Tabletop Plotters

by Chris Morton and Doug Cunningham

Looking for Something in a Moderate Price Range with a Little Something Extra?

As an independent reseller, we find customers are often interested in moderately priced, small hard copy output devices that offer unique attributes not found in the traditional, large-scale pen and electrostatic plotters retailing for $10,000 and more. According to literature from Enter Computer, "Research shows approximately 80 percent of plotter drawings are in the A- to C-class." This article examines tabletop offerings for less than $10,000 that produce the smaller output and offer features not generally found elsewhere.

By no means a comprehensive laboratory test, we looked at models by Enter, Japan Digital Laboratories (JDL), American Matrix Technology (AMT), LaserMaster, and Tektronix to learn what type of output device would be most appropriate in varying applications. LaserMaster and Tektronix were specifically included to learn how they would fare in an environment that might have additional needs beyond straightforward wireframe plots from AutoCAD.

ENTER COMPUTER, INC.
Encad SP4810

We were intrigued by the recent availability of Enter Computer's new 4800 roll-feed pen plotter series; the Encad SP4810 is an eight-pen, C-size model that fits easily on a tabletop and plots up to 50 drawings unattended. Larger D- and E-size models round out the series. Fully HP-GL compatible, 7475, 7550, 758x, and 759x emulations are built-in. We used both the 7550 and 7586 setups during our evaluation, the latter sending roll-feed and takeup codes with each plot to automatically advance the paper during multiple-file batch operation.

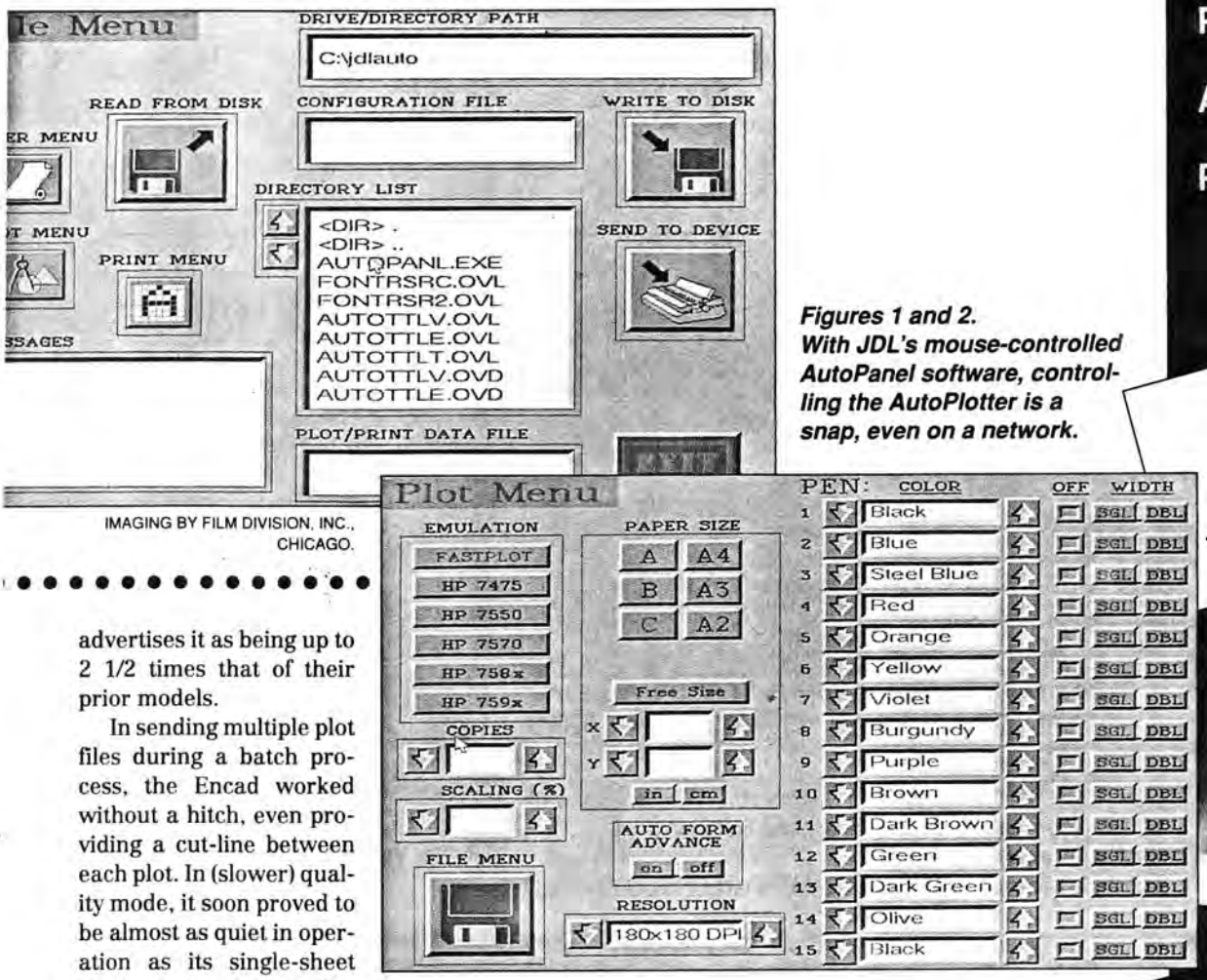
The SP4800 series allows automatic media sizing and centering, gram-adjustable pen settings, plot optimization, internal diagnostics, and keyboard-selectable software command override. A 512K buffer is standard and is expandable to 2Mb using standard SIMM modules. The Encad supports four custom configurations in memory at one time. Enter provides a one-year warranty on all 4800 series plotters.

Setup. Enter could stand to revise its manual; it is less than clear, the sparse illustrations aren't adequately labeled, and it does not have a thoroughly cross-referenced index. Frequently, information seems to have found its way directly from engineering spec sheets into the manual.

Putting Enter's instructions aside, setup went smoothly once we employed a bit of common sense to determine the proper placement of takeup and feeder spools. Loading media is relatively painless, although you should plan on having a roll of drafting tape on hand to attach the end to the takeup spool.

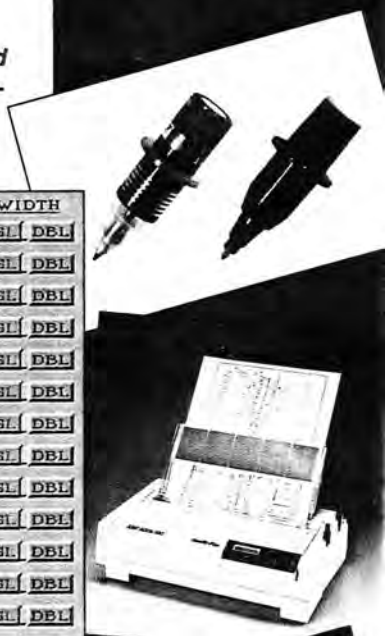
Since this plotter has a full complement of options and built-in features, there are many menu selections. Our previous experience with other Encads was a benefit at this point. The push-button selections on the front panel, while comprehensive, are somewhat bewildering to the uninitiated. Fortunately, the menu-driven setup on the 4800 series is more intuitive than previous models from the manufacturer. However, as with any of these devices, we recommend investing in the operations training provided by your dealer as part of your new hardware acquisition.

Operation. The Encad SP4810 performed very impressively. The first thing we observed was phenomenally fast operation in draft mode. Enter



IMAGING BY FILM DIVISION, INC., CHICAGO.

Figures 1 and 2. With JDL's mouse-controlled AutoPanel software, controlling the AutoPlotter is a snap, even on a network.



advertises it as being up to 2 1/2 times that of their prior models.

In sending multiple plot files during a batch process, the Encad worked without a hitch, even providing a cut-line between each plot. In (slower) quality mode, it soon proved to be almost as quiet in operation as its single-sheet predecessors (when idle, however, the pen-holder mechanism of our evaluation unit had an annoying vibration caused by a loose spring that needed replacement). A normal mode is also available for daily use. Line quality was as good as any we've seen in a conventional pen plotter.

Application. The Encad 4800 series would be appropriate in settings where unattended plotting of conventional wireframe plots using various pen types and media is desired. Due to its extremely quiet operation, it would be an especially good choice for installations where close proximity to the user during plotting is a factor. The C-size SP4810 would be an excellent investment where budget and space considerations are at a premium. The need for the occasional large plot could be farmed out to a service bureau.

JAPAN DIGITAL LABORATORY COMPANY, LTD.

AutoPlotter XP

JDL's AutoPlotter XP is a C-size, 14-color dot matrix plotter/printer that offers both high resolution and high speed. Unlike pen plotters, the AutoPlotter doubles as a letter-quality or high-speed draft printer for conventional documents; it emulates several Epson and IBM ProPrinter models.

If that isn't enough to distinguish the AutoPlotter, JDL includes an extremely useful software program, AutoPanel, that provides a series of mouse-selectable buttons on the screen that control plotting operations (Figures 1 and 2). Specialized setup files can be accessed from the hard disk through AutoPanel, allowing an unlimited number of custom user configurations. Optional device drivers include Microsoft Windows 3.0, AutoShade, TARGA, and GIF.

Using JDL's ADI FastPlot driver, AutoCAD drawing data can be transferred from the computer to the AutoPlotter much faster through a parallel cable connection as opposed to slow serial interfaces typically employed by other plotting devices. The unit is also compatible with standard HP-GL format, and a variety of HP emulations are offered for those requiring a serial connection.

The AutoPlotter provides output at a variety of resolutions ranging from 90 x 180 dpi to 360 x 360 dpi and has a provision for long-axis plotting (up to 150'). A 1Mb plot/print spool buffer is standard, with JDL offering an additional 1.5Mb upgrade kit as an option. Like the Encad, the AutoPlotter handles both 17"-wide cut-sheet and roll media. JDL offers a standard 90-day warranty, with an optional 15-month

Seiko's newly introduced ColorPoint PS is a PostScript color output device that retails for less than $7,000.

onsite contract available.

Setup. The AutoPlotter was fairly easy to install. The documentation is easy to follow and thorough; it includes section dividers and a full-index. JDL's AutoCAD automatic configuration script file got hung up answering a question in AutoCAD 386, but after a quick edit, all was well. We found that media loading on the AutoPlotter can be tricky if the paper is uneven.

The AutoPanel software interface is really appreciated; it makes selecting options from the monitor a breeze. In practice, LED panels on the plotter with push buttons for option selection are a nuisance and can be confusing. This was especially true of the AutoPlotter before the addition of the AutoPanel program.

Operation. Since the JDL is a dot matrix printer/plotter, it was noticeably louder than the Encad. Like any dot matrix printer, a good sound hood or even a separate room would help maintain sanity. As advertised, the line quality laid down by the AutoPlotter was exceptional for a device of this versatility, caliber, and price; we thought the 180 dpi resolution was entirely acceptable for quick check plots. The overall speed at which the AutoPlotter operated was very good.

Application. Because the AutoPlotter is controlled from the user's location, it is ideal for a network installation where the plotter may not be near everyone. Since it can also print letter-quality correspondence and documentation from programs like WordPerfect, it is a good choice for engineering departments with limited space and budgets.

AMERICAN MATRIX TECHNOLOGY, INC.
Accel-535 Intelli-Plot Plus

Similar to the JDL AutoPlotter (AMT and JDL are even located in the same town), the Accel-535 Intelli-Plot Plus is the newest upgrade to AMT's 16-color dot matrix printer/plotter. Like the JDL, the AMT unit is HP-GL plot compatible and provides several standard printer emulations for use with other software. The Intelli-Plot Plus technology provides remote keyboard switching between these two modes.

According to AMT marketing claims, "Intelli-Plot is now the fastest possible way to plot AutoCAD drawings." When the Accel-535 is used with AMT's AutoCAD ADI driver and a parallel-type cable interface, it can receive data from the computer at the same time it's plotting. This increases overall throughput speed when multiple drawings are sent to the plotter. AMT claims a drawing that takes 36 seconds to send in HP-GL format can be sent in nine seconds in ADI format.

Although AMT doesn't offer option selection software for the Accel-535, their patented Select-dial (rotary) mechanism on the front panel made manual configuration much easier than it was on the Encad or JDL models.

The buffer holds up to 20 drawings for processing in unattended mode. Like the Encad and the JDL, the AMT offers varying modes of operation, each one sacrificing a bit of speed for greater output quality. Five custom user configurations may be saved in the Accel-535's memory. Plots can be rotated and/or scaled up to 999 percent or down to one percent; this autoscaling feature can automatically scale a drawing to fit proportionally on A- through C-size media. Through Intelli-Plot Plus control, plots may be moved anywhere on the media, and the user may select portions of drawings to plot.

The Accel-500 series units come with a two-year warranty; print heads are warranted for one year. Older AMT Accel-

Also Noted— Seiko and Ioline Printers

Two new output devices not available for hands-on review but worth mentioning are the ColorPoint PS from Seiko and the Ioline Signature 5000 Signmaker.

SEIKO INSTRUMENTS, INC.
Colorpoint PS

Seiko is no newcomer to the printer industry; after bringing out a 150 dpi color model nearly a decade ago, it has now introduced the ColorPoint PS (see photo). For less than $7,000, this color PostScript device implements a RISC processor (Intel 80960) and PhoenixPage, a page description language (PDL) enabling accurate emulation of monochrome and color PostScript, PCL, and HP-GL. Seiko claims the ColorPoint PS is 60 percent faster and $3,000 less than comparable color models from other manufacturers. The new Seiko printers are available in both standard letter size as well as tabloid size (11" x 17"). The former has parallel, serial, and AppleTalk interfaces as well as two SCSI ports, 6Mb RAM, and 35 LaserWriter NT-equivalent fonts. It weighs only 41.8 pounds.

IOLINE CORP.
Signature 5000

Ioline's Signature 5000, although not a tabletop model, is a special application

plotter that gives the sign industry the best of both worlds—a high-quality, multiple pen plotter that doubles as a sophisticated vinyl cutter. This plotter enables signmakers, advertising firms, awning companies, and others to design, plot, and cut complex logos, patterns, or just plain text (or any variation thereof).

Featuring a tungsten-carbide blade, the Signature 5000 can easily cut vinyl, metalized polyesters, reflectives, and screenprint stencils or sand-blasted stencils. Its tangential cutter is the key to the speed and quality with which it can cut a wide range of materials. Both downward pressure and depth of cut can be easily adjusted, thereby ensuring proper performance. The Signature 5000 cuts at 24 ips and plots at 36 ips. For those interested in a dual-mode plotter/sign cutter, this model might be well worth consideration.—CM, DC

ColorPoint PS
A-size—$16,999;
Model 14—$9,999
Seiko Instruments, Inc.
1130 Ringwood Ct.
San Jose, CA 95131
(408) 922-5800

Signature 5000
$7,995
Ioline Corp.
12020 113th Ave. NE
Kirkland, WA 98034
(206) 821-2140

Ioline Signature 5000 signmaker with tangential cutter and optional file server.

500 series models may be retrofitted to include Intelli-Plot Plus capability.

Setup. The documentation that came with the Accel-535 was the best of the lot; it was indexed by section and illustrated throughout with photographs. The only way it could be improved is with the use of tabbed section dividers. We were held up a bit, however, by elusive Intelli-Plot Plus installation instructions that were packaged separately; they were eventually located in the bottom of the shipping carton. AMT is in the process of updating the manual to include this information.

Loading media on the Accel-535 was not a problem inasmuch as the Accel-535 has an automatic load feature that actually works. Like the JDL AutoPlotter, the configuration script file provided by AMT didn't work with AutoCAD 386 and had to be manually edited (it chooses menu pick #2, "ADI P386," instead of #4, "AutoCAD Device Interface").

Operation. Although AMT boasts that the Accel has been "quietized" for office use, we still found it obtrusive when working next to it. Other than the lack of software control, we found the performance of the Accel-535 comparable in all respects to the JDL AutoPlotter.

Application. Like the JDL, the Accel-535 would work well in any engineering department because of its dual personality. Many firms are now using these dot matrix based plotters to archive older drawings that have first been scanned and then partially touched up with a CAD program. Since they work with both raster and vector based data, this is an ideal use of the technology.

LASERMASTER, INC.

LaserMaster 1000

The LaserMaster 1000 Personal Typesetter is a complete, monochrome printing system that lets users produce camera-ready layouts on plain paper at an effective 1000 dpi resolution (referred to as "TurboRes," a patented process). It is housed in a conventional laser printer casing; a video cable attaches the printer to the interface board (both included). Once the registration card is mailed, LaserMaster extends the 90-day warranty to one year with free technical support.

AutoCAD users will want to get the optional CADPak software consisting of four plotting utilities; one of these, LMDRV, is an AutoCAD ADI driver. Two others provide direct output of either PLT or DXF files from the command line, while the fourth provides HP-GL compatibility with other software that supports this output format. If you wish to make a plot from AutoCAD HP-GL files with different pen widths than they were created with, this latter utility should be used. For regular AutoCAD plotting, however, LaserMaster recommends using the ADI utility LMDRV whenever possible because of its speed, accuracy, and ease of use.

For those interested in technical publishing with Aldus PageMaker, Ventura

New models and versions of tabletop plotters and printer/plotters included in this review include output devices from (left to right) JDL, Enter Computer, Tektronix, AMT, and LaserMaster (lower shelf).

Publisher, or other DTP software, the LaserMaster 1000 comes with 135 different typeface outlines, all scalable up to 1200 points. A typeface collection of this size would have cost more than $4,000 if purchased separately. No font downloading is required to use the system. A driver is included for use with Microsoft Windows 3.0.

The LaserMaster 1000 is restricted to letter and legal-size output. As this article was being completed, LaserMaster announced a 1200 dpi (effective resolution) version that outputs at a full 11" x 17" (tabloid). It will retail for $15,995.

Setup. The LaserMaster system requires an interface board to be installed in the computer; this is a fairly simple operation. We didn't need to change any dip switches or jumper settings, even with a network adapter installed. If running on a network, beware: the LaserMaster software consumes a large amount of conventional RAM, so load network drivers into extended memory to make more room.

Once the hardware connection is established, we simply ran the provided setup program, then sat back and accepted the default choices. The setup routine resembles the installation program for AutoCAD 386.

Operation. Where neither large format nor color plots are required, the LaserMaster 1000 provides blazing speed coupled with high resolution. Quiet operation has always been a virtue of laser printing technology; happily, this unit is no exception.

Application. The LaserMaster 1000 would absolutely shine in a technical publishing environment where AutoCAD drawings are merged into PageMaker or Ventura Publisher documents. All types of camera-ready documentation and sales/marketing masters could be produced in-house with this model, saving both time and production house costs.

Utilizing new types of media available especially for laser printers, high-resolution transparencies, and even adhesive-backed nameplates and signs (both clear and opaque) can be generated. With the LM-Net option, the LaserMaster 1000 can be operated on a network for workgroup publishing and plotting.

TEKTRONIX, INC.

Phaser PX

The Phaser PX is the latest Tektronix entry in the full-color, thermal wax transfer sweepstakes. Providing 300 dpi resolution and certified Pantone color matching in letter- or legal-size format, it's geared for the professional graphics department. The Phaser PX has a 90-day onsite warranty that can be augmented with the manufacturer's Warranty-Plus service option. A monochrome transfer roll is good for 1,100 prints; the four-color roll will output 275 prints.

The Phaser PX is PostScript compatible, has 35 standard PostScript typefaces built in, and is equipped with parallel, serial, and AppleTalk interfacing. With its automatic switching feature, it can accept data from different types of computers with no user intervention required. Beyond output from AutoCAD and AutoShade, the Phaser PX provides magnificent output from both Windows 3.0 and Macintosh graphics programs alike. With its HP-GL compatibility, it even accepts output from software such as Harvard Graphics.

Like the LaserMaster unit, the Phaser PX can output to cut sheet (special paper), transparency film, and fabric transfer media. For those applications that do not offer PostScript support, the Phaser PX includes software-selectable HP-GL compatibility. The unit can accept both PostScript and HP-GL files simultaneously through its multiple ports, making it an

ideal network printer/plotter that provides special capabilities.

Setup. The hardest part of setting up the Phaser PX was getting it up on the table; the unit is very heavy. Installing the heat transfer colored film is very easy and is well-documented, and in a Windows 3.0 environment, setup is also simple. Using the Micrografx-developed PostScript driver, the Phaser PX becomes an actual printer selection in the Windows Control Panel. For AutoCAD plotting using a parallel interface, a small PostScript file must first be sent to the Phaser to put it into HP-GL mode. You then plot your drawing to a file and send the file to the printer. However, if you're connected via a serial port, you can plot from AutoCAD directly. Upon completion, another file must be sent to the Phaser if you wish to reenable PostScript mode.

Since AutoShade 1.1 directly supports color PostScript devices, all that has to be done after configuration is to indicate a PostScript output device when prompted by the installation program. The color PostScript files created by AutoShade are simply copied through DOS to whichever port you have the Phaser PX connected.

Operation. When idle, the Phaser is not much louder than a laser printer. Printing becomes noisier as the device makes multiple passes over the coated paper, but it is not annoying. We found the overall operation of the Phaser PX to be as advertised by Tektronix, and we were pleased by the color output.

Application. A sophisticated color device like the Phaser PX is not going to be the unit of choice when basic AutoCAD color wireframe plotting is all that's required. We included it in this review because of the increasing interest among *CADENCE* readers in photorealism and presentation-quality graphics. While the output from AutoShade 1.1 is certainly attractive and useful, we're really looking forward to seeing the prints generated by the Phaser PX using AutoShade 2.0 with its RenderMan enhancement.

Affordably priced, the Phaser PX is sure to find a home wherever hard copy output incorporating presentation-quality graphics is required. Especially for the architectural office that is looking for an advantage over the competition, color renderings from the Phaser PX would go a long way toward helping close more deals. Its tremendous appeal and flexibility in the corporate environment also cannot be overlooked.

CONCLUSION

Instead of rushing out and investing in a large floor-standing pen plotter without much forethought, we suggest you carefully think about how your output device will be used most frequently. There are many different technologies on the market to suit a wide variety of needs. Some don't even require any additional hardware investment at all. Whatever your decision, recognize that your perception of the output may vary with the technology; in our opinion, the quality of 300 dpi resolution off a laser printer is superior to the 360 dpi from a dot matrix device (never mind 1,000 dpi).

If your large-format plotting requirements are nominal, you might well consider one of these tabletop models, then utilize an outside service bureau for the occasional D- or E-size plot. □

Chris Morton is a PC graphics specialist with Crossover Technologies, Inc. in Traverse City, MI, an authorized AutoCAD reseller and consulting firm. Doug Cunningham is chief technician and network specialist with the company.

Encad SP4810
$4,495
Enter Computer, Inc.
7710 Kenamar Ct.
San Diego, CA 92121
(619) 578-4070

AutoPlotter XP
$3,495
Japan Digital Laboratory Company, Ltd.
4770 Calle Quetzal
Camarillo, CA 93012
(805) 388-8709

Accel 535 Intelli-Plot Plus
$2,095
American Matrix Technology, Inc.
765 Flynn Rd.
Camarillo, CA 93012
(800) 992-2264

LaserMaster 1000
$7,495 (AT bus)
$7,995 (MCA and Macintosh)
CADPak 4.4 software—$195
LM-Net—$995
LaserMaster Corp.
7156 Shady Oak Rd.
Eden Prairie, MN 55344
(612) 944-9457

Phaser PX
$7,995
Tektronix, Inc.
Graphics Printing & Imaging Division
P.O. Box 1000
Wilsonville, OR 97070
(800) 835-6100