

Thermal 1/1.7 Exposure Head

Running and Interpreting Diagnostic Scripts

Document Number
13.0

December 21, 2004

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Revision History

Revision	Date	Author	Comments
1	6/3/97	OCramer	
2	30/9/97	TSteiner	Updated script comments
3	14/1/98	TSteiner	Comments on new scripts
4	19/1/98	TSteiner	Modified for head integrator use.
5	17/11/98	TSteiner	Additional scripts, modified to match 2.14
6	12/1/00	TSteiner	Additional scripts: setdiagmode.spt, readdiagmem.spt, focusdiag.spt, fieldnvscheck.spt; Splot ver 2.68; Remove Perl script: extract.bat
7	28/7/00	TSteiner	Replaced scripts: runphase.spt and runflat.spt with scripts: manphase.spt and manflat.spt. Made minor clarifications to several script descriptions. Updated all applicable scripts to produce *pdf* files instead of *eps* files.
8	14/9/01	AKrause	Updated setdiagmode.spt, readdiagmem.spt, and focusdiag.spt scripts to reflect changes in head firmware version 1.74.
9	11 Dec 2001	MGill	Added updated list and notes for Media Setup Scripts
10	11 Jan 2002	AStrocel	Cleaned up Media Setup Scripts documentation
11	15 Oct 2002	AStrocel	Deleted mpeupld.spt and upload.spt from the bundle.
12	29 Nov 2002	AStrocel	Added contrast.spt to the bundle.
13	21 Dec 2004	AStrocel	Added shutter scripts to the bundle, added documentation on MPE/MCE compatibility, and added discussion of Service Shell.

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1. SCOPE

This document details the use and interpretation of thermal head diagnostic scripts run under *Service Shell* or *Splot*. Most scripts are MCE-compatible. The documentation for each script outlines host compatibility.

2. INTRODUCTION

The diagnostic scripts are intended to be run in the field, to characterize head performance and diagnose problems. In general, the scripts have been tested many times with good results. At present, we recommend that you only run the plot and scan scripts on Kodak media as they have not been proven on other media and likely will not work on most media. The other scripts are useful regardless which media is in use.

Unless otherwise indicated the scripts restore the device to its original state upon exit.

Refer any problems with the scripts to Shane Martin.

3. RUNNING THE SCRIPTS

The preferred terminal application on all Creo devices is *Service Shell*. The diagnostic scripts are installed along with Service Shell, and can be accessed in the 'Scripts' window. The most commonly-used scripts are found under 'TH1.7x Service', and the rest of the scripts are found under 'TH1.7x Expert'. In order to ensure that you have up-to-date versions of all scripts, be sure to update your version of Service Shell regularly. Service Shell can be downloaded from the Downloads page of the Service Shell TechPlanet site.

Alternately, these scripts can be executed using *Splot*. Splot can be downloaded from the Downloads page of the Splot TechPlanet site.

4. RUNNING SERVICE SHELL

To access and run the scripts in Service Shell, click on the 'Scripts' option under 'Views', visible on the left-hand side of the screen. The scripts will take a minute to load. Navigate to the desired script by choosing the group, and clicking on the script's name. The script will then appear in the main Service Shell window.

To run a script, you can double-click on its name, or click on 'Run' in the top right corner of the Service Shell window.

5. RUNNING SPLOT

Open Splot, and load the script that you want to run by selecting **File > Open** and navigating to the script.

To run the script, press Ctrl + g (g for go) or select **Exec Menu** > **Execute**.

6. SCRIPT OUTPUT

Script output is stored in the c:\th1results\ directory. Subdirectories for each head serial number, script name, and script run are created. To modify the root directory for storage, edit the BASEPATH parameter in **th1_include.spt**.

7. DESCRIPTION OF SCRIPT OPERATION

What each of the scripts does is outlined below. It is best to start with **savecfg.spt** and **fieldnvscheck.spt** when first working on a problem thermal head. This is especially important for MCE devices as any settings changed are automatically saved. The files created by this script will allow you to return the device to its original state.

Note: The plot and scan scripts should executed in the same order as they appear in this listing.

7.1 Common Utilities

7.1.1 th1_include.spt

Th1_include.spt is not a stand-alone script. This script contains common utilities, which the other field scripts call. This script must be stored in the same directory as the other field scripts, in order for the field scripts to function properly.

7.2 Data collection and display

7.2.1 savecfg.spt

Savecfg.spt is compatible with MPE and MCE devices. It is a service-level script.

This script extracts head parameters and saves them to a file. It is very useful for logging the machine status and is the first script that should be done when conducting maintenance or trouble-shooting.

This script produces three output files. Previous versions of files produced by this script are retained and renamed as *LD0046.sp1, LD0046.sp2,* etc. These files are put in a subdirectory from the current directory named *TH0046* where the number is the head serial number 46 in this example.

Savecfg.spt generates an output file of the form *TH0046.cfg* where the number in the name is the head serial number. It also produces a *strokcal.pdf* file with the stroke cal results displayed graphically **The script does a *reset head* at the end so be sure to save any changed head parameters first**.

This script records every nvs parameter relevant to the head as well as the scorr tables for all defined media. This thus captures the current state of the head and produces a new script called **ldthxxxx.spt**, which can be run to return the head to this state. Thus, run this script before a firmware upgrade or other major changes or tests.

7.2.2 strokcal.spt

Strokcal.spt is compatible with MPE and MCE devices. It is a service-level script.

This script tests basic laser and LV operation. The results will tell you if the laser profile is square enough. It will also tell you if there are any stuck pixels. Use this if you have stroke cal problems, or in case of banding.

There are two options when running this script, and the script will prompt you to choose one. The first option, ***1) Regular Strokecal***, plots three stroke profiles. They are *stroke init 33, stroke init 1*, and the calibrated profile following *stroke cal*. The first option is the preferred mode of operation. The second option, ***2) Stroke graph (without the strokcal)*** plots three stroke profiles as well. They are *stroke init 33, stroke init 1*, and *stroke init 16*. The second option is useful for heads that are unable to perform a beam balance. If you select option 1 and beam balance fails, the script will automatically perform option 2.

By looking at the output plot you can determine if there are any weak or stuck channels on the head. The plot includes additional information about firmware versions and head parameters at the bottom of the graph. This script also does a *reset head* at end.

7.2.3 strkstab.spt

Strkstab.spt is compatible with MPE and MCE devices. It is an expert-level script.

This script determines the stroke stability of a head by doing repeated *stroke cals* with the laser on and light valve off for 10 minutes between iterations. 4 iterations are done and at the end two plots are produced. The top plot displays the stroke table for each iteration, while the bottom plot displays the stroke profile for each iteration. This script is effectively measuring light valve creep on a per channel basis. The change in power (stroke profile numbers) should be less than 10 %. Often the creep is non-uniform and in this case the upper stroke plots will show a marked difference from one side to the other as time progresses. Keep in mind how the stroke cal works in interpreting which channels if any are bad.

7.2.4 getcontr.spt

Getcontr.spt is compatible with MPE and MCE devices. It is a service-level script.

This script tests the beam pointing actuator, pointing sensors, head alignment and leakage. It produces a graph.

This script varies the beam position servo set point between -1000 and 1000 and measures power full and power off at each position. From this information the contrast ratio as a function of *bposn* is calculated and displayed. The peak in the output and the peak in the contrast should occur at near the same *bposn* and this value of *bposn* should be entered and saved in the head NVS.

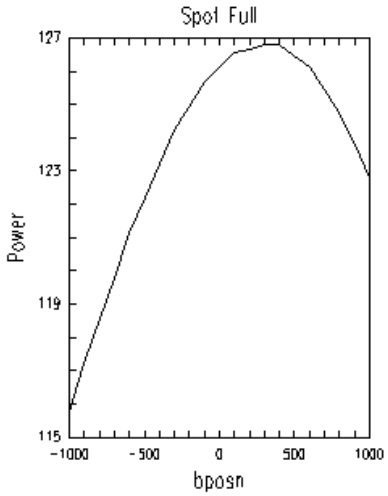
7.2.5 contrast.spt

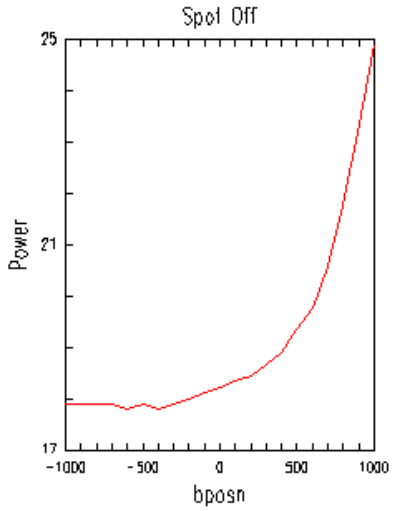
Contrast.spt is compatible with MPE and MCE devices. It is a service-level script.

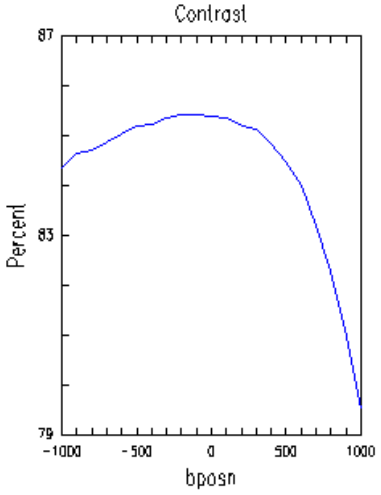
This script is a modification of getcontr.spt, intended to provide more information to the user. This script tests the beam pointing actuator, pointing sensors, head alignment and leakage. It produces four graphs.

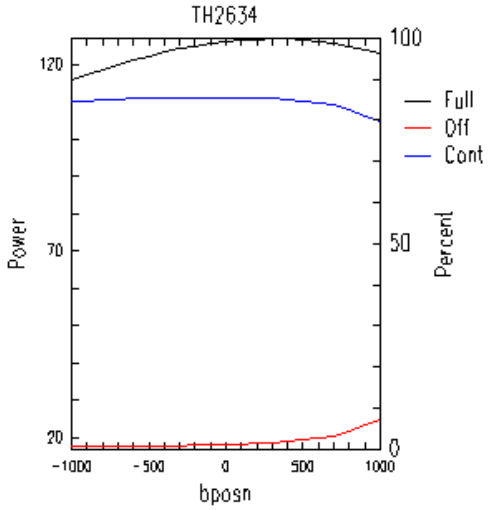
This script varies the beam position servo set point between -1000 and 1000 and measures the power full and power off at each position. From this information the contrast ratio as a function of *bposn* is calculated and displayed. The peak in the output and the peak in the contrast should occur at near the same *bposn* and this value of *bposn* should be entered and saved in the head NVS.

The graphs are displayed in succession. The first three graphs display power full, power off, and contrast individually. Note that the scale is altered for the first three graphs. This allows you to see more detail in each of the lines plotted. The fourth graph displays all three lines together, as in getcontr.spt. The fourth graph should be consulted before determining beam position. Sample graphs are displayed below.









7.2.6 setdiagmode.spt

Setdiagmode.spt is compatible with MPE and MCE devices. It is a service-level script.

This script determines which data is stored using the head diagnostic capabilities. This script will also start and stop data collection one time. Note that if you run this script a second time, the original data will be over-written.

The head may be configured to collect and store sensor data from any two sensors on the head and thereby act much like a 2 channel digital storage scope. One limitation however, is the low transfer rate of data out of the head. So, while it is possible to collect a lot of data quickly, it can take many minutes to read it out.

This script does not read out any data—it is only a user-friendly way of setting the values of the head parameters diag0, diag1, and diag5, which control the data collection mode. When the script is started you will see a button menu allowing selection of the first diagnostic memory mode. After selecting both data sources you will be given an indication of how long it will take to fill the buffer and if desired it is then possible to enter a divisor to change this.

The diagnostic memory modes that can be chosen are:

1. Focus Data – choose this mode for both upper and lower banks to configure for use with **focusdiag.spt** script
2. Write Laser – write laser power sensor reading
3. BP0 Data – BP0 sensor reading
4. BP1 Data – BP1 sensor reading
5. Nosepiece – shutter sensor power reading
6. Diode Temp – laser diode temp reading
7. Ambient Temp – ambient temp reading
8. Case Temp – case temp reading
9. Humidity – humidity reading
10. LV Temp –
11. Focus Sum – focus sum signal
12. Focus Error – focus error signal
13. Diag0 Data – **leads to additional menu of choices, see below**
14. Diag1 Data – **leads to menu of additional choices, see below**
15. Lens Position – lens position reading

Each of these sensors have their own characteristic data collection rate; so, in order to get the time scale to match for both of the data streams, the first channel (lower bank) sets the overall timescale, and the data for the second channel (upper bank) is either pruned or padded with duplicates as necessary. The total available space is 30K of samples for each channel. Once this many values have been collected data acquisition stops. The time it takes to fill the sample memory depends on the characteristic data

rate of the channel 1 source, and may be as short as 6 seconds. In order to be able to collect data for a longer time period or to simply reduce the number of samples that need to be read out of the head it is possible to set a divisor (the diag5 parameter). For example, if a divisor is set to 10, then only every tenth sample is stored, and it now takes 60 seconds to fill the memory if it took 6 seconds with a divisor of 1. Setting the divisor to the largest value of 32767 will allow collection of environment information such as humidity for a period of months. Setting the divisor to 0 turns off data collection for the **readdiagmem.spt** script. If the head is configured to collect information for the **focusdiag.spt** script it will still collect this data while plotting, even if the divisor (diag5) is 0.

It is important to know what starts and stops the data acquisition. This also depends on what input was selected for the first channel. The first channel is the master and the second is the slave. The second channel starts and stops at the same time as the first. If the channel 1 data source is the write laser power, the BP sensors or the shutter sensor, then data collection starts and stops every time the laser is turned on or off respectively. If the channel 1 data source is the focus sum, focus error or lens position, then data collection starts and stops when the focus is turned on and off. For the environment sensors or the diag0 and diag1 outputs data collection starts immediately after the script sets up the data acquisition mode, and stops when the acquisition mode is set back to "Focus Data". Note that every time data collection is stopped and restarted any previous unread data is lost. Only the most recently collected data is available to be read out.

The “Diag0 Data” and “Diag1 Data” modes allow the user to configure the head’s original diagnostic output capabilities. The head has a diagnostic port to which it is possible to connect a cable and look at signals from in the head. Instead of connecting a cable, it is now possible to, in effect, loop the output back into the head and store these values. The configuring of these data sources is separate from configuring what to store in the head diagnostic memory and is handled by the script if these data sources are chosen.

An additional menu of output parameters is offered. There is some parameter duplication.

Diag0 Data mode options

1. Focus Error
2. Lens Position Error
3. Lens Position
4. Focus State
5. Focus Control
6. Laser Power Error
7. Laser Current
8. BP Error
9. BP Current
10. Stroke Cal Pulse Heights
11. Stroke Cal Total Off

Diag1 Data mode options

1. Focus Sum
2. Focus Diff
3. Focus Actuator Current
4. Focus State
5. Focus Control
6. Laser Current
7. Laser Power
8. BP Current
9. BP Sum
10. Focus Error
11. Stroke Cal Pulse Heights
12. Stroke Cal Total On

There are three configuration scenarios for this script. The first is used if focus information is to be analyzed using the **focusdiag.spt** script. Both the upper and lower diagnostic memory banks must be set to “Focus Data” (diag0 and diag1 set to 0). The **readdiagmem.spt** script will not work in this memory bank configuration. The second scenario is if the other head parameters will be analyzed with the **readdiagmem.spt** script. In this case the banks are configured to the two parameters desired (other than “Focus Data”). The third scenario is when it is desired to analyze only one head parameter with the **readdiagmem.spt** script. In this case, the first channel (lower bank) must be configured to the desired parameter and the second channel (upper bank) must be set to “Focus Data”. Only the desired parameter will be displayed by **readdiagmem.spt.**

Lastly, the script displays two buttons with the options "COLLECT MANUALLY" and "COLLECT USING SCRIPT". The “COLLECT MANUALLY” choice applies to data acquisition requiring user actions, or data acquisition that is intended to run for a long time. The “COLLECT USING SCRIPT” choice applies to those situations in which you want to collect for some short time under script control. The second choice will display a "STOP" button to terminate data acquisition.

Note: In the context of this explanation, the settings “Focus Error”, “Focus Sum”, “Focus Diff”, “Focus State”, and “Focus Control” are all considered other head parameters. The phrase ‘focus information’ is used in reference to the data captured when using the “Focus Data” setting only.

7.2.7 readdiagmem.spt

Readdiagmem.spt is compatible with MPE and MCE devices. It is a service-level script.

This scripts outputs the diagnostic sensor data that is stored by the head when **setdiagmode.spt** is used (except for focus information – see **focusdiag.spt** below). When this script is run you will be asked for a file name to store the results to on your local computer. A simple choice is something like "c:\temp\data". Then, if the number of data points stored is large a dialog will allow entry of a reduced number of data points to read out. Reading out data from the head is slow and reading the entire memory contents may take fifteen minutes or more if both the lower and upper banks are full.

Once data has been read out it is graphed in the graphics window, and the axes are labeled to reflect the data source(s) and the time scale.

To view the data again it is not necessary to read the data from the head again. Instead by answering "n" to the "Collect data from head" question at the start of script execution the data is read from the local data file (at the user specified location) that was created the first time the script was run. This is considerably faster, taking less than five minutes in most cases.

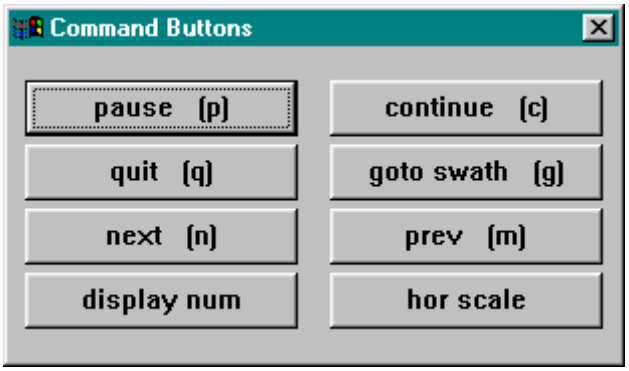
7.2.8 focusdiag.spt

Focusdiag.spt is compatible with MPE and MCE devices. It is a service-level script.

The script **focusdiag.spt** is a powerful tool that may be used to diagnose most focus problems- files for LCA bundle 5.03. Any time a plot is made focus modes 0 or 4 the focus details for the entire plot can be stored to a bank of memory in the head. This information can then be read and displayed using **focusdiag.spt**. This does not interfere with regular operation and can be used as a post mortem test for problems with the focus system.

In order to set up the head to store focus information, configure both the upper and lower banks of head diagnostic memory to “Focus Data” using the **setdiagmode.spt** script. You can store either focus information or other head parameters with the **setdiagmode.spt** script but not both. Setting the diagnostic mode to “Focus Data” causes focus information to be stored and implicitly turns off other data collection. Previously stored information will be over-written when the diag mode is changed. Thus if you have been storing humidity (or other parameter) for months you probably want to read it out before changing these settings.

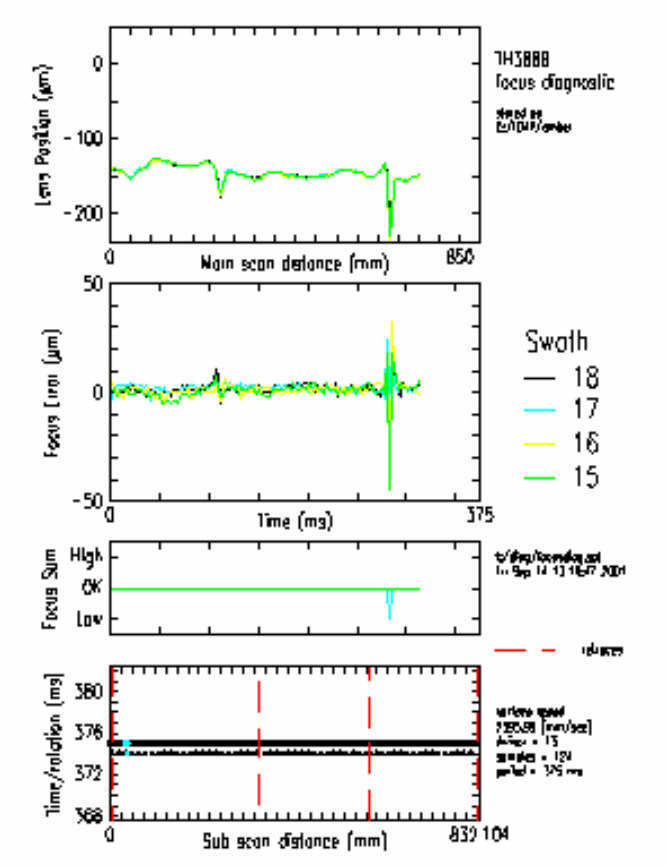
The **focusdiag.spt** script only reads out previously stored focus data; it does not configure the head to collect data. When running the script you will be asked for a path to a data storage location as well as the start and stop swaths. To read out an entire plate's worth of focus diagnostic information can take fifteen minutes or more, so it is usually a good idea to restrict the readout to the sub scan area of interest. To do this, select a start and stop swath in the region of interest. By default, start and stop values correspond to the first and last swath from the last plot. When the script has finished extracting all the data from the head it will display a movie of the focus performance. One to four swaths (user configurable) are displayed at any one time and the script will play them all from start to stop. There are dialog buttons, displayed below, to pause, quit, step forward, back etc. The movie will terminate on the last swath. To view the focus performance again it is not necessary to read the data from the head again. Instead by answering "n" to the "Collect data from head" question at the start of script execution the data is read from the local data file (at the user specified location) that was created the first time the script was run. This is considerably faster, taking less than five minutes in most cases.



Movie dialog buttons.

Note: If the head firmware is not up to date then you will only get this first graph of lens position and the rest of the diagnostics discussed below are not available.

There are four graphs on the screen when focus data is displayed. A sample is displayed below:



Focus data display.

- **The top-most graph** is a plot of the lens set point position in microns as a function of main scan distance around the drum. The displayed swaths are color coded and the printed legend on the right side indicates the swath numbers of the currently displayed group. The x-axis is calibrated in mm and should correspond to the actual size of the imaged region on the plate. It is quite normal to have a fairly gradual plate bulge of -50 um or so near the leading edge (left side of the plot) but any other large deviations from 0 most likely mean damaged plates or a loading problem.

- **The second graph** on the screen shows the focus error in microns. This is the difference between the actual lens position and where it should have been as determined by the auto-focus mechanism. This should be within 5 um of zero everywhere if the focus is working properly. Even a relatively small bump may be

too steep for the auto-focus servo and in this case you will see a larger error in the focus error graph. The horizontal scale for this graph exactly matches the one for the lens position graph above it but in this case the units are time in milliseconds. Either horizontal scale may be used for any of the upper three graphs.

- **The third graph** is the focus sum signal graph. For the focus to work properly the returned auto-focus laser intensity must be in the range 500 - 1800. The sum signal graph only has three states: “okay”, “low” or “high”. Every swath should be a straight line at the “okay” level. If this graph has “low” regions where the focus sum is less than 500 (actually 1/2 of (*onthresh* - *offthresh*) or “high” regions where the focus sum is greater than 1800, it means that the focus is not working in those regions. In regions where the sum level is not “okay” the recorded error is 0 but the actual error may well be large it is just that the head can't measure it reliably in these circumstances. Thus the focus error displayed on the second graph as described in the preceding paragraph is only meaningful if the focus sum level is “okay” as displayed in the third graph. If the sum signal is not “okay”, make sure that the surface reflectivity setting (sr) is appropriate for the current media. Other causes of sum signal problems could be starting off the media or defects in the media. On some highly reflective media the reflected sum signal fluctuates wildly. In this case an occasional not “okay” spike in the focus sum level may be tolerable, but it is suspicious.

While the top three graphs are displays for the swaths identified by the legend and have x-axes that correspond to distance (or time) around the drum, the bottom graph's x-axis is distance along the drum. For every imaged and read-out swath a dot is drawn. The swaths displayed in the top 3 graphs are represented as cyan dots, while the rest are black dots. The y-axis for the bottom graph is time in milliseconds. The head times the arrival of the *newline* and imaging signals from the MPE using its own internal clock (1 ms resolution). The timing for every rotation should be very uniform (< 1% variation). If not, there is a problem with the drum drive, or with the timing signals going to the head. Since both the imaging and *newline* signals are timed, the script can detect where any retraces occurred because the imaging signal stops during a retrace. The imaging timing values are not explicitly displayed on the graph, but a vertical dashed line is drawn at the sub scan location of the retrace. If there are focus problems right after a retrace the shutter is likely the problem.

7.2.9 fieldnvscheck.spt

Fieldnvscheck.spt is compatible with MPE and MCE devices. It is a service-level script.

This is an NVS parameter checking script similar to the older **extract.bat** perl script. It will generate warning messages for any parameters that are out of range. It also performs some other sanity checks as well. Errors or warnings generated may not actually reflect a problem; for example, a parameter may have to be adjusted outside

the normal range to allow operation of the head. However, the script provides a good starting point to investigate possible problems. The user is warned not to adjust the parameters into range to get rid of the warnings if you don't understand what the parameter does or the implications of the adjustment.

7.3 General Scripts

7.3.1 actuator.spt

Actuator.spt is compatible with MPE and MCE devices. It is a service-level script.

The script verifies that the focus actuator can move, and that it does so linearly and with repeatability. This script produces a graph. Note that the MPE firmware must of a vintage that reports the lpos as part of "head sample focus" so test that first.

7.3.2 calcexp.spt

Calcexp.spt is compatible with MPE and MCE devices. It is a service-level script.

This script is a useful exposure calculator. Any parameter in its dialog box may be changed and the script will update the rest of the fields as necessary. This script requires Splot version 2.68 or later to operate. The calculator dialog box will open with a set of default values. If the computer running the script is connected to an output device the script will retrieve the current parameters from the connected head and use those values as the defaults in the calculator. Otherwise, pre-stored approximations are used.

The list of parameters and calculated values is:

- Nose piece power in W
- Drum diameter in mm
- Drum speed in RPM
- Effective swath width in pixels
- Head DPI
- Exposure in mJ/cm2
- Surface velocity in mm/sec
- Sub scan speed in mm/sec
- Imaging time in sec
- Stroke rate in KHz
- Data rate in MHz

7.3.3 copyscor.spt

Copyscor.spt is compatible with MPE and MCE devices. It is an expert-level script.

Copies a scorr table from one hdm slot to another. It produces a graph of the copied scorr table.

7.3.4 creep.spt

Creep.spt is compatible with MPE and MCE devices. It is an expert-level script.

Tests light valve creep and at the same time the shutter sensor. It is recommended that you ensure that the *wpower* is no higher than 10W (30 amps) before running this script, so that sensor heating has less of an effect on the measurement. Creep should be less than 10%. Creep is suspect if part of a plate is good but the rest is not or if the banding changes rapidly from plate to plate. Creep can sometimes be noticed during a long VLF plot.

This script prompts you to enter the time between samples—the default is 20 seconds. This script also prompts you to enter the number of cycles—the default is 30. This script produces a graph.

7.3.5 edgesim.spt

Edgesim.spt is compatible with MPE and MCE devices. It is a service-level script.

Simulates edge detect by slowly moving the carriage and making head sample focus measurements along the way. Useful for diagnosing edge detect problems.

Determine the edge position manually by the following:

```
>> plot edge
>> carriage
```

The carriage command will display the required position information which is then to be entered in the script.

7.3.6 flpos.spt

Flpos.spt is compatible with MPE and MCE devices. It is a service-level script.

Tests focus init lens position choice. This script produces a graph. The correct lens position for focus init is with the sum signal low and the difference flat.

7.3.7 foctest.spt

Foctest.spt is compatible with MPE and MCE devices. It is a service-level script. -files for LCA bundle 5.03Tests basic focus operation this includes the setting of the focus laser intensity, positioning of the head, PSD and electronics, alignment, actuator travel and nvs settings. Before running this script position the head over media. This script produces a graph.

7.3.8 headpwr.spt

Headpwr.spt is compatible with MPE and MCE devices. It is an expert-level script.

Calculates the exposure on plate in mJ based on the measured power on the nose piece sensor, the drum speed and the drum diameter. This script also measures the leakage light and reports the leakage percentage. This is a sanity test for the power and drum speed settings. This script does not produce a graph.

7.3.9 platprof.spt

Platprof.spt is compatible with MPE and MCE devices. It is an expert-level script.

Measures the plate profile at a given carriage position by very slowly turning the drum through one rotation and doing head sample focus measurements at each step. This is much slower than profiling using the **readfocus.spt** script but will work with any firmware version. Use this script to detect loading or plate problems that cause focus learn failures.

7.3.10 calibrate_amp.spt

Calibrate_amp.spt is compatible with MPE and MCE devices. It is a service-level script.

This is the first of two scripts required when replacing the shutter on a thermal head. Please see the TH1.x Shutter Replacement document (719-0028A-C-PR01) for a full description of how to use this script.

This script is used after the old shutter is disconnected. It calibrates the shutter amplifier gain by using a fixed current from a calibration jig (10-4738A). The script will screen output six values marked G, H, I, J, K, and L. These values must be written down and used in the second shutter script **calibrate_calculator.spt**.

7.3.11 calibrate_calculator.spt

Calibrate_calculator.spt is compatible with MPE and MCE devices. It is a service-level script.

This is the second of two scripts required when replacing the shutter on a thermal head. Please see the TH1.x Shutter Replacement document (719-0028A-C-PR01) for a full description of how to use this script.

This script is used after the new shutter has been connected to the head. It calculates the shutter calibration values needed for proper operation of the shutter sensor using four values included with the new shutter and six values output from **calibrate_amp.spt**.

7.3.12 tilt_mpe_th1x.spt / tilt_mce_th1x.spt

Tilt_mpe_th1x.spt and **tilt_mce_th1x.spt** scripts are compatible with MPE and MCE devices respectively. They are service-level scripts.

These series are used to help determine how much the head is tilted on the carriage. This script should be used in conjunction with a lenticular tilt tool (690-00225A). Please refer to the document *Adjusting Tilt on a Thermal Head* for more details on adjusting tilt and using this script.

When used with the default settings, the script will image 13 1” strips on a plate. The strips will have a geometeric correction adjustment to simulate a varying amount of tilt, from –0.75 to +0.75. After the scripts completes, it will also screen output a listing of the strips:

```
Strip:   1
Tilt:    -0.750
Clicks:  7 down

Strip:   2
Tilt:    -0.625
Clicks:  6 down

Strip:   3
Tilt:    -0.375
…
```

By using the tilt tool to determine the strip with the least tilt, the amount of adjustment of the tilt screw needed (if any) can be determined from the output listing.

7.4 Media Setup Scripts

The media setup scripts are compatible with MPE devices only. These are service-level scripts.

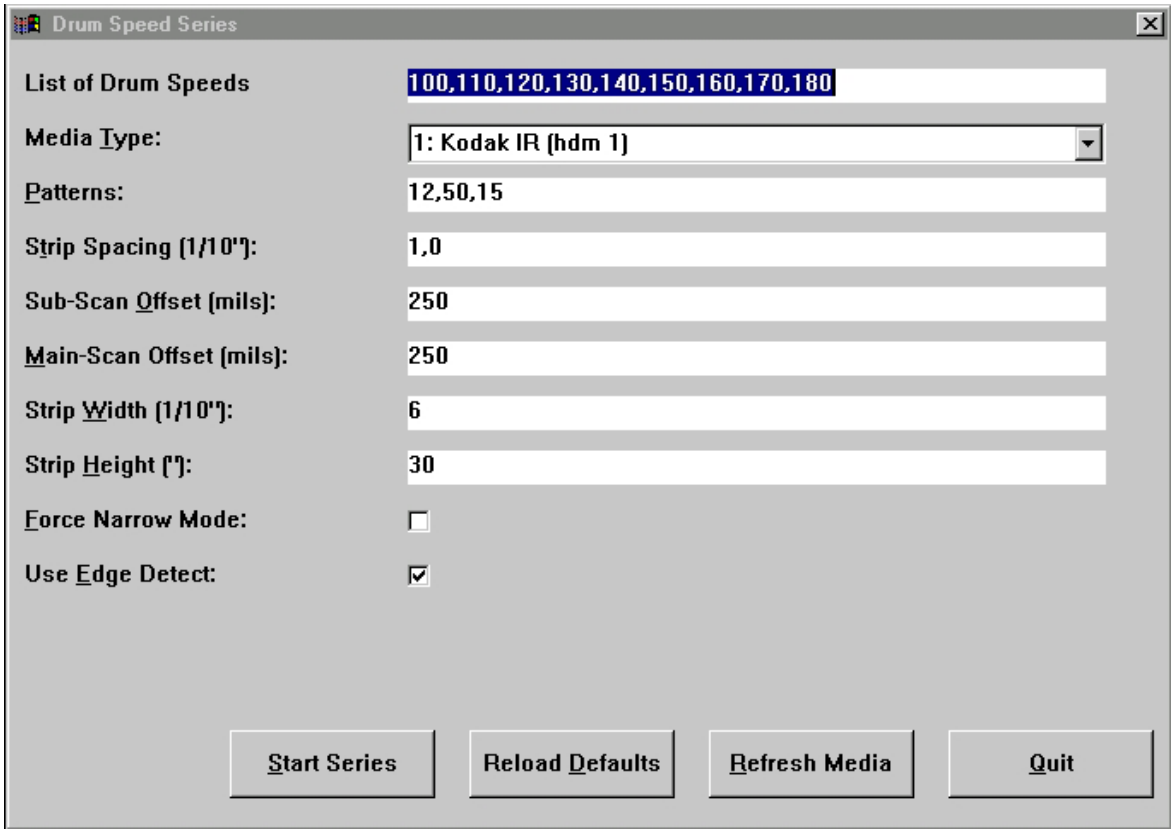
The media setup scripts include:

- bmcurve_series.spt
- bmslope_series.spt
- ds_series_constant_step.spt
- ds_series.spt
- sd_hdm_series.spt
- sd_media_series.spt
- wpower_series_constant_step.spt
- wpower_series.spt

The scripts require Splot version >= 2.98 in order to run properly.

7.4.1 Options common to all scripts

Each program starts with a menu that allows you to pick a number of options. The options that appear on all scripts are listed below.



Media Type is a drop-down list that allows you to pick which media type you will use during plotting. **If you add a new media or change which hdm or media slot a media is kept in, you must refresh the media settings by clicking on the** refresh media **button.**

Pattern allows you to choose the patterns that you wish to plot. You can plot more than one pattern by writing a list of patterns separated by a comma. To get a list of available patterns, type "list pattern" in the terminal in Splot.

Strip Spacing is the spacing between plots in tenths of an inch.

Sub-Scan Offset is the offset along the drum of the first plot in mils. It's basically `mode n sssa`.

Main-Scan Offset is the offset around the drum of the plots in mils. It's equivalent to `mode n mssa`.

Strip Width is the width of the plots in tenths of an inch.

Strip Height is the height of the plots in tenths of an inch.

Use Edge Detect determines whether or not an edge detect is done before writing the first plot.

Reload Defaults reloads the settings that were set when you started the script.

Start Series starts running the script with the values you have set. It also saves those settings so that it will start up with those settings the next time you run that script.

Refresh Media queries the trendsetter to find out what media have been installed on the device, and then lists them in the Media Type drop-down box. **If you add a new media or change which hdm or media slot a media is kept in, you must refresh the media settings by clicking on this button.**

Quit stops the script without saving any of the changes you have made to the parameters of the script.

7.4.2 Options specific to certain scripts

The **wpower_series.spt** and **ds_series.spt** scripts ask you to set a series of write laser powers or drum speed values for their series. Input a series of the wpowers or drum speeds that you want to plot with, separated by commas. Refer to the Trendsetter Command document for details.

The **sd_series.spt, bmcurve_series.spt** and **bmslope_series.spt** scripts ask for an initial value, step value and number of plots. These are the same options that you would have using a firmware series. If you want to output a slope series from -9 to +9 with steps of 1, set the initial slope to -9, the slope step to 1 and the number of plots to 19. Refer to the Trendsetter Command document for details.

7.4.3 Using Large Main-scan Shifts

The total main-scan shift is the sum of *gc mss*, *gc mssa* and *mode n mssa*. If the total main-scan shift is larger than 3000, the script will warn you that you have to have plot shift large on, but will continue running whether or not you have done it. If you want to set large main-scan shifts, make sure that you turn on large plot shifts by typing:

```
>>plot shift large
```

and turn off range-checking by typing

```
>>mask range
```

in the terminal log. Older versions of MPE firmware will not support large main-scan shifts. To go back to normal main-scan shift sized, type:

```
>>plot shift normal
```

and

```
>>mask range
```

7.4.4 Exiting the scripts

When the script ends, it will re-set all of the parameters it has changed to whatever they were before the script started running. If you try to stop the script too many times (by using Exec->Stop Execution more than once, for example), you will interrupt the script before it has finished doing this, and your firmware parameters may or may not be reset to their initial values. If you need to exit the script quickly, make sure that you check that the parameters did get reset to their default values.

If the script exits with an error, a message box will come up telling you what went wrong. If the script exits normally, it will print `"*** Script completed successfully ***"` near the end of its output.

NOTE: The scripts do not do a stroke cal after re-setting the parameters. You will need to do this manually.

7.4.5 Troubleshooting

If the media and hdm slots don't match up, click on the Refresh Media button to query the TrendSetter's media and hdm slots again.

If the script tells you that you need a newer version of Splot, then install the version supplied on the CD-ROM.

If this doesn't work, look at the output window and try to figure out what command the script is having trouble with. If the script is timing out, it may be a hardware problem, or the firmware may have changed its replies so that the scripts are no longer compatible.

7.4.6 Media Script MPE Patterns

These are the numbers that you input into the “pattern” box when running the scripts. Unless otherwise noted, all of the regular AM screens are Euclidean at 212 lpi and 45 degrees.

Pattern #	Description	Comments
0	Universal pattern	
1	Microband pattern	
2	Microband2 pattern	
3	Exposure series	black pattern
4	Exposure series	screen pattern
5	Blank pattern – all zeroes	100% screen for positive media (invert =1)

6	DPE Test 0	Universal DPE test pattern (all DPE patterns)
7	3 pixel horizontal bars	
8	Focus Series	
9	Microband pattern	150 lpi
10	Step Wedge	
11	Paul's 2 vbar	
12	Solid pattern - all ones	100% screen for negative media (invert =0)
13	3 pixel vertical bars	
15	1 pixel checkerboard	Equivalent to a square 50% at 1700 lpi, 45 degrees. Very hard to image.
22	2 pixel checkerboard	Equivalent to a square 50% at 849 lpi, 45 degrees. Comparable to Staccato 10 and 20.1.
33	3 pixel checkerboard	Equivalent to a square 50% at 566 lpi, 45 degrees. Comparable to Staccato 20.
44	4 pixel checkerboard	Equivalent to a square 50% at 424 lpi, 45 degrees.
55	5 pixel checkerboard	Equivalent to a square 50% at 339 lpi, 45 degrees.
66	6 pixel checkerboard	Equivalent to a square 50% at 283 lpi, 45 degrees.
77	7 pixel checkerboard	Equivalent to a square 50% at 242 lpi, 45 degrees.
88	8 pixel checkerboard	Equivalent to a square 50% at 212 lpi, 45 degrees.
99	1x1 to 8x8 checkerboards	
16	Microband pattern, 283 lpi	
18	3 pixel diagonal bars	
19	Microband6 pattern	horizontal
30	30 percent screen	Euclidean screen at 212 lpi, 45 degrees
50	50 percent screen	Euclidean screen at 212 lpi. Equivalent to an 8x8 checkerboard (pattern 88).
80	80 percent screen	Euclidean screen at 212 lpi, 45 degrees.
93	93 percent screen	Euclidean screen at 212 lpi, 45 degrees.
97	97 percent screen	Euclidean screen at 212 lpi, 45 degrees.
100	Crosshair pattern for GC	
101	DPE Test 1	alternating 1's and 0's in sscan/mscan

102	DPE Test 2	Same as DPE Test 1, but different signature
103	DPE Test 3	Walking 1's in mscan
104	DPE Test 4	Walking 0's in mscan
105	DPE Test 5	Walking 1's in sscan
106	DPE Test 6	Walking 0's in sscan
107	DPE Test 7	0.2 inch horizontal bars
110	10 percent screen	Euclidean screen at 212 lpi, 45 degrees.
111	1 Pixel Vertical Bars	
112	Quarter-Wide Plot 1	
113	Digital Masking Test 1	Checkerboard
114	Dashed Crosshairs	for GC Matching

7.5 "Plot & scan" scripts

The plot and scan scripts are compatible with MPE devices only. **Bestfoc.spt** is a service-level script, all other plot and scan scripts are expert-level scripts.

These scripts all write on a plate thus a plate needs to be loaded first. Ensure that you set a suitable *sssa* before running a second script otherwise you will get garbage as you plot over the first test on the plate.

These scripts are only known to work with Kodak plates.

These scripts work by writing on a plate and then reading back the results with the focus laser used as a slow scanner. This relies on a colour change on the plate due to writing, which must be monotonic.

7.5.1 bestfoc.spt

This script determines the best *foffset* by plotting and scanning the results with the focus laser. It searches ± 100 from the current *foffset* in steps of *20*. Before starting this script be sure to load a plate on the machine.

The script produces the file *bestfoc.pdf* and sets the *foffset* to the best focus. The plot should show a well-defined minimum at the best focus. If the minimum is at the edge of the plot the best focus is more than 100 units from the current setting and the script needs to be run again. This script uses up 17 inches of plate so set a suitable *sssa* before running the next script or load a new plate. The determined *foffset* is not NVS saved.

7.5.2 manphase.spt

WARNING:
Note that this script wipes out the existing scorr table. It is thus best to set up a new media first to run this. Or else make sure that savecfg.spt **has been run so that any previous scorr table can be restored if necessary.**

This is a self-calibration script that only needs to be run once for any given head unless the number of pixels is changed. It sets the head NVS parameters *fsphase* and *scanscale*. Be sure to save these at the end because they are only used for the plot scan commands. These nvs values are only used for these diagnostic scans and will thus not interfere with normal operation regardless of their values. This script produces a figure called *phase.pdf*. A curve fit to the results will calculate a correction to the beam slope and curve in effect and will modify these NVS settings but not save them. This script uses up 8.5 inches on a plate. Unless this script has run successfully and the above two parameters have been established and saved there is no point in trying the remaining scripts. The thing to look for to decide if this script has run successfully is to see if the two curves in the lower graph line up nicely and have the same rough outline.

7.5.3 slopcurv.spt

This script only performs the second half of what the **manphase.spt** script does and can be used once the *fsphase* and *scanscale* parameters have been determined using **manphase.spt** to do further plot and scan iterations with fits to make adjustments to the beam slope and curve parameters. The changes to these NVS parameters are not saved. The script produces a figure called *slopcurv.pdf* and uses 4 inches of plate per iteration. This script may be run repeatedly until the add slope and add curve labels are 0 or 1. At this stage, the best *bmslope* and *bmcurve* have been found.

7.5.4 getskew.spt

This script determines if the focus is skewed by plotting two sections one at *foffset* + 100 and another at *foffset* -100 and comparing the two. The resultant figure called *getskew.pdf* should not have a slope. This script also uses 8.5 inches on a plate and the phase must be setup with the *runphase* script first. The result should be a straight line that does not differ by more than 2% from side to side. Note that this will also test if the *foffset* is correct since only with a correct *foffset* will the line appear near 0 on the vertical axes. A shift either up or down indicates that foffset is not optimal.

7.5.8 manflat.spt

WARNING:

Note that this script wipes out the existing scorr table. It is thus best to set up a new media first to run this. Or else, make sure that savecfg.spt **has been run so that any previous scorr table can be restored if necessary.**

This script attempts to flatten the stroke by writing on the plate and scanning the results - **manphase.spt** must have been run first. It uses up to 16.5 inches in up to 4 swaths/iterations on a plate and produces a figure called *flat.pdf*. The figure shows the scan results as well as the stroke and scorr table for each iteration. The best looking swath/iteration can then be chosen and saved. Unlike the **slopcurv.spt** script **manflat.spt** attempts to flatten the stroke by changing the scorr table rather than by changing the slope and the curve. It is recommended that you start with the best slope and curve before using this script. This script can fix problems that cannot be handled by a slope and a curve such as a line defect. As with **manphase.spt** this script does not preserve any previous curve, slope and scorr table so it is best to set up a dummy media to run this. This new media can then be renamed "Kodak IR" at the end if the results are adequate.

7.6 Obsolete Scripts

These obsolete scripts have been removed from the script bundle. They are compatible with MPE devices only.

7.6.1 readfocus.spt - *deleted*

Readfocus.spt has been made obsolete by the newer **setdiagmem.spt** and **focusdiag.spt** scripts, and was deleted from the script bundle.

Reads out the stored focus table for the entire plate. This script can be used as a plate-profiling tool. This is very useful for diagnosing focus problems. This script needs head firmware 1.24 minimum and matching MPE thermal module. To use this script plot a plate first. Only the first 8 rotations are normally plotted in the produced graph but a data file with all the swaths is also written.

7.6.2 extract.bat - *deleted*

This script has been replaced by **fieldnvscheck.spt**.

7.6.3 bestexp.spt- *deleted*

It is no longer recommend that this script be used since it has not been very reliable. It is only described for completeness. Try **headpwr.spt** instead.

This script determines the best exposure by plotting and scanning 100 % and 50 % strips and measuring their densities using the focus laser. The target is a relative change in the solid of 23%. This script produces a file called *bestexp.pdf* and the last graph on the sheet should be a straight line. The *wpower* corresponding to 23% is the correct exposure. The script starts with the current *wpower* as a starting point. This script uses 20.5 inches on a plate and sets a new wpower but does not save it.

7.6.4 runphase.spt - *deleted*

This script has been replaced by **manphase.spt**.

7.6.5 runflat.spt – *deleted*

This script has been replaced by **manflat.spt.**

7.6.6 burnin.spt - *deleted*

This script was used to test the stability of the head over a relatively long period of time (8 hours). This script's intended use was for after build, during production. Over time it was concluded that this script is not useful, therefore use has been discontinued.

7.6.7 slopeser.spt - *deleted*

This script has been replaced by **bmslope_series.spt**.

7.6.8 upload.spt - *deleted*

This script is obsolete. To upgrade head firmware, refer to the release notes found on TechPlanet

7.6.9 mpeupld.spt - *deleted*

This script is obsolete. To upgrade head firmware, refer to the release notes found on TechPlanet