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.