Computer-to-Plate White Paper

by

Robert J. Weber

Rev. 10.24.08

BOB·WEBER·INC.
23850 Commerce Park Road • Cleveland, Ohio 44122
T. 800.399-4294 • F. 800.837-8973 •
Email. sales@bob-weber.com • www. bob-weber.com

COMPUTER-TO-PLATE
White Paper

by: Robert J. Weber

1st Revision September 6, 2007
2nd Revision September 5, 2008

Page

Overview of Computer-to-Plate (CTP) Technology

INTRODUCTION

Over the last 27 years, the staff at Bob Weber, Inc. (BWI) has witnessed numerous "revolutions" transpire in the prepress segment of the printing industry. During that 27 year journey, we have witnessed the evolution of platemaking technology from a multi-stepped process that involved paper, cameras and film, to the current technology of imaging directly to the printing plate. This journey has resulted in a wealth of knowledge. Through this paper, we wish to impart as much of that knowledge as possible. Although by no means comprehensive, this knowledge should prove useful to those who are considering purchasing CTP equipment but have not been exposed to the progress and trends of CTP technology.

The information contained herein was obtained from manufacturers' brochures, subscription information services, web sites, our own experience with equipment, and our many contacts and informants throughout the industry. We welcome any corrections, additions, or critique that readers may have, so that we can improve upon the content or accuracy of this paper and remove any elements of unintended bias.

We have included information that is not readily available to those not immersed in the imaging equipment business. We strongly believe that "It's not what they tell you but what they don't tell you" that you must be most concerned about. We hope this paper can help you identify what "they" are not telling you. We hope to provide you with the information that will enable you to make the best decision to not only fulfill your existing needs, but to position yourself properly for future technology changes and growth, regardless of whether that final decision results in business for BWI. We feel that the information contained in this paper will arm you with the knowledge to ask the right questions and, hopefully, help you make the best choice possible for your company.

We have segmented this paper into the sections listed below. Please note that we have not addressed platesetters specifically designed for the newspaper and flexo markets in this paper, as we possess little to no knowledge or experience with the vast majority of these machines.

CTP EVOLUTION

With a rather broad brush, we cover major elements in the evolution of CTP from its inception.

LASER AND PLATE TECHNOLOGY

The transition of imaging from film to plate has at its core the evolution of laser technology. There are a variety of factors that influence the use of laser technology in CTP equipment. These factors include laser type, power, design, life, operating cost, and plate sensitivity. We address each of these in separate sub-sections. We also address corresponding evolution in plate technology.

VIOLET VERSUS THERMAL

We summarize the pros and cons of the two dominant technologies in the market.

MEASURES OF PLATESETTER PRODUCTIVITY

In this section, we present an objective measurement of the productivity of various platesetters on the market.

MANUFACTURERS' PRODUCT OFFERINGS

This section attempts to provide insight into the evolution of product development by the major players in the U.S. marketplace. This section in particular should prove useful in clarifying the various and often confusing product lines offered by platesetter manufacturers.

TRADE PRACTICES

We address some of the common tactics and policies of the major equipment manufacturers in their sale and support of platesetters and related peripherals.

CONCLUSION

CTP EVOLUTION

CTP engineering evolved from computer-to-film (CTF) imagesetter technology, which was predominantly internal drum. In this design, the media is vacuumed to the internal surface of the drum and exposed by a laser beam reflected by a mirror (or mirrors) mounted on a high speed spinner motor. The laser is positioned a considerable distance from the media and moves across it to expose the image. Because of this distance, a sensitive media emulsion is required for the system to function. When this design was incorporated into CTP equipment, the most viable laser was a 532 nanometer (nm) YAG green laser. Other available lasers were the 633 nm red and the 488 nm blue gas lasers. The most viable media was silver-based plate, which could be exposed by all three laser types.

Internal drum construction, utilizing a single laser diode, was the technology of choice in the mid 1990s, when CTP technology first began to emerge. Most early entrants into the CTP market, such as Agfa, Autologic, Cymbolic Sciences, Purup, and Western Litho, chose the 532 nm YAG laser, following the lead of Creo, who pioneered CTP technology with their 3244 Platesetter. Competitors such as Barco (which later became part of Esko Graphics) and ECRM chose the 488 nm blue gas laser. History proved the choice of the blue laser to be a mistake, primarily because of its high failure rate, often in less than 1,000 hours. A few manufacturers also offered equipment with the 633 nm red laser, since this laser was well accepted and understood in CTF technology.

From these primitive laser technologies evolved violet laser diode technology, which is used in almost all internal drum-based CTP equipment today. The violet diodes cost less than the blue and green lasers, and can also be used in a more user-friendly yellow safe-light environment.

Although the majority of early CTP devices were based on internal drum design, several manufacturers took a different approach: Creo and Scitex initially, joined soon thereafter by Screen. These companies recognized the limitations inherent in internal drum technology for imaging directly to plate emulsions.

Rather than using the traditional internal drum technology, these pioneers developed external drum recorders bearing an 830 nm infrared laser. In this design, the media is clamped to the external surface of the drum, which allows for mounting of the laser a few centimeters from the media. Mounting the laser closer to the plate, combined with the design of a powerful laser source with multiple laser diodes, created the ability to expose what is known today as thermal plates. The use of thermal plates eliminated the need for a darkroom or safelight environment. In addition, the thermal plates had the advantage of durability for print runs of upwards of a million if baked.

The external drum approach also had its roots in film imagesetting devices. External drum imagesetters were being marketed by Screen and also by Orbotech, a lesser known Israeli manufacturer of very large format imagesetters. Behind the scenes of these two manufacturers lay Creo, a little known company at the time. In the 1980s and early 1990s, Creo was a major supplier of components to these manufacturers. Creo held the patents and supplied to Orbotech nearly all of the major components for its external drum recorders, and supplied similar components to Screen. Creo did not, however, design and manufacture actual imagesetters, which placed it in the unique position of having advanced imaging technology but with little vested interest in CTF. Creo was the first to come out with a thermal external drum platesetter, introducing their pioneering Trendsetter at Graph Expo in October 1995. The first production models shipped to customers in Spring of 1996.

Since Screen had experience manufacturing external drum imagesetters, one would have expected them to have been an early leader in the application of this technology to the imaging of plates. Surprisingly, this is not the case. Screen's original efforts to produce a CTP device, in 1996, were based upon a flatbed design. It is possible that the patents owned by Creo on external drum technology prevented Screen from initially pursuing an external drum device. Whatever the reason, it was not until late 1998 that Screen began shipping the external drum-based PlateRite (PT-R) 8000.

With the introduction of the PT-R platesetter, Screen quickly made major inroads in the CTP market. The mechanisms and electronics to achieve the mounting of film to an external drum, although reliable, were extremely complex and undoubtedly more costly to manufacture than the mainstream internal drum imagesetter. Since Screen had already perfected the manufacture of external drum technology for its imagesetters, this experience gave the company a competitive advantage when it became clear that this technology would capture an expanded market that could not accept their initial flatbed design or the internal drum design of other manufacturers

Scitex, who focused on internal drum imagesetters, originally introduced the internal drum Doplate 800 platesetter along with a flatbed platesetter in 1996. However, neither product was successful, and Scitex quickly abandoned both models in favor of the external drum design, introducing their first Lotem by the middle of 1997.

The external drum devices of all three manufacturers quickly became widely accepted in the marketplace. Creo at first was the dominant player, but Screen's offerings eventually became the most widely used because of OEM agreements. Heideberg, Agfa, and Fuji were at a competitive disadvantage with Creo, Scitex, and Screen, as they did not have an external drum thermal platesetter to offer the market. Realizing that any attempt to "reinvent the wheel", at least in the short term, was senseless, these manufacturers turned to OEM agreements. Until these manufacturers had the ability to develop their own viable external drum platesetters, they purchased proven Screen platesetters and re-badged them as their own. Heidelberg at first marketed Creo Trendsetters, but then switched to offering Screen PT-Rs after their agreement with Creo dissolved. Agfa and Fuji both offered Screen PT-Rs under their brand names. Heidelberg has since developed their own external drum thermal platesetters and has discontinued marketing Screen PT-Rs.

Agfa developed a thermal external drum platesetter of their own design - the Xcalibur/Avalon series. However, they continued marketing 4-up PT-Rs under their Accento brand. On January 29, 2008, Agfa announced the closure of its production facility for thermal external drum platesetters. At this time, Agfa also announced future plans for extending their offering of the PT-R line to the 8 up and VLF models, which were not previously part of their product offerings since they would conflict with their Avalon series of platesetters.

Fuji, rather than create its own thermal platesetter at a very high cost, continues to offer the Screen PT-R platesetters, along with internal drum violet machines of their own design.

Because of widespread market acceptance of the PT-R and because of these OEM agreements, Screen is now the number one manufacturer of platesetters worldwide.

LASER AND PLATE TECHNOLOGY

The visionaries of the late 1980s and early 1990s determined that film-based imagesetting equipment had matured to such a level that the basic design principles could be adapted to imaging directly to plates. The key ingredient missing in that era was an affordable laser with the power necessary to image the less sensitive emulsion of the plates available at the time. CTP technology progressed as advances were made in both laser technology and plate technology, which generally progress in unison.

LASER WAVELENGTHS

Lasers are usually described by platesetter manufacturers according to their position on the color spectrum. The spectrum is measured in nanometers (nm). Each laser color requires a plate with an emulsion that is sensitive to that particular laser wavelength. Below is a chronological listing of lasers used in CTP equipment, along with corresponding technological advances in available plates.

CTP Lasers

nm	Color
360-450	Ultraviolet
405-410	Violet
488	Blue
532	Green (YAG)
633-670	Red
830	Infrared - thermal
1064	Infrared (YAG) - thermal

Chronological Introduction

Year	nm	Technology	Applications
1994	532	Green	Very early Creo 3244 platesetter, Cymbolic Sciences Platejet, Agfa Galileo.
1994	488	Blue	Gas laser tubes used in the Barco Crescents and the ECRM AIR 75. This technology is completely obsolete because of the unreliable nature of these lasers.
1995	1064	Infrared	The thermal 1064 nm laser represents a doubling of the 532 nm green laser and was used in internal drum machines. This technology has been replaced by external drum platesetters with 830 nm lasers. The 1064 nm laser is completely obsolete.
1995	360-450	Ultraviolet	Technically not a laser, this is a UV light source that is used to expose conventional plates. This technology was pioneered by basysPrint. Other manufacturers have attempted to create competitive equipment to expose conventional plates, but until Lüscher's entry into this market in 2006, only basysPrint had widespread acceptance. Lüscher is now offering serious competition to basysPrint in this market.
1996-8	830	Infrared	Thermal - Pioneered by Creo, Scitex, and Screen, and now the standard laser wavelength in all thermal platesetters.
2000	633-670	Visible Red	VR diode - Generally found as an option for ECRM platesetters. The red laser diode never found wide acceptance and is no longer used in current production platesetters.
2000	405-410	Violet	Silver-based - Introduced at Drupa 2000, violet technology was well received as an alternative to green lasers. Violet sensitive plates can be handled in user-friendly yellow safelight conditions. Violet lasers also cost less than green and thermal lasers. All early offerings of this laser were for use with silver-based plates.

2000	830	Processless	Ablative (thermal) – Presstek pioneered specialized plates that can be imaged by thermal lasers and that do not require chemical processing. Presstek's plates are imaged by an ablative process, in which the laser erodes the emulsion, creating a dust that must then be removed from the machine's interior. This requires a device to vacuum the dust out of the system. However, even with this device, regular cleaning of the machine interior is essential. Recent innovations have created processless plates that do not require chemical development and do not use an ablative process for imaging.
2002	405-410	Violet	Photopolymer - Photopolymer plate requires a more powerful laser than the original 5 milliwatt (mW) violet laser that most manufacturers used when violet platesetters were first introduced. Generally, these plates require at least a 30 mW laser for exposure. Depending upon the architecture of the platesetter and the sensitivity of the plate being used, a 60 mW laser may be required. There is no silver content in photopolymer plates, eliminating the need to deal with this pollutant. Photopolymer plates are also cleaner than silver plates and require less processor maintenance.
2005	830	Chemical Free	Non-ablative (thermal) - At Graph Expo 2005, Agfa introduced their Azura plate. This plate is technically classified as "chemistry-free", since it requires processing with a gumming solution prior to printing. The Azura plates have an advantage over the Kodak and Fuji true "processless" plates in that there is a clear visible image on the plate prior to mounting on the press.
2006	830	Processless	Non-ablative (thermal) - Plates requiring no processing prior to mounting on the press are currently offered by Kodak and Fuji. The primary difference between the two offerings is the sensitivity of the emulsion. Kodak's plates require 300 mJ per cm^2 of laser power for exposure, compared to 120 mJ per cm^2 for the Fuji plates. The more sensitive the emulsion, the less laser power is required to expose the plate. Fuji's more sensitive emulsion allows exposure of their plates on all existing 830 nm thermal platesetters without slowing the speed of the drum. Of course, less laser power equates to longer laser life. Kodak's and Fuji's processless plates do have the disadvantage of having minimal visible image for inspection prior to mounting on the press. These plates are also prone to losing the image if not used within 4 hours after being exposed. In addition, the press operator must turn on the water to saturate the exposed emulsion, and then turn on the ink to further saturate the exposed emulsion for printing off this emulsion until a quality printed image is achieved.

As the market evolved, the industry abandoned less reliable and less cost-effective technologies, and as a result, the 830 nm infrared laser and the 405 nm violet laser are the thermal and visible light lasers that have survived. Generally, visible light platesetters can image either silver-based plates or the more environment-friendly photopolymer plates. Furthermore, with the recent introduction of 120 mW violet diodes combined in multiple diode arrays, violet platesetters are now available that are able to image conventional UV plates. Thermal platesetters can image plates requiring chemical processing or, depending on the laser power, non-ablative processless plates. The ablative processless plate continues to be offered by Presstek, but has been abandoned by other manufacturers. We will address the laser power requirements of these varying plate technologies in detail in the next section.

Both Agfa and Fuji have been developing a processless violet plate for some time. Although it has been displayed at graphics shows and talked about as a coming product since 2005, this plate has not been available to the market. Finally, at Drupa 2008, it appears that they are on the verge of introducing a commercially viable product. These plates are not true processless, but rather are chemistry-free, as they require preheating and gumming before they can be used on press. It is reported that initially Agfa will restrict availability of their processless violet plates to the newspaper market. Whatever initial limitations for availability there may be, at least it appears that a chemistry free violet plate will be available to the market in the near future. It is anticipated that a 30 mW laser will be required to image these plates, with the 60 mW laser preferred for optimum performance.

LASER POWER

As changes in imaging technology occur, laser power requirements also change. To meet industry demands for improved speed and for compatibility with different plate types, manufacturers have gradually introduced lasers that are capable of generating more power.

When addressing the subject of laser power, it is important to understand the differences in laser power requirements between the various plate emulsions. To illustrate these differences, we've compared the power requirements based on the average sensitivity of each emulsion type. We've assigned a value of "one" to the average sensitivity of the most sensitive emulsion, silver halide. We then established the power requirements for other plate emulsions compared to silver plate.

Emulsion	Range of Plate Sensitivities	Average $mJ\ cm^2$ Sensitivity	Laser Power required relative to Silver Halide
Violet Silver Halide	.005 - .010 $mJ\ cm^2$	.075	1
Violet Photopolymer	.050 - .100 $mJ\ cm^2$	.75	10
Violet Chemistry-Free	.050 - .100 $mJ\ cm^2$	.75	10
Agfa	.040		
Thermal Plates	120 - 150 $mJ\ cm^2$	135	13,500
Thermal Processless	275 - 325 $mJ\ cm^2$	300	30,000
Thermal Chemistry-Free	300 $mJ\ cm^2$	300	30,000
Thermal Processless (Fuji)	120 $mJ\ cm^2$	120	12,000
Conventional (Majority of Plates)	75 - 120 $mJ\ cm^2$	100	10,000
Conventional (Low Energy Plates)	50 - 70 $mJ\ cm^2$	60	6,000

Clearly, violet photopolymer and chemistry-free plates require more laser power than silver plates, and thermal and conventional plates require significantly more power than any of the violet plate types. Thermal processless and chemistry-free require even more energy for exposure. Given the wide range of power requirements of plates on the market, it is wise to determine the laser power in any machine you are considering purchasing, and to confirm it has sufficient power to image the plates you want to use. For a more detailed spreadsheet of various plates on the market and their sensitivity rating turn to pages 8 - 9.

In thermal devices, manufacturers have increased laser power by either increasing the number of diodes or by increasing the wattage of the lasers used in their machines. Machines with higher laser power are generally faster, and are compatible with a wider variety of plates. Laser power is especially of concern if you wish to use Agfa's or Kodak's chemistry-free/processless plates. Agfa's Azura and Kodak's Thermal Direct both require 275-325 mJ per cm^2 of power to expose, compared to the 120 to 150 mJ needed to expose thermal plates that require processing. While the information presented by the manufacturers is somewhat inconsistent, it can be surmised that a minimum of 24 W of laser power is required to image these plates. In addition, these plates may further require reduction of the drum speed in order to increase the dwell time. However, if the laser wattage is not adequate, even a slower drum setting will not provide the saturation required to expose the emulsion. As a result, not all existing thermal platesetters are capable of exposing the Agfa and Kodak thermal processless plates. Fuji, on the other hand, represents that their Pro-T processless thermal plate has an emulsion sensitivity of 120 mJ per cm^2, which allows it to be run on all existing thermal platesetters, since its sensitivity is well within the range required for conventional thermal plates.

One should be cautious when attempting to expose low sensitivity plates such as the Azura and Thermal Direct when using a platesetter with marginal laser power. In addition to slowing the drum speed, it may be necessary to adjust the power setting of the laser to obtain acceptable quality. Increasing the laser power setting has the effect of decreasing the diode life. This can be a hidden cost that only comes to light after the damage is done.

Laser power is also an important consideration with violet platesetters. Since most violet platesetters, except those offered by Fuji, use only one laser, additional laser diodes cannot be added to increase the laser power. Rather, manufacturers increased laser power by using increasingly higher wattage lasers in their platesetters. When originally introduced, violet platesetters used 5 mW lasers, as this laser was the most available and affordable laser at the time. Diode manufacturers were able to supply a low cost product by culling the most powerful diode from the thousands available for DVD and CD consumer products. The 5 mW lasers perform well for exposing silver-based plates, but are insufficient for imaging photopolymer plates, which are becoming increasingly popular. Photopolymer plates have no silver content, thus eliminating a major pollutant that plagues the printing industry. For most photopolymer plates, exposure is attainable with a 30 mW laser, but a 60 mW laser might be required, depending on the sensitivity of the plate and engineering design of the platesetter. Since 2004, 60 mW lasers have become the standard in violet platesetters for most manufacturers.

Violet-sensitive plates and violet laser diodes continue to evolve. Violet chemistry-free plates have been in development by Fuji and Agfa for several years. At Drupa 2008, both manufacturers finally demonstrated a commercially viable product. These plates should work with lasers that are 30 mW or higher. The laser industry is also continually developing stronger diodes, and is on the threshold of producing 150 to 250 mW violet diodes, opening new horizons for both violet and conventional UV plates. In fact, at Ipex 2006, Luscher introduced a platesetter capable of imaging conventional plates using a 405 nm laser. This platesetter uses 120 mW laser diodes, and can be outfitted with 32 to 128 of these diodes in order to create the laser power required to expose less sensitive conventional plates.

The following pages show a representation of various plates from different manufacturers and their sensitivities. For comparison purposes, they are grouped by types, i.e. thermal, silver, photopolymer, processless or waterless.

CTP PLATE SENSITIVITIES

THERMAL PLATES

Manufacturer	Plate Name	nm	Print	mJ/cm2
Agfa	Energy Elite	830		120
Agfa	Thermostar P970	830		135
Agfa	Ampio	830	Pos	120 - 150
Ding Kailong (Fujain)	Thermax	810 - 830		150 - 180
Fuji	Brillia LH-PSE	800 - 850		120 - 150
Fuji	Brillia LH-N12	800 - 850	Neg	120
Fuji	Brillia LH	830		120
Huagnang	TP-11	830	Pos	120 - 140
Huagnang	TP-26	830	Pos	130 - 150
IBF	Million 2	830		110 - 150
Ipagsa	Rubi T-50	800 - 850		170
Ipagsa	Arte IP 21	830		140
Kodak	Thermal Gold	800 - 830		90 - 110
Kodak	Electra XD	800 - 850		110 - 130
Kodak	Electra Excel	800 - 850		120 - 180
Kodak	Sword Excel	800 - 850		120
Kodak	Thermal News Gold	800 - 850		70 - 80
Southern Litho	Cobra 830 TN	830	Neg	110

SILVER PLATES

Manufacturer	Plate Name	nm	Print	Laser Power
Agfa	LithoStar Ultra V	400 - 410		5 mW
Agfa	LithoStar Ultra LAP-V	400 - 410		5 mW
Heidelberg	Saphira Violet	400 - 410		5 mW

PHOTOPOLYMER PLATES

Manufacturer	Plate Name	nm	Print	Laser Power
Agfa	N91 (Newspapers)	488 - 532	Neg	30 mW +
Escher Grad	ECG-HRV1	n/a		n/a
Fuji	Brillia HD Pro-V LP-NV2 & NV	405		30 mW +
Fuji	Brillia HD Pro-V	405		30 mW +
Fuji	Brillia LH PI	405	Pos	30 mW +
Fuji	Brillia LH PSE	405	Pos	30 mW +
Kodak	Violet Print	405	Neg	30 mW +
Kodak	Violet News	405		n/a
Konica	Duros HSV	405		30 mW +
Southern Litho	Tiger Newspaper	405		30 mW +
Southern Litho	CPM 400	405		30 mW +
				30 mW +

THERMAL CHEMISTRY FREE or PROCESSLESS PLATES

Manufacturer	Plate Name	nm	mJ/cm2
Agfa	Azura - chem free (original)		300
Agfa	Azura - chem free		225
Agfa	Amigo - chem free	830	220 - 260
Heidelberg	Saphira Chem Free	830	300
Fuji	Brillia HD Pro-T	800 - 850	120
Fuji	Brillia Pro-T LH-PJ	830	120
Fuji	Brillia Pro-T LH-PSE	830	120
Fuji	Economaxx-T	n/a	n/a
Kodak	Thermal Direct	800 - 850	275 - 325
Kodak	PF-N (Newspaper)	830	325
Presstek	Anthem Pro	800 - 1200	600
Presstek	Applause	800 - 1200	600
Presstek	Freedom	1064	n/a
Presstek	Aurora		140 - 150

Note: Presstek does not publish the digital sensitivity of their plates but it has been reported to be 600mj/cm2. This value has never been challenged by Presstek.

WATERLESS PLATES

Manufacturer	Plate Name	nm	Type	mJ/cm2
Toray		830	Thermal	150

PLATE SENSITIVITIES

The following data was supplied by Luscher to customers at Drupa 2008 regarding the use of different conventional plates by various plate manufacturers. We found this information particularly interesting since it is seldom supplied by manufacturers as part of their broad marketing efforts.
We have listed the plates to correspond with Lushcers productivity ratings for the UV platesetters.
Although all of these plates fall within the nm range for violet platesetters, the laser power (mW) requirement exceeds violet platesetter currently available.

CONVENTIONAL PLATES for UV Platesetters

Manufacturer	Plate Name	nm	Print	mj/cm2
100 mj/cm2 productivity class				
Agfa	Zenith N555		Neg	105
Ipagsa	Top F1		Pos	100
Kapoor Imaging India	Topaz		Pos	120
Kodak	Capricorn Gold		Pos	106
Kodak	PP-W		Pos	113
Kodak	DITP Gold		Pos	112
Korea	Jell PS		Pos	100
Second Film Factory of Chir	Huaguang YN-II		Neg	141
Sichuan Juguang Printing	JPS-C		Pos	103
Technovia Indien	Gemini		Pos	113
Vela	LPN 100		Pos	106
75 mj/cm2 productivity class				
Fuji	VP		Pos	95
IBF Brazil	N 2000 + N 2000D		Neg	75
IBF Brazil	P4001		Pos	92
Kodak	Capricorn Excel Positive		Pos	92
Kodak	PP3		Pos	90
Lastra Nirai Indien	Winner		Pos	98
LongMa Group	UV-CTP		Pos	90
Man Roland	Printcom P101		Pos	76
PNE Print Technology	NP-1		Pos	95
Sichuan Juguang Printing	JPS-N		Pos	97
Technovia Indien	Argos / Low coating wt		Neg	90
Vela	Universal		Pos	93
Vela	LPV 100		Pos	76
Vela	NS-300		Neg	91
50 mj/cm2 productivity class				
Cinkama Grafika	Kremolit P07		Pos	60
Crema / China	Crema		Pos	60
Fuji	VPS-E		Pos	70
Fuji	VS		Pos	53
Fuji	FND-E		Neg	63
Ipagsa	Eco 88		Pos	68
Kodak	Winner Gold		Neg	53
Konica Minolta	Duros KPS		Pos	69
Korea	EZ-Plate D Top		Pos	68
Man Roland	Printcom P103		Pos	68
Second Film Factory of Chir	UV-P		Pos	53
Second Film Factory of Chir	Huaguang YP-A		Pos	60
Second Film Factory of Chir	Huaguang YN-S		Neg	70
Top High Image	TP 101		Pos	57
Wenzhou Wondertec of CH	Konita KPT		Pos	70
Wenzhou Wondertec of CH	Konita KPI-SS		Pos	60

LASER DESIGN

Laser designs tend to fall into the following classes:

Single Beam Laser Technology
Laser Diode Array
Creo Laser Diode Bar with Light Valve
GLV - Grating Light Valve Technology
Basys DMD - UV Conventional Plate Laser Technology
Presstek ProFire Laser Technology
Heidelberg SupraSetter Laser Head

Single Beam Laser Technology

While there are a few exceptions, platesetters using internal drum technology generally use a single laser. These platesetters use a transmission system which directs the laser beam to a mirror (or multiple mirrors) mounted upon a high speed spinner motor. The mirror(s) reflect the laser beam to the media, producing the image. In their green laser P9600 internal drum platesetter, Fuji also offered the option of splitting the beam, which had the effect of doubling the throughput speed. The service cost involved to maintain a consistently equal balance between the two beams led Fuji to abandon this technology with the introduction of their V (violet) 9600 model. In the violet model, rather than splitting the beam created by one diode, Fuji offered the option of an additional laser diode. To our knowledge, Fuji is the only manufacturer who has successfully offered dual lasers on their internal drum platesetter.

Single laser beam technology is perhaps the most economical since it involves the cost of just one laser diode. This diode has a life considerably longer than thermal diodes because of its low power requirements. The maximum life of the violet diode is generally in the realm of 10,000 hours, although the potential for considerably more hours remains. The cost to replace this laser varies irrationally between manufacturers, but it is still far more economical than the cost of replacing multiple high-powered laser diodes required for exposing thermal plates. Furthermore, because of the use of very high speed spinner motors (or in some designs, lower speed motors with multiple mirrors), output speeds attainable with this technology exceed anything historically available among competitively priced thermal platesetters.

Laser Diode Array Technology

Laser diode arrays are used in a variety of external drum platesetters, including those offered by Screen, Scitex, and Agfa.

Screen employs 830 nm laser diode arrays as their laser technology for all external drum models prior to the PT-R 8800. In most of these models (all except the PT-R 8600), Screen mounts individual diodes, each caged in a module, on a metal plate which has a maximum capacity of 32 diodes. The diodes are segmented into banks of eight, with each bank controlled by a circuit board. The laser beams from these diodes pass through a series of lenses, apertures, and modulators until finally a focus zoom device directs the beam to the media. While Screen rates each diode at 1 W of power, the net power at the media is considerably lower due to transmission loss. Net power is in the range of 270 to 300 mW for the PT-R 8000 and 240 mW for the PT-R 4000 series.

With the introduction of the PT-R 8600, Screen adopted a slightly different design, a Fiber Coupled Diode Array. This design is actually common in the industry. In this design, each laser diode is fused to a fiber optics cable to form the Fiber Coupled Laser Diode. These diodes are then mounted in groups on circuit boards. The number of circuit boards and lasers per circuit board will vary between manufacturers and models, but the concept remains the same. For all manufacturers using this technology, the number of diodes determines the maximum speed of the platesetter. In the PT-R 8600, Screen uses 64 diodes (32 in the later “E” models), each rated at 500 mW, mounted upon circuit boards in groups of 8 diodes. Agfa used a very similar arrangement in their original offering of their Xcalibur VLF. For their standard speed model, Agfa installed 48 diodes mounted on six circuit boards, and in the high-speed model, 96 diodes mounted on 12 circuit boards.

Scitex and certain Creo/Kodak successor models of the Lotem also employ this technology, using arrays of 12 or 24 diodes. In these Lotems, each diode has a dedicated control board. The diodes, with their control boards, are then mounted in groups of 12 or 24 on a circuit board. The V2 model with 48 diodes contains two 24 diode circuit boards. Only 12 diodes are used in the S (slow) model of the 4 up Lotem 400.

The laser array technology is an attractive choice because the platesetter can still operate when a diode fails. However, platesetter models vary in the effect laser diode failure has on the throughput of the machine. When a laser fails in a Screen or Agfa diode array machine, the imaging speed always drops to one-half of the rated speed until the failed diode is replaced, regardless of the number of lasers in the array. In the Scitex Lotems, the loss of output speed is contingent upon the location of the failed diode within the array. This benefit is derived from their design where each diode is controlled by a dedicated circuit board. Although, upon the surface, the individual circuit board design may appear wasteful, it mitigates the effect of a failed diode when compared to the Screen and Agfa design. To illustrate, if you number the diodes 1 to 24 (for the Lotem 800V) or 1 to 48 (for the Lotem 800V2) and you lose the first diode or the last, you lose the speed of just one diode. If you lose the second diode or the next to last, you lose the speed of just 2 diodes. This continues, until you lose diode #12 of 24 or #24 of 48, at which point you will lose half of the imaging speed, the maximum reduction in speed from a single failed diode.

Another subtle advantage of the diode array technology, for those who can accept the reduced throughput, is the ability to disable unneeded diodes. In this scenario, you can purchase, for example, a Lotem 800V2 with 48 diodes or a 32 diode PT-R model, and disable half the diodes. When a diode fails in the banks of diodes that are being used for imaging, you can use one of the disabled diodes to replace it, thereby eliminating the need to purchase a replacement diode at the inflated price charged by the manufacturers' parts departments. This practice is not nearly as feasible in the new market because of the much higher price charged for faster machines with more diodes, but this aspect of diode array machines can be beneficial in the pre-owned market, where the price spread between the two models is much less. In addition, if future business growth requires, it is possible to reinstate the original throughput capacity by reactivating the previously disabled diode banks, and purchasing diodes to replace any that had previously been used.

Laser Diode Bar with Light Valve Technology (Creo Laser Head)

The Creo laser head uses an integrated laser bar with light valve transmission. This design was unique among CTP systems until the introduction of GLV technology in 2000. In their laser head, Creo utilizes an array of 19 laser diodes molded together to form an integrated laser diode bar. The beams from these diodes are concentrated through a series of lenses, mirrors, and prisms into a single beam aimed at a light valve, which splits the single laser beam into channels. This light valve is the distinctive feature of the Creo head. It is responsible for the creation of the "SQUAREspot", which according to their marketing department, sets Creo's technology apart from its competitors. This light valve also allows Creo to create varying speeds by controlling the number of channels emitted. By creating 128, 192 or 224 channels, simply by setting the light valve to emit the desired quantity, Creo is able to offer S (Standard speed - 128 channel), F (Fast -192 channel), and V/VF (Very Fast - 224 channel) models. Refer to the GLV portion of this Laser Design section for a more detailed description of light valve technology.

The Creo laser head comes in six basic models: the Thermal 1.0, Thermal 1.7, Thermal E, Thermal 2.0, Thermal 2.5, and the Thermal 3. Each of these basic models has their own niche in the Creo platesetter offerings. The following will attempt to describe the specifications of each of the laser head models. See pages 13A/B for a matrix of Creo laser heads and compatible platesetters.

Thermal 1.0 Head (TH 1.0)

This is the original head that created the Trendsetter SQUAREspot platesetter. Although SQUAREspot was not initially promoted from a marketing standpoint, it has been inherent in the engineering of the Creo head from the outset. This head is a 20 W, 2400 dpi head, and is available in S and F speeds. The very earliest heads had a high failure rate, which was quickly identified as an overheat problem and remedied with the introduction of an air-cooled model. The problematic heads have been removed from the market, and all 20 W heads still in use are this improved air-cooled Th 1.0 head.

A real concern regarding the early versions of the TH 1.0 head is the method of mounting the laser head in the Trendsetter. Sometime during the early period of manufacturing Trendsetters, Creo changed the mounting configuration of the laser head. We believe the serial number when this change occurred was 162. This mounting change has the effect of making the earliest Trendsetter models incompatible with newer heads. We recommend that buyers be wary of these older machines, because of the questionable future availability of replacement laser heads.

Thermal 1.7 Head (TH 1.7)

The TH 1.7 head was introduced in conjunction with the Spectrum proofing option. Proofing material requires more laser power for exposure than the 20 W TH 1.0 head offered. The TH 1.7 head is in the same enclosure as the TH1.0 head, but is equipped with a 40 W laser bar and has improved fluid cooling. The standard resolution for this head is 2400 dpi, but an optional 3200 dpi head is available. This head is offered in S, F, and VF speeds. In 2002, Creo badged all their SQUAREspot capable platesetters, including those using the TH 1.7 head, as “Quantum” models. This renaming was done for marketing purposes, to distinguish SQUAREspot machines from those fitted with the newly introduced entry level head, designated the TH E.

Thermal E Head (TH E)

This head has the same housing as the TH 1.0 and 1.7 heads. In fact, it appears to be identical to the TH 1.7 head, but with a re-engineered light valve. This new light valve has the effect of removing many features available in the TH 1.7 head but not required by many users in the marketplace. It was introduced in 2002 by Creo as, in our opinion, a marketing tool. It allowed Creo to create a lower-priced, “entry-level” model of the Trendsetter to cater to smaller enterprises that couldn’t afford, or didn’t need, a full-featured Trendsetter. To match the lower price tag, there are a variety of features that Creo limited in machines with this head. Platesetters with the TH E head are limited to 200 lpi and Staccato 25 micron screens, and do not include the temperature compensation feature. In the original Trendsetter 800 models where the TH E head was initially introduced, the V speed, Spectrum, and Autoloader options available on previous Trendsetters were no longer offered. With the next generation of the Trendsetter 800, badged as the 800 II, these options again became available, but the lpi, Staccato dot size, and temperature compensation limitations remain. The TH E head was installed in most Trendsetters without the Quantum designation sold since early 2002.

Thermal 2.0 Head (TH 2.0)

The TH 2.0 head was introduced in 2002 and was used to convert the Lotem 800V series of platesetters, acquired from Scitex, to Creo laser head technology. This head is much smaller than the TH 1.x and E series heads, and is engineered standard with a 40 W laser and 224 pixels.

Lotems with this laser head have the Quantum designation. This head was installed in the Lotem 800V/V2 models, which were then renamed the Lotem 800 Quantum, and in the Lotem 400V, which was correspondingly renamed the Lotem 400 Quantum. After Kodak’s acquisition of Creo, this model was further renamed the Magnus 400 Quantum in 2005. Although the Thermal 2.0 head is engineered with 224 pixels, implying it only operates at VF speed, the Lotem Quantums are actually offered in varying speeds with corresponding varying price levels. This is possible because Scitex engineered the Lotems to allow for factory setting of the maximum speed of the drum. In early models, the speed settings in the Lotem Quantums were controlled by passwords, but apparently these passwords became compromised, so in later models the speed settings are controlled by program chips.

Thermal 2.5 Head (TH 2.5)

This head was introduced at Graph Expo 2005. It is basically the same head as the TH 2.0, but contains a 50 W laser. It is installed in the “X” series of Trendsetter Quantum platesetters, and has more recently been carried forward to the Magnus models.

Thermal 3 Head (TH 3)

This head was also introduced at Graph Expo 2005, and is an entirely new design. At the show, it was installed in an 80 inch Magnus VLF. From the outside this head could be mistaken for the TH 2.0 head, but inside it is quite different. The TH 3 head has two 50 W laser bars, which made possible 448 laser channels and 100 W of laser power. This head continues the SQUAREspot technology.

Creo Laser Heads with Recorder Models Adaptable to Each

Part Number	Base Model	Watts	Pixels/ Channel	Speed Code	Sq. Dot	Origin & Status	DPI	Cooling System	Line Screen	Volts	Debris Removal Ready
32-4005A	TH 1.0	20	128	S	Y	1/97	2400	Air	200	24	No
32-4005B	TH 1.0	20	192	S & F	Y	8/97	2400	Air	200	24	No
Recorder Models		3244 TS3	3244 TS 3/8	3244 TS8		3230 TS4	400Q	400IIQ	TS VLF Models (w/ver.1.30+ Firmware)		
32-4025	TH 1.0	20	128	S	Y	1/97	2400	Air	200	24	No
Recorder Models		3244 TS3	TS VLF Models (w/ver.1.30+ Firmware)								
32-4030A-B	TH 1.0	20	192	S & F	Y		3200	Air	200	24	No
Recorder Models											
32-4041	TH 1.0	20	192	S & F	Y		3200	Air	200	24	No
Recorder Models											
32-4089A-B	TH 1.0	20	128	S	Y	10/99	2400	Air	450	24	
Packaging Head	Rec. Models	3244 TS8	3230 TS4	3244 SP TS3 & TS 3/8			TS VLF Models (w/ver.1.30+ Firmware)				
32-4052	TH 1.7	40	192	S & F	Y	8/97- 6/00	2400	Liquid		A-24	
A-B-C										B/C-48	
Recorder Models	See Note (1)	3244 TS3	3244 SP TS3	3244 SP TS3/8		3244 SP TS8	3230 SP TS4		TS VLF Models		
32-4090B	TH 1.7	40	224	S, F & V	Y	6/00	2400	Liquid	450	A-24	
A-B-C										B/C-48	No
Recorder Models	See Note (1)	TS 800IIQ	TS VLF Models (w/ver.1.51+ Firmware)								
32-4091A	TH 1.7	40	224	S, F & V	Y		2400	Liquid	450	24	
Recorder Models		TS VLF Models (w/ver.1.51+ Firmware)				Spectrum Proofer					
32-4106B	TH 1.7	40	224	VFX	Y	7/06	2400	Liquid		48	
Recorder Models											
32-4134B	TH 1.7	40	224	S, F & V	Y		2400	Liquid		48	Yes
Recorder Models		3244 SP TS8	Spectrum Proofer								
32-4141A	TH 1.7	40	192/224	S, F & V	Y		2400	Liquid		24	
Recorder Models		TS 800IIQ	TS 800Q	TS VLF Models (w/ver.1.51+ Firmware)							
32-4161A	TH 1.7	40	224	V	Y		2400	Liquid	450	48	Yes
Recorder Models		TS VLF Models									
32-4180A	TH 1.7	40	224	V	N	2/02	2400	Liquid	200	48	
Entry Model	Rec. Models	Lotem 800II	Magnus 400	TS 800II	TS VLF Models (w/ver.2.0+ Firmware)						
32-4182-A	TH 1.7	40	224	V	Y		2400	Liquid	450	24	Yes
Recorder Models		TS VLF Models (w/ver.2.0+ Firmware)									
32-4206A	TH 1.7	40	224	V	Y		2400	Liquid	450	48	Yes
Recorder Models		3230 SP	3244 SP TS3/8	3244 SP TS8		Spectrum Proofer					
32-4217A-B-C	TH 1.7	40	224	V	Y		2400	Liquid	450	48	Yes
Recorder Models		3244 SP TS8	Spectrum Proofer								

Creo Laser Heads with Recorder Models Adaptable to Each

Part Number	Base Model	Watts	Pixels/ Channel	Speed Code	Sq. Dot	Origin & Status	DPI	Cooling System	Line Screen	Volts	Debris Removal Ready
32-4154A	TH 2.0	40	224	S, F & V	Y	2/02	2400 or 2540	Liquid	450	48	Yes
Recorder Models		L 800Q	L 800IIQ	L 400Q		L 400IIQ	Magnus 400Q				
32-4181A					N		7/06				
Entry Model	Rec. Models										
32-4186A	TH 2.0	40	224	S, F & V	N	2005	2400	Liquid	200	48	Yes
Entry Model	Rec. Models										
32-4196A	TH 2.0	40	224	V	Y		2540				
Recorder Models		L 800Q	L 800IIQ	L 400Q		L 400IIQ	Magnus 400Q	Magnus VLF	Magnus 800		
32-4222A	TH 2.0	40	224	S, F & V	N	2005	2400	Liquid	200	48	Yes
Entry Model	Rec. Models	Models designated as II without Q									
32-4223A	TH 2.0	40	224	S, F & V	N	2005	2540	Liquid	200	48	Yes
Entry Model	Rec. Models	Models designated as II without Q									
Unknown	TH 2.5	50	224	S, F & X	Y	9/05	2400	Liquid	450	48	Yes
Recorder Models			TS 800IIQX				Magnus VLF				
Unknown	TH 2.5	50	224	F, V & X	N	2006	2400	Liquid	200	48	Yes
Entry Model	Rec. Models	Magnus V & X Models		News							
Unknown	TH 2.7	55	224	X	Y	10/06	2400	Liquid	450	48	Yes
Recorder Models			Magnus X Q	Magnus VLF XQ							
Unknown	TH 2.7	55	224	F, V & X	N	2006	2400	Liquid	200	48	Yes
Entry Model	Rec. Models	Magnus V & X Models		News							
507-0216A	TH 3	Dual 50	448	F, V & X	Y	10/05	2400	Liquid	450	48	Yes
Recorder Models		Magnus News									
	Note (1) VLF models may require upgraded ALE and MPE boards to accept this head.										

BWI is not privileged to access internal manufacturer's information, therefor the information contained in this chart was gathered internally at BWI or obtained from third party sources.
It is for this reason, that this chart may not be complete, but the information listed is believed to be reliable

GLV Laser Technology

Grating Light Valve (GLV) is a technology developed by Silicon Light Machines. It was originally introduced to the market at Ipex 2000, but the first platesetters based on GLV were not available until the Spring of 2003, when both Agfa and Screen began shipping machines using this technology. Agfa converted the production of its original fiber coupled diode array Xcalibur VLF platesetters to GLV. At the same time, Screen announced their VLF Ultima and 8-up PT-R 8800 platesetters, which both featured this innovative new technology.

There are two central elements to a GLV imaging system: a unique laser module, and a modulator utilizing a GLV ribbon array. The heart of the laser module is a new type of semiconductor laser manufactured by Coherent Technologies. This laser is in the form of a bar just 7 mm long and estimated 1 mm high. The laser has 39 emitters, and is hermetically sealed in a water-cooled metal housing. We have no specific knowledge of the wattage, but based on information contained in Screen's patent application, we believe it to be between 40 and 60 W. Screen uses two lasers in their GLV machines, the beams of which are combined and then directed to the GLV chip. The use of dual lasers doubles the beam intensity. Agfa appears to use just one laser in their implementation of GLV technology.

The GLV array itself defies comprehension. It consists of an array of thousands of microscopic ribbons mounted on a chip. These ribbons are controlled to either reflect or diffract the laser beam, splitting the beam into a very high number of sub-beams, which act as optical channels. The high number of channels imaging the plate at once (512 channels, for example, in the Screen PT-R 8800, vs 64 in a PT-R 8600), results in very high imaging speeds, with one third or less the drum speed, with no loss of quality.

The astonishing fact about the GLV chip is that these thousands of individual ribbons are mounted on a chip only a little over one inch wide. Each ribbon, which can be controlled with extreme precision, is only 4.25 microns wide and 220 microns long, and are spaced in parallel .65 microns apart (keep in mind that there are 25,400 microns to an inch!). In Screen's implementation of GLV technology there are 6,528 ribbons on the GLV chip. Six ribbons (3 active-inactive ribbon pairs) are used to create 1,088 addressable pixels. Two pixels are combined to create 544 individual writing channels, each 51 microns wide. A 5:1 reduction lens then further reduces the size of the pixels to 10 micron dots on the plate. This reduction has the added benefit of concentrating the beam's power, allowing for significantly lower laser intensity on the GLV, thus prolonging its life.

One point of confusion is the final number of writing channels. In their white paper explaining GLV technology, Silicon Light Machines and Screen state that the end result of the above process is "up to 544 discrete 10 micron spots on the plate". However, later in the white paper and in Screen's brochures, they say that their GLV-based platesetters use 512 writing beams. Apparently engineers determined that 512 beams better addressed their needs than the maximum available.

Agfa GLV platesetters are based upon the same ribbon array technology described above, but their implementation of this technology appears to vary from Screen's in some respects. In particular, Agfa seems to have had some problems with their first foray into GLV technology, which was with the Xcalibur VLF platesetter

One issue with the original Xcalibur was its output speed. The original Xcalibur was plagued by consistently slower throughput than its competition. One reason for this could be the number of writing channels found in the Xcalibur. The original Agfa GLV laser head was engineered with 240 channels. Later, a second model with 360 channels was added. Although the Agfa GLV chip has the full array of 6528 ribbons capable of producing 1088 addressable channels, it appears that Agfa has chosen to use only the center portion of the complete array to produce 240 (and later 360) channels. Why the machine only has 240 channels compared to 512 on the Screen is unknown, but we suspect that the dual laser approach engineered by Screen was the probable difference. In 2005, to address the speed issue, Agfa re-engineered the Xcalibur (now known as the Avalon) with a 512 channel GLV and renamed it the GLV II. This 512 channel GLV II head allowed Agfa to increase the throughput speed of all VLF models of the Avalon, and also of the XT and XXT models of the Avalon LF.

Another issue with the Xcalibur is that the GLV Xcaliburs require that the laser be powered “on” even when not imaging a plate. This can explain why some users report a somewhat limited laser life of approximately 2 years compared to the 4 – 5 years normally expected. At an estimated cost of $25,000 per laser replacement, this can be costly. One compensating factor programmed into the Xcalibur is the automatic shutdown of the laser if not used to image for a 5 minute period. Unfortunately, when the laser shuts down, it requires a 5 minute warm-up period following this shutdown. It is unknown to us whether Agfa solved this problem when the Xcalibur was re-engineered as the Avalon. Screen’s GLV machines do not have this diode “on” time issue. In Screen’s GLV application, the laser diode is “on” but with only enough power to avoid the 5 minute warm-up period, but not enough to affect the life of the laser diodes.

While GLV offers considerable speed improvement, there is one limitation inherent to the design of all external drum platesetters that limits the speeds that can be obtained using these more powerful laser modules. This limitation is the cycle time required to load the unexposed plate, clamp it to the drum, and then unclamp the plate and eject it after it has been imaged. This cycle time presents a new challenge to engineers for increasing productivity of today’s platesetters. For example, in an attempt to increase productivity in their new Magnus platesetters, Kodak has abandoned the combined input/output slot found on the Trendsetters in favor of “Continuous Load”. In the Continuous Load design, there are dual input/output slots, and the next plate is loaded and is on standby while the first plate is being imaged. However, this design is not new, as Screen has had separate input and output tables on all their PT-R platesetters from their introduction, with the ability to load a plate while another plate is being imaged. Undoubtably manufacturers will continue to seek solutions to overcome the cycle time issue.

With limitations, GLV is being used to expose processless plates. The GLV Xcalibur is not compatible with processless plates, however, the Avalon LF and VLF can image processless plates, but only the optional “Universal” models. The Standard Avalon LF and VLF are not compatible with processless plates. Meanwhile, Screen maintains that the Fuji HD-Pro-T processless plate can be exposed on their entire cadre of GLV devices.

Overall, GLV opens the door for manufacturers’ engineers to explore new frontiers, utilizing the speed and quality enhancement this technology offers. If you are further intrigued by this technology, visit the Silicon Light Machines website (www.siliconlight.com) for a white paper that will take you far beyond this simplified description of the technology.

DMD Technology - Digital Micromirror Device

Digital Micromirror Device (DMD) is an adaptation by basysPrint of Texas Instruments’ Digital Light Processing (DLP) technology chip to platesetting. BasysPrint uses this technology in their platesetters, which utilize a UV light source to image conventional plates.

DMD technology was introduced in 2000 to replace basysPrint’s original “Supercell” technology, which fell short of the quality requirements of most of the industry. With DMD, a UV light source is reflected through an optical lens to concentrate its power (similar to what is experienced when concentrating the rays of the sun with a magnifying glass). This concentrated light is directed to a mirror that in turn directs the light beam to the DMD chip, which measures just two centimeter square. This chip contains approximately 1.3 million digitally controlled micromirrors, of which approximately 800,000 were initially used by basysPrint for creating an image. Each of the 800,000 mirrors can be tilted to either direct the light beam to the media or away from the media as required by the data sent from the RIP. The pixels created by the micromirrors are square, providing the same quality advantage as espoused by Creo with their SQUAREspot technology. The end result of this process are image blocks that measure approximately 2 cm^2 which are laid down precisely in a series of quick steps to create the image in a process similar to “step and repeat.” Later, basysPrint improved their technology to utilize all 1.3 million micromirrors on the DMD chip. The company further improved its image quality with a new process introduced at Drupa 2004, called DSI^2, which replaced the “step and repeat” method of building the image with a scrolling method. This eliminated the need for the precision mating of image blocks on the vertical axis of the image.

ProFire Laser Technology

The ProFire laser design found in Presstek’s platesetters is based on their Direct Imaging (DI) technology, used for directly imaging plates on a press. The ProFire laser module is composed of a series of laser clusters, with 4 diodes per cluster. The 4 up and 8 up models use 16 clusters, resulting in a 64 diode system. The 2 up model uses 12 clusters, resulting in a 48 diode system. These clusters are mounted to form an imaging bar, with each cluster writing its own zone on the plate. The imaging time per plate is the same regardless of the size of the plate since the imaging bar extends across the entire imaging area, regardless of whether there is media to image there or not. One shortcoming of this technology is that each of the 16 clusters must be precisely leveled so that each of the 16 zones are imaged with the same level of laser intensity. Software tools are provided by Presstek for the user to perform these adjustments, but this can often be a tedious process and may be best left to an experienced technician.

Heidelberg Laser Head

Heidelberg did not manufacture platesetters of their own design until several years later than most of their competitors. Instead, Heidelberg chose to manufacture and market Creo Trendsetters and then Screen PT-Rs under their own brand names. It wasn’t until 2001 that Heidelberg introduced machines of their own design, the internal drum violet Prosetters. It wasn’t until 2004 that they introduced a thermal external drum machine, the Suprasetter. In engineering the laser for the Suprasetter, Heidelberg worked with optics and semiconductor manufacturers to design a laser head with the primary goals of compact size, precision, and power.

The resulting Suprasetter laser module has 64 diodes, each with a power of 100 mW. The most unique feature of this module, at least on the surface, is its size. It measures 4.3" (110 mm) deep x 2.6" (67 mm) wide x 2.4" (60 mm) high, easily held in your hand. In comparison, a Creo Trendsetter laser head is 10" deep x 18" wide x 10" high and weighs approximately 60 lbs. Also unique is the elimination of the need for automatic focus, which is common to other laser technologies.

The Suprasetter can be configured with one to six laser modules, depending on the productivity requirements of the buyer. Since each laser module emits 64 channels, the Suprasetter models range from 64 channels for a single module machine to 384 channels for a machine outfitted with the maximum number of laser modules. Although Heidelberg does not specify in their brochure the number of laser modules contained in each of their Suprasetter models, it is clear that the distinction between the E (entry-level), S (standard), and H (high-speed) models of the Suprasetter is the number of modules. According to Heidelberg, the H model with 6 modules can image a 27.6" x 39.4" (700 x 1000 mm) plate in 60 seconds, plus cycle time. This same head will be featured in Heidelberg’s forthcoming VLF platesetter, which was introduced at Drupa 2008, with availability in early 2009.

The laser module also features what Heidelberg calls “Intelligent Diode System” (IDS). This is similar to the design found in the Scitex Lotem platesetters, in that if a diode fails the effect on throughput is relative to the position of the diode in the array. In the Suprasetter, the IDS automatically looks to the left or right of the failed diode to find the largest possible group of active diodes, and then continues to work with that group. If another diode fails, the IDS system repeats its search for the largest group of active diodes.

In tests, Heidelberg has achieved 3000 hours of continuous operation with the Suprasetter laser head, which they state correlates to 6.5 years of practical use.

LASER LIFE

Laser life is rightfully a concern when making any CTP purchase. At BWI, we try to provide our customers with reliable information on the prior usage of the platesetters we have available, and a reasonable idea of the future life of these machines. Unfortunately, it is impossible to provide a definitive answer to the much-asked question by CTP buyers, "how long will the laser last". Part of the reason for this is the nature of lasers themselves. Lasers are sensitive to static, temperature, power settings, and other variables that can affect the life of a given laser. Furthermore, platesetter manufacturers may provide statistical odds of laser life, but nothing "set in stone" that you can rely on. However, there are some factors that effect laser life that are quantifiable, and which can be used to try to predict the estimated remaining life of a laser. These factors include:

Hours of Use Obviously, how much the laser has already been used will affect its remaining life. Most platesetters are designed so that the laser is in "standby mode" when the machine is turned on to avoid a warm-up period. The laser only emits and registers usage when the machine is actually imaging a plate. It is this actual imaging time that is of importance.

Wattage The wattage setting of a laser head also affects its potential life. As a rule, the higher the wattage of the laser, the lower its potential life.

Output Power If a laser is operated above or below the recommended power settings, its life will be reduced or extended accordingly. There are power settings within the machine parameters on most platesetters.

When a customer asks how long a laser will last, we also look to our own experience with that equipment. We've seen many Creo Trendsetters and Screen PT-Rs, thus we have a relatively good sense of what can be expected with these machines as it relates to laser life. We will try to impart some of our experience later in this section. Unfortunately, we have little or no experience with some other models, such as Agfa Xcaliburs and Avalons, Heidelberg Suprasetters, etc. What little information we have on these particular machines as it relates to their laser life was included in the "Laser Design" section. Details on how to access the usage logs for various machines are listed at the end of this section on page 25.

Thermal Lasers

The following are the odds, represented by one diode manufacturer, for the life expectancy of an 830 nm laser diode when operated at normal power. We suspect that these odds are conservative, as it is unlikely the manufacturer's legal department would have allowed any risk of exaggeration in this area.

Hours Laser has Imaged	Failure Rate	Survival Rate
2,500	3%	97%
5,000	25%	75%
7,500	65%	35%
8,700	80%	20%
10,000	100%	0%

Although this table of "odds" provides guidance for what might be expected as a loss factor, it still does not answer the question of how long the average 830 nm laser diode can be expected to last. To answer this question, we applied these odds to a theoretical population of 100 laser diodes. According to our calculations, the average life of a single diode is approximately 6,000 hours.

Our calculation method follows: (for simplicity, we assumed the diodes failed halfway through each incremental period.)

Calculation of the average life of a population of 100 laser diodes

Exposure Hours	Failure Rate	Survivors	History of 100 Diodes Failures	History of 100 Diodes Survivors	History of Exposure Hours Failures	History of Exposure Hours Survivors	Total Exposure Hours Failures	Total Exposure Hours Survivors
0 - 2,500	3%		3.00	97.00	1,250	2,500	3,750	242,500
2,500 - 5,000	25%	x 97	24.25	72.75	1,250	2,500	30,312	181,875
5,000 - 7,500	65%	x 72.75	47.29	25.46	1,250	2,500	59,113	63,650
7,500 - 8,700	80%	x 25.46	20.37	5.09	600	1,200	12,222	6,108
8,700 - 10,000	100%	x 5.09	5.09		650	-0-	3,309	-0-_
			100.0				108,706	494,133

108,706 + 494,133 = **602,839 TOTAL HOURS**

We then took the total hours exposed as calculated (602,839) and divided by the quantity of diodes (100) to arrive at the average exposure hours for each diode of 6,028 hours. While these results of approximately 6,000 hours are credible based on our experience with Trendsetters and PT-Rs, it is unclear whether these results would be repeated using the "real world" data most likely known to manufacturers that BWI cannot obtain. In all likelihood, this 6,000 hour life will produce 100,000 to 200,000 8 up plates over the average laser's life, depending on the speed of the platesetter and sensitivity of the media being imaged.

Creo Laser Head - Estimating Remaining Life

When attempting to determine the remaining life of a Trendsetter laser head, it is helpful to possess an understanding of the engineering of this head. The laser portion of the head is actually an interlocking chain of 19 laser diodes, which are molded to form a single bar. This arrangement does not permit the replacement of individual diodes, unlike equipment engineered with laser diode array technology. Rather, replacing a laser requires replacement of the entire laser head. While this is extremely costly (approximately $32,500), on the flip side, the loss of a single diode does not hinder the operation of the head. It is possible to lose up to five diodes before the laser head fails. Each time a diode fails, this loss has the effect of placing more burden upon the remaining diodes, requiring them to pull more amperage to maintain a constant level of laser intensity. While the laser will continue to operate fully, this additional burden shortens the life of the remaining diodes. This amperage pull measure can be accessed along with other laser data, and is a reliable measure of the number of failed diodes. Therefore, the amperage reading on a Creo laser head is an important factor in predicting remaining laser life.

The amperage reading is also affected by the "Setpoint Power" of the head. The Setpoint Power is the output power of the laser, and is measured in Watts. The normal setting on the Trendsetters is between 8 and 10 W. Operating a machine with a setting above 10 W can lead to reduced laser life, while settings below 8 W can be expected to prolong the life of the laser. This setting usually varies depending on the media being imaged.

For a 20 W laser head, with a Setpoint Power between 8 and 10 W, a reading of 18 to 20 amp is evidence that all 19 diodes are functioning. A reading of 30 amp is evidence that 4 or 5 diodes have failed and the remaining life is tentative at best. Intermediate amp reads are a fair estimate of the remaining life of the head. For the 40 W heads, the amperage is slightly higher when the Setpoint Power is at 8 to 10 W. For these heads, a 22 to 25 amp reading is typical of a fully functioning laser, and a 40 amp reading is an indication of minimal remaining life.

Laser hours are also a gauge for estimating laser life. A 20 W laser head can reasonably be expected to have a life of 6,000-8,000 hours. The 40 W head has a slightly shorter life expectancy of 5,000-7,000 hours. However, the actual laser life can deviate from these expected norms considerably, depending on the Setpoint Power settings. For example, BWI recently received a 20 W laser head with 13,000 hours and an amperage reading of 15.9 amps. This is [redacted]letely con[redacted]y to wha[redacted]w t[redacted]rma[redacted]y e[redacted]tion[redacted]ddi[redacted]an ex[redacted]low output power setting of 3 W, compared to the usual 8 to 10 W. In another instance, we encountered the opposite. In this case, we encountered a 40 W Spectrum Proofsetter with 2,500 hours but an amperage reading of 37.6 amps. Based on the hour reading, we would expect this head to have a remaining life of 3,500 hours. However, the 37.6 amp reading indicates that as many of 4 of the 19 diodes in the head have failed, and it is nearing the end of its life-span. This head had a Setpoint Power setting of 15 W, well above the 8 to 10 W usually encountered on 40 W Trendsetters. However, this setting is not unusual on the Spectrum proofers, since proofing media is less sensitive than a normal plate.

Since laser heads are interchangeable, laser hours can be misleading if the remarketer has replaced the original laser head with that of a Spectrum, or if a Trendsetter with the Spectrum option has a history of being used extensively as a proofing device. In both instances, the hours without a corresponding amp reading taken at a normal 8 to 10 W Setpoint Power can be deceptive. Although a high wattage setting is a requirement on a Spectrum Proofsetter, it is only required on a Trendsetter with the Spectrum option when that option is being employed. Therefore, the Spectrum option can affect the remaining life of a laser head, depending on the amount of proof production that occurred with the previous owner. Fortunately, this will generally be nominal, since half-tone dot proofers have lost favor to soft and inkjet proofs.

Premature failure of a Creo head is usually not a laser diode problem at all. The odds of 5 of 19 diodes failing prematurely are low. In all probability, the failure can be attributed to dust or humidity residue, or even something as simple as a fuse. To repair a premature Creo head malfunction requires an experienced technician, but the cost is far less than the cost of a new laser head.

It is important to take caution when purchasing a pre-owned Trendsetter, as it is possible to “turn back” the hours clock in the head, and only a complete audit of the machine’s log will reveal such a transgression. This is where the amperage can be a useful tool for verification. Our contacts in Europe tell us this type of tampering is prevalent in their market. We have no knowledge of any prevalence of this tampering in the U.S. market, but with the shrinking world, there are no barriers to a rogue dealer from taking advantage of the expertise reportedly available in the European market.

Screen Laser Arrays - Estimating Remaining Life

Screen is just one manufacturer that provides a wide array of historical data about their equipment. They have engineered data storage for various historical data that can be very useful to those considering the purchase of a pre-owned platesetter. It not only allows full knowledge of the past usage of the equipment, but it also provides a basis for estimating the future cost of ownership. It further allows both the purchaser and the reseller to establish a value for the equipment that reflects the estimated remaining life of components that have a finite life, such as the laser diodes, clamps, and punches. Once the age and engineering features are known and acceptable, the past usage of these components can be used to determine the machine’s value.

For the Screen PT-R platesetters, data on prior usage of the machine can easily be obtained through the keypad. The procedure for accessing this data can be found at the end of this section. The usage data available includes:

Running Time Records the total hours the equipment is switched on.

Commentary *This meter serves very little purpose for evaluating the usage of the platesetter. It is simply a record of the hours the unit has been switched on. Some users leave the machine on all the time, others may turn off the machine when not in use, and others may follow the practice of turning the machine off after each 8 hour day. One has no way of knowing what these hours represent, so for all practical purposes, they are meaningless.*

Actual Running Time Records the hours the machine has actually been in operation, i.e. loading and unloading plates and imaging. It also includes non-productive time.

Commentary	*We use these hours to audit against the manufacturer's rated plate production per hour. To do this we simply divide the plate cycles by the actual running hours to determine the actual plate production per hour. This result is of little value other than to raise questions should the result be completely outside the expected plates per hour range.*
Exposure Time	Records the number of hours the lasers have actually been imaging plates.
Commentary	*This is the most important number in the machine database, as this number is the actual laser "burn" time. Also, we can, by dividing the plate count into the exposure hours (converted to minutes) calculate the expose minutes per plate. From our experience we would expect to see times as follows for a full size plate:*

PT-R 4000/4300	*2.2 - 2.4 minutes*
PT-R 8000	*3.4 minutes*
PT-R 8100	*6.8 minutes*
PT-R 8600	*2.0 minutes*
PT-R 8800	*1.2 minutes*

Deviations would be an indicator of smaller than full size plates, processless plates, or plates with less sensitive emulsions.

We recommend cross-referencing the exposure time number with the hour log of the individual diodes in the machine, as the exposure time is part of the "consumables" menu, which can be reset to zero. More information on this follows later in this section.

Plate Winding Cycles	Records the quantity of plates exposed over the life of the machine.
Commentary	*The number of plates produced over the life of the platesetter is of secondary importance to the exposure time. Smaller plates will obviously require fewer hours to image than full size plates, and there is no way to determine the plate sizes used by the previous owner from the information contained in the database.*

Another important consideration is the number of diodes in the platesetter. Keep in mind that the fewer the diodes in the machine, the longer it takes the machine to expose a plate. It takes approximately 2.0 minutes for a 64 diode PT-R 8600 to image a full size plate, compared to 3.4 minutes for a 32 diode PT-R and 6.8 minutes for a 16 diode machine. It will take double the laser exposure time for a 16 diode PT-R 8100 to image an equal number of plates as a 32 diode PT-R 8000. While the life of the individual diodes in the PT-R 8100 will be about the same as those in the PT-R 8000 in terms of hours, they will be able to image only about half as many plates over their life-span. More information on this topic can be found in the "Laser Operating Cost" section - page 26.

Clamp Cycles	Records the number of plates that have exposed using the current set of clamps.
Commentary	*This counter is reset by the technician whenever the clamps are replaced. The platesetter displays a warning on the display panel after 30,000 plates have cycled since the last replacement. It is our observation that 30,000 is a conservative replacement threshold, as the clamps are still viable well beyond this number of plate cycles. However, this threshold does merit a thorough cleaning and evaluation for wear by a trained technician. As a comparison, the Trendsetter purports a clamp life of between 200,000 and 1,000,000 plates. This disparity can probably be explained by the difference in drum speed between the PT-Rs and Trendsetters. The drum of the PT-R diode array models rotates at 800 to 1,000 RPM, compared to 150 to 200 RPM on the Trendsetters. The damage caused by a plate flying off a drum rotating at 800 to 1,000 RPM would undoubtably cause considerable more damage than on drum that rotates at 150 to 200 RPM.*

Unfortunately, all of the aforementioned registers are part of the "consumables" menu, which can be reset to "zero". A PT-R 4000II purchased by BWI bears witness to this fact. The machine was manufactured in December 2001. It was resold by a dealer in 2005 to a company that went out of business soon thereafter. When BWI received the machine, the register displayed 25 hours of laser running time and 531 plates produced. Obviously, the register was reset by the dealer prior to remarketing it.

In addition to the consumables menu, there is a menu with data on the individual diodes in the machine, which is very helpful in auditing the information contained in the consumables menu. Data available includes the hour log for individual diodes and their milliamp readings.

The individual diode readings can be used to audit the exposure time and also determine if any lasers have been replaced. We've encountered several machines with much lower exposure time than the hour readings for each individual diode. For example, we recently encountered a machine with 3,027 exposure hours, but the majority of the individual diodes had approximately 6,734 hours logged. Clearly, the consumable menu was reset at about 3700 hours. The individual diode hour log will also show you how many lasers have been replaced over the life of the machine, and approximately when they were replaced. Please note though that the hours for each individual diode can be reset. In fact, this is done by a technician whenever a diode is replaced and he will reset the hours for that diode.

There is, however, a value that cannot be tampered with, since it is a real-time calculation made by the machine each time the register readings are accessed. This value is the laser power measured in milliamps (mA).

Each new PT-R diode has an "IOPD" value, which is a measure of the current that the diode can hold. A new diode will have an IOPD number between 300 and 500 mA, with the number varying between diodes. The diode manufacturer will supply the IOPD value with the diode, and this is entered in the machine database when a diode is replaced. A milliamp reading between 300 and 500 mA will indicate that the diode is healthy and strong. Diodes between 200 and 300 mA are showing wear but are still good and viable. Diodes under 200 mA are starting to show a half life or less status. A diode with a milliamp reading under 100 should be considered critical, and a diode with a reading of 50 mA or below should be considered dead and must be replaced.

On the PT-R 8600, another value is calculated by the platesetter whenever the IOPD screen is displayed. The PT-R 8600 will display the original IOPD value, along with the current measured strength. A third value is displayed upon that same screen which represents the % of life that the machine computer calculates as remaining for each diode. This percentage is not the comparison of the two IOPD values as one might suspect, but is a calculation made within the platesetter operating system representing the remaining life of each diode.

Since the mA values cannot be tampered with, and since they show the approximate strength of each diode, these values are perhaps the most important figures to consider when evaluating a PT-R platesetter.

SUMMARY COMMENTS

Besides providing an audit of the extent of use by a prior owner, this data can also be useful as a management tool for gauging the operating efficiency of an individual platesetter by calculating the percentage of un-utilized time to the actual running time. An example of how this percentage is calculated follows. The data below is taken from a PT-R 8000 in BWI's inventory. The cycle time is estimated, but in an actual working environment, it should be possible to determine cycle time accurately with a stop watch.

PT-R 8000 calculations:

Actual running time (time the switch is "on")			6,958 hours
Exposure time		-	3,691 hours
Time not exposing			3,267 hours
Plate winding cycles	80,716		
	X		
Estimated cycle time	1.75 minutes		
Minutes of cycle time	141,253 divided by 60		
	= 2,354 hours	-	2,354 hours
Un-utilized time			913 hours
Percentage to running time =			13.1 %

Violet Lasers

BWI does not have as much experience with violet laser machines as we do with the thermal Trendsetters and PT-Rs. Manufacturers represent that violet diodes should work for somewhere between 5,000 - 10,000 hours. We have no data or experience to dispute this information. To this point, we have never had to replace a laser in a violet machine, but by the same token, the violet platesetters have been on the market for less time than the thermal platesetters, and we have worked with fewer of these machines. Overall though, given the low power usage of the violet diodes, we believe the estimate of 10,000 hours, or even higher, to be entirely feasible.

Even though the violet lasers can be expected to have considerable life and hence the usage is of far less concern than with thermal platesetters, it can still be comforting to know the prior usage. Unfortunately, this information is unavailable on many violet platesetters. For example, we know of no way to access this information with Agfa Galileos and Palladios, or Escher Grad Cobalts. This information is available on ECRM Makos, Fuji violet devices, and Heidelberg Prosetters. The Prosetter actually has a very extensive amount of information available.

Heidelberg, in addition to supplying the usage image time and plate count, actually also tells you the square meters of material exposure. To illustrate this somewhat complex calculation, we will start with the information made available to us from an actual platesetter in our inventory - a Heidelberg Prosetter 74. This machine was manufactured in 2005. This information was obtained from the serial number of 05404096. The first two digits represent the year of manufacture, the next three digits are a product code, and the balance of the number represents the consecutive number assigned to that specific machine.

The information contained in the machines memory can be accessed by following the procedure outlined at the end of this section. The information for this Prosetter is as follows:

Operator Resettable Job Counter		
Material Counter	8307.61	m^2
Plate Counter	38456	pieces
Exposing Counter	38332	pieces
Recorder Life History		
Sum of Material Used	9874.13	m^2
Total Plate Count	46030	pieces
Sum of All Exposures	46081	pieces
Sum of All Punches	45957	pieces
Sum of Power on Time	13959.53	hours
Sum of Exposure Time	842.37	hours

This data can be used to analyze the following elements valuable for evaluating past and future usage of the machine as well as its productivity.

To avoid describing the methodology of these calculations for each equipments' analysis presented on our website, we will describe the logic herein for those who seek more background. From this data we can calculate the information to assist you with determining if this equipment is right for your needs.

Sum of Material Used	Records the area imaged on a cumulative basis for the life of the machine. It is reported in square meters. For those accustomed to the imperial measure used in the USA, meters can be converted to square inches by multiplying the meters by 1550 or if square feet are desired, multiply by 10.76.
Total Plate Count and Sum of All Exposures	These two registers should normally be close to identical. We have chosen to use Total Plate Count for the purpose of calculating historical production data.
Sum of All Punches	We find this register of value for determining the likelihood of the punches coming close to needing replacement and thus a factor when determining market value.
Sum of Time On	This is simply the hours the machine's switch is in the "on" position. Some users leave the machine on 24 hours a day regardless of use and others turn the machine off when not in use. It has little useful purpose for evaluating the past usage or anything else.
Sum of Exposure Time	In addition to being used in the calculation of time required to image a plate, this value aids in the estimate of the remaining life of the laser. Since violet was not in volume production until 2002, few devices outside of the newspaper industry have accumulated hours that are a concern to the buyer of pre-owned violet platesetters. Nevertheless, this is a value that should be of concern at least from the standpoint of the offer price of the unit.

The following is the information we can create from this data when combined with other data provided in the remaining counters.

1) Average plate size produced by the prior owner(s).
2) Square inches of exposure per minute previously produced by this machine.
3) Historical average of minutes per plate imaged can be calculated by converting the hours to minutes and dividing the product by the "sum of all exposures."

These separate calculations can then be combined for perhaps a more useful calculation to estimate how many plates you can expect to realize from whatever you estimate to be the useful life of the platesetter for your purpose. Or perhaps more realistic is the number of hours you estimate are required to produce your requirements over what you consider to be its remaining useful life for your needs.

The simplest method for determining this is to multiply the actual minutes per plate for the history of the platesetter, times the ratio that your actual plate size is to the historical average plate size. This will give you the minutes per plate for your average plate size. These minutes divided into whatever number of hours (converted to minutes) you choose to assign to the machine when you are contemplating the purchase will result in the number of plates you can expect based upon the laser life estimate you choose. In most cases, the result will far exceed the quantity of plates you will produce over what you may consider to be its life span.

If the above discourse thoroughly confused you, the following is a step-by-step procedure for making this calculation. This illustration uses actual data from a Prosetter 74 combined with substitutes for amounts you may calculate for your plate size and your estimates of future useful life and plate requirements. (Note: This calculation will also appear in the FAQ section of our website, at a later date, for individual Prosetters we are inventorying. You will be able to substitute your estimates and recalculate each model if you choose, to determine the balance between price and future needs that fit your circumstances.)

Actual minutes per plate:

Sum of exposure time	842.3	hours
Conversion factor to minutes	x 60	minutes equals
Exposure time minutes	50,542	minutes divided by
Total plate count	46,030	equals
Exposure time per plate	1.10	minutes

Historical average plate size:

Sum of materials used	9874	m^2 divided by
Total plate count	46,030	equals historical plate sizes as follows
Square meters per plate	.2145	m^2
Conversion to sq. ft. (x 10.76)	2.31	sq. feet
Conversion to sq. in. (x 1550)	332	sq. in.

Calculation for converting historical plate size to maximum plate size:

Historical plate size	332	sq. in.
(1) Maximum plate size (25.4 x 29.5)	749	sq. in.
Ratio of maximum plate size to historical	2.257	(749 divided by 332) times
X Historical minutes per plate	1.10	minutes equals
(1) Minutes per maximum size plate	2.48	minutes

(1) *Note: You should substitute your estimated plate size useful life and future annual production and recalculate to create the laser hours estimated over the useful life you choose*

The following is an illustration of how the preceding calculations can be used to determine the "fit" of this machine for your future needs. This calculation is based upon using the maximum size plate. This and other data must be substituted with your estimates to fit the computation to your needs.

	Example to use as a guide	**Your estimates for your needs**
Estimated useful life for your purpose	9 yrs.	____________ yrs.
times	X	X
Estimated average annual plates needed	12,000 plates	____________ plates
equals	=	=
Plates required over useful life	108,000 plates	____________ plates
times	X	X
Minutes to produce plate of max. std. size	2.48 minutes	____________ minutes
equals	=	=
Minutes required to produce your est. future requirements	267,840 minutes	____________ minutes
divided by	/	divided by
Conversion factor for minutes to hours	60 minutes	60 minutes
equals	=	=
Hours to produce future requirements	4,640 hours	____________ hours
plus	+	+
Exposure hours on existing counter	842 hours	842 hours
equals	=	=
Estimated hours at end of estimated useful life	5,482 hours	____________ hours

Probable total life of laser should be in the range of 8 - 10,000 hours for a 5 mW laser and 6 - 8,000 hours for a 30 mW laser.

Procedures to access various laser usage databases on platesetters:

Procedure to Access Creo Trendsetter Laser Database:

-- Disconnect front end or CRI
-- Connect Trendsetter (diagnostic port) to a Windows PC with serial cable
-- Setup Hyperterminal on Windows PC (under Programs - Accessories - Communication)
-- Start a new connection in Hyperterminal - the settings should be Baud Rate 9600, 8 bit, no parity, 1 stop, Flow control XON/XOFF
-- Power up Trendsetter
-- At a prompt, type "laser on"
-- When reported that command was executed, type "laser"
-- Trendsetter should report back laser stats, including amperage, hours, power, etc.
-- At a prompt, type "set config" (this will give you the machine configuration and serial number)
-- At a prompt, type "list stats" (this will give you the machine history)
-- At a prompt, type "list version" (this will give you the version of pcb and head data)
-- Save this log file

Procedure to Access Screen PT-R Usage Data:

-- On the display panel go to User Maintenance - hit OK
-- Choose ETC - hit OK
-- Next choose the Consumable Timer Menu - hit OK to access display usage data
-- Return to ETC. - hit OK
-- Choose Laser Power Measure - hit OK
-- Next choose 2400 DPI - hit OK
-- (On a PT-R 8600 only) Read remain % of laser life for each diode
-- Hit next to get to next set of diode readings

Procedure to Access Agfa Xcalibur Usage Data:

-- Locate the unidiag program on your console computer
-- Click on Tools
-- On the drop down menu - click on "Operational Statistics"
-- A screen will appear that indicates "Plates Used" and "Laser Usage" (hours used)

Procedure to Access Heidelberg Prosetter Usage Data:

-- From the GUI of the machine (on RIP or Tiff Catcher/Shooter) - go to Device
-- Choose Recorder
-- Choose Operator Counter for these statistics:
    - Material Counter
    - Plate Counter
    - Exposing Counter
    - Sum of Material Used
    - Total Plate Count
    - Sum of All Exposures
    - Sum of All Punches
    - Sum of Power On Time
    - Sum of Exposure Time

Procedure to Access Fuji Violet Platesetters Usage Data:

-- Connect a PC with Hyperterminal to the machine with a serial cable
-- Hyperterminal Setup:
  - Baud 9600
  - Databits: 8
  - Parity: None
  - Stopbit: 1
  - Flow Control: None
-- Hit enter to bring up the following prompt:
  - main>
-- Type diagnostics and hit enter
-- Enterpassword> will come up, type uk1 and hit enter
-- Hit yes at prompt about Date & Time
-- Diag> will come up, type log_utils and hit enter
-- Utils> will come up, type disp_stats and hit enter
-- Save this log file

When evaluating usage cost of a platesetter, we consider determining “laser operating cost per plate” more important than simply determining the cost to purchase a replacement laser. While it is obviously important to know the cost to buy a replacement laser for a platesetter, it is even more important to know what kind of productivity you are obtaining for those dollars.

Violet Laser Vs Thermal Operating Cost

Platesetters utilizing violet laser diodes have several advantages regarding operating cost. These advantages include lower prices for replacement lasers and compatibility with considerably more sensitive plate emulsions. Since silver-based and photopolymer-based plates are much more sensitive than thermal plates, violet platesetters expend far less laser energy during exposure than their thermal counterparts. Furthermore, when considering machines currently available on the used market, violet platesetters are usually somewhat faster than competitively priced thermal systems. More plates imaged per hour with less laser energy expended by a lower priced laser equates to considerably less operating cost with a violet platesetter compared to a thermal machine.

To illustrate, we have prepared the following calculations comparing the Agfa GalileoVS (violet silver) with the Creo (Kodak) Trendsetter 3244 with a 40 W thermal laser head and the Screen PT-R 8600 thermal platesetters.

The Trendsetter exposure time is based upon 15 plates per hour less the load/unload time of one minute historically used by Creo for the Trendsetter models. For the PT-R 8600 we have used two minutes per plate that we have determined as typical from actual metered data obtained from the machines we have bought and sold.

	Galileo VS	**Trendsetter 3244**	**PT-R 8600**
Exposure minutes per plate	2.6	3.0	2.0
milliwatts of power per diode	5 mW	1,000 mW	500 mW
Quantity of diodes	1	19	64
mW minutes of power per plate	13	57,0000	64,0000
If the Galileo VS equals one -- then the comparative power requirement is	1	4,380	4,923

From the result of these calculations, it appears that a GalileoVS imaging silver plates uses approximately 4,000 to 5,000 times (13 vs 57,000 or 64,000 mW minutes) less energy per plate than a Trendsetter 3244VF or the PT-R 8600. This seems impossible, but if you turn to page 6 of this paper, you will probably conclude that this is not only feasible, but probably conservative.

This is not to say that the laser operating costs for thermal are 4,000 to 5,000 times more than violet platesetters imaging a silver plate, but there is no question that thermal platesetters require far more laser energy than violet systems and have far higher laser operating costs. The difference between violet lasers imaging photopolymer plates compared with thermal is also considerable, though not as great as silver. Furthermore, there is no denying that the replacement cost of violet lasers is less expensive than thermal. A new Galileo laser, for example, costs about $18,000, while a new Trendsetter laser head is $32,500. The PT-R 8600 lasers diodes cost approximately $2,000 each, but there are 64 of these in the machine. Whether this additional cost can be justified depends on whether you require the features found with thermal plates that are not available with violet. We address the pros and cons of each technology in the following section.

Thermal Diode Array Laser Operating Cost

To calculate the laser operating cost of diode array platesetters, we start by applying the table of estimated laser life of these diodes (see page 17) to determine the approximate number of lasers that will require replacement over the first 10,000 hours of the machine’s life. We then multiply this by the price of each individual diode to determine the laser operating cost for this time period. For a 32 diode Screen PT-R, we estimate a total operating cost of approximately $58,500. Our methodology for arriving at this cost is on the following page.

	Failure Rate	Foot-notes	Failure of Original 32 Diodes	Failure of Replaced Diodes	Total Failed Diodes	Total Cost @ $1,500 per diode
0 - 2,500 hrs	3%	(A)	1	0	1	$1,500.
2,500 - 5,000 hrs	25%	(B)	7	0	7	$10,500.
5,000 - 7,500 hrs	65%	(C)	13	2	15	$22,500.
7,500 - 8,700 hrs	80%	(D)	5	3	8	$12,000.
8,700 - 10,000 hrs	100%	(E)	6	2	8	$12,000.
			32	7	39	$58,500.

Footnotes:

(A) Applying the laser life percentages to an array of 32 lasers we calculated that in the period 0-2,500 hours, 3% of the 32 lasers statistically will fail, i.e. one laser.

(B) Of the remaining 31 diodes, it is estimated that at 5,000 exposure hours there will be 24 surviving diodes (75%). This means that 7 diodes will fail in this time period, for a total of 8 failed diodes (25%).

(C) At 7,500 hours it is estimated that there will be just 11 surviving diodes (35%) or a loss of an additional 13 diodes. Plus there is a loss of 2 of the 8 previously replaced diodes.

(D) Next at 8,700 hours it is estimated there will be 6 surviving diodes (20%) or a loss of 5 additional diodes plus a loss of 3 of the previously replaced diodes.

(E) Finally, at 10,000 hours, we can assume that the remaining 6 diodes will have expired, plus 2 of the previously replaced diodes.

Based on the statistical odds for the life-span of these diodes, we calculate that 39 total diodes will have to be replaced over the first 10,000 hours of the machine. At $1,500 per diode, the total operating cost equates to $58,500. This equates to $5.85 per hour. If you figure the machine will image approximately 200,000 plates over this 10,000 hour period (based on 20 plates per hour of laser exposure time), this works out to a cost of approximately 29 cents per plate laser operating cost.

A strategy used by Screen service, for units on service contract, has been to replace all of the remaining diodes when they are near end of life. By so doing, they avoid the cost of numerous service calls to replace near end of life diodes. The logic being that the cost of the service calls to replace near end of life diodes exceeds the remaining value of those diodes. This logic can apply to users not favoring the cost of service contracts by simply balancing the value remaining in the surviving diodes against the cost of the service calls to replace each individually.

Analysis of Per Plate Cost of Creo Laser Head

As stated in the Laser Life section of this paper, in actual operating experience a 6,000 hour life is typical for a 40 W Creo head and 7,000 hours is typical for a 20 W head. Our cost analysis will focus on the 6,000 hour life of the 40 W head.

Creo/Kodak offers 3 different speed models of this head, and they charge different prices for each speed. We don't have the exact price of the various heads, but we estimate a price of $28,000 for the Slow head, $32,500 for the Fast, and $38,000 for the Very Fast. Based on a 6,000 hour life for these head, to arrive at the laser operating cost per plate, we first calculated the cost per hour for each head as follows:

Head	Replacement Cost	Cost per hour (head cost divided by 6,000 hours)
Slow	$28,000.	$4.67
Fast	$32,500.	$5.42
Very Fast	$38,000.	$6.33

We then divided the cost per hour by the number of plates per hour each machine can expose, arriving at an approximate cost per plate:

Head	Plates Per Hour	Cost Per Hour	Cost Per Plate
Slow	12	$4.67	$0.389
Fast	18	$5.42	$0.301
Very Fast	21	$6.33	$0.301

Comparing two similar Creo and Screen models (the F speed Trendsetter 3244 and PT-R 8000), the laser cost per plate is surprisingly close - around 30 cents. However, there is one additional consideration that we have not included in these calculations, which is the service cost to replace lasers on this equipment. With the Trendsetter, you would require only one service call approximately every 6,000 hours to replace the head. While the probable life of the PT-R diodes is in the range of 6,000 hours, statistical analysis plus our own experience indicates you can expect some diodes to require replacement well before this hour threshold, while some will last longer. A service call would be required each time a diode needs replaced, however, the total can be mitigated by the wholesale replacement of near end of life diodes as suggested in the previous diode array section.

For some buyers, it is much easier to swallow replacing one diode at a time for $1,500 plus the service call, than accepting the fact that at some point over the life of a Trendsetter, you will have to pay out $32,500 for a new laser head. For others, the simplicity of having to deal with just one laser as in the Trendsetter is appealing. Buyers considering both the Trendsetters and the PT-Rs will have to weigh the pros and cons of each design.

Analysis of Internal Drum Single Diode Laser Cost

When we estimate the laser cost for a user of internal drum technology, where a single diode is the norm, it requires a much different approach. The first conclusion that may arise is the reality that if the total plate production that may be needed over the life of the machine is less than the quantity reasonably expected from the laser (even at its most conservative life expectancy) it is safe to conclude that there will be no laser cost incurred over the original capital outlay for the platesetter.

Since the life of a laser is not easily defined, it is perhaps best to look at logical scenarios for a laser life. Since 6,000 hours is a conservative minimum and 10,000 hours is a sensible maximum we can estimate the production of image area over the life of a laser. As a starting point for making this calculation, we took the register readings of a Prosetter 74 recently placed into our inventory. This unit produced 13,126 square meters of image with a laser exposure time of 1,054 hours or 12.45 m^2 each laser hour. If we convert this metric to imperial measure it translates to 19,297 square inches per hour or 19,297,000 per thousand hours. The following calculation converts this production to total output for the chosen laser life expectancies.

Hours of Laser Life	Sq.inches of thru-put (000)	Quantity 4-up plates 28.5" x 24.2" (690 sq. in.)	Quantity 8-up plates 40.5" x 31.4" (1271 sq. in.)	Cost per plate @ $20K laser cost 4-up	8-up
6,000	115,782	167,800	91,000	.119	.220
7,000	135,079	195,800	106,200	.102	.188
8,000	154,376	223,700	121,400	.089	.165
9,000	173,673	251,700	136,500	.079	.147
10,000	192,970	279,700	151,700	.072	.132

Since speed varies with the dpi setting when using internal drum technology, we have further calculated that this Prosetter was set at 2400 dpi. Should actual dpi be higher or lower than 2400 dpi, the throughput will decrease or increase in proportion to the dpi actually being use.

If the estimated quantity of plates you will reasonably expect to produce over the life you assign to the system is less than those shown above, it is reasonable to assume that you will incur no expense for laser replacement over the life you assign to your system.

Laser Life/Cost of Thermal Processless Plates

The increased power requirements of the 275 – 325 mJ/cm2 rated processless plates places an entirely new dimension upon the user of these plates. Obviously, from the foregoing information, greater laser power requirements from any given laser diode has a direct effect upon the life of that diode as it relates to the per plate cost of diode consumption. This cost per plate is realized in the form of either - increased laser intensity, thus shortening the life of the diode, or decreasing the speed of the imaging device to gain more dwell time for exposing the less sensitive emulsion.

In the case of the Creo head, a combination of both increased intensity and decreased drum rotation may be required. Whichever occurs, the end result is increased cost. Fortunately, this increased cost is mitigated by reduced chemical and chemical processor maintenance cost. The caveat is that when manufacturers tout the economic advantages of processless plates, the reduced cost of chemicals and processor maintenance is used as the justification for the increased cost of the plate. It has been our experience that there is an inclination to overlook increased laser diode cost as an economic factor. Of course energy consumption of the processor is always included in the savings side of the cost equation but nary a mention of the increased energy consumption for longer per plate image time and laser power requirements.

The higher power settings are not, as a general rule, disclosed by the technician reconfiguring your Trendsetter for processless. You will find it out when your laser head requires replacement at 3,000 hours instead of the expected 6,000 hours. This basically doubles your laser cost which we calculate on page 28 to be approximately $.30 per plate. This can be a cause for concern when you realize that you signed a plate contract for an extended period of time.

If you are using a laser (coupled) diode array technology commonly found in Screen manufactured platesetters, there is no increase in power settings. The added exposure requirement is attained by slowing down the drum revolutions from perhaps 800 RPM to 400 RPM. This slower speed of course, cannot be hidden as possible with the laser power setting, but the slower speed doubles the laser exposure thus doubling the laser cost and in addition increasing the number of service calls to replace those diodes not to mention the loss of output which can equate to added labor cost. Obviously if you are covered by a service contract it can be rationalized that this added cost does not exist. You may be right, but generally speaking nothing is free.

A caveat to those using Agfa and Kodak processless plates is that the previous calculations may be inadequate to accurately convey laser operating costs when imaging these plates. While these plates eliminate the cost of a processor, and related chemistry, it seems that there is no question that laser operating cost will be higher.

Not only are we seeing shorter laser life as a result of higher power setting, but we are also seeing the need for lasers to be replaced at an "end of life" sooner than a laser exposing lower energy plates. This is a reality because the laser will not generate the power required to expose the less sensitive processless plates yet that same laser has the latent power to expose the more sensitive thermal plate requiring chemical processing.
Granted, there are savings to be had by using processless technology, but seldom do you see those savings calculations tempered with the cost of laser diodes and energy cost to operate at higher power or longer throughput times – and of course, the service cost of laser replacement!

Analysis of Presstek Laser Cost

The entire laser module for the 8-up model is composed of 16 individual laser arrays (12 arrays for 2-up model) each with 4 diodes for a total of 64 diodes. If just one of the four diodes fails, it affects the quality of the output of the array and should be replaced. The normal replacement cost is in the range of $2,500 plus the service call.

Conventional external drum laser engineering moves the laser beam or beams across the axis of the drum. In so doing the exposure time is limited to the axis dimension of the plate. With the Presstek engineering, the entire 64 diodes are fixed across the axis of the drum. As a result, laser exposure takes place across the entire drum width regardless if media is there to expose. Waste only exists when the user exposes less than the maximum size plate but that added laser costs exists whenever less than full size is exposed.

Another factor adding to the laser cost is the sensitivity of the Presstek plate. Because their plate uses the ablative method of creating the image on the plate to avoid the conventional chemical based processing the sensitivity of the plate is rated at 600 mJ per cm^2. This compares with 110 to 150 mJ for a normal conventional plate or 300 mJ for the Agfa and Kodak processless plates. The added laser power affects the life of the laser diode which obviously equates to added cost. Thus we conclude, from our analysis, that the Presstek laser has the highest operating cost.

Summary of Laser Technology - Violet vs. Thermal

Violet and thermal are the dominant technologies currently in use in platesetting. There is much debate in the industry about the merits and flaws of each technology. We have discussed both technologies throughout the preceding sections of this paper, but have not directly addressed the frequent question of "which is better - violet or thermal". Of course, this question is impossible to answer. The real question is not which is better, but which is better for each company's particular needs, budget, and future. The answer to this depends on what are the main concerns of each company in acquiring a CTP system. These possible concerns include *quality, initial investment, safelight requirements, throughput, run-length, consumables cost and availability, environmental impact, and maintenance requirements*. Therefore, we are not going to say one technology is better than the other, but rather provide information on the pros and cons of each technology for each of these issues.

Quality: The main argument against violet is that output quality is subpar compared with thermal systems. However, this is not the case in all situations. It is true that thermal plates are capable of producing ultra-high quality with line screens exceeding 300 lpi, which violet plates cannot do. But this is not a requirement for the vast majority of users. For the vast majority of applications, silver-based plates imaged by violet lasers produce output comparable in quality to output from thermal platesetters. The other choice for violet is the photopolymer-based plate. Although historically, photopolymer plates have been judged to be inferior to silver and thermal from a quality perspective, recent advances in photopolymer technology has made available improved quality that meets or exceeds the requirement of commercial printers requiring a superior quality product.

Initial Investment: In general, violet platesetting equipment is less expensive to purchase than thermal equipment.

Safelight Requirements: Violet plates are light sensitive, and hence require handling in safelight conditions, however autoload options available on many machines can minimize this requirement. Violet plates have an advantage over previous visible laser technologies in that they can be used with yellow safelights instead of the red lights required by green sensitive plates. Thermal plates have a further advantage over violet in that they are not light sensitive and hence do not require safelighting. They can be handled in daylight conditions with no adverse effects.

Throughput: Violet is generally faster, and particularly so where only low resolution is required, as output speed on an internal drum device is directly proportional to the resolution setting. The lower the resolution that is required, the faster the machine will image. However, new technologies in the thermal drum arena, such as laser power, expanded quantity of diodes, and GLV technology, are providing considerable improvement in the throughput of thermal platesetters.

Run-Length: Thermal plates offer the longest run lengths possible, but to achieve this, they must be baked. Unbaked run lengths for thermal plates varies among the many products available on the market, from 150,000 to 400,000. When baked, thermal plates can produce up to 1 to 2 million impressions, depending on the plate type. Processless thermal plates offer run lengths of 100,000 impressions. Silver-based plates are capable of producing in the range of 350,000 impressions. Photopolymer plate run length varies among manufacturers, from 200,000 to 400,000. These plates can also be baked to yield up to 1 million impressions.

Consumables Cost and Availability: Considering the many competing consumables manufacturers, and the many factors that are involved in the manufacturers pricing that each customer receives, consumables cost is impossible for us to quantify. The type of plate and chemistry required is just one factor. Other factors are the volume of plates being purchased, presenting negotiating opportunities for the purchaser, whether any additional equipment is being purchased that would allow the manufacturer to offer a "consumables deal", etc. We recommend that each buyer check with their suppliers for pricing as it applies to their particular situation. One concern that buyers should keep in mind is the number of manufacturers for each plate type. To our knowledge, only Agfa (Lithostar) and Heidelberg (Saphira) manufacture silver-based plates. There is a wider variety of photopolymer plates available, including those from Agfa (N91), Fuji (Brillia), Konica (Duros), Kodak (VioletPrint), and Escher Grad (EG-HRV1). Except Escher Grad, all these manufacturers produce at least one thermal plate, while some (Agfa, Kodak and Fuji) have half a dozen varieties of thermal plates available. In addition to the major manufacturers, there are a variety of other producers (such as Southern Lithoplate) of thermal plates as well. Clearly, consumers have far more choices among thermal plates, including processless plates, than plates for violet lasers.

Environmental Impact: Silver-based violet plates have the worst impact for the environment. Silver is a pollutant, and must be removed from waste chemistry before its disposal. Photopolymer plates do not have this issue, but they do require chemical processing. Thermal plates are silver-free, but most require chemical processing. However, there are also processless thermal plates available which eliminate the need for chemicals entirely, thereby providing the least environmental impact. Currently processless plates are not available for violet platesetters. At Ipex 2006, Agfa previewed their violet processless plate prototype, but they are still not available on the market. Furthermore, this plate will probably require a minimum of a 30 mW laser in order to image.

At Drupa 2008, both Agfa and Fuji introduced a violet processless plate. Agfa, it appears, is restricting their plate to the newspaper industry initially. The availability of information at Drupa was limited, indicating their offering will not be available immediately. Fuji, however, distributed a brochure with full disclosure of the specifications inherent in their product. It appears that Fuji's ProV plate will be available in the waning months of 2008.

Maintenance Requirements: It appears that maintenance cost for violet-based platesetters will be considerably lower than thermal over the life of the equipment. In violet equipment, there is one laser diode to replace. In thermal machines, there are multiple diodes that may at some point require replacement, or in some cases, multiple diodes that cannot be replaced individually as they are contained in a single very expensive head. Not only are lasers less expensive to replace, they are longer lived in violet machines. Furthermore, another cost associated with thermal is the maintenance of the plate clamps and registration punch required for external drum thermal devices, which are not used on the internal drum violet platesetters. On the Screen PT-Rs, for example, it is recommended that the plate clamps be replaced every 30,000 plate loading cycles (depending on model), at $2,700 for the clamps, plus the cost of the service call. The registration punch requires maintenance every 10,000 plate cycles. These punches do not necessarily have to be replaced at every 10,000 plates. Rather, they need to be removed, cleaned, oiled, and inspected for damage. If replacement punches are required, the price is in the range of $5,000 to $6,000 plus the cost of the service call. Internal drum technology does require a high-speed spinner motor that can fail, but this failure rate is impossible to quantify and may not occur under normal operating conditions.

Violet silver-based plates do have one issue that purchasers should keep in mind. There is considerable debris from these plates that is removed during processing, leading to an accumulation of a purple "sludge" in the processor. This sludge stains easily and requires attention on a weekly basis. With silver-based plate, users will run into more processor maintenance by the operator than with other technologies.

Summary

Clearly there are pros and cons for each technology. Thermal technology offers the user quality output, user-friendliness, long run lengths, and a wide variety of plate choices, all with minimized environmental impact. The downside of thermal is the high acquisition cost and high maintenance cost, and less speed versus similarly priced violet devices. Violet users benefit from this technology's lower acquisition and maintenance cost, and high throughput. Unfortunately, violet does not offer the same range of plate choices, including no currently available processless plates. Violet users also have to make the choice between higher quality silver plates which have significant environmental impact, or photopolymer plates that do not contain silver but will require a special processor with preheat capability. The question you must answer, is the considerably reduced cost involved with violet technology worth it, given the quality, environmental, and plate choices that must be made? Can the extra acquisition and maintenance cost of a thermal platesetter be justified? It is up to each buyer to decide. The pros and cons will have to be weighed by each individual buyer to decide which technology is the right choice for their situation.

MEASURES OF PLATESETTER PRODUCTIVITY

Productivity can be an important consideration when determining which platesetter to buy. However, manufacturers are often vague when describing the throughput of their equipment. This section attempts to objectively clarify productivity.

Most manufacturers' brochures quote the productivity of a device as the plates per hour (PPH) at or near the maximum plate size. For many buyers this information is sufficient. For others, for whom production throughput is a concern and operating costs must be keenly evaluated, this provides an adequate "ballpark" guide, but doesn't give sufficient insight to whether the machine will produce the quantity of plates the size they actually use within the time frame that they require.

The various methods of stating productivity can easily create confusion and lead to a miscalculation. If the productivity is stated as PPH, it is safe to conclude that this includes the cycle time of the platesetter. If the plate size is not stated, you must assume that it is for the maximum size plate. If productivity is stated in terms of imaging time, or square inches per minute, or linear inches per minute, it is necessary to account for the cycle time of the platesetter, which is generally in the area of two minutes, but can be in the range of one minute for current technology.

In the case of internal drum devices, the imaging resolution is an important part of the productivity equation. The speed of an internal drum device varies directly with the dpi. In addition, the smaller the plates being imaged, the higher the productivity, as the image time of an internal drum device varies directly with the square inches being imaged. These two variables can result in a significant variance between the PPH represented by the manufacturer and the throughput obtained based on your plate size and resolution requirements. However, there is a caveat when making this calculation. Do not assume that the productivity increases directly with the DPI or plate size since the cycle time per plate remains the same regardless of size or dpi. A fair estimate in computing increases or decreases in PPH should be to assume that the cycle time is 50% of the minutes per plate at the dpi used on the illustrated productivity schedules. It is therefore necessary to calculate any PPH difference because of dpi or plate size by allowing for this constant in your calculation.

In external drum machines, the resolution has no impact on the throughput of the machine. The size of the plates being imaged does have some impact, but it is less than in the internal drum machines. In external drum machines, the drum must rotate the full circumference, regardless of whether it has to image the entire surface or not. The only impact size has on PPH is that the laser has less distance to travel on the linear edge if the full size is not used.

We do feel that use of a common denominator in comparing production speeds between models can be a useful tool for determining the suitability of a given device to your needs. To simplify the comparison between various models, we have chosen to calculate just one common denominator value for each type of equipment (external or internal drum.)

For external drum machines, this value was calculated by multiplying the manufacturers' representation of PPH times the measure of the lead edge of the plate size used by the manufacturer to calculate the PPH. The resulting number was divided by 60 minutes to determine the linear inches per minute, including the cycle time. Linear inches per minute including cycle time is the common denominator for comparing speed of external drum devices.

For the internal drum models, the square inch area of the size plate was multiplied times the manufacturers' stated PPH at the dpi closest to 2400 for that model of platesetter, and the product was divided by 60 minutes for our square inches per minute including cycle time. This value became the common denominator for comparing throughput of internal drum devices.

Productivity for individual platesetters is listed by manufacturer in the charts on pages 33 - 42.

EXTERNAL DRUM TECHNOLOGY PRODUCTIVITY

AGFA		Media Size					Manufacturers Speed Rating - 2400 DPI (incl.cycle time)									
Model	Comments	Axis Inches		Circumference Inches		Plate Width	Plates Per Hour					Linear Inches Per Minute				
		Max.	Min.	Max.	Min.		LE	E	S/SD	XT	Z	LE	E	S	XT	Z
Xcalibur VLF 50-60-70-80 (48 diodes)	Using 140 mJ cm^2 Plates	50-80"	22.0	45-58"	28.0	48.0			9.2					10.0		
Xcalibur VLF 50-60-70-80 (96 diodes)	Using 140 mJ cm^2 Plates	50-80"	22.0	45-58"	28.0	48.0				14.4					20.0	
Xcalibur 45 (original 2002)	GLV-240	45.66	9.8	32.30	17.7	40.5			20					13.5		
Xcalibur 45 8 Up (9/2003 introduced)	GLV-240 - using 140 mJ cm^2 Plates	45.66	9.8	32.3	17.7	40.5	10	15	20	25		6.8	10.1	13.5	16.9	
Xcalibur VLF - 50	GLV-360 - using 140 mJ cm^2 Plates	50.0	22.2	45.0	17.7	48.0		7.5	10.5	14	22.5		6.0	8.4	11.2	18.0
Xcalibur VLF - 60	GLV-360 - using 140 mJ cm^2 Plates	60.0	22.2	50.0	17.7	60.0		6.5	9	12	19.5		6.5	9.0	12.0	19.5
Xcalibur VLF - 70	GLV-360 - using 140 mJ cm^2 Plates	70.0	22.2	55.0	17.7	68.0		5.5	8	11	18.0		6.2	9.1	12.5	20.4
Xcalibur VLF - 80	GLV-360 - using 140 mJ cm^2 Plates	80.0	22.2	58.0	17.7	80.0		5	7	9.5	16.0		6.7	9.3	12.7	21.3
Avalon LF 8 Up	GLV II - using 140 mJ cm^2 Plates	45.7	12.2	32.2	12.2	40.5	10	15	20	30	40.0	6.8	10.1	13.5	20.2	27.0
Avalon VLF 50 - thermal	GLV II - using 140 mJ cm^2 Plates	50.0	12.2	45.0	12.2	35.4		10	13	17.5	24.0		5.9	7.7	10.3	14.6
Avalon VLF 55 - thermal	GLV II - using 140 mJ cm^2 Plates	55.0	12.2	50.0	12.2	35.4		10	13	17.5	24.0		5.9	7.7	10.3	14.6
Avalon VLF 60 - thermal	GLV II - using 140 mJ cm^2 Plates	60.0	12.2	50.0	12.2	35.4		10	13	17.5	24.0		5.9	7.7	10.3	14.6
Avalon VLF 65 - thermal	GLV II - using 140 mJ cm^2 Plates	65.0	12.2	55.0	12.2	35.4		10	13	17.5	24.0		5.9	7.7	10.3	14.6
Avalon VLF 70 - thermal	GLV II - using 140 mJ cm^2 Plates	70.0	12.2	55.0	12.2	66.9		5.5	8	11	16.5		6.1	8.9	12.3	18.4
Avalon VLF 75 - thermal	GLV II - using 140 mJ cm^2 Plates	75.0	12.2	58.0	12.2	66.9		5.5	8	11	16.5		6.1	8.9	12.3	18.4
Avalon VLF 80 - thermal	GLV II - using 140 mJ cm^2 Plates	80.0	12.2	58.0	12.2	66.9		5.5	8	11	16.5		6.1	8.9	12.3	18.4
Avalon VLF 83 - thermal	GLV II - using 140 mJ cm^2 Plates	83.0		63.0		82.0				8	12.0				10.9	16.4
Avalon SF S - Elite & Universal	GLV II - using 140 mJ cm^2 Plates	38.6	9.8	27.2	12.2	38.6			20.5					13.2		
Avalon SF S - Universal	GLV II - using Amigo Plates	38.6	9.8	27.2	12.2	38.6			18.5					11.9		
Avalon SF S - Universal	GLV II - using Azura Plates	38.6	9.8	27.2	12.2	38.6			17					10.9		
Avalon LF - violet	GLV Violet Laser - LapV Plates	45.7	9.8	32.2	12.2	40.5			20	30				13.5	16.9	
Avalon LF - violet	GLV Violet Laser - N91V Plates	45.7	9.8	32.2	12.2	40.5			15	15				10.1	10.1	
Avalon N8 10 Series	Diode Array Module	45.6	17.7	37.0	14.5	40.5		8	13				5.4	9.6		
Avalon N8 20 Series	Fiber Coupled Diode Array	45.6	17.7	37.0	21.7	40.5		14	22				9.5	14.8		
Avalon N8 50 Series	GLV 512 channel	45.6	17.8	37.0	14.6	40.5		23	31	40			15.5	20.9	27.0	
Avalon N8 70 Series	GLV 1024 channel	45.6	17.8	37.0	14.6	40.5				48					32.4	
Avalon N16 Series E/S/XT	GLV 512 channel	57.8	25.6	45.4	21.7	57.0		16	24	29			15.2	22.8	27.5	
Avalon N24-50 Series SD	GLV 512 channel	68.8	25.6	55.1	21.7	60.0			22					22.0		
Avalon N24-50 XT	GLV 512 channel - dual modules	68.8	25.6	55.1	21.7	60.0				32					32.0	
Avalon N24-70 S/SD	GLV 1024 channels	68.8	25.6	55.1	21.7	60.0			27					27.0		
Avalon N24-70 XT	GLV 1024 channels - dual modules	68.8	25.6	55.1	21.7	60.0				38					38.0	
Avalon N36-50 Series S/SD	GLV 512 channel	82.6	25.6	62.9	21.7	80.0			18					25.3		
Avalon N36-50 XT	GLV 512 channel - dual modules	82.6	25.6	62.9	21.7	80.0				28					37.3	
Avalon N36-70 S/SD	GLV 1024 channel	82.6	25.6	62.9	21.7	80.0			22					29.3		
Avalon N36-70 XT	GLV 1024 channel - dual modules	82.6	25.6	62.9	21.7	80.0				33					44.0	
Avalon N40 Series	GLV (available 2009)	89.7	25.6	62.9	21.7	89.7			17	22				25.4	32.9	
Avalon N48 Series	GLV (available 2009)	114.1	25.6	53.1	21.7	114.1			13	17				24.7	32.3	
Accento E	16 Diode Array	32.7	12.8	26.0	14.5	28.5		10					4.8			
Accento S	32 Diode Array	32.7	12.8	25.4	15.5	28.5		16					7.6			
Accento II E & S	E=16 & S=32 Diode Array	32.7	12.8	26.0	14.5	28.5		11	21				5.2	10.0		
Accento LF	84 channel laser diode	41.7	17.8	31.6	14.6	40.5		11					7.4			

EXTERNAL DRUM TECHNOLOGY PRODUCTIVITY

KODAK - CREO - SCITEX		Media Size					Manufacturers Speed Rating (incl. cycle time)									
Page	1 of 2	Axis Inches		Circumference Inches		Plate Width	Plates Per Hour					Linear Inches Per Minute				
Model	Comments	Max.	Min.	Max.	Min.		S/E	F	V	X	Z	S/E	F	V	X	Z
Trendsetter 3230	TH 1.0 Head	30.0	13.0	33.0	15.5	30.0	11	25				5.5	12.5			
Trendsetter 3230 Spectrum	TH 1.7 Head	30.0	13.0	33.0	15.5	30.0			25					12.5		
Trendsetter 400	TH 1.0 Head	30.0	13.4	26.0	13.0	30.0		16					7.9			
TS 400 Quantum (renamed 3230)	TH 1.7 Head	30.0	13.0	33.0	15.5	30.0	11		25			5.5		12.5		
TS 400 II Quantum	TH 1.7 Head	30.0	13.0	33.0	15.5	26.0		19	36				8.2	15.6		
TS 400 III Quantum	TH 2.5 Head	39.0	9.0	33.0	10.6	28.3				43				20.0	20.4	
Lotem 400V	24 diodes	29.5	15.0	24.5	12.5	29.5		16					7.9			
Lotem 400S	12 diodes	29.5	9.0	24.0	12.3	19.5	10					4.9				
Lotem 400 (Creo)	24 diodes	29.5	9.0	24.5	12.25	29.5		16					7.9			
Lotem 400 Quantum	TH 2.0 Head	29.5	9.0	24.0	12.25	29.5	11		25			5.4		12.3		
Magnus 400	TH E Head	29.5	9.0	26.77	12.25	29.5	16	21				7.9	10.3			
Magnus 400 Quantum	TH 2.5 Head	29.5	9.0	26.77	12.25	29.5			32					15.7		
Magnus 400 II	200 LPI - 24 diodes	30.0	8.9	26.90	11.80	29.5	17	22				8.4	10.8			
Magnus 400 II Quantum	450 LPI - TH 2.0 Head	30.0	8.9	26.90	11.80	29.5			38					18.7		
TS 3244 (TS 3)	TH 1.0 Head	44.0	13.0	32.0	15.5	44.0	8	13				5.9	9.5			
TS 3244 (TS 3/8) (re-engineered TS 3)	TH 1.0 Head	44.0	13.0	33.0	15.5	44.0	8	13				5.9	9.5			
TS 3244+ (TS 8)	TH 1.0 Head	44.0	13.0	33.0	15.5	44.0	8	13				5.9	9.5			
TS 3244+ (TS 8) Spectrum	TH 1.7 Head	44.0	13.0	33.0	15.5	44.0	8	13	15			5.9	9.5	11.0		
TS 800 (renamed 3244 TS 8)	TH 1.7 Entry Head	45.0	13.0	33.0	15.5	44.5	8	13				5.9	9.6			
TS 800 Quantum	TH 1.7 Head	45.0	13.0	33.0	15.5	44.5	8	13	21			5.9	9.6	15.6		
TS 800 II	TH 1.7 Entry Head	45.0	9.0	33.0	12.0	44.5	15	22	30			11.1	16.3	22.2		
TS 800 II Quantum	TH 1.7 Head	45.0	9.0	33.0	12.0	44.5	15	22	30			11.1	16.3	22.2		
TS 800 II X	TH 2.5 Entry Head	45.0	9.0	33.0	12.0	40.5				35					23.6	
TS 800 II Quantum X	TH 2.5 Entry Head	45.0	9.0	33.0	12.0	40.5				35					23.6	
Trendsetter 800 III	200 LPI Staccato 25 µm TH 2.5 Entry	45.0	9.0	33.0	10.6	40.5	15	22	30	37		10.1	14.9	20.2	25.0	
Trendsetter 800 III Quantum	450 LPI Staccato 20 µm TH 2.5 Sq. Dot	45.0	9.0	33.0	10.6	40.5	15	22	30	37		10.1	14.9	20.2	25.0	
Lotem 800V	24 diodes	44.5	25.6	35.6	10.6	40.5	10					6.8				
Lotem 800 (Creo)	24 diodes	44.5	25.6	35.4	19.3	40.5	10	16				6.8	10.8			
Lotem 800V2	48 diodes	44.5	25.6	35.4	19.3	40.5	16						10.8			
Lotem 800 Quantum	TH 2.0 Head	44.5	18.0	35.6	15.0	40.5		16	25				10.8	16.9		
Lotem 800 II	TH 2.0 Entry Head	44.5	18.0	35.0	14.5	40.5	15	22	29			10.1	14.8	19.6		
Lotem 800 II Quantum	TH 2.0 Square Dot Head	44.5	18.0	35.0	14.5	40.5	15	22	29			10.1	14.8	19.6		
Magnus 800	TH 2.5 Entry Head	45.7	15.0	37.4	13.0	44.5	15	22	30	40		11.1	16.3	22.2	29.7	
Magnus 800 Quantum	TH 2.5 Square Dot Head	45.7	15.0	37.4	13.0	44.5	15	22	30	40		11.1	16.3	22.2	29.7	
Magnus 800 Z Quantum	450 LPI Staccato 20 µm TH 3.0	45.7	15.0	36.9	12.5	40.5					60					40.5

(1) Speeds are fixed. They must be specified at time of purchase.

(2) Fully automatic plate loading and unloading standard and reflected in this speed but not others.

Continued next page.

EXTERNAL DRUM TECHNOLOGY PRODUCTIVITY

KODAK - CREO - SCITEX (Continued)		Media Size					Manufacturers Speed Rating (incl. cycle time)									
Page	2 of 2	Axis Inches		Circumference Inches		Plate Width	Plates Per Hour					Linear Inches Per Minute				
Model	Comments	Max.	Min.	Max.	Min.		S	F	V	X	XX	S	F	V	X	XX
TS 4557 VLF 9/96 - 10/98	TH 1.0 32-4005B Head 192 Ch 20W	57.0	15.5	45.0	20.0	57.0	7.6	10.9					7.2			
TS 5067 VLF 9/96 - 10/98	TH 1.0 32-4005B Head 192 Ch 20W	67.0	15.5	50.0	20.0	67.0	6.7	9.8					7.5			
TS 5467 VLF 9/96 - 10/98	TH 1.0 32-4005B Head 192 Ch 20W	67.0	15.5	54.0	20.0	67.0	6.7	9.8					7.5			
TS 5080 VLF 9/96 - 10/98	TH 1.0 32-4005B Head 192 Ch 20W	80.0	15.5	50.0	20.0	80.0	5.8	8.7					7.7			
TS 5880 VLF 9/96 - 10/98	TH 1.0 32-4005B Head 192 Ch 20W	80.0	15.5	58.0	20.0	80.0	5.8	8.7					7.7			
TS 4557 QPackaging 12/00	TH 1.0 32-4089B Head 128 Ch 20W	57.0	15.5	45.0	20.0	57.0	5.5					5.2				
TS 5067 QPackaging 12/00	TH 1.0 32-4089B Head 128 Ch 20W	67.0	15.5	50.0	20.0	67.0	4.8					5.4				
TS 5467 QPackaging 12/00	TH 1.0 32-4089B Head 128 Ch 20W	67.0	15.5	54.0	20.0	67.0	4.8					5.4				
TS 5080 QPackaging 12/00	TH 1.0 32-4089B Head 128 Ch 20W	80.0	15.5	50.0	20.0	80.0	4.2					5.6				
TS 5880 QPackaging 12/00	TH 1.0 32-4089B Head 128 Ch 20W	80.0	15.5	58.0	20.0	80.0	4.2					5.6				
TS 4557 11/98 - 5/00	TH 1.7 32-4052C/4141A 192 Ch 40W	57.0	15.5	45.0	20.0	44.0		13.9					9.4			
TS 5067 11/98 - 5/00	TH 1.7 32-4052C/4141A 192 Ch 40W	67.0	15.5	50.0	20.0	57.0		12.0					10.3			
TS 5467 11/98 - 5/00	TH 1.7 32-4052C/4141A 192 Ch 40W	67.0	15.5	54.0	20.0	67.0		10.9					10.9			
TS 5080 11/98 - 5/00	TH 1.7 32-4052C/4141A 192 Ch 40W	80.0	15.5	50.0	20.0	80.0		9.7					11.6			
TS 5880 11/98 - 5/00	TH 1.7 32-4052C/4141A 192 Ch 40W	80.0	15.5	58.0	20.0	80.0		9.7					11.6			
TS 4557 Q V 2.5 since 6/00	TH 1.7 32-4090C/4182A 224 Ch	57.0	15.5	45.0	20.0	57.0		12	13.8					13.1		
TS 5067 Q V 2.5 since 6/00	TH 1.7 32-4090C/4182A 224 Ch	67.0	15.5	50.0	20.0	67.0		10.9	12.6					14.1		
TS 5467 Q V 2.5 since 6/00	TH 1.7 32-4090C/4182A 224 Ch	67.0	15.5	54.0	20.0	67.0		10.9	11.5					14.1		
TS 5080 Q V 2.5 since 6/00	TH 1.7 32-4090C/4182A 224 Ch	80.0	15.5	50.0	20.0	80.0		9.7	11.3					16.0		
TS 5880 Q V 2.5 since 6/00	TH 1.7 32-4090C/4182A 224 Ch	80.0	15.5	58.0	20.0	80.0		9.7	11.3					16.0		
TS 4557E 7/01	TH E 32-4180A 224 Ch	57.0	15.5	45.0	20.0	57.0		12.8	13.8				12.1			
TS 5067E 7/01	TH E 32-4180A 224 Ch	67.0	15.5	50.0	20.0	67.0		10.9	12.6				12.2			
TS 5467E 7/01	TH E 32-4180A 224 Ch	67.0	15.5	54.0	20.0	67.0		9.8	11.5				10.9			
TS 5080E 7/01	TH E 32-4180A 224 Ch	80.0	15.5	50.0	20.0	80.0		8.7	11.3				11.6			
TS 5880E 7/01	TH E 32-4180A 224 Ch	80.0	15.5	58.0	20.0	80.0		8.7	11.3				11.6			
Magnus VLF 4570	TH 2.7 224 Ch / TH 3.0 448 Ch (X spd)	70.0	15.5	45.0	19.3	40.5	12.6	20.6	28.8	38.9		8.5	13.9	19.4	26.2	
Magnus VLF 5183	TH 2.7 224 Ch / TH 3.0 448 Ch (X spd)	83.0	15.5	51.0	19.3	81.5	7.0	12.5	16.5	19.1			9.5	16.9	26.0	
Magnus VLF 5570	TH 2.7 224 Ch / TH 3.0 448 Ch (X spd)	70.0	15.5	55.0	19.3	60.0	7.0	12.5	16.7	26.8		7.0	12.5	16.7	26.8	
Magnus VLF 6383	TH 2.7 224 Ch / TH 3.0 448 Ch (X spd)	83.0	15.5	63.0	19.3	81.5	7.0	12.5	16.5	19.1		9.5	16.9	22.4	26.0	
Magnus XLF 80 (One size fits all)	Staccato 20 2400 DPI	88.9	31.5	51.0	19.7	37.0			22.3	(A)				13.7		
						57.0			17.0	(A)				16.1		
						40.5			21.0	(A)				14.1		
						60.0			16.0	(A)				16.0		
						89.0			12.0	(A)				17.8		
Lotem XL 45/80	48 DiodeArray	80.0	18.0	45.0	18.0	80.6		7.0					9.33			
Lotem XL 55/80	48 DiodeArray	81.0	18.0	55.0	18.0	80.6		7.0					9.33			
Lotem XL 60/80	48 DiodeArray	80.0	18.0	60.0	18.0	80.6		7.0					9.33			
(A) Based upon Electra XD Plate recommended as optimal for this application.																

EXTERNAL DRUM TECHNOLOGY PRODUCTIVITY

PRESSTEK		Media Size				Width (A)	Manufacturers Speed Rating (ncl. cycle time)			
Model	Comments	Axis Inches		Circumference Inches		Image Width	Plates Per Hour @ Fixed DPI		Linear Inches Per Minute	
		Max.	Min.	Max.	Min.		2540	2400	2540	2400
Dimension 200	2400 or 2540 DPI Factory Set	21.00	9.45	20.00	9.45	21.0	20		7.0	
Dimension 400	2400 or 2540 DPI Factory Set	30.71	9.45	26.77	9.45	30.7	20		10.2	
Dimension 800	2400 or 2540 DPI Factory Set	44.01	11.50	32.01	9.45	44.0	12		8.8	
Excel 425	2400 or 2540 DPI Factory Set	30.24	12.60	25.20	9.45	30.2	11		5.5	
Excel 450	2400 or 2540 DPI Factory Set	30.24	9.45	25.20	9.45	30.2	17		8.6	
Excel 225	2400 or 2540 DPI Factory Set	22.68	12.60	22.05	9.45	22.7	11		4.2	
Excel 250	2400 or 2540 DPI Factory Set	22.68	9.45	22.05	9.45	22.7	17		6.4	
Vector TX52 - Virtual Drum (B)	2400 or 2540 DPI Factory Set	20.90	13.00	19.88	14.38	20.9	20		7.0	
Excel 400	2400 or 2540 DPI Factory Set	30.71	9.45	26.77	9.45	30.7	20		10.2	
Excel 200	2400 or 2540 DPI Factory Set	20.87	9.45	19.69	9.45	20.9	20		7.0	
Compass 4015	2024-3048 DPI Variable	25.90	9.00	26.77	12.25	25.9	15		6.4	
Compass 4038	2024-3048 DPI Variable	25.90	9.00	26.77	12.25	25.9	38		16.4	
Compass 8022	Optional DPIs: Variable from 1200-2400 DPI or 1270-2540 DPI	45.70	15.00	37.40	13.00	45.7		22		16.7
Compass 8030		45.70	15.00	37.40	13.00	45.7		30		22.8
Vector FL52 - Virtual Drum (B)	2400 DPI Factory Set (C)	15.00	11.02	19.88	14.37	20.7		16		5.3
		20.67	20.07							

(A) Width of the media is irrelevant since the laser is engineered to expose the maximum width of the drum regardless of the width of the media being exposed.
(B) Virtual Drum describes the engineering concept where the plate is positioned by guides on each side in a concave position simulating the curvature of a drum.
(C) Axis measure is variable between both the maximum and minimum plate sizes.

EXTERNAL DRUM TECHNOLOGY PRODUCTIVITY

SCREEN		Media Size					Manufacturers Speed Rating (incl. cycle time)									
Model	Comments	Axis Inches		Circumference Inches		Plate Width	Plates Per Hour					Linear Inches Per Minute				
		Max.	Min.	Max.	Min.		E	Std	SX	Z	ZX	E	Std	SX	Z	ZX
PT-R 4000	32 Diode Array	32.7	12.8	25.4	15.5	28.5		16					7.6			
PT-R 4000II	32 Diode Array	32.7	12.8	25.4	15.5	28.5		17					8.7			
PT-R 4100	16 Diode Array	32.7	12.8	26.0	14.5	28.5		10					4.8			
PT-R 4300 (original)	32 Diode Array	32.7	12.8	26.0	14.5	28.5	11	20				5.2	9.5			
PT-R 4300E & S Series	E=16 & S=32 Diode Array	32.7	12.8	26.0	14.5	28.5	11	21				5.2	10.0			
PT-R 6600E & S Series	E=32 & S=64 Fiber Coupled Diode Array	38.5	12.0	26.9	14.6	28.5	18	30				8.6	14.2			
PT-R 8000 (Prior to 2/01)	32 Diode Array	45.6	25.6	37.0	21.7	40.5		12					8.1			
PT-R 8000II	32 Diode Array - 2/01	45.6	19.6	37.0	14.5	40.5		12					8.1			
PT-R 8000II	32 Diode Array - 2/03	45.6	17.7	37.0	14.5	40.5		13					9.6			
PT-R 8100	16 Diode Array	45.6	17.7	37.0	14.5	40.5		8					5.4			
PT-R 8200 (Niagra)	84 Fiber Coupled Diode Array	41.7	17.8	31.6	14.6	40.5		11					7.4			
PT-R 8300E & S Series	E=16 & S=32 Diode Array	45.6	17.7	37.0	14.6	40.5	8	13				5.4	9.6			
PT-R 8600E & S/Z Series	E=32 & Z=64 Fiber Coupled Diode Array	45.6	17.7	37.0	14.6	40.5	14	22				9.5	14.8			
PT-R 8600	64 Fiber Coupled Diode Array - 2/01	45.6	19.6	37.0	14.5	40.5		20					13.5			
PT-R 8600	64 Fiber Coupled Diode Array - 2/03	45.6	17.7	37.0	14.5	40.5		20					13.5			
PT-R 8800	GLV 512 channel 830 nm	45.7	17.7	37.0	14.5	40.5		30					20.3			
PT-R 8800II	GLV 512 channel 830 nm	45.7	17.8	37.0	14.6	40.5		30					20.3			
PT-R 8800IIHS	GLV 512 channel 830 nm	45.7	17.8	37.0	14.6	40.5		35					23.7			
PT-R 8800 Series E, S+Z	GLV 512 channel 830 nm	45.6	17.8	37.0	14.6	40.5		24	32	42			16.2	21.6	28.3	
PT-R 8800ZX	GLV 1024 channel 830 nm	45.6	17.8	37.0	14.6	40.5					50					33.7
PT-R Ultima (original) 4/03	GLV 512 channels	93.7	25.6	50.2	21.6	50.0		12					16			
PT-R Ultima 16000 (original) 5/05	GLV 512 channels	52.8	25.6	45.8	21.7	50.0		23					19.1			
PT-R Ultima 16000Series	GLV 512 channel 830 nm	57.9	25.6	45.9	21.7	57.0		14	23				13.3	21.8		
PT-R Ultima 16000II E, S+Z	GLV 512 channel 830 nm	57.9	25.6	45.9	21.7	57.0	17	25	31	31			16.1	23.7	29	
PT-R Ultima 24000	GLV 512 channel 830 nm - 8/05	68.9	25.6	55.1	21.7	60.0		21					21			
PT-R Ultima 24000Series S+Z	GLV 512 channel 830 nm - 3/06	68.9	25.6	55.1	21.7	60.0		23		33			23		33	
PT-R Ultima 24000Series SX+ZX	GLV 1024 channel head dual head	68.9	25.6	55.1	21.7	60.0			28		38			28		38
PT-R Ultima 32000 -discontinued 1/06	GLV 512 channel 830 nm	93.7	25.6	50.2	21.7	80.0		14					18.7			
PT-R Ultima 32000Z -disc. 1/06	GLV 512 channel 830 nm dual head	83.6	25.6	50.2	21.7	80.0		18					24			
PT-R Ultima 36000Series S+Z	S=sgl. 512 head, Z=dual 512 head	82.6	25.6	62.9	21.7	80.0		19		29			25.3		38.6	
PT-R Ultima 36000Series SX+ZX	SX=sgl. 1024 head, ZX=dual 1024 head	82.6	25.6	62.9	21.7	80.0			23		33			30.6		44
PT-R Ultima 40000 S+SX	S=sgl. 512 head, SX=sgl. 1024 head	89.7	25.6	63.0	21.7	89.7		17	22				25.4	32.9		
PT-R Ultima 48000 S+SX	S=sgl. 512 head, SX=sgl. 1024 head	114.1	25.6	53.1	21.7	114.1		13	17				24.7	32.3		

EXTERNAL DRUM TECHNOLOGY PRODUCTIVITY

HEIDELBERG		Media Size					Manufacturers Speed Rating (incl.cycle time) (A)											
Model	Comments	Axis Inches		Circumference Inches		Plate Width	Plates Per Hour @ 2540 DPI						Linear Inches Per Minute					
		Max.	Min.	Max.	Min.		1	2	3	4	5	6	1	2	3	4	5	6
Suprasetter A52	1 Module - 64 Diodes	20.67	9.45	26.38	9.45	20.6	17						5.8					
Suprasetter A74	1 Module - 64 Diodes	29.52	9.45	26.38	9.45	29.5	14						6.9					
Suprasetter A105 - Disc. 2008	1 Module - 64 Diodes	41.54	12.72	36.61	14.57	41.5	8						5.5					
Suprasetter 74	2 - 3 Modules - 128-192 Diodes	29.53	12.72	26.77	14.57	29.5		19	30					9.3	14.7			
Suprasetter 105	2-3-4 Modules - 128-192-256 Diodes	44.88	12.72	36.61	14.57	44.9		14	19	30				10.5	14.2	22.4		
Suprasetter A75	1 Module - 64 Diodes	20.87	9.45	26.38	9.45	20.8	14						4.8					
Suprasetter 75	2-3-4-5 Modules -	29.92	12.72	26.77	14.57	29.9		21	27	33	38			10.4	13.4	16.4	18.9	
Suprasetter A105	2 Modules - 128 Diodes	46.54	12.72	36.61	14.57	41.5		12						8.3				
Suprasetter 105	2-3-4-5-6 Modules - 128-192-256-320-384	44.88	12.72	36.61	14.57	44.8		15	21	27	33	38		11.2	15.6	20.1	24.6	28.3
Suprasetter 145 VLF	3-5-6 Modules - 192-256-384 Diodes	57.48	25.56	56.1	19.69	57.4			15		25	35			14.3		23.9	33.4
Suprasetter 162 VLF	3-5-6 Modules - 192-256-384 Diodes	64.17	25.56	56.1	19.69	64.1			15		25	35			16.0		26.7	37.4
Suprasetter 190 VLF	4 - 6 Modules - 256 - 384 Diodes	75.0	25.56	56.1	19.69	75.0				15		25				18.7		31.2
							E	Std	SX	Z	ZX		E	Std	SX	Z	ZX	
Topsetter 74	32 Diode Array	32.7	12.8	25.4	15.5	28.5		17						8.7				
Topsetter P74	32 Diode Array	32.7	12.8	26.0	14.5	28.5		20						9.5				
Topsetter 102	32 Diode Array	45.6	25.6	37.0	21.7	40.5		12						8.1				
Topsetter P102	32 Diode Array	45.6	19.6	37.0	14.5	40.5		12						8.1				
Topsetter PF102	64 Diode Array	45.6	19.6	37.0	14.5	40.5		20						13.5				
(A) Manufacturer's speed ratings of the Suprasetter are presented by the number of laser modules installed in the platesetter																		

EXTERNAL DRUM TECHNOLOGY PRODUCTIVITY

Lüscher (Internal drum with external drum laser travel)		Media Size					Manufacturers Speed Rating (incl.cycle time)							
Model	Comments	Axis Inches		Circumference Inches		Plate Width	Plates Per Hour - (A)				Linear Inches Per Minute @ 2400			
		Max.	Min.	Max.	Min.		32	64	128	Diodes	32	64	128	Diodes
Thermal 830 nm Models														
Xpose! 75		29.9	15.0	25.6	9.8	29	10.0				4.8			
Xpose! 80		31.5	20.4	25.6	14.1	31	6.4				3.3			
Xpose! 120		43.3	20.4	35.4	14.1	43	8.6	12.5			6.1	9.4		
Xpose! 130		44.5	19.7	37.4	14.1	44		12.3				9.0		
Xpose! 160	(B)	66.9	20.4	53.9	14.1	66	4.7	7.1	12.0		5.1	7.8	22.0	
Xpose! 180		80.0	25.6	58.5	19.6	80	2.7	4.5			3.6	6.0		
Xpose! 190		74.8	23.8	58.4	16.1	74		5.5	9.1			6.7	11.2	
Xpose! 190 L		81.9	25.7	63.0	16.1	81		5.1	8.5			6.7	11.2	
Xpose! 190 XL		89.0	25.7	63.0	16.1	89		4.5	7.6			6.7	11.2	
Conventional Plate - Visible Light - 405 nm							Speed with 100 mj/cm2 plates - ©							
Xpose! 230 UV		44.4	16.9	37.4	14.1	44	8.0	14.5	23.7		5.8	10.6	17.3	
Xpose! 260 UV		66.1	21.2	53.9	14.9	66		7.1	13.0			7.8	14.3	
Xpose! 290 UV		74.8	23.8	58.4	16.1	74		5.5	9.1			6.7	11.2	
Xpose! 290 L UV		81.9	25.7	63.0	16.1	81		5.1	8.5			6.7	11.2	
Xpose! 290 XL UV		89.0	25.7	63.0	16.1	89		4.5	7.6			6.7	11.2	
Convention Plate - Visible Light 405 nm							Speed with 75 mj/cm2 plates - ©							
Xpose! 230 UV		44.4	16.9	37.4	14.1	44	10.5	18.0	28.6		7.7	13.2	21.0	
Xpose! 260 UV		66.1	21.2	53.9	14.9	66		9.3	16.0			10.2	17.6	
Xpose! 290 UV		74.8	23.8	58.4	16.1	74		7.0	12.0			8.6	14.8	
Convention Plate - Visible Light 405 nm							Speed with 50 mj/cm2 plates - ©							
Xpose! 230 UV		44.4	16.9	37.4	14.1	44	14.0	23.5	35.0		10.2	17.2	25.7	
Xpose! 260 UV		66.1	21.2	53.9	14.9	66		13.0	21.0			14.3	23.1	
Xpose! 290 UV		74.8	23.8	58.4	16.1	74		9.8	15.5			12.1	19.5	

(A):
Plates per hour were determined by adding an estimated allowance of 1.5 minutes for the combined machine cycling and manual load/unload time to the Luscher published laser expose time to obtain the minutes per plate for calculating plates per hour.

(B):
Plates per hour for the 128 diode models are from a Luscher press release dated 4-4-04.

(C):
Specific plates available for each of these sensitivity ratings can be found on page 9.

INTERNAL DRUM TECHNOLOGY PRODUCTIVITY

AGFA		Media Size				Manufacturers Speed Rating (incl. cycle time)				
Model	Comment	Axis Inches Max.	Axis Inches Min.	Circumference Inches Max.	Circumference Inches Min.	Plates Per Hour Quant.	DPI	Plate Size	Sq.in./min. 2400 DPI	Resolutions
Galileo VS4	400 nm Violet (5 mW) 37500 RPM	29.33	17.72	26.61	14.50	22	2400	25.6 x 21.6	211	1200, 1800, 2400, 3600
Galileo VS	400 nm Violet (5 mW) 37500 RPM	44.50	17.72	32.29	14.50	17	2400	40.5 x 31.5	361	1200, 1800, 2400
Galileo VXT	400 nm Violet (5 mW) 55000 RPM	44.50	17.72	32.29	14.50	22	2400	40.5 x 31.5	468	4 Resolutions: 1200, 1800, 2400, 3600
Galileo VS4	410 nm Violet (60 mW) 37500 RPM	29.33	17.72	26.61	14.50	22	2400	25.6 x 21.6	211	
Galileo VE	410 nm Violet (60 mW) 37500 RPM	44.50	17.72	32.29	14.50	12	2400	40.5 x 31.5	255	
Galileo VS	410 nm Violet (60 mW) 37500 RPM	44.50	17.72	32.29	14.50	17	2400	40.5 x 31.5	361	
Galleo VXT	410 nm Violet (60 mW) 55000 RPM	44.50	17.72	32.29	14.50	22	2400	40.5 x 31.5	467	

ESCHER GRAD		Media Size				Manufacturers Speed Rating (incl. cycle time)				
Model	Comment	Axis Inches Max.	Axis Inches Min.	Circumference Inches Max.	Circumference Inches Min.	Plates Per Hour Quant.	DPI	Plate Size	Square Inches Per Minute 2400 DPI	Resolutions
Cobalt 4	5 mW or 30 mW 410 nm selectable fiber optics la	29.33	11.00	24.21	8.50	22	2400	29.3 x 24.2	260	1000 - 3600
Cobalt 8	5 mW or 30 mW 410 nm selectable fiber optics la	42.12	16.14	31.90	19.68	18	2400	42.1 x 31.9	403	1000 - 3600
Cobalt 4	30 mW & 60 mW 410 nm fiber optics laser	29.33	11.00	24.21	8.50	22	2400	29.3 x 24.2	260	1000 - 3600
Cobalt 8	30 mW & 60 mW 410 nm fiber optics laser	40.50	16.14	31.90	19.68	18	2400	42.1 x 31.9	403	1000 - 3600
Cobalt 24	30 mW & 60 mW 410 nm fiber optics laser	50.00	40.00	60.00	30.00	10	2400	60 x 50.0	500	1000 - 3000
Cobalt 32	30 mW & 60 mW 410 nm fiber optics laser	80.00	40.00	60.00	30.00	8	2400	80 x 60.0	640	1000 - 3000
Cobalt-4 Next	60 mW 410 nm laser module	31.00	11.00	24.25	8.50	39	2400	31 x 24.3	488	1000 - 3600
Cobalt-6 Next	60 mW 410 nm laser module	40.00	18.00	26.00	11.00	37	2400	40 x 26.0	645	1000 - 3600
Cobalt-8 Next	60 mW 410 nm laser module	40.50	16.14	31.90	19.68	31	2400	40.5 x 31.9	667	1000 - 3600
	Note: Automated versions handle slightly larger sizes									

HEIDELBERG		Media Size				Manufacturers Speed Rating				
Model	Comment	Axis Inches Max.	Axis Inches Min.	Circumference Inches Max.	Circumference Inches Min.	Plates Per Hour Quant.	DPI	Plate Size	Square Inches Per Minute 2540 DPI	Resolutions
Prosetter 52 - 6/01	5 mW	20.67	14.57	26.38	12.72	20	2540	25.4 x 20.7	175	2400, 2540, 3386
Prosetter 52 - 12/02	30 mW adjustable to 5 mW	20.67	14.57	26.38	12.72	20	2540	25.4 x 20.7	175	2400, 2540, 3200, 3386
Prosetter P52 - 9/05	60 mW adjustable to 5 mW	20.67	14.57	26.38	12.72	25	2540	25.4 x 20.7	219	2032, 2400, 2540, 3200, 3386
Prosetter 74 - 6/01	5 mW	29.53	14.57	26.38	12.72	16	2540	25.4 x 29.5	200	2400, 2540, 3386
Prosetter 74 - 12/02	30 mW adjustable to 5 mW	29.53	14.57	26.38	12.72	16	2540	25.4 x 29.5	200	2400, 2540, 3200, 3386
Prosetter P74 - 9/05	60 mW adjustable to 5 mW	29.53	14.57	26.38	12.72	20	2540	25.4 x 29.5	250	2032, 2400, 2540, 3200, 3386
Prosetter F74 - 6/01	5 mW	29.53	14.57	26.38	12.72	24	2540	25.4 x 29.5	300	2400, 2540, 3386
Prosetter F74 - 12/02	30 mW adjustable to 5 mW	29.53	14.57	26.38	12.72	24	2540	25.4 x 29.5	300	2400, 2540, 3200, 3386
Prosetter PF74 - 9/05	60 mW adjustable to 5 mW	29.53	14.57	26.38	12.72	24	2540	25.4 x 29.5	300	2032, 2400, 2540, 3200, 3386
Prosetter 102 - 6/01	5 mW	41.54	15.75	31.93	12.72	12	2540	30.9 x 41.5	173	2400, 2540, 3386
Prosetter 102 - 12/02	30 mW adjustable to 5 mW	41.54	14.57	31.93	12.72	12	2540	30.9 x 41.5	173	2400, 2540, 3200, 3386
Prosetter P102 - 9/05	60 mW adjustable to 5 mW	41.54	14.57	31.93	12.72	16	2540	30.9 x 41.5	231	2032, 2400, 2540, 3200, 3386
Prosetter F102 - 6/01	5 mW	41.54	14.57	31.93	12.72	12	2540	30.9 x 41.5	173	2400, 2540, 3386
Prosetter F102 - 12/02	30 mW adjustable to 5 mW	41.54	14.57	31.93	12.72	18	2540	30.9 x 41.5	260	2400, 2540, 3200, 3386
Prosetter PF102 - 9/05	60 mW adjustable to 5 mW	41.54	14.57	31.93	12.72	20	2540	30.9 x 41.5	289	2032, 2400, 2540, 3200, 3386
Prosetter P74 - 6/08	60 mW adjustable to 5 mW	29.92	14.57	26.38	12.72	20	2540	25.4 x 29.5	250	2032, 2400, 2540, 3200, 3386
Prosetter PF74 - 6/08	60 mW adjustable to 5 mW	29.92	14.57	26.38	12.72	24	2540	25.4 x 29.5	300	2032, 2400, 2540, 3200, 3386

INTERNAL DRUM TECHNOLOGY PRODUCTIVITY

FUJI		Media Size				Manufacturers Speed Rating (incl. cycle time)						
		Axis Inches		Circumference Inches		Plates Per Hour					Square Inches Per Minute	
Luxel Models (A)	Comment	Max.	Min.	Max.	Min.	Quant.	DPI	Plate Size			2438 DPI	Resolutions
P-9600 - Single Beam	532 nm - green	45.70	19.70	37.80	15.70	15	2438	45.7	x	37.8	431	6 resolutions: 1219, 1828, 2400, 2438, 2540, 3657
P-9600 - Split Beam	532 nm - green	45.70	19.70	37.80	15.70	27	2438	45.7	x	37.8	777	
V-9600	30 mW - 405 nm violet	45.70	19.70	37.80	15.70	19	2438	45.7	x	37.8	546	8 resolutions: 1200, 1219, 1800, 1828, 2400, 2438, 2540, 3657
V-9600 - Dual Laser	30 mW - 405 nm violet	45.70	19.70	37.80	15.70	32	2438	45.7	x	37.8	921	
Vx-9600	30 mW - 405 nm violet	45.70	19.70	38.80	15.70	19	2438	45.7	x	37.8	546	
Vx-9600 - Dual Laser	30 mW - 405 nm violet	45.70	19.70	38.80	15.70	32	2438	45.7	x	37.8	921	
Vx-6000	30 mW - 405 nm violet	30.00	13.40	27.60	12.50	22	2438	30.0	x	26.6	293	
Vx-6000 - Dual Laser	30 mW - 405 nm violet	30.00	13.40	27.60	12.50	32	2438	30.0	x	26.6	425	
V-6	30 mW - 405 nm violet	30.10	12.60	27.00	11.40	20	2438	30.0	x	26.6	266	8 resolutions: 1200, 1219, 1270, 2400, 2438, 2540, 3600, 3657
V-6e	30 mW - 405 nm violet	30.10	12.60	27.00	11.40	10	2438	30.0	x	26.6	133	
V-6e	60 mW - using 6 mil plate	20.67	13.78	18.00	13.78	(B)	2400	20.1	x	15.7	133	
V-6e	60 mW - using 8 mil plate	30.10	13.78	27.01	13.78	10	2400	30.0	x	26.6	133	
V-6e	60 mW - using 10 & 12 mil plate	30.10	16.14	27.01	13.78	10	2400	30.0	x	26.6	133	
V-6	60 mW - using 6 mil plate	20.67	13.78	18.07	13.78	(B)	2400	20.1	x	15.7	319	
V-6	60 mW - using 8 mil plate	30.10	13.78	27.01	13.78	24	2400	30.0	x	26.6	319	
V-6	60 mW - using 10 & 12 mil plate	30.10	16.14	27.01	13.78	24	2400	30.0	x	26.6	319	
V-8	60 mW - using 6 mil plate - w/o punch	23.62	19.68	23.62	15.75	TBD						
V-8	60 mW - using 8 mil plate - w/o punch	41.34	19.68	31.50	15.75	TBD						
V-8	60 mW - using 10 & 12 mil plate - w/o punch	45.67	19.68	37.80	15.75	TBD						
V-8 - Dual Laser	60 mW - using 6 mil plate - w/o punch	23.62	19.68	23.62	15.75	TBD						
V-8 - Dual Laser	60 mW - using 8 mil plate - w/o punch	41.34	19.68	31.50	15.75	TBD						
V-8 - Dual Laser	60 mW - using 10 & 12 mil plate - w/o punch	45.75	19.68	37.80	15.75	TBD						
V-8 HS - Dual Laser	60 mW - using 6 mil plate	23.62	19.68	23.62	15.75	TBD						
V-8 HS - Dual Laser	60 mW - using 8 mil plate	41.34	19.68	31.50	15.75	TBD						
V-8 HS - Dual Laser	60 mW - using 10 & 12 mil plate	45.75	19.68	37.80	15.75	TBD						

(A) All versions are Luxel - Saber was only used in the USA and Canada.

(B) Manufacturer does not publish productivity by plate size. Square inches per minute can be assumed to be the same as other plate sizes of the same model however the PPH (plates per hour) will be affected to the extent that each added machine cycle will affect the quantity of plates produced

FLATBED TECHNOLOGY

ECRM		Media Size				Manufacturers Speed Rating (incl. cycle time)							
		Axis Inches		Circumference Inches		Plates Per Hour					Square Inches Per Minute		
Model	Comment	Max.	Min.	Max.	Min.	Quant.	DPI	Plate Size			DPI	Sq. In.	Resolutions
Mako (Original)	5 mW 405 nm Violet	22.00	10.00	22.00	10.00	29	2540	20.1	x	15.7	2540	153	7 resolutions:
Mako 2L	30 mw 405 nm Violet	22.10	9.94	22.10	8.98	29	2540	20.1	x	15.7	2540	153	
Mako 2 / Mako 4 (2 page)	5 mW or 30 mW option 405 nm Violet	26.40	9.94	22.10	8.98	29	2540	20.1	x	15.7	2540	153	1200, 1270,
Mako 4 (Original)	5 mW or 30 mW option 405 nm Violet	36.50	9.94	25.00	8.98	20	2540	29.3	x	23.3	2540	227	1800, 2400,
Mako 4X	60 mW 405 nm Violet	37.79	9.94	25.98	8.98	19	2400	29.3	x	23.3	2400	216	2540, 3048,
Mako 4matic (Original)	5 mW or 30 mW option 405 nm Violet	38.50	15.15	25.00	15.15	20	2540	29.3	x	23.3	2540	227	3556
Mako 4matic (Re-engineered)	Max. axis and min circum. changed in 2006	36.50	15.15	25.00	11.40	20	2400	29.3	x	23.3	2400	227	
Mako System4 - 4 Page Model	Mako 4 re-engineered in 2006	29.33	9.94	24.21	8.98	20	2400	29.3	x	23.3	2400	227	
Mako 8	5 mW or 30 mW option 405 nm Violet	45.00	9.94	32.44	8.98	(A) 11	2400	40.5	x	31.5	2400	233	1800-3556 undefined
Mako 2X	120 mW 405 nm Violet	22.00	8.90	26.40	8.98	27	2400	20.1	x	15.7	2400	142	
Mako 8X	120 mW 405 nm Violet	45.00	9.90	32.40	8.90	(A) 15	2400	40.5	x	31.5		319	

(A) The manufacturer brochure states production to be an "up to" quantity. This must be interpreted to be at the minimum DPI. Therefore the manufacturer's stated through-put is adjusted to reflect that attainable at 2400 DPI.

SCREEN / AGFA		Media Size				Manufacturers Speed Rating					
		Length		Width		Plates Per Hour					Square Inches Per Minute
Model	Diode	Max.	Min.	Max.	Min.	Quant.	DPI	Plate Size			2400 DPI
PT-R Micra	Also Palladio	22.8	13.0	20.3	9.8	23	2400	22.8	x	20.3	177
PT-R 2055Vi	Also Palladio and Palladio M	25.0	11.0	29.9	17.7	20	2400	25.0	x	29.7	247
Palladio 30M	Altered PT-R 2055Vi	25.0	11.0	21.6	17.7	17	2400	25.0	x	21.6	153

TRADE PRACTICES

Trade practices can be a very important consideration when contemplating a purchase in the graphics prepress industry. For example, a common trade practice of marketing departments when designing a product brochure is the lack of specifications that may not present the product on a footing favorable with the competition It is always prudent to compare brochures with those of similar equipment to detect information that is lacking completely or does not describe fully what it is you are receiving. What is left unsaid is often more important that what was said. BWI posts product brochures on our website for items currently listed for sale plus we have a library of additional brochures available should you require something not posted to our website.

Some trade practices are almost universal and are generally presented upfront by the sales and marketing department to promote sales. Probably the most common, and articulated when circumstances dictate, is the practice of providing deep discounts on equipment purchases when a contract to purchase consumable products is made part of the purchase agreement.

Another common practice is to supply a plate processor with the rental payments being credited by a percentage of the consumable purchases or some similar arrangement.

Manufacturers have a practice of inflating the price of the processor that may or may not be available from sources other than from that manufacturer. Of course, this creates a further economic motivation to enter into a consumable contract with that manufacturer. It is always prudent to investigate the availability of an adaptable processor in the dealer market. Alternatives are often available from the manufacturers of the processor that has been simply rebadged by the manufacturer of the image recorder.

A more recent practice is to include a multiple year parts warranty with the purchase of a platesetter. This is a perk that can best be described by the adage – "all that glitters is not gold." In other words, if all the facts are known, it becomes obvious that these parts must be installed by the manufacturer. A manufacturer offering this type of warranty will obviously not tolerate any service being performed outside of their service organization for fear of incompetent service persons creating the need for the part.

Trade practices vary widely when purchasing software products. Most proprietary software i.e. software that is specific to the manufacturers hardware, are often protected by imbedded codes that will only allow the application to function on their product and with their options or upgrades. Others will allow its use on competitive platesetters but require the purchase of a license to permit such adaptation. Obviously, these upgrades or options are sold at prices substantially greater than that charged by competitors who specialize in supplying alternative devices. A practice found most commonly, where larger workflow systems are marketed, is the licensing agreement. What this means is, that you are not purchasing their products – you are simply paying for the right to use that software so long as you alone are the user. Some developers have a re-licensing policy which will allow transfer to another user upon payment of a relicensing fee. The most common practice is to deny any legal right to use the software outside of the original licensee. Generally these terms can only be discovered if all of the fine print contained in the licensing agreement is read and understood.

All software issued in conjunction with imaging devices is protected by what is commonly referred to as a "dongle," however the purpose of this protective device is to prevent the proliferation of the software by simply making a copy. These protective devices have no effect upon the ownership rights of the purchaser.

This dongle concept has been adopted by at least one platesetter manufacturer to restrict access to the electronics of their platesetter. Apparently its intended to prevent service being performed on the equipment by anybody not possessing the dongle to access the system. This not only restricts service being purchased from competitive suppliers, but it obviously affects the resale value of your purchase. Trade-in to anybody but the manufacturer will be improbable since the equipment can only be reconditioned by a technician in possession of the dongle. This dongle is only possessed by factory authorized (their) service technicians. Of course their service technicians are prevented from providing service to remarketers of their equipment (or at least this remarketer.) Further to prevent any misuse of a dongle, the access code is changed periodically to make unauthorized dongles inoperative.

Another by-product of this dongle control mechanism is to place the manufacturer on immediate notice that plates, other than the plates currently in use, (theirs) are being replaced by a competitive product. Any change of this nature requires the services of their technician to access the electronics to adapt the platesetter to the plates of another manufacturer. This movement in the industry is tantamount to the software licensing agreement mentioned earlier. Basically you do not own the equipment the manufacturer owns you.

MANUFACTURERS' PRODUCT OFFERINGS

This section provides a history of CTP product development by the major manufacturers. It will hopefully prove useful to buyers evaluating platesetters available on the used market. In particular, it should help buyers avoid confusion among the many similar models on the market. It is not unusual for a manufacturer to make changes to the technology within a given CTP model or product line without substantially altering its name. The opposite also occurs: manufacturers change the name of a model but they make little or no change to the engineering of the machine. Also adding to the confusion are OEM agreements that lead to the identical machine bearing different names, depending upon the manufacturer who has put their label on it.

This section also provides the chronological date of introduction, maximum and minimum plate sizes in inches, and laser information for each machine in the manufacturers' product lines. For more detailed information on the laser technology, please refer to the "Laser Design" section, beginning on page 10. For detailed information on the throughput of the models described in this section, please refer to "Measures of Platesetter Productivity", starting on page 33.

CREO

(the Grandaddy of all who have survived)

Trendsetters

The original Creo 3244 was their Platesetter 3244, the first of which shipped to RR Donnelley in April 1994. For all practical purposes this model is extinct, but does appear from time to time. Be cautious if you are offered a Platesetter 3244, without the Trendsetter designation. The Platesetter 3244 used a 532 nm YAG green laser, which is unusual among external drum devices. The use of the 532 nm YAG laser can probably be explained by the lack of a commercially viable 830 nm laser diode and corresponding plate at the time this equipment was being developed.

Creo's Trendsetter (TS) with 830 nm thermal laser was introduced at Graph Expo in October of 1995, and production models were first shipped in the Spring of 1996. The first TS produced was the 8-up TS3244 model, which is capable of imaging plates up to 32 x 44". The 4-up TS 3230, capable of imaging plates up to 32 x 30", was not introduced until September of 1998, with production models appearing in January of 1999.

Since the introduction of the TS 3244, there have been three basic engineering versions of this machine. The original design is identified as the TS 3, followed by the TS 3/8 and then the TS 8. When the Trendsetter was re-engineered in June of 1999, it was identified as TS 3/8 for engineering purposes only. The TS 3/8 is actually a transitional model that included changes incorporated in the newly introduced TS 3230 , a.k.a. the TS 4. The changes made to the TS 3 to create the TS 3/8 related to mechanical components such as the encoder and pneumatics. The TS 8 design followed in June of 2000, representing a major redesign with new skins that changed the external appearance of the machine, as well as relocation internally of numerous components, such as the power supply and filter. Most significantly, Creo improved the laser cooling mechanism in the TS 8. When the 40 W laser head was introduced, it required improved cooling over the 20 W head. Initially, Creo improvised an external fluid cooling system for the 40 W head to address this issue. With the TS 8, Creo made this fluid cooling system internal to the machine. Still, even with these substantial changes, there remained no change of the model name.

Creo's marketing department described the Trendsetter as "semi-automatic". This is a misnomer. In Creo's sense of the word, semi-automatic can be applied to any platesetter ever brought to market. The term semi-automatic has had varying meanings throughout the evolution of CTP technology, but Creo's use of the word is entirely incorrect. Semi-automatic can mean that plates are manually loaded, but are automatically unloaded to an online processor. It can also mean that the machine has separate plate load and unload slots, and the operator could place the next plate in the plate load slot once the previous plate had been moved onto the drum, so it could be drawn into the platesetter as soon as the previous plate was exposed and ejected. Neither case is true with the Trendsetter. The Trendsetter has just one slot for loading and unloading plates. The operator must load the plate into the plate slot, and after it has been imaged, remove it from the same slot. Clearly, unless fitted with the Autoloader option, Trendsetters are properly described as manual machines.

Since the TS 3, TS 3/8 and the TS 8 engineering changes were never reflected in the product model identification, it is difficult to determine which model is being offered when dealing in the secondary market unless you know the serial number of the machine. If you have the serial number, you can determine which model you are considering. Follows a list of the various TS models and corresponding Creo and Heidelberg serial numbering:

		Serial Number Series
TS 3 Model:	Creo	S001 to S331
	Heidelberg	98363XXX, 99363XXXX
TS 4 Model:	Creo	BWI has never seen a TS 4 manufactured by Creo
	Heidelberg	99371XXXX, 00371XXXX
TS 4 Spectrum:	Heidelberg	00385XXXX
TS 3/8 Model:	Creo	S332 - 566
	Heidelberg	993861324 and up
TS 8 Model:	Creo	TE 001 and up
	Heidelberg	003860000 and up

In addition to the serial number itself, there is a prefix associated with all Creo and/or Kodak serial numbers that can aid in the identification of a machine. However, this can just be used as a guide, and not provide absolute certainty about the type of machine being evaluated, since Creo has the ability to upgrade or downgrade many of their machines. Follows an analysis of the serial number prefixes gathered by BWI and from third parties.

Index of Creo Serial Number Prefixes

C	This is the original green laser platesetter. Completely obsolete.
S	Serial numbers from S001 to S331 are the original version of the Trendsetter, the TS 3.
S	Serial numbers S332 and up designate the transition models (TS 3/8). These are nearly always Trendsetter 3244s. BWI has only seen two S model 3230s, and they were based on the TS3/8 architecture. We believe these were 3244 models reprogrammed as 3230s. All other 3230s encountered by BWI have been TS4 Heidelberg machines, with Heidelberg serial numbers.
TE	Serial numbers with this prefix designate the re-engineered TS 8 model Trendsetters.
PR	Prefix used for Spectrum proofers manufactured prior to the TS 8 engineering design.
PX	Prefix used for Spectrum proofsetters with TS 8 engineering design.
TR	Prefix used for the Trendsetter 400 models.
TM	This prefix can be found on Trendsetter models with the 800 designation.
TMB	This prefix can be found on Trendsetter 800 models with Spectrum option.
NM	This prefix was used on the Trendsetter News models.
B	Prefix used on VLF Trendsetters.
BB	Prefix used on Beta VLF Trendsetters.
FX	Prefix used on the Thermoflex CTP device.
MT	Prefix on the new Magnus VLF platesetters.

CREO Purchase of Scitex Graphic Arts Division

Creo completed negotiations with Scitex for the purchase of their graphic arts division in April of 2000. This purchase added the Lotem 400 and 800 platesetters to Creo's stable of 4-up and 8-up devices. Like Creo's Trendsetters, the Lotems were based on external drum technology. Unlike the Trendsetters, the Lotems featured automatic plate-loading with slipsheet removal, optional press punches, and optional online processor compatibility—none of which were strong features in the Trendsetter design. Punches were not available at all on the Trendsetters. Creo did have an Autoloader option available for the Trendsetters, but being void of slipsheet removal and the ability to handle multiple plate sizes, it fared poorly in the marketplace.

The original Lotem 800 was a 16 diode array device introduced by Scitex in mid -1997. The Lotem, however, did not become a serious market contender until early 1998 when the 24 diode model was introduced. From early 1998 until the sale to Creo in April 2000, Scitex was able to make substantial inroads with the Lotem 800 series in the U.S. and world markets. Much of this success can be attributed to the unique features noted above, which were unavailable elsewhere at the time, except on the Screen PT-Rs. Furthermore, like the Screen PT-Rs, the Lotem used a diode array which allowed for continued operation even if a diode failed.

Although Scitex had other products such as the Lotem XL (VLF models) and the Lotem Flex 40/45 (a flexo platesetter), only the 24 diode Lotem 800V and 48 diode Lotem 800V2 had substantial success in the U.S. market. The Lotem 400V, although a well engineered 4-up device, was not sold in any substantial quantity in the U.S.

One drawback of the Lotem models is that these machines are only compatible with a Brisque or Prinergy RIP (or also a PS/M for the Lotem 400). There are no compatible third party RIPs or TIFF catchers. However, at current price levels, pre-owned Brisque RIPs are affordable as a TIFF catcher. Further, anyone considering the purchase of a Lotem should be aware of the change in late 1999 in the type of RIP interface these machines could accommodate. This change converted the original fiber optics to faster "Turboscreening" technology. To convert a fiber optics Lotem to the current Turboscreening technology requires the replacement of all the laser diode controller boards - 24 for the 800V and 48 for the 800V2. Because of the expense and labor required for this conversion, non-Turboscreening machines should be avoided.

Following the acquisition of Scitex by Creo, the adaptation of the Creo laser head to the Lotem became one of Creo's top priorities. In September of 2001, Creo announced the Lotem 800 Quantum, which incorporated the newly designed TH 2.0 laser head, a Creo-style head engineered specifically to work within the confines of the Lotem architecture. After integrating the Creo laser head into the Lotem product line, Creo continued with new model introductions of both Lotems and Trendsetters

In 2002, Creo introduced the TH E head (entry level), which allowed the introduction of a lower priced "entry-level" model of the Trendsetter. This head led to the requirement for a new designation to distinguish the original full-featured SQUAREspot laser head from the new entry level models. This was the origin of the Quantum designation. It is safe to assume that all non-Quantum Trendsetters with the 400 or 800 designation contain the entry level head. The entry-level Trendsetters have a variety of limitations compared to the full-fledged models (see the Laser Design section for details).

Creo also introduced a new lower priced model of the Lotem, the Lotem 800II. The Lotem 800II has the same entry-level limitations as the non-Quantum Trendsetters. While we are not sure exactly what laser head is contained in the Lotem 800II, we've deduced that it is a TH 2.0 head, since this head was engineered specifically for the Lotem product line. We believe that the light valve on the TH 2.0 head has been re-engineered for the entry-level Lotem models, much like the light valve in the TH E Trendsetter head, but we cannot say this with certainty. The Lotem 800II, which also incorporated a re-engineered drum size, was badged as a Quantum when fitted with the TH 2.0 laser head.

Both the Lotem and the Trendsetter entry-level lower price models are upgradable to the Quantum laser head and speeds.

Kodak Acquisition of Creo

Kodak acquired Creo in February 2005, and soon thereafter initiated extensive renaming and enhancement of the Creo product line. The Lotem 400V was renamed the Magnus 400, which featured increased speed and line screen capabilities. Also at this time, the Lotem 400 Quantum was renamed the Magnus 400 Quantum, which featured a slight increase in speed.

Although Creo had announced the Magnus VLF in 2004, it was not until after the Kodak acquisition that this product became a reality. The Magnus VLF did not replace the TS VLF, but simply supplemented the VLF product line with a completely re-engineered model that featured more speed and automation features.

At Print China in June 2006, Kodak introduced the Magnus 800 platesetter. The Magnus 800 is a completely new product representing the marriage of the best of the Lotem combined with the best of the Trendsetter. The Magnus includes an entirely new autoloader design, which is more in keeping with those offered by Screen, and is available with a conveyor to an online processor. The Magnus 800 also includes a Debris Removal System standard, which was an option on the Trendsetters.

The plate loading mechanism on the Magnus 800 is also improved over the Trendsetter. Rather than having one plate load and unload slot like the Trendsetters, the Magnus has separate load and unload slots, allowing one plate to load at the same time as it unloads the exposed plate. Kodak calls this design Continuous Load.

Other significant product developments released on Kodak's watch were the TH 2.5 laser head and the TH 3 laser head. The TH 3 head is the first Creo/Kodak head to have two laser bars, and can be configured to create 448 imaging channels. This innovation is obviously Kodak's answer to the 512 channel GLV laser implemented by Agfa and Screen in some of their platesetters.

The following is a chronological listing of the model introductions by Kodak/Creo/Scitex.

4-UP Models	**Year**	**Max. & Min. Plate Size**		**Laser**
Trendsetter (TS) 3230	2/1999	32 x 30	15.5 x 13	TH 1.0
TS 3230 Spectrum	2/1999	32 x 30	15.5 x 13	TH 1.7
Lotem 400V	4/1999	29.5 x 24.5	15 x 12.5	24 diodes
TS 400	2000	30 x 26	13.4 x 13	TH 1.0
TS 400 Quantum (renamed 3230)	2002	33 x 30	15.5 x 13	TH 1.7
Lotem 400S	2002	29.5 x 24	12.3 x 9	12 diodes
Lotem 400 (Creo)	2002	29.5 x 24.5	12.25 x 9	24 diodes
Lotem 400 Quantum	2002	29.5 x 24	12.25 x 9	TH 2.0
TS 400 II Quantum	6/2003	33 x 30	15.5 x 13	TH 1.7
Magnus 400	6/2005	29.5 x 26.77	12.25 x 9	TH E
Magnus 400 Quantum	6/2005	29.5 x 26.77	12.25 x 9	TH 2.0
TS 400 III Quantum	11/2006	39 x 33	10.6 x 9	TH 2.5
Magnus 400 II	6/2008	30 x 26.9	11.8 x 8.9	24 diodes
Magnus 400II Quantum	6/2008	30 x 26.9	11.8 x 8.9	TH 2.0

8-UP Models				**Laser**
TS 3244 (TS 3)	9/1996	44 x 32	15.5 x 13	TH 1.0
Lotem 800V	1/1998	44.5 x 35.6	25.6 x 10.6	24 diodes
TS 3244 (TS 3/8)	6/1999	44 x 33	15.5 x 13	TH 1.0
Lotem 800V2	9/1999	44.5 x 35.4	25.6 x 19.3	48 diodes
TS 3244+ (TS 8)	6/2000	44 x 33	15.5 x 13	TH 1.0
TS 3244+ (TS 8) Spectrum	6/2000	44 x 33	15.5 x 13	TH 1.7
Lotem 800 (Creo)	2001	44.5 x 35.4	25.6 x 19.3	24 diodes
Lotem 800 Quantum	5/2001	44.5 x 35.6	18 x 15	TH 2.0
TS 800 Quantum	2002	45 x 33	15.5 x 13	TH 1.7

8-UP Models (cont.)	Year	Max. & Min. Plate Size		Laser
TS 800	2003	45 x 33	15.5 x 13	TH E
TS 800 II	2003	45 x 33	12 x 9	TH E
TS 800 II Quantum	2003	45 x 33	12 x 9	TH 1.7
Lotem 800 II	2003	44.5 x 35	18 x 14.5	Modified TH 2.0
Lotem 800 II Quantum	2003	44.5 x 35	18 x 14.5	TH 2.0
TS 800 II X	9/2005	45 x 33	12 x 9	Unknown
TS 800 II Quantum X	9/2005	45 x 33	12 x 9	TH 2.5
Magnus 800	6/2006	45.7 x 37.4	15 x 13	Unknown
Magnus 800 Quantum	6/2006	45.7 x 37.4	15 x 13	TH 2.5
Magnus 800Z Quantum	6/2008	45.7 x 36.9	15 x 12.5	TH 2.5
Trendsetter 800 III	11/2006	45 x 33	12 x 9	TH E
Trendsetter 800 III Quantum	2008	45 x 33	10.6 x 9	Unknown
VLF Models				
TS 4557 VLF	9/1996	57 x 45	20 x 15.5	TH 1.0 192 channels
TS 5067 VLF	9/1996	67 x 50	20 x 15.5	TH 1.0 192 channels
TS 5467 VLF	9/1996	67 x 54	20 x 15.5	TH 1.0 192 channels
TS 5080 VLF	9/1996	80 x 50	20 x 15.5	TH 1.0 192 channels
TS 5880 VLF	9/1996	80 x 58	20 x 15.5	TH 1.0 192 channels
TS 4557 VLF	11/1998	57 x 45	20 x 15.5	TH 1.7 192 channels
TS 5067 VLF	11/1998	67 x 50	20 x 15.5	TH 1.7 192 channels
TS 5467 VLF	11/1998	67 x 54	20 x 15.5	TH 1.7 192 channels
TS 5080 VLF	11/1998	80 x 50	20 x 15.5	TH 1.7 192 channels
TS 5880 VLF	11/1998	80 x 58	20 x 15.5	TH 1.7 192 channels
Lotem XL 45/80	9/1999	80 x 45	18 x 18	48 diodes
Lotem XL 55/80	9/1999	80 x 55	18 x 18	48 diodes
Lotem XL 60/80	9/1999	80 x 60	18 x 18	48 diodes
TS 4557 Quantum	6/2000	57 x 45	20 x 15.5	TH 1.7 224 channels
TS 5067 Quantum	6/2000	67 x 50	20 x 15.5	TH 1.7 224 channels
TS 5080 Quantum	6/2000	80 x 50	20 x 15.5	TH 1.7 224 channels
TS 5880 Quantum	6/2000	80 x 58	20 x 15.5	TH 1.7 224 channels
TS 4557 QPackaging	12/2000	57 x 45	20 x 15.5	TH 1.0 128 channels
TS 5067 QPackaging	12/2000	67 x 50	20 x 15.5	TH 1.0 128 channels
TS 5467 QPackaging	12/2000	67 x 54	20 x 15.5	TH 1.0 128 channels
TS 5080 QPackaging	12/2000	80 x 50	20 x 15.5	TH 1.0 128 channels
TS 5880 QPackaging	12/2000	80 x 58	20 x 15.5	TH 1.0 128 channels
TS 4557E VLF	7/2001	57 x 45	20 x 15.5	TH 1.7 Entry
TS 5067E VLF	7/2001	67 x 50	20 x 15.5	TH 1.7 Entry
TS 5467E VLF	7/2001	67 x 54	20 x 15.5	TH 1.7 Entry
TS 5080E VLF	7/2001	80 x 50	20 x 15.5	TH 1.7 Entry
TS 5880E VLF	7/2001	80 x 58	20 x 15.5	TH 1.7 Entry
Magnus VLF 4570	2005	70 x 45	19.3 x 15.5	TH 3.0=X, TH 2.5=S/F, TH 2.7=VF
Magnus VLF 5183	2005	83 x 51	19.3 x 15.5	TH 3.0=X, TH 2.5=S/F, TH 2.7=VF
Magnus VLF 5570	2005	70 x 55	19.3 x 15.5	TH 3.0=X, TH 2.5=S/F, TH 2.7=VF
Magnus VLF 6383	2005	83 x 63	19.3 x 15.5	TH 3.0=X, TH 2.5=S/F, TH 2.7=VF
Magnus XLF 80	6/2008	88.9 x 51	31.5 x 19.7	TH 3.0=X, TH 2.5=S/F, TH 2.7=VF
Trendsetter VLF 80	6/2008	80 x 58	20 x 15.5	TH 2.5 / TH 2.7

See pages 34 - 35 for productivity specs on these models.

SCREEN

Although Dainippon Screen had always used external drum engineering as the imaging technology for their drum imagesetters, they were not an early entrant to the external drum CTP market. They were, however, perfectly positioned to become a major player once Creo and Scitex experienced success with the external drum approach to CTP.

Screen produces two basic platesetter designs. By far the most popular is their external drum thermal PlateRite (PT-R) platesetter, which is available in 4-up, 6-up, 8-up, and VLF models. These machines are sold by Screen under the PlateRite brand, and are also offered under OEM agreements by Agfa, Fuji, and, until 2003, Heidelberg.

Screen also produces a flatbed platesetter with a visible light laser. This model was introduced in 1997 as the PF-R 1050 or Flat-Rite 1055, and had a 633 visible red laser diode. There was virtually no acceptance of this model in the U.S. market. Starting in 2001, Screen began producing a violet variation of this model with a 5 mW diode, the PT-R 2055Vi. This model was sold by Agfa as the Palladio. However, to our knowledge Screen did not offer this machine under their own brand name until 2004, when it introduced a 60 mW version of this device. In late 2003, Screen also introduced a 5 mW violet 2-up flatbed, the PlateRite Micra. The violet flatbed has proved far more successful than the original red laser model. Recent identification codes for this product appear to have been changed from PT-R to FT-R.

At Drupa 2008, Screen introduced an extension of its Ultima VLF platesetter offerings to include the Ultima 40000, with a plate size of 89.7 x 62.9" (2280 mm x 1600 mm) and the Ultima 48000, with a plate size of 114.1 x 53.1" (2900 mm x 1350 mm). These models are represented as 80 & 96 page formats respectively. The Ultima 40000 appears to be a replacement of the Ultima 32000, which was discontinued in 2006. The Ultima 48000 appears to be a precursor of things to come in the printing industry, as we will discuss in the conclusion of this paper.

The following list of the PT-R external drum platesetters with 830 nm diode technology specifies the number of laser diodes found in each model. The 4000 model series are 4-up, 6000 series are 6-up, 8000 series are 8-up, and the Ultima Series are VLF devices.

Note:

E = Entry level model with half the diodes of the standard model. These can be upgraded to the full number of diodes of the standard machine.

S = Fully populated, standard machine.

Z = Fully populated machine, with additional resolution of 4000 dpi

External Drum Models

Model	Year	Max. & Min. Size		Number of Diodes
Diode Array / 1 watt diode:				
PT-R 8000	9/1998	45.6 x 37.0	25.6 x 21.7	32
PT-R 4000	9/1999	32.7 x 25.4	15.5 x 12.8	32
PT-R 8000II	2/2001	45.6 x 37.0	19.6 x 14.5	32
PT-R 4000II	8/2001	32.7 x 25.4	15.5 x 12.8	32
PT-R 4300	3/2002	32.7 x 26.0	14.5 x 12.8	32
PT-R 4100	5/2002	32.7 x 26.0	14.5 x 12.8	16
PT-R 8000II	2/2003	45.6 x 37.0	17.7 x 14.5	32
PT-R 8100	4/2003	45.6 x 37.0	17.7 x 14.5	16
PT-R 4300E	3/2006	32.7 x 26.0	14.5 x 12.8	16
PT-R 4300S	3/2006	32.7 x 26.0	14.5 x 12.8	32
PT-R 8300E	6/2006	45.6 x 37.0	17.7 x 14.6	16
PT-R 8300S	6/2006	45.6 x 37.0	17.7 x 14.6	32

Fiber Coupled Diode Array / 1/2 watt diode:		**Max. & Min. Plate Size**		**Laser Diodes**
PT-R 8600	2/2001	45.6 x 37.0	19.6 x 14.5	64
PT-R 8600 (opt.2000/4000dpi)	7/2003	45.6 x 37.0	17.7 x 14.5	64
PT-R 8600Z	8/2006	45.6 x 37.0	17.8 x 14.6	64
PT-R 6600S	8/2006	38.5 x 26.9	14.6 x 12	64
PT-R 6600E	8/2006	38.5 x 26.9	14.6 x 12	32
PT-R 8600E	10/2006	45.6 x 37.0	17.8 x 14.6	32
PT-R 8600S	10/2006	45.6 x 37.0	17.8 x 14.6	64
PT-R Niagra	3/2007	41.7 x 31.6	17.8 x 14.6	84

GLV Technology: Thermal 830 nm:

Single 512 Channel Laser Module

PT-R Ultima	4/2003	93.7 x 50.2	25.6 x 21.6
PT-R 8800	9/2003	45.7 x 37.0	17.8 x 14.5
PT-R Ultima 16000	6/2004	57.9 x 45.9	25.6 x 21.7
PT-R Ultima 32000	9/2004	93.7 x 50.2	25.6 x 21.7
PT-R 8800II	8/2005	45.7 x 37	17.8 x 14.6
PT-R 8800II /HS option	8/2005	45.7 x 37	17.8 x 14.6
PT-R Ultima 24000	8/2005	68.9 x 55.1	25.6 x 21.7
PT-R Ultima 16000S	3/2006	57.9 x 45.9	25.6 x 21.7
PT-R Ultima 24000S/Z	3/2006	68.9 x 55.1	25.6 x 21.7
PT-R Ultima 36000S/Z	3/2006	82.6 x 62.9	25.6 x 21.7
PT-R 8800E	2/2007	45.6 x 37	17.8 x 14.6
PT-R 8800S	2/2007	45.6 x 37	17.8 x 14.6
PT-R Ultima 16000IIE/S/Z	3/2007	57.9 x 45.9	25.6 x 21.7
PT-R Ultima 40000S	5/2008	89.7 x 63	25.6 x 21.7
PT-R Ultima 48000S	5/2008	114.1 x 53.1	25.6 x 21.7

Dual 512 Channel Laser Module

PT-R Ultima 32000Z	9/2004	83.6 x 50.2	25.6 x 21.7
PT-R 8800Z dual head	2/2007	45.6 x 37	17.8 x 14.6
PT-R Ultima 24000Z	5/2008	68.9 x 55.1	25.6 x 21.7
PT-R Ultima 36000Z	5/2008	82.6 x 62.9	25.6 x 21.7

Single 1024 Channel Laser Module

PT-R 8800ZX	8/2007	45.6 x 37	17.8 x 14.6
PT-R Ultima 24000SX	5/2008	68.9 x 55.1	25.6 x 21.7
PT-R Ultima 36000SX	5/2008	82.6 x 62.9	25.6 x 21.7
PT-R Ultima 40000SX	5/2008	89.7 x 63	25.6 x 21.7
PT-R Ultima 48000SX	5/2008	114.1 x 53.1	25.6 x 21.7

Dual 1024 Channel Laser Module

PT-R Ultima 24000ZX	5/2008	45.6 x 37	17.8 x 14.6
PT-R Ultima 36000ZX	5/2008	82.6 x 62.9	25.6 x 21.7

Flatbed Models:

Model	**Year**	**Size**	**Violet Laser**	**Max. & Min. Plate Size**		**Comments**
PF-R 1050	5/1997	4-up	red 633 nm			Discontinued in 2002
PT-R 2055Vi	9/2001	4-up	410 nm 5 mW	see below		Re-engineered PT-R 1050, sold under the Agfa Palladio name. Originally had a 5 mW laser, later offered with a 30 mW laser as the Palladio 30 and Palladio II
PT-R Micra	9/2003	2-up	410 nm 5 mW	22.8 x 20.3	13 x 9.8	60 mW diode optional
PT-R 2055Vi	9/2004	4-up	410 nm 60 mW	29.9 x 25	17.7 x 11	60 mW standard
FT-R 2055VR	3/2007	4-up	410 nm 60 mW	29.9 x 25	17.7 x 11	Appears identical to the Vi, just rebadged
FT-R 2055Vill	2008	4-up	410 nm 60 mW	29.7 x 25	17.7 x 11	

See pages 37 and 42 for productivity specs.

AGFA

Agfa has struggled as a substantial contributor in the platesetter market. While Agfa's Accusets and Avantras were arguably among the most popular imagesetters ever made, Agfa has not had comparable success with any of their platesetter models. The Galileo seems to have sold well, and there was moderate market acceptance of the Xcalibur, but Agfa has certainly not had the success of their main competitors - Creo/Kodak and Screen.

In fact, in January 2008, Agfa surprised the industry with the announcement of the closure of their manufacturing plant in Wilmington, MA. Suffering from sagging profits and share prices, Agfa was forced to abandon unprofitable elements within the company. The commercial CTP production facility was clearly one of these elements.

To fill the void in their product line created by the plant closure, Agfa expanded its OEM agreement with Screen. Agfa already sold Screen 4-up devices with their Acento and Palladio labels. Agfa and Screen expanded this OEM agreement to cover 8-up and VLF PlateRites. This allows Agfa to offer a complete product line, while focusing its resources on doing what it does best - i.e., to provide service, training, peripherals and consumables to maximize the efficiency and quality of these systems.

Galileo

The Galileo, introduced in 1997, was Agfa's original entry into the platesetter market. The original Galileo used a green laser diode, with a thermal 1064 nm version of the machine being introduced several years later. In 2000, Agfa converted the Galileo to violet laser technology. The Galileo is based on internal drum technology and was offered in manual, semi-automatic, or fully automatic configurations. Without the autoloader (PlateManager) option, the green and violet laser Galileos require a "safelight" environment. Early models utilized a straight-through conveyor to a 59" wide LP 150 online processor. This processor was huge, with enormous chemistry tanks. To eliminate the space and chemistry demands of the LP150, Agfa later introduced the "L" conveyor, which repositions the plate after it exits the Galileo, allowing it to be fed at a 90° angle to a much smaller 32" online processor, the LP82. This innovation substantially reduced chemical consumption and related costs. Of the Galileo models, only the violet laser machines with LP82 processors remain viable in the pre-owned market. Galileo production was discontinued in 2005.

Xcalibur

In August 1999, Agfa purchased the division of Misomex (known for its step and repeat equipment) that had developed and produced the Omnisetter, an external drum CTP device. Following the purchase, Agfa discontinued the production and marketing of the Omnisetter but promptly employed it's engineering staff, who worked with Agfa engineers to redesign the platesetter. The redesigned machine was introduced at Drupa in the fall of 2000 as the Xcalibur VLF. This device represented a marriage of the Omnisetter mechanics with newly developed optics utilizing fiber-coupled diode array technology. The initial offering was a very basic platesetter available as a standard speed machine with 48 laser diodes, or a high-speed model with 96 diodes, which was twice as fast.

At Ipex 2000, Agfa prematurely introduced the re-engineered Xcalibur, which was converted from fiber-coupled diode array to GLV laser technology. We say "prematurely" because it was not until spring 2003 that the GLV models actually became available. This timing was in concert with Screen's introduction of the Ultima, which was also equipped with a GLV laser. In an effort to simplify their service responsibility for Xcaliburs, Agfa offered a special upgrade price to those customers with diode array Xcalibur VLF models to encourage their conversion to GLV technology. Agfa also came out with a new product - the Xcalibur 45. The Xcalibur 45 is an 8-up version of the GLV Xcalibur.

Avalon

In 2005, Agfa introduced the Avalon. The Avalon, although staged as a new product, is a re-engineered version of the Xcalibur. The most significant improvement found in the Avalon over its predecessor is the introduction of the GLV II laser head. The original GLV laser had just 240 imaging channels (360 for VLF & XT heads) as compared to 512 channels for the GLV II. This new head allows for increased speed. Further, Agfa states that the GLV II allows for tighter tolerance and better control of the laser beams. With the introduction of the GLV II laser, Agfa increased the throughput on the XT version of their 8-up platesetter, and added a super-high speed model, the XXT. All the VLF model platesetters featured increased speed, and Agfa made other enhancements to the VLF product line, adding models and options.

The Avalon further offers increased compatibility with processless plates. None of the Xcaliburs could image processless plates except the Xcalibur 45 with “Thermofuse” option. The Avalon LF and VLF can image processless plates, but not all models. Per Agfa’s literature, the “Standard” Avalons cannot image their Azura or Amigo processless plates. In order to image processless plates, the “Universal” model is required. Unfortunately, Agfa does not indicate what is different in the engineering of the Universal versus the Standard model.

In 2006, Agfa followed up the 2005 release of the Avalon LF and VLF models with the Avalon SF 4-up/6-up model and the Avalon LF Violet, an innovative external drum violet laser model These engineering developments established a complete product line built upon one core architecture with GLV technology. The lineup appeared adequate to accommodate the needs of a broad spectrum of the printing industry and position Agfa to again become a major contender in this very competitive market. However, that turned out not to be the case, as evidenced by Agfa’s plant closure in 2008.

Below is a chronology of platesetters engineered by Agfa.

Internal Drum Technology

Model	Year	Max. & Min. Plate Size		Laser
Galileo	1997	8-up		green 532 nm YAG
Galileo Thermal	1999	8-up		thermal 1064 nm YAG
Galileo S	2000	8-up		green 532 nm YAG
Galileo Thermal S	2000	8-up		thermal 1064 nm YAG
Galileo Talant	2000	8-up	Ablative (Mistral) Plate	1064 nm YAG
Galileo VS4	2000	29.33 x 26.61	17.72 x 14.5	violet 400 nm 5 mW
Galileo VS	2000	44.5 x 32.29	17.72 x 14.5	violet 400 nm 5 mW
Galileo VXT	2000	44.5 x 32.29	17.72 x 14.5	violet 400 nm 5 mW
Galileo VS4	2003	29.33 x 26.61	17.72 x 14.5	violet 410 nm 60 mW
Galileo VS & VXT	2003	44.5 x 32.9	17.72 x 14.5	violet 410 nm 60 mW
Galileo VE	2003	44.5 x 32.29	17.72 x 14.5	violet 410 nm 60 mW

External Drum Technology

Fiber Coupled Diode Array: Thermal Laser - 830 nm:

		Max. & Min. Plate Size		Laser
Xcalibur VLF 50-60-70-80	2000	50-80 x 45-58	28 x 22	48 diodes
Xcalibur VLF HS 50-60-70-80	2000	50-80 x 45-58	28 x 22	96 diodes

GLV Technology: Thermal Laser - 830 nm:

				Laser - Single
Xcalibur 45	2002	45.66 x 32.3	17.7 x 9.8	240 channel
Xcalibur 45 E/S	2003	45.66 x 32.3	17.7 x 9.8	240 channel
Xcalibur 45 XT	2003			360 channel
Xcalibur VLF 50-60-70-80:				
E entry level	2003	50-80 x 45-58	22.2 x 17.7	240 channel
S standard speed	2003	50-80 x 45-58	22.2 x 17.7	360 channel
XT high speed	2003	50-80 x 45-58	22.2 x 17.7	360 channel
XXT extra high speed	2003	50-80 x 45-58	22.2 x 17.7	512 channel
Avalon LF (large format)	2005	45.7 x 32.2	12.2 x 12.2	512 channel
Avalon VLF 50, 55, 60, 65, 70, 75, 80, 83:				
E/S/X/XT (same as Xcalibur)	2005	50-80 x 45-58	22.2 x 17.7	512 channel
Avalon SF (small format)	2006	38.6 x 27.2	9.8 x 12.2	512 channel

Violet:

		Max. & Min. Plate Size		Laser
Avalon LF Violet	2006	45.7 x 32.2	12.2 x 12.2	violet 400 nm

Follows a listing of platesetters offered by Agfa under OEM agreements, including the introduction date and model name assigned by the original manufacturer. Also follows more detailed information, including plate sizes and laser type, for the external drum Screen PT-Rs offered by Agfa.

Agfa Model Name	Year	Manufacturer Model Name
Internal Drum Model:		
Antares 1000	1/1998	Cymbolic Science Platejet 4
Antares 1600	1/1998	Cymbolic Science Platejet 8
External Drum Model:		
Acento E	2004	Screen PT-R 4100
Acento S	2004	Screen PT-R 4300
Acento IIE	2006	Screen PT-R 4300E
Acento IIS	2006	Screen PT-R 4300S
Acento LF	2007	Screen PT-R Niagra
Avalon N8 10E	2008	Screen 8300 E
Avalon N8 10S	2008	Screen 8300 S
Avalon N8 20E	2008	Screen 8600 E
Avalon N8 20 S/Sr	2008	Screen 8600 S/Z
Avalon N8 50E	2008	Screen 8800 E
Avalon N8 50S	2008	Screen 8800 S
Avalon N8 50XT	2008	Screen 8800 Z
Avalon N8 70XT	2008	Screen 8800
Avalon N16 Series	2008	Screen Ultima 16000 Series
Avalon N24 Series	2008	Screen Ultima 24000 Series
Avalon N36 Series	2008	Screen Ultima 36000 Series
Avalon N40 Series	2008	Screen Ultima 40000 Series
Avalon N48 Series	2008	Screen Ultima 48000 Series
Flatbed Model:		
Palladio	9/2001	Screen PT-R 2055Vi 5 mW laser diode with autoload
Palladio 30	7/2004	Screen PT-R 2055Vi 30 mW laser diode with autoload
Palladio 30M	5/2004	Screen PT-R 2055Vi without autoload
Palladio II	2006	Screen PT-R 2055Vi slightly larger image area, no 3000 dpi
Palladio IIM	2006	Screen PT-R 2055Vi w/o autoload, slightly larger image area, no 3000 dpi

External Drum Models

Screen Diode Array Models: Thermal Laser - 830nm:

Model	Max. & Min. Plate Size		Laser
Acento E	32.7 x 26	14.5 x 12.8	16 diodes
Acento S	32.7 x 26	14.5 x 12.8	32 diodes
Acento II	32.7 x 26	14.5 x 12.8	16 diodes
Acento IIS	32.7 x 26	14.5 x 12.8	32 diodes
Avalon N8 10E/S	45.6 x 37	17.8 x 14.6	16 / 32 diodes
Avalon N8 20E/S/Sr	45.6 x 37	17.8 x 14.6	32 / 64 diodes

Screen GLV Models: Thermal Laser - 830nm:

			Laser- Single
Avalon N8 50E/S/XT	45.6 x 37	17.8 x 14.6	512 channel
Avalon N16 E/S/XT	57.8 x 45.4	25.6 x 21.7	512 channel
Avalon N24 50S/SD	68.8 x 55.1	25.6 x 21.7	512 channel
Avalon N36 50S/SD	82.6 x 62.9	25.6 x 21.7	512 channel
Avalon N40	89.7 x 62.9	25.6 x 21.7	512 channel - dual
Avalon N48	114.1 x 53.1	25.6 x 21.7	512 channel - dual
			Laser - Dual
Avalon N24 50XT	68.8 x 55.1	25.6 x 21.7	512 channel - dual
Avalon N36 50XT	82.6 x 62.9	25.6 x 21.7	512 channel - dual
			Laser - Single
Avalon N8 70XT	45.6 x 37	17.8 x 14.6	1024 channel
Avalon N24 70SD	68.8 x 55.1	25.6 x 21.7	1024 channel
Avalon N36 70SD	82.6 x 62.9	25.6 x 21.7	1024 channel
Avalon N40XT	89.7 x 62.9	25.6 x 21.7	1024 channel
Avalon N48XT	114.1 x 53.1	25.6 x 21.7	1024 channel
			Laser - Dual 1024
Avalon N24 70XT	68.8 x 55.1	25.6 x 21.7	1024 channel - dual
Avalon N36 70XT	82.6 x 62.9	25.6 x 21.7	1024 channel - dual

See pages 33 and 40 for productivity specs.

HEIDELBERG

Heidelberg was one of the earliest players in the CTP movement through their acquisition of Linotype-Hell in August of 1996. A year earlier, Linotype had introduced the Gutenberg with great fanfare at Drupa 1995. This was a 532 nm YAG laser internal drum device. At the time of the acquisition, Linotype was also in the process of developing what was to be their adaptation of the successful Herkules imagesetter to platesetting. As late as March 1997, Heidelberg vowed to continue support for the Gutenberg, and to continue development of the Herkules 1064 nm YAG laser platesetter, which had not yet been released as a product.

All of this changed early in 1998, when Heidelberg signed an OEM agreement with Creo to produce Trendsetters, putting the "nail in the coffin" of Heidelberg's proprietary CTP systems development. A unique aspect of Heidelberg's agreement with Creo was the manufacturing rights for Heidelberg to actually produce Trendsetters in Germany. Usually in OEM agreements, the original product developer does the manufacturing, and the other party simply relabels it under its own brand name. This was not the case with the Creo/Heidleberg partnership. The units manufactured in Germany by Heidelberg were all marketed as Trendsetters but with a dual Heidelberg/Creo identification badge. This partnership was short-lived, however, as Creo terminated it shortly after their acquisition of Scitex in April 2000.

The failed Creo partnership was immediately followed by a similar partnership with Screen. This agreement also granted manufacture rights that allowed the units marketed by Heidelberg to be produced by Heidelberg in Germany. Products from this partnership became available in August 2000 badged as the Topsetter. Unlike the arrangement with Creo, the rebadging makes no reference to Screen or the PlateRite trademark.

The following Topsetter models were manufactured by Heidelberg. Those sold previous to these dates were manufactured by Screen.

Heidelberg Model	**Year**	**Screen Model**
Topsetter 74	12/00-2002	PT-R 4000
Topsetter 102	01/01-2002	PT-R 8000
Topsetter P74	01/02-2003	PT-R 4300
Topsetter P102	01/02-2003	PT-R 8000II
Topsetter PF102	01/02-2003	PT-R 8600

Prosetter

While gearing up to manufacture the Topsetter, Heidelberg was also completing engineering of a machine of their own design, the Prosetter. The Prosetter was first introduced in June 2001, approximately a year after the Creo divorce. It incorporated internal drum architecture and took advantage of newly introduced violet laser technology. The initial Prosetter used a 5 mW violet laser diode. By August 2002, an upgrade to a 30 mW laser (switchable to 5 mW) was available to accommodate photopolymer violet plates. By September 2005, a 60 mW laser (switchable to 5 mW) was offered as standard in the Prosetters.

Follows a chronology of Prosetter models:

Model	**Year**	**Max. & Min. Plate Size**		**Violet Laser - 405 nm**	
Prosetter 52	6/2001	26.38 x 20.67	14.57 x 12.72	5 mW	
Prosetter 74	6/2001	29.53 x 26.38	14.57 x 12.72	5 mW	
Prosetter F74	6/2001	29.53 x 26.38	14.57 x 12.72	5 mW	
Prosetter 102	6/2001	41.54 x 31.93	14.57 x 12.72	5 mW	
Prosetter F102	6/2001	41.54 x 31.93	14.57 x 12.72	5 mW	
Prosetter 52	12/2002	26.38 x 20.67	14.57 x 12.72	30 mW	(adjustable to 5 mW)
Prosetter 74	12/2002	29.53 x 26.38	14.57 x 12.72	30 mW	(adjustable to 5 mW)
Prosetter F74	12/2002	29.53 x 26.38	14.57 x 12.72	30 mW	(adjustable to 5 mW)
Prosetter 102	12/2002	41.54 x 31.93	14.57 x 12.72	30 mW	(adjustable to 5 mW)
Prosetter F102	12/2002	41.54 x 31.93	14.57 x 12.72	30 mW	(adjustable to 5 mW)
Prosetter P52	9/2005	26.38 x 20.67	14.57 x 12.72	60 mW	(adjustable to 5 mW)
Prosetter P74	9/2005	29.53 x 26.38	14.57 x 12.72	60 mW	(adjustable to 5 mW)
Prosetter PF74	9/2005	29.53 x 26.38	14.57 x 12.72	60 mW	(adjustable to 5 mW)
Prosetter P102	9/2005	41.54 x 31.93	14.57 x 12.72	60 mW	(adjustable to 5 mW)
Prosetter PF102	9/2005	41.54 x 31.93	14.57 x 12.72	60 mW	(adjustable to 5 mW)
Prosetter P74	6/2008	29.92 x 26.38	14.57 x 12.72	60 mW	(adjustable to 5 mW)
Prosetter PF74	6/2008	29.92 x 26.38	14.57 x 12.72	60 mW	(adjustable to 5 mW)

Suprasetter

At Drupa 2004, Heidelberg introduced their Suprasetter, an external drum thermal platesetter. The Suprasetter was originally offered with one to six laser modules, in E (entry), S (standard), H (high speed) models, and two sizes - the 4-up 74 and 8-up 105. In May 2005, Heidelberg announced the A105, a lower cost variation of the 105, but did not make it available to the U.S. market until 2006. The 2-up A52 and the 4-up A74 were not available in the U.S. until January 2007 after being introduced in October 2006 at Graph Expo.

The "A" models of the Suprasetter were engineered to be offered at a lower price point for the same imaging technology as the more powerful and expensive models. These A models were sold standard with just one laser head, substantially reducing the throughput, and precludes the use of Agfa or Kodak processless plates. As of today, there is no speed upgrade path available for the A models to a full-fledged, faster Suprasetter.

At drupa 2008, Heidelberg introduced their first VLF device, the VLF Suprasetter. Like other Suprasetters, it is available with optional autoloader, online conveyor, and plate punches. The VLF Suprasetters can also be upgraded in the field with additional lasers for higher throughput, and smaller format machines can be upgrade to the larger format sizes. There was no information regarding availability of this machine at Drupa, but judging from history, we guess it will be available in 2009.

The following is a chronological list of the Suprasetter models:

Model	**Year**	**Max. & Min. Plate Size**		**Laser - 830 nm**
Suprasetter S 74	4/2004	29.5 x 26.7	14.57 x 12.72	2 modules - 128 diodes - 100 mW
Suprasetter H 74	4/2004	29.5 x 26.7	14.57 x 12.72	3 modules - 192 diodes - 100 mW
Suprasetter E 105	4/2004	44.8 x 36.6	14.57 x 12.72	2 modules - 128 diodes - 100 mW
Suprasetter S 105	4/2004	44.8 x 36.6	14.57 x 12.72	3 modules - 192 diodes - 100 mW
Suprasetter H 105	4/2004	44.8 x 36.6	14.57 x 12.72	4 modules - 256 diodes - 100 mW
Suprasetter A105	10/05	44.8 x 36.6	14.57 x 12.72	1 module - 64 diodes - 100 mW
Suprasetter A52	8/2006	26.3 x 20.6	9.45 x 9.45	1 module - 64 diodes - 100 mW
Suprasetter A74	8/2006	29.5 x 26.3	9.45 x 9.45	1 module - 64 diodes - 100 mW
Suprasetter 75	5/2008	29.9 x 26.7	14.57 x 12.72	optional 2 - 5 modules - 128 - 320 diodes
Suprasetter A105	5/2008	41.5 x 36.6	14.57 x 12.72	2 modules - 128 diodes - 100mW
Suprasetter 105	5/2008	44.8 x 36.6	14.57 x 12.72	optional 2 - 6 modules - 128 - 384 diodes
Suprasetter 145 VLF	5/2008	57.48 x 56.1	25.5 x 19.6	opt. 3-5-6 modules - 192-320-384 diodes
Suprasetter 162 VLF	5/2008	64.17 x 56.1	25.5 x 19.6	opt. 3-5-6 modules - 192-320-384 diodes
Suprasetter 190 VLF	5/2008	75 x 56.1	25.5 x 19.6	opt. 4 or 6 modules - 256 or 384 diodes

See pages 38 and 40 for productivity specs.

FUJI

Fuji introduced their first platesetter, the 8-up Celix, in 1997, but this machine was never made available to the US market. Their first mainstream platesetter was the Luxel P-9600, an internal drum device, introduced at Drupa in June 2000. In North America, it was nicknamed the "Saber" to avoid confusion with other Fuji Luxel devices. P stood for photopolymer, as the machine was designed to image Fuji's photopolymer LP-N2 532 nm plates. The P-9600 was sold as a fully automatic system with autoloader, platesetter, and online conveyor to a processor. The timing of its introduction was somewhat unfortunate, as violet technology was introduced at the same Drupa show. Fuji had to settle for the 532 nm YAG laser in the P-9600, rather than violet technology, probably because of the lack of violet lasers that had power sufficient to image their photopolymer plates. Regardless of the reason, Fuji was in the unenviable position of introducing a green machine as this technology was losing favor. Within a year of the Drupa debut, the industry had virtually eliminated green lasers in favor of violet technology. Fuji did, however, have the advantage of having photopolymer plates, rather than the silver-based plates required by all early violet machines. By 2002, violet lasers with sufficient power to image photopolymer plates were available, and Fuji introduced the violet 8-up V-9600 and VX-9600, and 4-up VX-6000.

The Luxel P-9600 is now completely obsolete. Fuji announced a June 2007 "End of Life" date for the machine, and is making a concentrated effort to remove any remaining green laser machines from the marketplace by offering incentives to current owners to upgrade to a violet Saber or thermal Javelin. Fuji is scrapping the machines that they replace. Fuji is also discontinuing their green-sensitive photopolymer plates, with last shipments targeted for December 2008.

The V-9600, VX-9600, and VX-6000 originally used a 30 mW laser, with a second laser available as an option. The VX-6000 was available with an online processor. The V-9600 and VX-9600 were available with optional autoloaders, online processors, and for the V-9600, punches.

In 2004, the VX-6000 was discontinued and in its place the Saber V-6 and V-6e were introduced as more economical machines for the lower-end 2-up and 4-up market. Both machines have a 60 mW laser. Fuji continued to market the V-9600 and VX-9600 until 2008, when these models were replaced by the V-8 and V-8HS, which were introduced at Drupa.

Follows a chronology of Fuji Luxel models:

Luxel Series Models

Model	**Year**	**Max. & Min. Plate Size**		**Violet Laser - 405 nm** **(unless specified otherwise)**
P-9600 Single Beam	2000	45.7 x 37.8	19.7 x 15.7	532 nm YAG - green
P-9600 Split Beam	2000	45.7 x 37.8	19.7 x 15.7	532 nm YAG - green w/ split beam opt.
V-9600 (A)	9/2002	45.7 x 37.8	19.7 x 15.7	30 mW (C)
Vx-9600 (A)	9/2002	45.7 x 37.8	19.7 x 15.7	30 mW (C)
Vx-6000 (A)	9/2002	30.0 x 26.6	13.4 x 12.5	30 mW (C)
9600 series	6/2004	45.7 x 37.8	19.7 x 15.7	60 mW
V-6	6/2004	(B)		60 mW
V-6e	2005	(B)		60 mW
V-8 (A)	6/2008	(B)		60 mW
V-8 HS	4th Q/2008	(B)		60 mW

(A) Dual laser optional.
(B) Varies depending upon plate gauge and plate orientation (portrait or landscape) - see productivity chart on page 41 for details.
(C) Early mfg. machines have 30 mW diodes, later models contain 45 mW and are programmed to 30 mW, but can be reprogrammed to 45 mW.

At approximately the same time that Fuji introduced their P-9600 internal drum platesetter, they completed negotiations for an OEM agreement with Screen to market Screen's PT-R 8000 8-up and the PT-R 4000 4-up thermal external drum machines, which Fuji sold under their Javelin T-9000 and Dart T-6000 labels. This agreement was ultimately expanded to the full line of Screen 4-up and 8-up thermal platesetters. In 2006, Fuji rebadged these models to more closely identify their product to the comparable model marketed by Screen. Fuji currently sells the rest of the Screen platesetter line (Ultima VLF, PT-R6600, FT-R 2055, News 2000, and FX870 flexo device), but does so with the Screen label.

The full line of renamed Screen platesetters follows.

Fuji Model - 2005 and prior year		**Rebadged 2006**	**Screen Model**
8-up Models			
Javelin T-9000	1998	None	PT-R 8000
Javelin T-9000II	2001	None	PT-R 8000II
Not available in 2005	xxxx	Javelin 8300E	PT-R 8300E
Not available in 2005	xxxx	Javelin 8300S	PT-R 8300S
Javelin T-9000HS-S	2001	Javelin 8600S	PT-R 8600
Javelin T-9000HS	2003	Javelin 8600Z	PT-R 8600Z
Not available in 2005	xxxx	Javelin 8600E	PT-R 8600E
Javelin T-9000E	2003	Javelin 8300E	PT-R 8100
Javelin T-9800	2004	None	PT-R 8800
Javelin T-9800	2005	Javelin 8800II	PT-R 8800II
4-up Models			
Dart 6000	2002	None	PT-R 4000
Dart T-6000E	2002	None	PT-R 4100
Dart T-6000II	2002	None	PT-R 4000II
Dart T-6000E	2005	Dart 4300E	PT-R 4300E
Dart T-6000III	2002	Dart 4300S	PT-R 4300S

ECRM

ECRM was one of the early entrants into the CTP market with the AIR 75, a 4-up platesetter which utilized a 488 nm blue argon gas laser. The first AIR 75s shipped in September 1997, but this model ultimately met the same fate as the Barco Crescent, which also used an argon blue laser - total obsolescence.

In October 1999, at Graph Expo, ECRM introduced two new platesetter models, the Wildcat and the Tigercat, both based on holographic imaging technology. Both machines were available with a 633 nm HeNe red gas laser or 532 nm green YAG laser diode. The WildCat was aimed at the newspaper market. The TigerCat targeted commercial printers, offering resolutions up to 3556 dpi. Of these two models, the TigerCat survived, and a violet model was introduced in 2001. However, overall, neither the WildCat nor the TigerCat were well received by the marketplace.

ECRM's made its next attempt in the CTP arena by acquiring Optronics in March 2000. Optronics was a manufacturer of imagesetters, scanners and platesetters. Optronics' platesetter, the 8-up 830 nm thermal Aurora, had only mediocre market acceptance. Upon acquiring Optronics, ECRM discontinued their imagesetters and scanners, and rebadged the Aurora platesetter as the ECRM DesertCat. Market acceptance remained mediocre. This, combined with the lukewarm acceptance of the WildCat and TigerCat, resulted in difficult times for the company. Financial and management reorganization followed. ECRM emerged from this reorganization with introduction of the violet Mako 2 platesetter in March 2002. In this machine, ECRM utilized the simple and proven design of their Mako and Stingray imagesetter engines and adapted them to the production of metal plates. The reasonable price and the relatively simple engineering of the Mako2 made it a popular machine.

In the following year, ECRM introduced their 4-up Mako 4. This model was available with either a 5 mW violet laser for silver-based plates or the 30 mW violet laser for photopolymer plates. This choice of laser also became available to Mako 2 buyers. The success of the Mako 2 and 4, along with the introduction of the Newsmatic for the newspaper market, provided the resources to ECRM to finally introduce a viable 8-up CTP device, the Mako 8. Eventually all these models were available with a 60mW laser.

At Drupa 2008, ECRM trumped their competition by introducing the 120 mW visible light diode in its entire commercial line-up of platesetters. ECRM added an X to the model number to designate the 120 mW machines. However, this is somewhat confusing, as a Mako 4X was introduced in 2006. In 2006, ECRM heralded the Mako 4X as offering "a clear path to chemistry-free technology". However, they made no mention of the wattage of the laser, but we know it to be a 60 mW. In their pre-Drupa press release, ECRM announces the Mako 4X as a brand new product, along with the Mako 2X and 8X.

Follows a chronological history of ECRM's commercial printing platesetters:

Model	Year	Max. & Min. Plate Size		Laser
AIR 75	9/1997	4-up		blue 488 nm Argon Ion
TigerCat	9/1999	4-up		red 633 nm or green 532 nm YAG
TigerCat	5/2001	4-up		violet 405nm 5 mW
DesertCat 8	5/2000	8-up		thermal 830 nm
DesertCat 44	9/2002	4-up		thermal 830 nm
Mako 2	3/2002	22.0 x 22.0	10.0 x 10.0	violet 405 nm 5 mW
Mako 2 (or System 2)	5/2003	26.4 x 22.1	9.94 x 8.98	violet 405 nm 5 mW or 30 mW
Mako 4	5/2003	36.5 x 25	15.0 x 9.9	violet 405 nm 5 mW or 30 mW
Mako System 4		29.3 x 24.2	9.94 x 8.98	violet 405 nm 5 mW or 30 mW
Mako 4Matic	4/2004	38.5 x 25	15.15 x 11.4	violet 405 nm 5 mW or 30 mW
Mako 8	4/2004	45 x 32.44	9.94 x 8.98	violet 405 nm 5 mW or 30 mW
Mako 4X (or System 4X)	9/2006	37.8 x 26.0	9.94 x 8.98	violet 405 nm 60 mW
Mako 2L	2006	22.1 x 22.1	9.94 x 8.98	violet 405 nm 30 mW
Mako 2X	5/2008	26.4 x 22.0	9.94 x 8.98	violet 405 nm 120 mW
Mako 4X	5/2008	37.8 x 26.0	9.94 x 8.98	violet 405 nm 120 mW
Mako 8X	5/2008	45 x 32.44	9.94 x 8.98	violet 405 nm 120 mW

See page 42 for productivity specs.

PRESSTEK

Presstek became a darling of the stock market thanks to its revolutionary concept of imaging plates directly on the press, thereby bypassing the usual prepress steps of imagesetting and platemaking. In addition to eliminating steps, Presstek's technology eliminated chemicals, as the plates used on press required no chemical processing. Presstek has been successful in marketing this technology, called Direct Imaging (DI), but not to the degree which market speculators envisioned.

In addition to offering DI technology to the press manufacturing industry, Presstek has adapted this technology to computer to plate. Presstek badged the laser technology used in their DI presses and platesetters Profire. Presstek's first attempt at applying Profire technology was the Pearlsetter, introduced in January 1996. Presstek offered chemical-free plates for imaging on the Pearlsetter, which were the first commercially viable processless plates on the market. However, engineering of the Pearlsetter proved troublesome, and this product was discontinued. Presstek's next application of Profire technology was the Dimension 400, introduced in 2000. This re-engineered model overcame the problems associated with the earlier Pearlsetter, but continued to be accepted by only a niche market, where simplicity of operation, small footprint, and environmental concern trumped the need for volume throughput. Presstek has continued to introduce new Dimension models of varying sizes and speed.

In mid-2005 Presstek introduced an entirely new compact small-format model, badged as the Vector TX52. This machine uses "SureFire" technology and images the newly developed Freedom plate. This technology utilizes a 1064 YAG laser. Unlike the Dimensions, which use an external wash unit, it is designed with an internal wash section. The result is a compact imaging device for smaller presses (up to 20 x 21") where press runs under 25,000 are the norm. At Drupa 2008, Presstek introduced a newer version of the TX52, the Vector FL52, which they state has a redesigned imaging system for better quality.

A serious caveat when purchasing either Vector model is that these machines can only be used with Presstek's ironically named "Freedom" plates. You must buy your plates from Presstek, and therefore must pay their prices, without the possibility of shopping for a better deal. You are also limited to the plate sizes that they offer. If considering one of these machines, its imperative that you confirm that Presstek offers plates that match your press sizes.

In fact, all platesetters offered by Presstek require that you use their plates. The Dimensions and also the newly introduced Compass models must be used with Presstek's processless plates, which use "ablative" technology. With ablative technology, the emulsion of the printing plate is either loosened or actually removed by the laser beam, leaving only the positive image on the plate. A wash process is all that is required following the imaging of the plate for the plate to be used on press. While this has the advantage of eliminating the need for chemical processing, it does have the disadvantage of creating debris within the machine that must be dealt with. A vacuum system is included by Presstek to remove this debris, but still frequent internal cleaning of the machine is required.

Another concern with this technology is the amount of laser power required to image ablative plates. While standard thermal plates have a sensitivity of 120 to 150 mJ/cm^2, the ablative emulsion on Presstek processless plates requires 600 mJ/cm^2 . Thus, significantly more laser power is required to image these plates, resulting in higher laser operating cost. Another possible source of added laser cost is the engineering feature that requires the laser head to expose the entire width of the drum regardless of the width of the media being exposed. If you always image the maximum size, this is of no concern, however if you use smaller media, you will incur additional unnecessary operating cost.

The processless plates offered by Agfa, Kodak, and Fuji over the last few years do not use ablative technology. The elimination of this technology in processless CTP correlates to less debris and maintenance and also less laser power required for imaging. Obviously this new plate technology threatens the future of Presstek's existing CTP technology and consumables market. Presstek has, as a defense, taken the position that these competitive plates are not authorized for use on their equipment. As a consequence, their use will void any responsibility for service or warranty for problems that can be identified with the use of an unauthorized plate. This has not discouraged Agfa from distributing a white paper outlining the procedures required to image Azura plates on Presstek Dimensions, although the viability of this is unknown. Elsewhere in the world, Dimension customers have been successful in converting to Fuji processless plates.

A summary of Presstek platesetters can be found below.

Model	**Year**	**Max. & Min. Plate Size**		**Thermal Laser - 830 nm**
Pearlsetter Beta	1996	(obsolete)		
Pearlsetter Upgrade	6/1997	(obsolete)		
Dimension 200	9/2000	21 x 20	9.45 x 9.45	ProFire ablative
Dimension 400	4/2000	30.71 x 26.77	9.45 x 9.45	ProFire ablative
Dimension 800	9/2000	44 x 32	44.5 x 9.45	ProFire ablative
Dimension 400 Excel	2004	30.7 x 26.77	9.45 x 9.45	ProFire Excel ablative
Dimension 200 Excel	2004	20.87 x 19.69	9.45 x 9.45	ProFire Excel ablative
Dimension 425 Excel	3/2005	30.24 x 25.2	12.6 x 9.45	ProFire Excel ablative
Dimension 450 Excel	3/2005	30.24 x 25.2	9.45 x 9.45	ProFire Excel ablative
Dimension 225 Excel	3/2005	22.68 x 22.05	12.6 x 9.45	ProFire Excel ablative
Dimension 250 Excel	3/2005	22.68 x 22.05	9.45 x 9.45	ProFire Excel ablative
Vector TX52	6/2005	20.9 x 19.88	14.38 x 13	Sure Fire 1064 nm YAG laser
Vector FL52	6/2008	20.6 x 20	15 x 11	Sure Fire 1064 nm YAG laser
Compass 4000 Series	6/2008	29.5 x 26.77	12.25 x 9	830 nm
Compass 8000 Series	6/2008	45.7 x 37.4	15 x 13	830 nm

See page 36 for productivity specs.

ESCHER-GRAD

Escher-Grad was never a power in the U. S. market with its imagesetters, but has been moderately successful at building an international niche with their line of Cobalt platesetters. Their first offering was the Cobalt 8, introduced in September 1999, which used a 410 nm violet laser diode. Since violet plates were not yet available, the device imaged blue-sensitive high-speed plates.

The choice of implementing a 410 nm violet laser in the Cobalt was either dumb luck or brilliant foresight, as just one year later, violet technology was introduced to the market at Drupa 2000 with great fanfare. However, while it seems like Escher-Grad should have been perfectly positioned to capitalize on the market's new interest in violet technology, it turned out not to be the case. The main problem Escher-Grad encountered was a lack of plate availability. At the time, Agfa was the only source for violet compatible plates that could be imaged with the Cobalt's 5 mW laser. Agfa could not keep up with their own customer demand for these plates, and hence restricted sales of their violet plates only to customers using their equipment. Another issue that Escher Grad faced was the considerable interest in photopolymer plates, and the 5 mW Cobalt could not image these plates. This resulted in the introduction of a 30 mW violet diode. In 2001, Escher-Grad introduced the 30 mW laser as an option for both the Cobalt 4 and 8, and in 2003, the 30 mW laser became standard on both models. Other additions to the product line in 2003 were the Cobalt 24 with a 50 x 60" imaging format, and the Cobalt 32 with a 60 x 80" format.

It was soon discovered that even the 30 mW diode was marginal for exposing the photopolymer plates. As a result, in 2004, Escher Grad introduced a 60 mW laser diode. This adaptation proved to be a disaster, as the installation of a 60 mW laser in the Cobalt's existing engineering design was extremely unstable, resulting in high laser failure rates. Subsequent changes in the laser power components has resolved most of the initial technical difficulties. Regardless, Escher Grad plans to introduce a Cobalt with redesigned laser optics in the Fall of 2007, however as late as August 2008, the new design was not available. In addition, since the redesign is so extensive, it will not be possible to upgrade currently installed Cobalts to the newstyle 60 mW optics.

A history of Escher-Grad models can be found below.

Model	**Date**	**Max. & Min. Plate Size**		**Laser- 410 nm - Fiber Optics**
Cobalt 8	9/1999	8-up		5 mW
Cobalt 4	2001	29.33 x 24.21	11 x 8.5	5 mW standard, 30 mW optional
Cobalt 8	2001	42.12 x 31.9	19.68 x 16.14	Added optional 30 mW violet
Aqua LHP[1]	4/2002	(obsolete)		UV 355 nm 2 W
Cobalt 4	2003	29.33 x 24.21	11 x 8.5	30 mW standard
Cobalt 8	2003	40.5 x 31.9	19.68 x 16.14	30 mW standard
Cobalt 24	2003	60 x 50	40 x 30	30 mW standard
Cobalt 32	2003	80 x 60	40 x 30	30 mW standard
Cobalt 4	2004	29.33 x 24.21	11 x 8.5	60 mW standard
Cobalt 8	2004	40.5 x 31.9	19.68 x 16.14	60 mW standard
Cobalt 24	2004	60 x 50	40 x 30	60 mW standard
Cobalt 32	2004	60 x 80	40 x 30	60 mW standard
Cobalt-4 Next	2008	31 x 24.25	11 x 8.5	60 mW standard
Cobalt-6 Next	2008	40 x 26	18 x 11	60 mW standard
Cobalt-8 Next	2008	40.5 x 31.9	19.68 x 16.14	60 mW standard

(1)This did not prove to be a successful product. If any were sold they have been withdrawn from the market.

See page 40 for productivity specs.

LÜSCHER

Lüscher in the early 1990's had the vision to see and understand the developing technology of imaging data directly to plate and eliminating the inefficiencies inherent in creating the image on film and subsequently imposing that image onto the metal plate.

Although Lüscher was a small company, it had experience in developing various innovative and complex machines dealing with the automation of the textile industry including screen printing and the step & repeat mechanization.

With hindsight one can envision the engineering thought process that was going through the minds of this small, but innovative staff, to seize upon the opportunities available with this emerging technology of computer to plate. They obviously studied and analyzed the various processes that were developing in the industry. These were represented first by the internal drum approach used almost universally for imaging film and then secondly by the less prevalent approach utilizing the external drum. In addition, there were efforts by Scitex and Screen towards developing the flatbed approach to imaging plates.

Lüscher's staff obviously studied how they could seize upon the advantages of these various approaches and at the same time eliminate the disadvantages of each. Among the advantages was the ability of the external drum technology to position the laser head within a few millimeters of the media being exposed. However, to accomplish this required the disadvantage of being required to fasten the media to a drum that must rotate at a high speed requiring it to be secured by a complex clamping mechanism adequate to overcome the centrifugal force inherent in the process. The internal drum approach avoided these expensive mechanisms but in the process created an almost unsolvable problem of positioning the laser beam close enough to the media to avoid being locked into the need for a super sensitive media that could not sustain the very long print run required by a large segment of the industry. Although the flatbed approach contained elements that addressed the problems inherent in the drum approach, it contained complex engineering and manufacturing hurdles as well as productivity hurdles.

Lüscher's engineers analyzed the various technologies and reasoned that the internal drum advantages were the foundation to build upon. They further reasoned that if you could somehow rotate the laser mechanism as opposed to rotating a drum with the media adhered to it, you could have the best of the three engineering approaches.
This is exactly what they accomplished. It has evolved to be an approach that provides the benefits of all three engineering approaches.

Their solution was to design a precision concave drum similar to the internal drum that was currently in use. The drum was designed to be open and accessible to an operator to easily position and remove the metal plate. They then designed a rotating drum just wide enough to accommodate the laser diode mechanisms which they imbedded in its exterior surface in rows of 8 and placed this mechanism within the confines of the concave drum. This entire mechanism was mounted upon a lead screw similar to that used for traversing the laser across the internal drum of the imagesetter for exposing film. The effect was to move the imaging "drum" across the length of the plate which has previously been positioned by the operator in the cavity of the drum. This allowed the laser to image, with each revolution, as many channels on the plate as there were rows of diodes mounted on the drum. A rotating speed of 250 RPM (as compared to the early 800 - 1,000 RPMs of the PT-Rs and Lotems platesetters) to create imaging speeds competitive with most existing platesetters.

With this innovative approach, they had developed an entirely new approach to imaging plates which took advantage of all the positive benefits of the three competing technologies.

A chronological listing of Lüscher product offerings follows:

Model	Year	Max. & Min. Plate Size		Laser
Xpose! 120	1997	43.3 x 35.4	20.4 x 14.1	830 nm - 32 / 64 diodes
Xpose! 160	1997	53.14 x 64.96	20.4 x 14.1	830 nm - 32 / 64 / 128 diodes
Xpose! 180	2000	80 x 58.5	25.6 x 19.6	830 nm - 32 / 64 diodes
Xpose! 75	n/a	29.9 x 25.6	15.0 x 9.8	830 nm - 32 diodes
Xpose! 80	n/a	31.5 x 25.6	20.4 x 14.1	830 nm - 32 diodes
Xpose! 130	n/a	44.5 x 37.4	19.7 x 14.1	830 nm - 64 diodes
Xpose! 190	2004	74.8 x 58.4	23.8 x 16.1	830nm - 64 / 128 diodes
Xpose! 190L	2004	81.9 x 63	25.7 x 16.1	830 nm - 64 / 128 diodes
Xpose! 190XL	2004	89 x 63	25.7 x 16.1	830 nm - 64 / 128 diodes
Xpose! 230 UV	2007	44.4 x 37.4	16.9 x 14.1	405 nm - 32 / 64 / 128 diodes
Xpose! 260 UV	2007	66.1 x 53.9	21.2 x 14.9	405 nm - 64 / 128 diodes
Xpose! 290	2008	74.8 x 58.4	23.8 x 16.1	405 nm - 64 / 128 diodes
Xpose! 290L UV	2008	81.9 x 63	25.7 x 16.1	405 nm - 64 / 128 diodes
Xpose! 290XL UV	2008	89 x 63	25.7 x 16.1	405 nm - 64 / 128 diodes

See page 39 for the productivity specs.

CONCLUSION

In the preceding pages, we've provided a wide variety of information as relates to CTP equipment. While this brings us to the end of this white paper, in actuality this paper will never be "complete". The printing industry is a dynamic industry which experiences constant innovation and evolution. This paper will undoubtably require further updates as manufacturers introduce new product lines and as technology advances. BWI monitors trends and new product introductions, and will continue to update this paper as significant events occur.

There is an emergence of a trend in the industry to build upon the opportunities made possible by very large format (VLF) models of platesetters to efficiently produce VLF plates. Press manufacturers are recognizing opportunities for dramatically increasing productivity of their customers by supplying the presses to accommodate up to 80" wide plates. Increased print area dramatically increases profitability as a result of most all costs remaining constant except consumables and capital cost. With the elimination of film and the plate burning process coupled with automatic on press plate changing, the large press appears to be the next major advance in productivity and efficiency for the printing industry.

The large format press not only allows for the printing of multiple signatures at once, but it opens markets such as large posters, labels and carton printing that the 40" press either cannot produce or cannot compete when faced with the productivity increase afforded by the large format press.

Furthermore, we have not included CTPP (computer to polyester plate) equipment in this edition, but intend to do so in the future versions. The polyester plate market is an important segment of the industry, and this technology is very appealing to many customers, especially those with smaller shops and in the quick-print market.

While there is no question that CTP offers considerable benefits, including increased efficiency, more productivity, and better quality, it can be a very confusing subject. There is a wealth of information available on this technology, however some of it is contradictory, or, depending upon the author, it is biased in favor of a particular manufacturer or product type. In this paper, we have attempted to distill our collective knowledge about this technology in a clear and unbiased format. We sincerely hope that the information contained herein will be useful to you in making an informed choice when considering a computer to plate system. As stated in the introduction, we welcome any corrections, suggestions, or additional information readers may have.