1.x Thermal Exposure Heads

Planned Maintenance

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Creo Inc.
3700 Gilmore Way
Burnaby, BC
Canada V5G 4M1
(604) 451-2700

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Revision History

Revision	Date	Author	Comments
Draft	Feb 2001	André Blignaut	Initial release
	May 2001	Maureen Gill	Updated the getcontr result graph
	July 2001	M Gill	Added steps for replacing DHU air filter
	Sept 2001	M Gill	Added link to Debris Removal Nozzle Cleaning Procedure
	Oct 2001	M Gill	Added part number for DHU replacement filter DHU
Pre-release	Nov 28 2002	Kurt Shelton (Ken DeCarle, editor)	Technical review/edits by Kurt. Edits done by Ken D. Part number assigned (719-00011A)
Pre-release	Jan 13, 2003	Kurt Shelton (Ken DeCarle, editor)	Technical review/edits by Ian/Kurt. Edits to Sect 3, Step 4 done by Ken D.
Pre-release	Jan 16, 2003	Kurt Shelton (Ken DeCarle, editor)	Reviewed by Kurt and Ken D. Edits to PM Procedures section to align content with VLF.
719-00011A	21 Jan 2003	Kurt Shelton (Ken DeCarle, editor)	Final review by Kurt S. Posted on TechPlanet by MG.
719-00011A-B	06 Mar 2003	MGill	Reformatted table to match online version.
719-00011A-C	24 Jul 2003	MMunroe	Added reference to lens cleaning kit (04-0012B)

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1. OVERVIEW

The purpose of this procedure is to monitor the performance and condition of the Thermal Heads. This information can help the head specialist to predict head failures before they happen and plan accordingly. Minor head adjustments can also be made to certain parameters before a problem is detected. Keep in mind that any changes to parameters can have an effect on the final print quality.

Preventative maintenance should be performed once a year, or in conjunction with your output device preventative maintenance schedule. In order to perform this procedure, you need to be familiar with the use of Splot. The latest versions of Splot and the latest scripts can be downloaded from the Splot site on TechPlanet: (http://techplanet.creo.com/output/service_tools/splot/nav/index.htm).

WARNING: Follow all Laser Safety procedures when working with the Thermal Heads.

2. RELATED DOCUMENTS

Make sure that you order the lens cleaning kit (04-0012B BOM) **before you arrive on-site**.

- Running and Interpreting Diagnostic Scripts – can be found in the Field Scripts zip files at the Splot website (http://techplanet.creo.com/output/service_tools/splot/nav/index.htm)
- Lens Cleaning Procedure - available from the Procedures page of the Thermal 1/1.7x TechPlanet site (http://techplanet.creo.com/output/heads/thermal/nav/proced.htm)
- Debris Removal Nozzle Cleaning Procedure – available from the Procedures page of the Thermal 1/1.7x TechPlanet site (http://techplanet.creo.com/output/heads/thermal/nav/proced.htm)
- Installing Thermal Heads - available from the Installation page of the Thermal 1/1.7x TechPlanet site (http://techplanet.creo.com/output/heads/thermal/nav/install.htm)
- Replacing the Dessicant Pack - see the Dehumidifier Unit FCO E246 information at: (http://techplanet.creo.com/output/heads/thermal/nav/fcos.htm#next_fail)
- Chiller Maintenance - available from the Procedures page of the Thermal 1/1.7x TechPlanet site (http://techplanet.creo.com/output/heads/thermal/nav/proced.htm)
- Dehumidifier Unit Installation Procedure – available from the Procedures page of the Thermal 1/1.7x TechPlanet site (http://techplanet.creo.com/output/heads/thermal/nav/proced.htm)
- Offset Plate Specifications Spreadsheet - available from the Home page of the Media TechPlanet site (http://techplanet.creo.com/consumables/media/nav/index.htm)
- Chiller Maintenance – Neslab/Polyscience External Chiller Planned Maintenance

3. PM PROCEDURES

Preventative maintenance should be performed once a year, or in accordance with your output device preventative maintenance schedule. This preventative maintenance procedure should take approximately one hour or less.

Step	What to do	What to look for	Procedure / Parts
NVS settings	Back-up NVS. In Splot or ServiceShell, run: **savecfg.spt**		
Reference plot	Run the standard test plot agreed to by the customer.	Examine customer's image reference plot. Agree on a test plot that fits with what LPI and quality of jobs the customer is doing (FM/AM Proofing, linework, or high quality).	
Reference stroke cal	Create a Stroke cal reference. In Splot or ServiceShell, run: **strokcal.spt**. Wait for the graph to appear.	Examine the strokecal.spt graph in ServiceShell. This will give a baseline as to the health of the head. Compare to the factory or previous graphs and keep for reference.	Refer to the sample graphs in section 4.
Laser power	Check the laser power. 1. Type: >>mode media x(x=media in use) >>laser on >>laser 2. Record the current value that the head draws at the specified wpower. Record laser on time in hours. Type: >>set head nomlsrcur 3. The current should be less than nomlsrcur. Type: >>head power sum (use >>head power full if firmware version is earlier than 1.62v) >>laser off	Check the laser output of the head at the wpower for the media that is used. Note and record the current draw when the laser is on. If the laser current approaching the >>set head nomlsrcur value, it is a good indication the head is nearing end of life. Check the power at the nosepiece and compare to the power on the Media spreadsheet for the given media.	Offset Plate Specifications Spreadsheet in the Related Documents section.
Sum and focus error	Check the sum and focus error. Load a plate on the drum. Type >>head install on	Check that the sum value is around 1000 units and the error is near 0 (see note, below). A sum lower than 1000 can indicate debris buildup on the final lens. If the lens is clean and the error is not 0 ± 25 units, reinstall the head as per the head install document. **Note:** The error may be different on a Spectrum device.	

	Remove the head	Device must be powered down. All laser safety procedures must be followed.	Thermal Head 1.x Installation Procedure. Thermal Head 1.7 Installation Procedure. Both in the Related Documents section.
Safety	**Warning: Follow Laser Safety Procedures during the next step.**		
Debris removal nozzle	Clean the debris removal nozzle using the correct procedure.	The pressure tap in the vacuum nozzle needs to be clean of debris in order for the debris removal system to work properly.	TEH 1.7 Debris Removal Nozzle Cleaning Procedure in the Related Documents section.
Lens	Clean the lens using the correct procedure.	Leaving streaks can seriously impact imaging quality.	TH1/1.7 Lens Cleaning Procedure in the Related Documents section. **Note:** Make sure that you order the lens cleaning kit (04-0012B BOM) **before you arrive on-site**.
	Install the head	Follow the head installation procedure. • Check that the sum value is around 1000 units and the error is near 0 • If the lens is clean and the sum is lower than 1000, you may need to adjust the surface reflectivity	Thermal Head 1.x Installation Procedure. Thermal Head 1.7 Installation Procedure. Both in the Related Documents section.
New stroke cal	Generate a new stroke cal. In Splot or ServiceShell, run: **strokcal.spt** Wait for the graph to appear.	Generate a new stroke graph and compare it to the stroke reference graph (Step 3) to determine any changes as a result of the nozzle or lens cleaning.	Refer to the sample graphs in section 4.
	Compare stroke graphs. Type >>set head Bpmaxerr xxx	Compare the strokecal graph obtained in the previous step to the sample graphs and determine if any parameter adjustments are necessary.	Refer to the sample graphs in section 4.
Contrast script	Run the contrast script. In Splot or Service Shell run: **getcontr.spt** If adjustments are required, type: >>set head Bposn xxx	Compare the graph obtained to the sample graphs. Determine if any adjustments are necessary. **Note:** This may cause a change in the strokecal graph. If changes were made to the Bposn value, repeat Steps 27 to 28.	Refer to the sample graphs in section 4.
Laser power	Verify the laser power. 1. Type: >>mode media x(x=media in use) >>laser on >>laser 2. Record the current value that the head draws at the specified wpower. Record laser on time in hours. Type:	Check the laser output of the head at the wpower for the media that is used. Note and record the current draw when the laser is on. If the laser current approaching the >>set head nomlsrcur value, it is a good indication the head is nearing end of life. Check the power at the nosepiece and compare to the power on the Media spreadsheet for the given media.	Offset Plate Specifications Spreadsheet in the Related Documents section.

	>>set head nomlsrcur 3. The current should be less than nomlsrcur. Type: >>head power sum (use >>head power full if firmware version is earlier than 1.62v) >>laser off		
ECOs/FCOs and firmware	Check that all ECOs/FCOs have been implemented on the thermal head. To see the current firmware version of the head, type: >>head or >>list version	A list of FCOs can be seen at the FCOs page of the Thermal 1/1.7x TechPlanet site. Also check that all firmware upgrades have been carried out.	
Shutter	Test the operation of the lens shutter. Type: >>shutter open >>shutter close Another test option is to type >>focus cal reflect and listen to the shutter rapidly opening and closing.	If possible, listen to the sound and check that operation is normal. Clean the shutter, if necessary.	Thermal Head Shutter Cleaning and Replacing in the Related Documents section.
NVS settings	Final NVS save. In Splot or ServiceShell, run: **saveconfig.spt**	Generate a final strokecal graph and a THXXXX.cfg file that can be used for future reference. This script takes approximately 6 minutes to run. Leave the THXXXX.cfg file on the workstation for future reference.	
DHU	Each device will have a head-mounted Dehumidifier Unit (DHU). 1. Power down the device and purge all air from the system. 2. Replace the filter (PN 55-1219). 3. Turn the air on and power up the device.	**CAUTION:** If the differential pressure indicator displays red you need to examine the bowl to determine if the device has been tripped by moisture or oil in the line. You must replace the DHU (part number 05-0244) once it has been tripped, then investigate why the DHU tripped. Rectify air quality before reinstalling the new DHU. **Note: If the device has a desiccant box:** upgrade the Desiccant pack to a DHU (kit #05-0244). For details, see the Dehumidifier Unit FCO E246 information.	Dehumidifier Unit (DHU) Install Procedure in the Related Documents section.
	If the pressure indicator is red, the DHU MUST be replaced and the air system examined for contaminants.		
Chiller	Check the Chiller.	Allow 30 minutes, 5 minutes to return device to customer.	Refer to Chiller Maintenance in the Related Documents section.

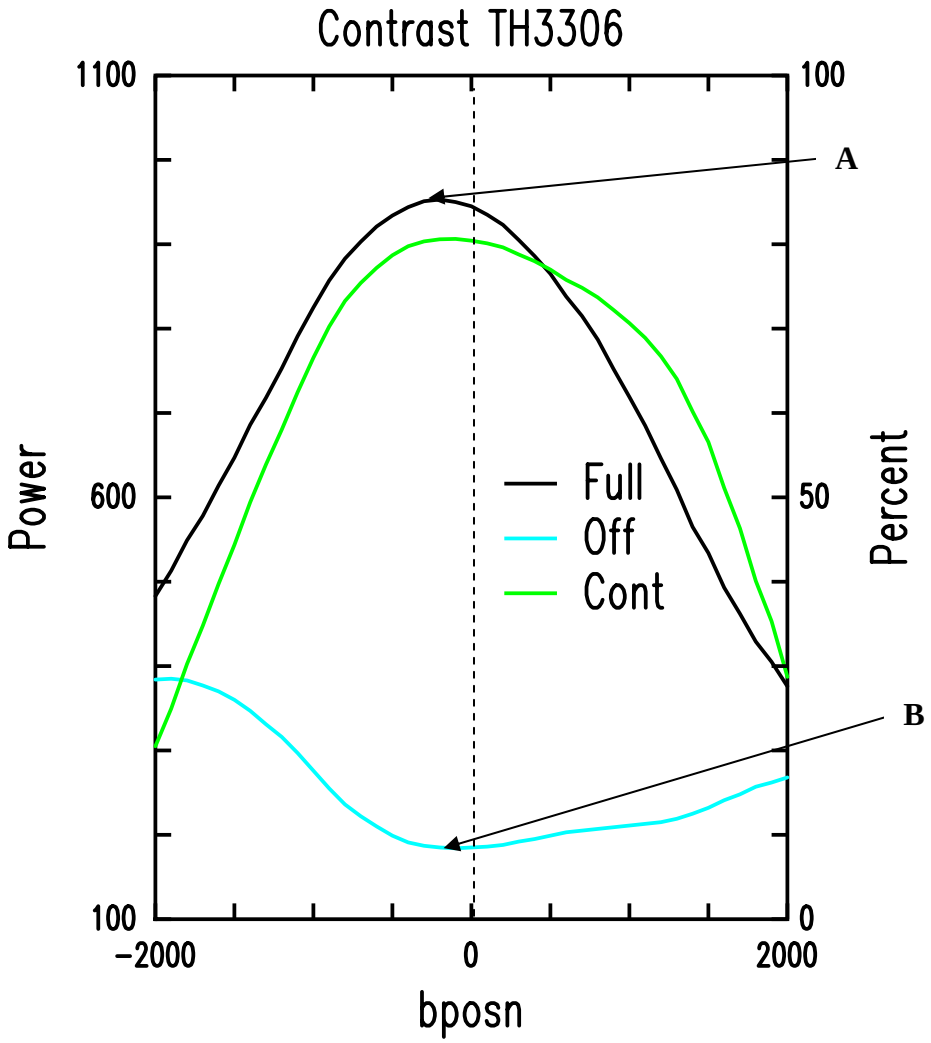
4. SAMPLE GRAPHS

Getcontr.spt: Graph of a good response

This is an example of a good response with a Beam position range of -2000 to +2000.

The best bposn value for maximum contrast for this head would be equal or close to zero.

Max power out (Line A); Max contrast (Line B at it's lowest).



t:\nvscfg\TH3306\getcontr.pdf Tue Oct 03 10:19:02 2000

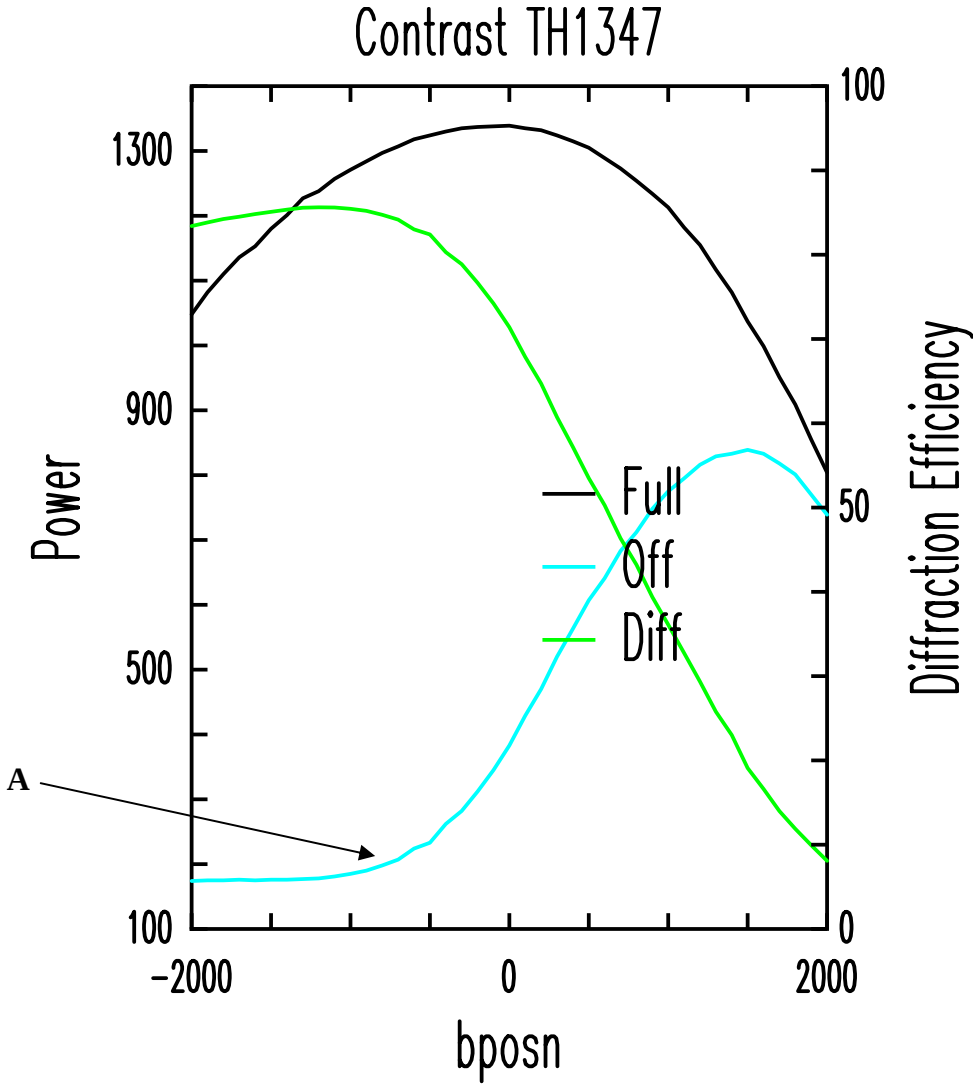
Getcontr.spt: Graph showing a large shift of an optical component

This graph indicates quite a large shift in one of the optical components in the Head.

While the power is still good, contrast (off power, Line A) is starting to get worse. To maximize head life, bposn must be changed to -1100 bposn. While the contrast improves, loss of max power output is compromised. In most situations the head has margins to accommodate this. This head can be tweaked for better performance but is near it's end of life if the shift continues.

It is best to compare getcontr graphs to previous graphs to get an indication if any change that has occurred.

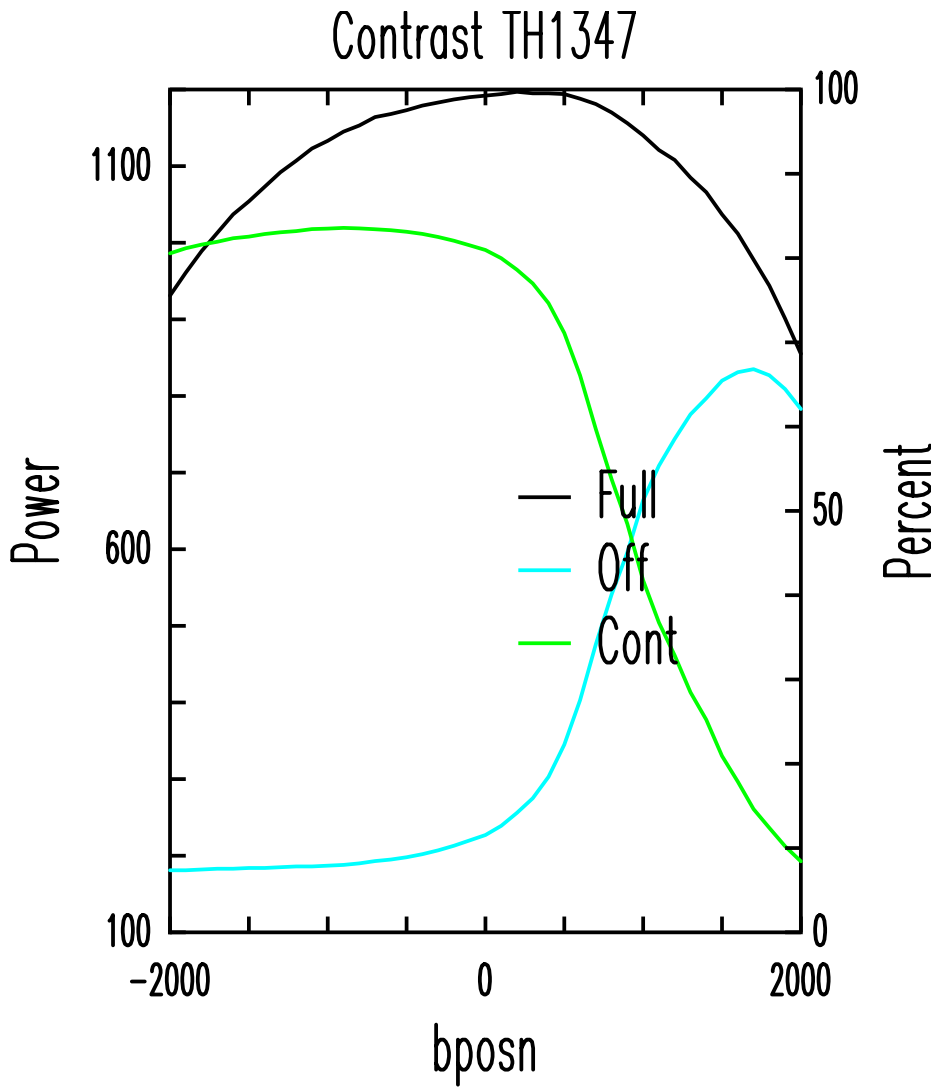
Note: After changing BPOSN, re-run *strokecal.spt* to confirm that the correction have made an improvement.



Getcontr.spt: Graph showing a small shift of an optical component

This is similar to the F33 shift, only not so large. It shows a small f33 shift. Bposn for this example would be approximately -950.

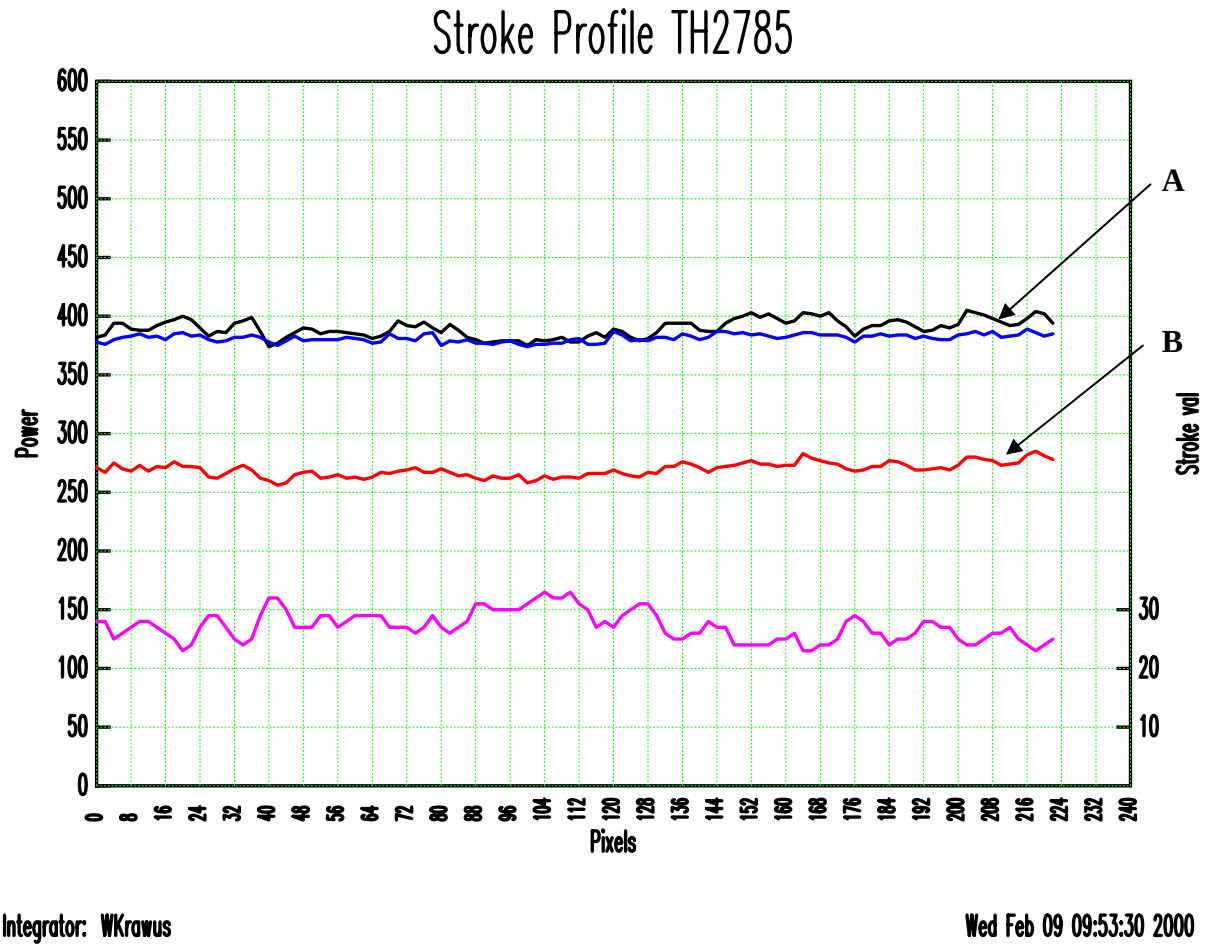
Note: When changing bposn, the stroke will most likely change. Re-run the *Strokecal.spt* script to confirm that the correction has made an improvement.



Strokecal.spt: Graph of good alignment, healthy laser

This is an example of what a good alignment with a good laser profile can output. Notice the flat profile (Line A, stroke init 33) and the large margin between Line A and Line B (Line B is stroke init 1).

BPMAXERR value is normal at 3%.

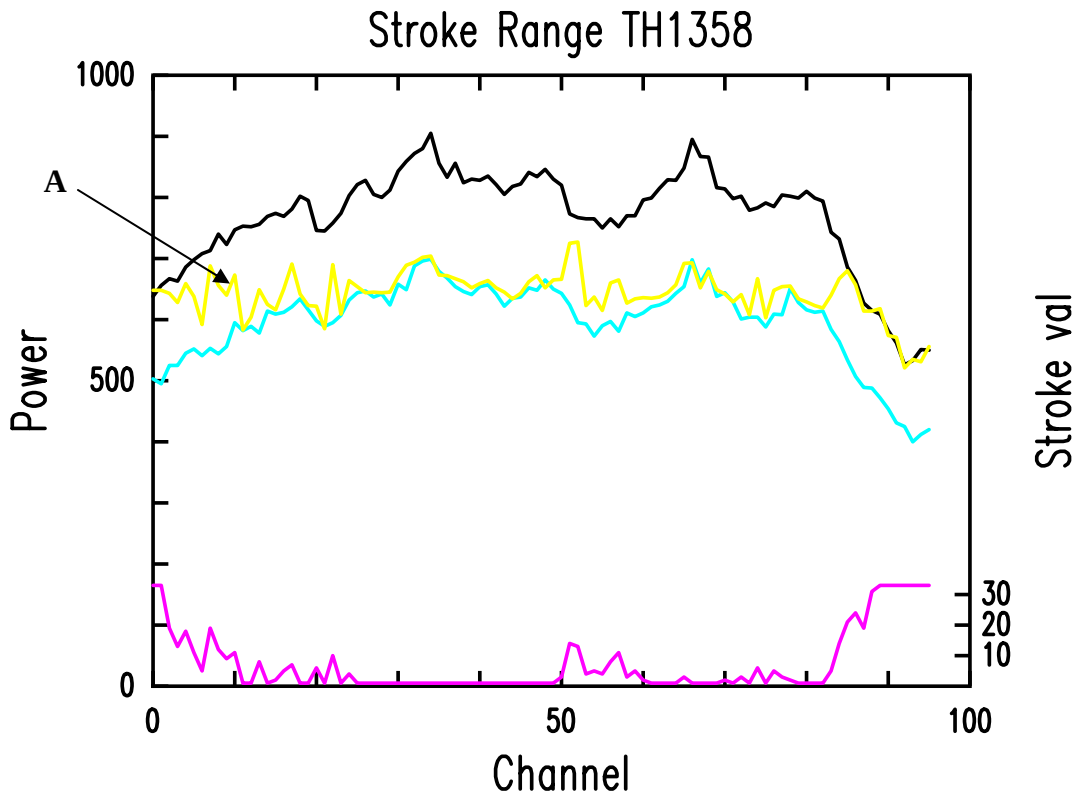


Strokecal.spt: Graph of poor profile, poor laser

This graph indicates a very degraded laser, or optical contamination (debris in the optical cavity), with a poor profile.

BPMAXERR was increased to overcome the profile. With a larger BPMAXERR value, stroke (Line A) can be the best fit for a successful `strokecal`.

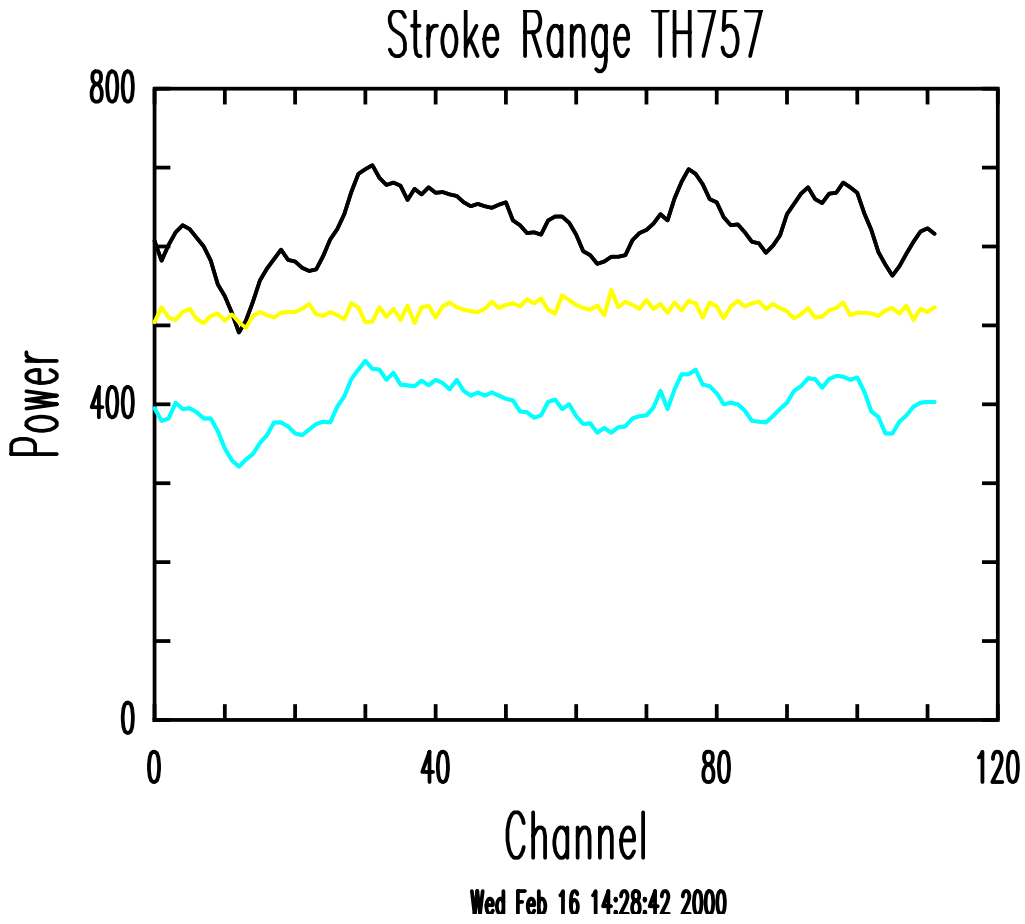
Banding would have been evident in this example.



Strokecal.spt: Graph of normal degradation

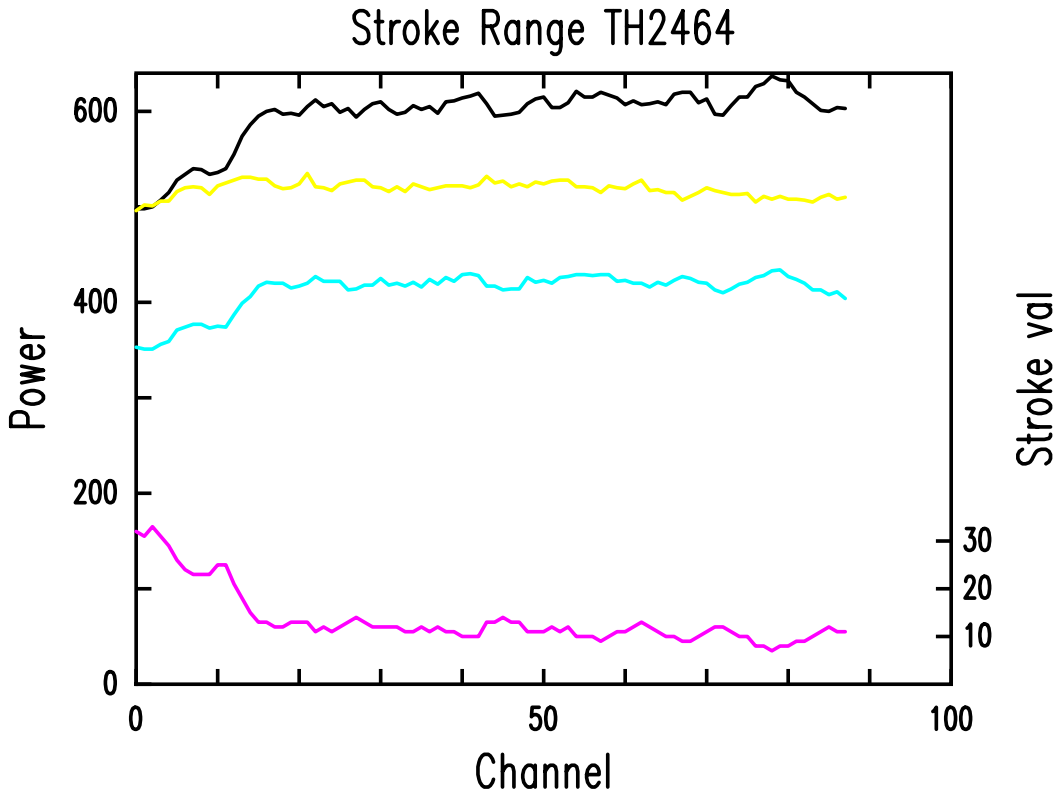
This is a normal degraded stroke cal graph. Notice how the stroke is flattened to the lowest point in the laser profile.

Minor tweaking of `bposn` can sometimes change the output profile and improve the stroke and margins to maximize head life. Laser profiles have been known to change over time.



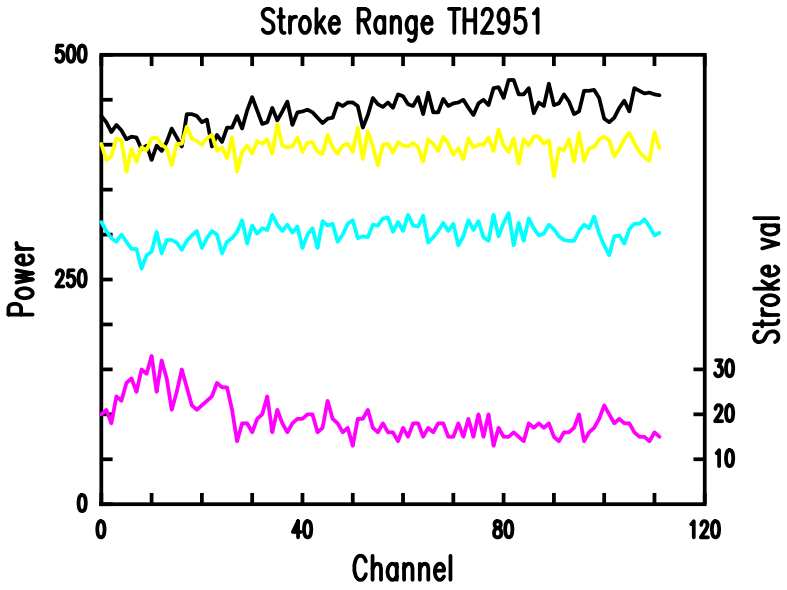
Strokecal.spt: Graph of incorrect bposn

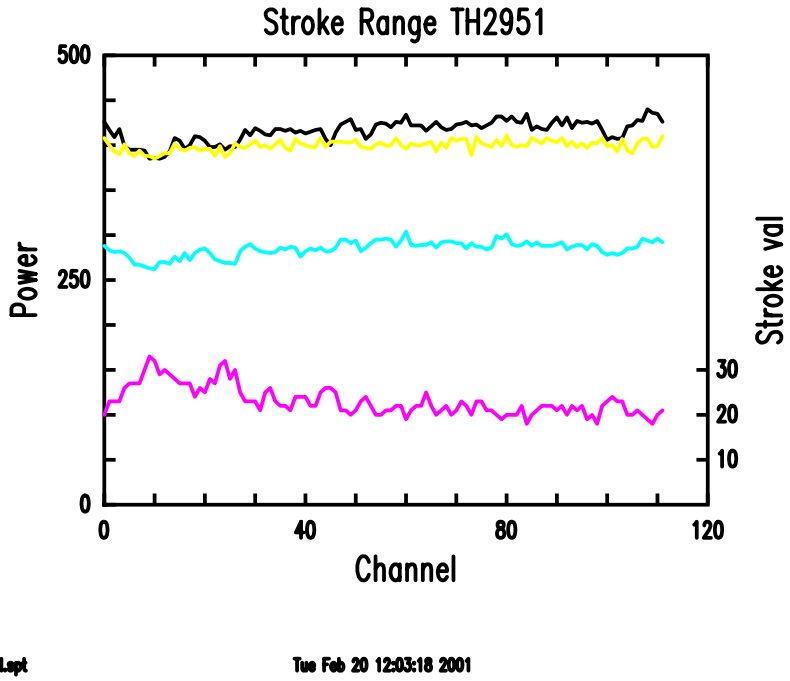
This is an indication of a possible incorrect `bposn.` As the best `bposn` position shifts, the `strokecal` graph starts to develop a side of the profile that appears to droop. The head will still operate, but possible corrections may be needed in the future to maximize head life.

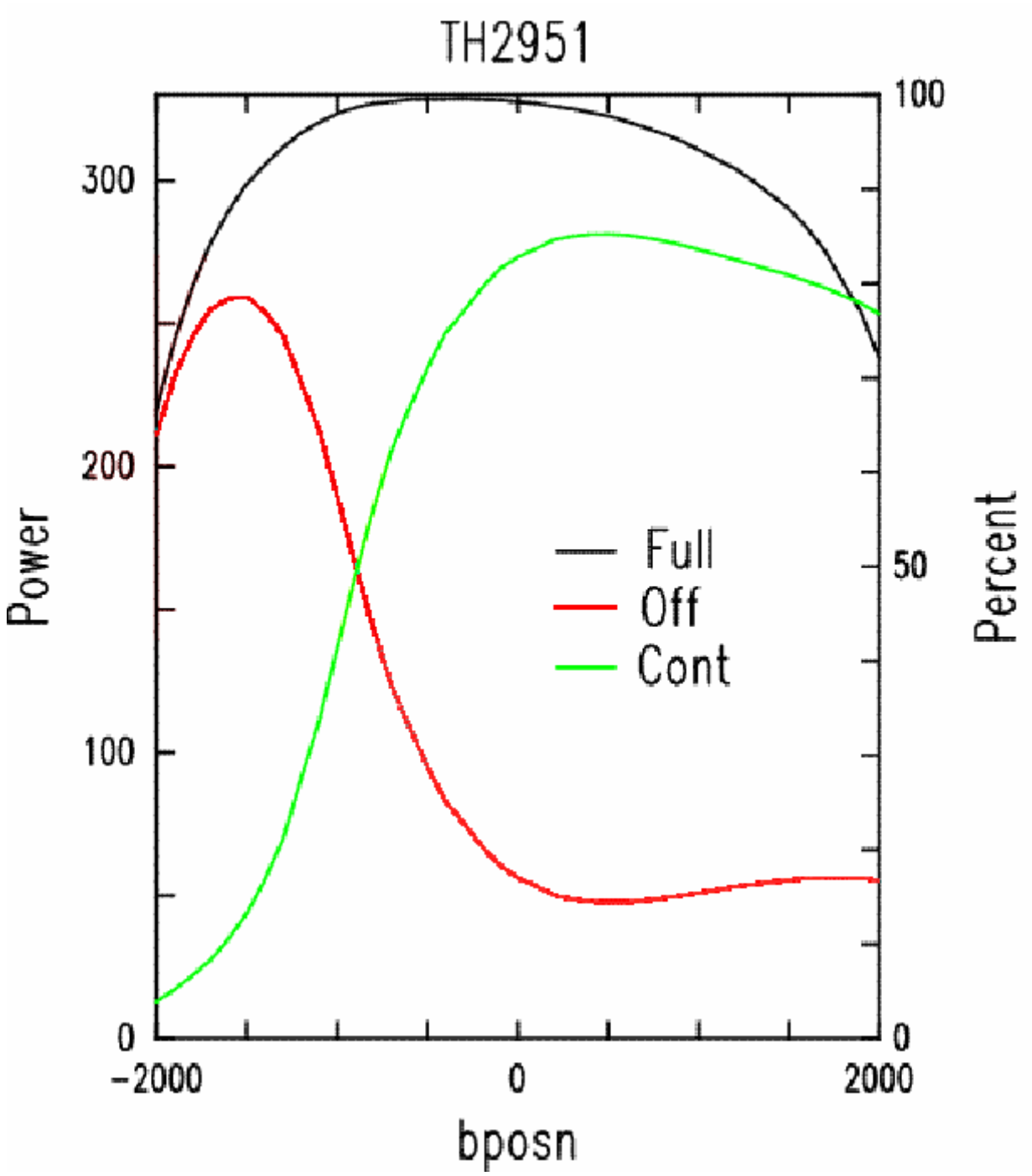


How to adjust Bpos

The first graph in this series of three shows a strokecal with poor power output where Bpos was equal to 0. The second strokecal graph shows a significant improvement after Bpos was changed to 500. The third graph illustrates the getcontr result.






TH2951
300
200
100
0
Power
100
50
0
Percent
Full
Off
Cont
-2000
0
2000
bposn