Thermal II Exposure Head
1200 DPI Performance Specification

Product Description

The Thermal II exposure head is a compact multi-channel imaging head with 23W of available laser power.

Physical

Size & Mounting details:	See mechanical interface document 72-0030A[1]

Imaging

Resolution:	**1200 dpi**
Write Laser:	830nm, 50W laser diode bar
Laser power at media:	5 - 23W
Contrast Ratio:[2]	< 8%
Leakage homogeneity:[3]	< 30%
Line Width:[4]	3.2 – 5.0 μm

Data

Max. Switching capability:[5]	150 Mbit/sec
Data Rate:[6]	212 Mbit/sec
Number of channels:	224 channels[7]

Pre-image time [8]

Laser ready time:[9]	<10 sec
Focus learn time:[10]	<12 drum revolutions
Edge detect time:[11]	Engine specific
Beam calibration time:[12]	Typically <60 sec
Write power servo time:[13]	0.5 mSec[14]

Auto focus system

Focus laser:	650 – 690 nm, ≤35 mW
Range of travel:	± 150 μm
Focus dynamic range:	See graph in footnotes[15]
Focus tracking accuracy[16]:	± 5 μm
Focus sensor sensitivity:	Depends on media characteristics[17]
Range finder range	±175 μm with valid magnitude or error ±500 μm with valid signal and direction of error, but clamped error magnitude

Environment

Ambient Temperature:	15°C – 40°C
Ambient Humidity:	5% to 90% RH
Coolant supply:	See mechanical interface document 72-0030A
Air supply:[18]	See mechanical interface document 72-0030A

Power Supplies[19]

Switched supply:	48V ± 10%, 305 W @ 48V Nominal
Un-switched supply:	48V ± 10%, 371W + 137 x (Rate Factor)[20]
Electrical Interface:	See electrical interface document 72-3480A

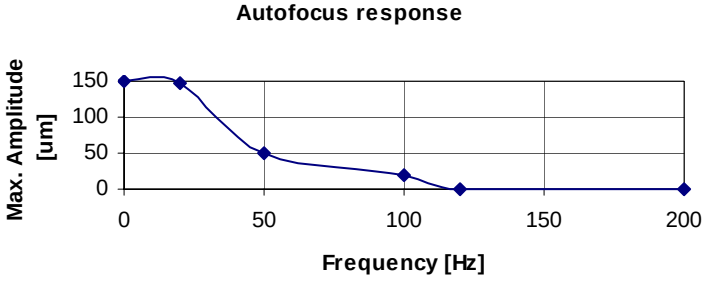
Regulatory Approvals[21]

Electrical safety:	IEC 950
Mechanical safety:	IEC 204-1
EMC:	FCC Part 15 Class A/B
Laser safety:[22]	Write laser: CDRH / IEC825-1 Class 4. Focus laser: CDRH / IEC825-1 Class 3B
Enclosure sealing:	IP 64

[1] The mechanical interface document describes in detail the mounting, connection and operating requirements for the exposure head. It should be read in conjunction with this specification.
[2] Even when all channels are switched off there will be some leakage of laser light to the media. The contrast ratio is defined as follows:

$$CR = \frac{P_{Leakage}}{P_{Spot_full}}.100\ \%$$

[3] The leakage light will not be perfectly distributed channel to channel – this specifies the maximum variation of the leakage light per channel.
[4] FWHM as measured by CreoScitex.
[5] At worst case drive conditions and worst case plot pattern (1x1 pixel checkerboard). This is a thermal limit – switching at a higher rate will put the driver electronics at risk.
[6] Under certain limits of pattern feature size the electronics will support a higher data rate of up to 240 Mbit/sec. Please consult CreoScitex for more information.
[7] Should an application require either a fixed number of channels and/or a minimum number of channels this should be explicitly indicated. In these cases heads could possibly be selected to meet the required criteria.
[8] Pre-image functions are media and application dependent. In some cases these functions can be done in parallel or even omitted.
[9] The time taken for the laser to stabilize sufficiently in order to be ready to image after a “laser on” command.
[10] The time for the focus system to initialize at the beginning of an image.
[11] This function is largely engine dependent but it does become part of the pre-image time. Typically if everything is set up correctly edge detection will complete in less than 6 seconds.
[12] The time taken for the head to calibrate all channels to the same power. This calibration is only performed at a fixed interval, typically every 9 hours.
[13] This servo operation occurs during the dead time between swath lines. All channels will be switched off during this time.
[14] Requires Thermal II head firmware V0.30 or later. For older firmware the time will be around 1.7 mSec.
[15] The graph below shows tracking response of auto-focus servo to bumps in the media surface.



[16] The accuracy quoted is typical for common media but can degrade on media with highly specular reflectivity or very low reflectivity.
[17] The auto-focus system uses the reflected focus laser light from the media surface to operate thus placing some requirements on the media for surface finish and reflectivity at a 670 nm. The specification of the minimum surface quality is a complex function of media reflectivity and surface quality – please consult CreoScitex for more information.
[18] An air supply is needed to run the active drier that protects the head from condensation build-up. An air supply may also be needed to feed the whisker jet, which aids in clearing smoke and or debris from the writing plane.
[19] Do not use electrical power supply specifications to determine cooling requirements for the product. Please consult mechanical interface document.
[20] For laser safety reasons there is a switched supply that can be cut to remove the laser diode drive, and an un-switched supply that supplies all other power requirements. The un-switched supply capacity cannot be specified without knowledge of the maximum stroke rate for the application.

$$StrokeRate[kHz] = \frac{\pi.dpi.d.rpm}{1{,}524{,}000}$$

where *d* is the drum diameter in mm, then

$$RateFactor = \frac{StrokeRate[kHz]}{650.Feature_Size[pel]}$$

where *Feature_Size* = 1 for 1x1 pixel pattern, 2 for 2x2 pixel pattern etc

[21] Approvals are usually certified through the platform the head is installed on and not for the head as a component with the exception of the enclosure sealing to IP64.
[22] Typically all platforms utilizing this exposure head will be compliant to CDRH / IEC825-1 Class 1