangles, etc • special templates available include architectural/mechanical/piping; user can construct symbol templates • text can appear inside a symbol; text/symbols can be combined in same drawing; groups of symbols/areas of drawing manipulated as a block; symbols enlarged/shrunk/rotated; user can draw freehand on the screen using a mouse or digitizer • no limit in size of drawing permitted by package.

Business or Numeric Graphics Features • data input directly • charts available include pie, bar-stacked/horizontal/hanging/vertical, line, histograms • CAD features • location of chart's labels are variable; size and style of label's text are variable; plotted points may be marked with symbols/labels; user's text/symbols may be placed on charts • menu-type commands • can output to any scale for charts; grid scale may be drawn over chart; chart image can be saved to disk once drawn.

Price • $1200 to $1800.

■ PRIMESOFT CORP

P.O. Box 40, Cabin John, MD 20818 • 301-229-4229.

□ (The) Prime Plotter

Application • text/numeric chart graphics.

Introduction Date • February 1983.

Hardware/Operating System Requirements • Apple II/IIe with Apple DOS; 64K bytes of memory minimum; 1 or 2 disk drives.

Printing, Plotting & Viewing • supports all dot-matrix printers; package has material for screen dumps • HP 7475A/7470A/GL, Strobe 100/200, Sweet P100, Comrex 1810, and soon also HI and Apple plotters will be supported • color viewing/printing/plotting supported; crosshatch pattern fill available for non-color viewing/printing/plotting; replay feature allows graphs to be presented as a slide show presentation.

Text Chart Features • 40-column text is supported; optional Apple Tool Kit gives 22 different type font sets • foreign language font can be loaded if user provided • Apple Tool Kit's utilities ($20) permits user to custom design type fonts • on plotter, text characters can be expanded/shrunk; on screen, text characters can be doubled vertically, horizontally, or both; text characters can be rotated • special symbols predefined by the package in conjunction with modular Apple Tool Kit include circles, boxes, ellipses, rectangles, squares, user's logo, and over 30 symbols from symbol table module • user can construct symbol templates; text/symbols can be combined in same drawing; text can appear inside a symbol; groups of symbols/areas of the drawing can be marked and manipulated as a block, but these are not compatible with the plotter which requires routine to be copied and boxed for plotting • text characters can be shrunk/expanded/rotated • user can draw freehand on the screen with cursor and with IJKM keys • joystick, digitizer/Koala pad are supported • size of plotter can determine drawing's size unless windowing to plotter.

Business or Numeric Graphics Features • data is input directly or through spreadsheet files, .DIF format, VisiCalc and comparable others • match any two sets of data and plot them as though they are X,Y pairs; conversions for other spreadsheets possible • BASIC routines can also input data • charts available include bar-stacked/horizontal/hanging/vertical, line, histograms, 3-D bar charts and multiple bar charts, scattergrams, area charts • 2 statistical modules include the following functions: linear, geometric, log, inverse, Spellman, best fit to data, gamma, normal, Chi square, contingency table analysis • maximum number of lines plotted per line chart is unlimited • location of chart's labels are fixed; size and style of label's text are fixed; plotted points may be marked with symbols/labels in the scatter chart; user's text/symbols may be placed on charts • 2 statistics modules provide much numeric preprocessing prior to making the chart; smoothing and massaging of the data for regression and other stat routines available in the package • menu-driven and command language capability • chart's scaling is automatic but

user can override; grid scale may be drawn over chart at any step and with any symbols; chart image can be saved to disk once drawn; package is modular based; allows for customization by user and more modules for later expansion; 2.5 seconds to change modules; disk is extension of memory • overlays on overlays are possible as are any other defaults because of customization options.

Price • $240.

■ REDDING GROUP, INC

609 Main Street, Ridgefield, CT 06877 • 203-431-4661.

□ GrafTalk

Application • text/numeric business/graphics charts.

Introduction Date • 1981.

Hardware/Operating System Requirements • most CP/M level 2 and MP/M computers; works with following built-in graphics screens: North Star Advantage/Otrona/Attache/SONY SMC-70/TeleVideo and can use their screens for a graphics device • 48K bytes of memory required with 1 disk drive • IBM PC with Baby Blue board; IBM color graphics board adapter (4 colors); Plantronics Color Plus board (16 colors) • DEC Rainbow with CP/M requires 48K bytes of memory and one disk drive • IBM PC with PC-DOS requires 128K bytes of memory, 1 disk drive, and color graphics board option • DEC Rainbow's MS-DOS and CP/M-86 version to be released soon for 16-bit capability requires 128K bytes of memory and one disk drive.

Printing, Plotting & Viewing • printers supported include Anadex 9501, Diablo 1640, 1650, and 630, Epson MX80, MX100, and other Epsons and Epson code compatibles, IDS Prism (black and white), IDS 460 Paper Tiger, NEC Spinwriter 3510, 3520, 5510, 5520, 7510, 7520, Okidata 82A, 83A, 84, 92, 93 • plotters supported include CalComp 81, Goerz 281, HP 7220, 7221, 7225, 7470, HI DMP3, DMP4, DMP6, DMP7, DMP29, IBM XY/750, Strobe 100, Tektronics 4662, and Watanabe 4675 • color viewing/plotting/printing supported; crosshatch pattern fill available for non-color viewing/printing/plotting; graphs can be combined to run as a slide show.

Text Chart Features • 80-column text supported; no special text fonts available; user can custom design type fonts with sketch commands • text characters can be expanded, shrunk, or rotated; special symbols predefined by the package include circles, half arcs, line, anything on keyboard; user can custom design symbols with sketch commands; user can construct custom templates; text/symbols can be combined in same drawing; text can appear inside a symbol • no block manipulation but split-screen capability/text editing; symbols can be enlarged/shrunk/rotated; user can draw freehand with cursor keys.

Business or Numeric Graphics Features • input data directly or through spreadsheet files from Lotus 1-2-3, VisiCalc, MultiPlan, and many others; most ASCII files can be used for input data • charts available include pie, bar-stacked/ horizontal/vertical; line; histograms; composite bar and pie/bar; line and symbol; multiple line; and capability to include symbols in bar and pie charts; floating bar/negative and positive bar; scatter diagrams; no set format/bar with pie in a corner; 8 different styles in a chart • location of chart's labels are variable; size and style of/ label's text are variable; plotted points may be marked with symbols/labels; user's text/symbols may be placed on charts • menu driven and command language capability • chart's scaling is automatic but user can override; grid scale may be drawn over chart; chart image can be saved to disk once drawn.

Price • $450.

■ SAVANT CORPORATION

P.O. Box 440278, Houston, TX 77244 • 713-556-8363.

□ Graphics Utility

Application • graphics utility tool kit.

Introduction Date • January 1983.

Hardware/Operating System Requirements • IBM PC/XT with

Microcomputer Graphics Software

64K/128K bytes of memory; 1 disk drive; color graphics card; color monitor or non-color monitor.

Printing, Plotting & Viewing ● Epson with Graftrax ● color is supported on the screen; non-color crosshatch pattern fill is not available for non-color printing, viewing, or plotting.

Text Chart Features ● user designs own fonts and text characters; text characters cannot be expanded, shrunk, or rotated; no special symbols are predefined by the package; user cannot construct own templates; text/symbols cannot be combined in the same drawing; groups of symbols/areas of drawing manipulated as a block; user can draw freehand using cursor keys; light pen, mouse, or digitizer is not supported ● drawing size is limited to 39x39 pixels.

Price ● $85.

■ SOFTKEY INC

411 Shaw Street, #1, Toronto, ON M6J 2X4 ● 416-537-0792.

☐ KeyChart Business Graphics Systems

Application ● text/numeric business chart graphics.

Introduction Date ● 1983.

Hardware/Operating System Requirements ● IBM PC/XT, 3270 or PC compatibles; DOS 1.1/2.0 requires 128K bytes of memory and 2 disk drives; color graphics board not necessary unless previewing.

Printing, Plotting & Viewing ● supports many plotters including HP 7475, 7470, Sweet P100, P600, Strobe 200, 260, Roland DXY 800, Watanabe, HI, Zeta; color viewing/printing/plotting supported; crosshatch pattern fill available for non-color viewing/printing/plotting; graphs can be arranged to provide a slide show.

Text Chart Features ● 80-column text supported; slant and italic text fonts available; foreign language fonts depend on the firmware of the plotter; user cannot custom design own fonts; text characters can be expanded, shrunk, or rotated; no special symbols are predefined by the package because package has 8 different types of hatches, line types, and 99 different floating titles; special template of boxes and lines ● keyboard provides symbols; text/symbols can be combined in same drawing; groups of symbols/areas of drawing manipulated as a block; symbols enlarged, shrunk or rotated; user cannot draw freehand on the screen; light pen, mouse, and digitizer are not supported ● plotter size determines drawing's size.

Business or Numeric Graphic Features ● data can be input directly, or through print-image files, or through spreadsheet files, or mainframe files ● package is compatible with Lotus 1-2-3, PeachCalc, Perfect Calc, VisiCalc, MultiPlan, any .DIF or ASCII format file or any text or print-file form ● charts available include pie, bar-stacked/horizontal/vertical, line, histograms, multiclustered automatic bars, or line and bar charts ● maximum number of lines plotted per line chart is 99 ● fixed label locations and size; fixed style of text of labels; plotted points may be marked with symbols/labels; user's text/symbols may be placed on charts ● upgrade will include linear regression numeric preprocessing and up to 700 lines in plot ● menu driven ● chart's scaling is automatic but user can override; grid scale may be drawn over chart; chart image can be saved to disk once drawn; few fonts because fonts make plotters run slower.

Price ● $375.

■ SUNSHINE COMPUTER SOFTWARE CO

1101 Post Oak Boulevard #9-493, Houston, TX 77056 ● 713-552-0949.

☐ The Artist

Application ● text charts.

Introduction Date ● 1983.

Hardware/Operating System Requirements ● IBM PC; 2.0 DOS; 192K bytes of memory; 1 disk drive; color graphics board.

Printing, Plotting & Viewing ● supports Quad printers; color viewing, printing, plotting supported; crosshatch pattern fill avail-

able for non-color viewing, printing, plotting; graphs can be combined to run as a slide show.

Text Chart Features ● 80-column text supported ● special text fonts available; no foreign language fonts; user can custom design own fonts; text characters can be rotated ● special symbols predefined by the package are circles and boxes ● no special templates but user can construct own templates; text/symbols can be combined in same drawing; text can appear inside a symbol; groups of symbols/areas of drawing manipulated as a block; symbols enlarged, shrunk, or rotated; user can draw freehand on the screen with cursor keys; light pen, mouse, or digitizer not supported ● screen size delimits drawing's size.

Business or Numeric Graphic Features ● no special support for business or numeric graphics.

Price ● $95.

■ SOFTWARE PUBLISHING CORPORATION

1901 Landings Drive, Mountain View TX 94043 ● 415-962-8910.

☐ pfs:Graph

Application ● numeric chart graphs.

Introduction Date ● 1982.

Hardware/Operating System Requirements ● IBM PC; MS-DOS 1.1 (installed on diskette); 128K bytes of memory; 1 disk drive; color graphics board ● Apple II/IIe/III; DOS; 64K bytes of memory.

Printing, Plotting & Viewing ● supports Apple printers, 7 types of IBM printers, C. Itoh, Okidata, NEC, IDS ● supports HP 7470A, 7220, and 7225 serial, Strobe 100 and 200, HI, Sweet P plotters ● color viewing, printing, plotting supported ● crosshatch pattern fill available for non-color viewing, printing, plotting; graphs cannot be run to make a slide show.

Text Chart Features ● 80-column text supported; special text fonts and foreign language fonts not available; user cannot design fonts and text characters not expanded/shrunk/rotated; screen limits drawing's size.

Business or Numeric Graphic Features ● input data directly or through .DIF files; .DIF files of spreadsheet programs, VisiCalc or pfs:File can provide data input ● pie, bar-stacked/horizontal, line, histograms, bar and line mixed; maximum number of lines plotted per line chart is 4 plotted lines in a single line plot with 36 data points per line ● location of chart's labels are variable; size and style of label's text are variable; plotted points can be marked with symbols/labels; user's text/symbols cannot be placed on charts ● no numeric pre-processing available prior to chart creation; command language and menu-driven user interface; chart's scaling is automatic but user can override ● grid scale may be drawn over chart; chart image can be saved to disk once drawn.

Price ● $140 for IBM version; $125 for Apple version.

■ TRANSPARENT DATA SYSTEMS, INC

P.O. Box 18276, San Jose, CA 95158 ● 408-559-0288.

☐ UGraf

Application ● numeric chart graphs.

Introduction Date ● 1982.

Hardware/Operating System Requirements ● IBM PC, DOS; 64K bytes of memory; 2 disk drives; Digital Research GSX graphics utility interface.

Printing, Plotting & Viewing ● supports indefinite number of printers and plotters; will test and provide for compatiblity; color viewing, printing, plotting supported; crosshatch pattern fill available for non-color viewing, printing, plotting; graphs can be combined to run as a slide show.

Text Chart Features ● user can custom design type fonts; text characters can be expanded or shrunk; no special pre-defined symbols in package; no special templates of symbols; user cannot construct templates; text/symbols not combined on same drawing;

Microcomputer Graphics Software

no block manipulation of areas of drawing/groups of symbols; symbols cannot be shrunk, expanded, or rotated; user cannot draw freehand on the screen; light pen, mouse, or digitizer are not supported; plotter delineates size of drawing.

Business or Numeric Graphic Features ● input data directly or through spreadsheet files such as Lotus 1-2-3, dBase, SuperCalc, Condor or ASCII comma separated value files such as WordStar ● pie, bar-horizontal/vertical, line, histograms, high-low bar charts, area charts, 3-D charts, block charts ● maximum number of lines plotted per line chart is 4, maybe more; location of chart's labels are fixed; style of label's text is variable but size is fixed ● plotted points may be marked with symbols/labels; user's text/symbols cannot be placed on charts; menu-driven; chart's scaling is automatic but user can override; grid scale may be drawn over chart; chart image can be saved to disk once drawn; 4 different charts on 1 page.

Price ● $495.

■ VISICORP

2895 Zanker Road, San Jose, CA 95134 ● 408-946-9000.

□ VisiTrend/Plot 1.3

Application ● text/numeric business chart graphics.

Introduction Date ● 1982.

Hardware/Operating System Requirements ● IBM PC; 1.1 or 2.0 DOS; 128K bytes of memory; 1 double-sided, double-density drive ● Apple II/III; DOS.

Printing, Plotting & Viewing ● Epson, NEC, and Okidata 92 printers are supported; no plotters supported; color is not supported for plotting, printing, viewing, since this is a high-resolution graphics; crosshatch pattern fill available for non-color printing, plotting, viewing; graphs cannot be run together for a slide show effect.

Text Chart Features ● 80-column text not supported; special text fonts available; foreign language fonts not available; user cannot design custom fonts; text characters can be expanded and shrunk but not rotated; special symbols predefined by the package are circles, boxes and others ● special templates not available and user cannot design such; text/symbols cannot be combined on the same drawing; text can appear inside a symbol; no block manipulation of areas of the drawing or groups of symbols; symbols can only be enlarged; user cannot draw freehand on the screen and mouse/light pen/digitizer are not supported; screen size defines size of drawing.

Business or Numeric Graphic Features ● data input directly or through spreadsheet files; .DIF file format of VisiCalc or other programs of similiar format accepted ● pie, bar-stacked/horizontal/vertical, line, histograms, area, X,Y charts ● location of chart's labels are fixed; size and style of label's text are fixed ● plotted points may be marked with symbols/labels; user's text/symbols may be placed on charts; statistical pre-processing/multiple linear regression available for numeric processing prior to chart construction ● menu driven; chart's scaling is automatic but user can override; grid scale may be drawn over chart; chart image can be saved to disk once drawn but cannot re-edit then ● math co-processor use; hard disk capability.

Price ● $300.

■ WEST COAST CONSULTANTS

1775 Lincoln Boulevard, Tracy, CA 95376 ● 209-835-1780.

□ Curvefit CRT

Application ● numeric chart graphs.

Introduction Date ● 1981.

Hardware/Operating System Requirements ● IBM PC, Apple, NEC and other microcomputers; DOS; 1 disk drive; color graphics board for the IBM.

Printing, Plotting & Viewing ● supports most plotters; high-resolution graphics; no color supported for printing, plotting, viewing.

Text Chart Features ● no special support for non-numeric charts or graphs.

Business or Numeric Graphics Features ● input data directly or through .DIF files (dBase II) or ASCII files ● produces charts based on multiple linear regression; does analysis for 4 different types of equations: polynomial, exponential, others ● maximum number of lines plotted per line chart is 4; 4 fit on same line ● location of chart labels are fixed; size and style of chart labels is also fixed; plotted points may be marked with symbols/labels; user's text/symbols may be placed on charts; statistical processing giving coefficients and plots of residuals available for numeric pre-processing prior to chart construction ● menu-driven structure to create the chart and command language capability ● grid scale may be drawn over chart; chart image can be saved to disk once drawn; projection and trend analysis also in package.

Price ● $99.50.

□ Curve II CRT

Application ● text/numeric chart graphics.

Introduction Date ● 1967 (latest revision is 1984).

Hardware/Operating System Requirements ● Applie IIe; 48K bytes of memory; 2 disk drives ● IBM PC; PC-DOS; 128K bytes of memory; 2 disk drives; IBM color graphics board.

Printing, Plotting & Viewing ● virtually every plotter is supported ● high-resolution graphics supported for printing, plotting, viewing; non-color crosshatch pattern fill available for printing, plotting, viewing; graphs can be combined to run as a slide show only on the Apple computer systems.

Text Chart Features ● 80-column text supported; special text fonts are available depending on the plotter's firmware; foreign language fonts are available depending on the plotter's firmware; user can custom design type fonts ● text characters can be expanded, shrunk, or rotated; special symbols resident in the plotter can be called up by the package ● no special symbol templates are available; user can define and construct symbols and symbol templates; text/symbols can be combined in same drawing; text can appear inside a symbol; groups of symbols/areas of drawing manipulated as a block if plotter supports this; symbols enlarged, shrunk, or rotated; user cannot draw freehand on the screen; light pen, mouse, digitizer is not supported ● no limit to size of drawing, based in plotter's bed.

Business or Numeric Graphic Features ● input data directly or through any .DIF spreadsheet files, VisiCalc, or dBase II; data also entered through symbol sequential files or ASCII files ● pie, bar-stacked/horizontal/vertical, line, histograms, scattergrams, positive and negative grouped vertical and horizontal bar charts, any combination of charts listed ● no limit to the maximum number of lines plotted per line chart ● location of chart's labels are variable; size and style of label's text are variable; plotted points may be marked with symbols/labels; user's text/symbols may be placed on charts; no numeric pre-processing prior to chart making ● menu-driven structure to create the chart as well as command language to create the chart; user manually determines the scale of the chart; grid scale may be drawn over chart; chart image can be saved to disk once drawn ● 26 sub-routines are built into the package which the user can call from BASIC and customize; editors to manipulate the data ● package has been undergoing revisions since introduction in 1967.

Price ● $325.

□ Curve Three-D CRT

Application ● numeric chart graphics.

Introduction Date ● 1980.

Hardware/Operating System Requirements ● IBM PC; DOS 1.1, 128K bytes of memory; 1 disk drive, and color graphics board ● Apple; DOS, 48K bytes of memory, 1 disk drive ● NEC; 48K bytes of memory and 1 disk drive ● Commodore; 32K and 1 disk drive.

Printing, Plotting & Viewing ● supports most plotters; high-resolution graphics precludes color printing, plotting or viewing;

Microcomputer Graphics Software

non-color printing, plotting, viewing with crosshatch pattern fill is not available; graphs cannot be run together to make a slide show.

Text Chart Features ● no special support for non-numeric charts or graphs.

Business or Numeric Graphic Features ● data is put in directly or through sequential ASCII files; program is not compatible with any spreadsheet packages ● 3-D oblique projection charts, isometric charts; can rotate charts 0 through 360 degrees ● maximum number of lines plotted per line chart is 1 ● location of chart's labels are variable; size and style of label's text are variable; plotted points may be marked with symbols/labels; user's text/symbols may be placed on charts; no numeric pre-processing available prior to chart making ● menu driven; command language, subroutine utility capability; user determines scale of the chart ● grid scale cannot be drawn over the chart; chart can be saved to disk once drawn.

Price ● $250.

● **END**