

Thermal 1/1.7 Exposure Head

Thermal Head Firmware Version 1.99 Notes

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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
1.0	7 Oct, 2005	Ken Dyck	Initial release.

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CONTENTS

Revision History i

1. Scope and Introduction (Please Read) 1

2. Laser Safety Practices 1

3. Related Documents 2

4. Focus Fade Problem Fix 3

5. NVS Changes 3

6. New Functionality 3
   6.1 Report Error When Figure of Merit Goes to Zero 3

7. Known Deficiencies 3

8. Preliminary Checklist (Complete Before Beginning Upgrade) 4
   8.1 Procedure for MPE-based Devices With Older MPE Firmware 5

9. Upgrade Procedure 5
   9.1 Upgrading on All Host Platforms 5
   9.2 Upgrading MPE-based Devices 6
   9.3 Upgrading Manually 7

10. Glossary of Abbreviations and Terms 7

11. Appendix A: Terminal Program Setup 7

12. Appendix B: Backing Up and Restoring the MPE NVS 8

13. Appendix C: Using the Upgrade Script thcv199x.spt 9

1. SCOPE AND INTRODUCTION (PLEASE READ)

This document describes the changes in thermal head firmware version 1.99 and the procedure for upgrading to firmware version 1.99.

Note: This document describes the firmware changes since firmware version 1.97. If you are upgrading from an earlier version of firmware, read the release notes for any skipped versions of firmware to understand all of the firmware changes.

- *Load this version of head firmware only as a patch if you are experiencing a focus fade issue during imaging, or if the Figure of Merit is stuck at zero while using head firmware version 1.93, 1.95, 1.96, 1.97, or 1.98.*
- To access all the features of version 1.99 thermal head firmware in the MPE or MCE, you must have specific versions of the thermal modules (see the table below).

	Minimum thermal module version
MPE	4.29 or later
MCE	2.15 or later

  Some new head functionality may be unavailable with older thermal modules. However, head firmware is backwards compatible and will work with old versions of host firmware.

- To simplify the upgrade, scripts automatically back up the head NVS and load the code. The appendices in this document include a guide for backing up and restoring NVS parameters and a revised procedure for loading thermal head firmware.

Formatting conventions:

- MPE commands are in `Courier` font and preceded by `>>`. Exceptions to this rule are commands contained in an explanation of a new feature where commands are in **`bold`**.
- MCE commands are in `Courier` font and preceded by `MCE>>`. Exceptions to this rule are commands contained in an explanation of a new feature where commands are in **`bold`**.
- All NVS parameters are in *italics.*
- All script names are **Arial 10pt, bold**.

Note: Unless otherwise specified, Trendsetter refers to any Creo output device.

2. LASER SAFETY PRACTICES

To use this document, you *must* have attended a thermal head introductory course presented by the Creo service-training department, product specialist, or engineering support team. You must also be familiar with the safety precautions required when working with a Creo output device.

DANGER! *Never operate a Creo output device with the write laser beam on and a door open. Do not use the service bypass jigs to bypass the door interlocks.*

3. RELATED DOCUMENTS

- *Manually Loading Thermal 1\1.7 Head Firmware*: **TechPlanet** > **Output** > **Heads** > **Thermal 1/17** > **Procedures** (http://techplanet.creo.com/output/heads/thermal/content/docs/Manual_Head_Firmware_Load.pdf)
- Controlled releases: **TechPlanet** > **Output** > **All CTP Devices** > **Control/settings** (http://techplanet.creo.com/output/computer_to_plate/all_ctp/nav/control-set.htm)
- CTP firmware and controlled releases: **TechPlanet** > **Output** > **All CTP Devices** > **Firmware** (http://techplanet.creo.com/output/computer_to_plate/all_ctp/nav/control-set.htm)
- Thermal 1/1.7 upgrade scripts: **TechPlanet** > **Output** > **Heads** > **Thermal 1/17** > **Downloads** > **Firmware Releases** (http://techplanet.creo.com/firmware/CTP/Head/Thermal/versions.htm)
- ServiceShell: **TechPlanet** > **Output** > **Service Tools** > **Service Shell** (http://techplanet.creo.com/output/service_tools/service_shell/nav/v2-x/index.htm)
- Splot: **TechPlanet** > **Output** > **Service Tools** > **Splot** (http://techplanet.creo.com/output/service_tools/splot/nav/index.htm)
- *TEH 1/1.7 Head Firmware Summary*: **TechPlanet** > **Output** > **Heads** > **Thermal 1/17** > **Reference** > **Release Notes** (http://techplanet.creo.com/output/heads/thermal/content/docs/719-00017A-A-PR01.pdf)

4. FOCUS FADE PROBLEM FIX

In firmware versions 1.93, 1.95, 1.96, 1.97, and 1.98, some customers have experienced a focus error where the Figure of Merit (FOM) goes to zero and stays there until the end of the plot. This error can cause the image to fade out. Previously, downgrading to 1.83 seemed to make the error go away. After further investigation it was found that the event that triggered the zero FOM happens with all firmware builds. The difference with 1.83 was that it would recover from the error. This source of this event is still unknown. The five versions listed above don't recover from this unknown event. The 1.99 firmware patch fixes the focus system so that it can recover from this unknown event. Once the source of the error is known and if a firmware fix is applicable a new version of TH1x head firmware will be released.

Note: A focus fade problem is often a symptom of faulty cables. Cables should always be checked and replaced if necessary before installing the 1.99 firmware patch. The 1.99 firmware patch will only be applicable if the focus artifact is caused by the FOM going to zero.

The figure of merit will be printed out during a plot if you enter the command **`>> set head vb 1`**.

5. NVS CHANGES

None.

6. NEW FUNCTIONALITY

6.1 Report Error When Figure of Merit Goes to Zero

In firmware versions 1.93, 1.95, 1.96, 1.97, and 1.98, some customers have experienced a focus fade problem. The image fades out and the figure of merit value goes to zero. No error is reported, so the only way to know if the focus failed is to inspect the plate or monitor the figure of merit.

Firmware version 1.99 will report an error if the figure of merit goes to zero for two or more times during a plot. The reported focus error is 17664:

```
HEAD: focus error detected at inches while imaging, check plate for artifacts
```

7. KNOWN DEFICIENCIES

Without thermal module version 3.38, the new *hms* block and all of its parameters will not be visible. If, after upgrading the head firmware, you receive error 17672 or 17673, type the following commands:

```
>>nvs save hms cal
>>nvs save hms cfg
```

If the error persists after you type the commands above, you can safely disregard it.
This error will not affect machine functionality or plot quality in any way.

8. PRELIMINARY CHECKLIST (COMPLETE BEFORE BEGINNING UPGRADE)

☐	1	Check that the head you're working on has thermal head firmware version 1.23 or later. Direct upgrades are only possible from head firmware version 1.23 or later. To upgrade from earlier versions, read the firmware release notes for the appropriate versions.
☐	2	*MPE devices only:* If you're upgrading from firmware version 1.32 or earlier, generate baseline plots `plot 1` and **inchgrid.ps** before performing the upgrade. Comparing the plots generated before and after the upgrade will help you resolve any geometric correction or image quality issues.
☐	3	*MCE devices only:* On MCE devices that are being upgraded from firmware version 1.74 or earlier, the head will not function when it's first installed (the MCE requires head firmware version 1.80 or later to access the head properly). To make the head functional, upgrade the head firmware.
☐	4	*MPE devices only*: Type the command: `>>list version` Record: current MPE Firmware version: _____ current Thermal software version: _____ current Head firmware version: _____ current PHC hardware version: _____ The thermal software version, more commonly referred to as the thermal module, is one module of the MPE firmware. For more information on the thermal module and thermal head, refer to the *TEH 1/1.7x Head Firmware Summary*.

☐	5	*MCE devices only*: Type the command:
		`MCE>>list version`
		Record:
		current Version: _____
		Type the command:
		`MCE>>head version`
		Record:
		current PHC software version: _____
		current PHC hardware version: _____
		Type the command:
		`MCE>>list version version`
		Record:
		current FW EHI Version: _____
		The FW EHI Version is one module of the MCE firmware. For more information on the MCE and thermal head, see the *TEH 1/1.7x Head Firmware Summary* (for details, see *Related Documents*).

CAUTION: *If the PHC hardware version is version 1.00 or earlier, do not upgrade the thermal head firmware. To do so could seriously affect head functionality. A hardware upgrade is required to take full advantage of new thermal head functionality.*		
☐	6	Ensure that you have Splot version 2.84 or later, or Service Shell version 2.5 SP2 or later. You will need one of these tools to back up the NVS and upgrade head firmware.

WARNING: *If you do not complete the next step, you may corrupt the NVS parameters.*		
☐	7	Make sure that the thermal head firmware *and* the host firmware are synchronized. Depending on how old your code is, this may require an incremental upgrade. ▪ Upgrade the host code *first* and then upgrade the head firmware to the next version compatible with the host firmware. See the controlled releases site for a listing of the versions of host and Thermal head code for each Trendsetter model. ▪ *If you are installing a new or replacement head,* first upgrade the host firmware to a version that is compatible with the replacement head. Do this *before* you install the head. This step is *mandatory*. **Note:** When installing the replacement head, be sure to follow the appropriate procedures for saving the head NVS parameters to the MPE. ▪ For MPE-based devices, if the current MPE firmware contains a thermal module that will *not* support thermal head firmware version later than 1.34, use the procedure in section 8.1, below.
☐	8	Ensure you have the following files available: ▪ Thermal Head firmware version 1.99 (**thcv199_Patch.exo**) ▪ LCA bundle (**lcav503.hex**)
☐	9	Ensure Allegro™, PrintConsole, or Prinergy® software is not running.

8.1 Procedure for MPE-based Devices With Older MPE Firmware

For MPE-based devices, if the current MPE firmware contains a thermal module that will *not* support thermal head firmware version later than 1.34, use the following procedure:

1. Upgrade to a version of MPE code that *does* support thermal head firmware version later than 1.34.
2. Reboot the device and ensure that it is functioning correctly.
3. Upgrade to the latest version of MPE firmware for your particular device model.
4. Upgrade the thermal head firmware to version 1.99.

Note: Depending on how old the host version is you may need to do an incremental upgrade. To find out if this is necessary, read the release notes for all versions of host firmware between the current version and the one you are planning to upgrade to.

If it is still not clear after reading the host firmware release notes which versions it is OK to skip, contact your device Product Support Specialist.

9. UPGRADE PROCEDURE

9.1 Upgrading on All Host Platforms

The upgrade takes approximately 30 minutes.

To upgrade any Creo firmware, use the upgrade script **FirmwareUpgrade.spt** (use with ServiceShell). This is the preferred tool for upgrading firmware on all platforms. You are strongly encouraged to use the upgrade script, as it performs all necessary backups and provides a simple downgrade path if that becomes necessary.

For detailed information on **FirmwareUpgrade.spt**, right-click on the script name in ServiceShell (as shown below), or see the **d:\ServiceShell\scripts\device** folder on your computer.



1. *If any field upgrade is required*, upgrade the host firmware *first*, prior to upgrading the head. For more information see the controlled release version tables and the TechPlanet Controlled Releases site (these versions are updated frequently).

2. In Service Shell, click the **Device** tab and load **FirmwareUpgrade.spt**.

3. Execute the script. This script will upgrade the head code to the latest version, provided the current version is 1.23 or later.

4. *MPE only*: Generate the plots `plot 1` and **inchgrid.ps** (if necessary) and compare with the plots run in section 4, step 3. Check that:

   - the quality of `plot 1` should be unaltered
   - the geometric correction and positioning of **inchgrid.ps** should be the same as the plot that you imaged before the upgrade

9.2 Upgrading MPE-based Devices

The upgrade takes approximately 20 minutes.

The upgrade script **thcv199x.spt** upgrades the head firmware on MPE-based platforms. For head firmware version 1.99, this script should be used rather than **FirmwareUpgrade.spt**.

If you are upgrading the head from version 1.97, use the manual upgrade procedure described in section 9.3, *Upgrading Manually*. This is because using the **thcv199x.spt** script to upgrade from 1.97 will reset some of the NVS parameters to the default.

To upgrade the thermal head firmware using **thcv199x.spt**, Splot version 2.84 or later is required. Alternatively, you can use Service Shell 2.6 or later. For locations of all necessary tools and files, see *Related Documents*.

For detailed information on **thcv199x.spt**, see *Appendix C: Using the Upgrade Script* ***thcv199x.spt***.

To upgrade the firmware:

1. *If any field upgrade is required*, upgrade the MPE firmware *first*, prior to upgrading the head. For more information refer to the controlled release version tables and the TechPlanet Controlled Releases site (these versions are updated frequently).

2. Open Splot or Service Shell and load **thcv199x.spt**.

3. Run the script. The script will upgrade the head code to the latest version, provided the current version is 1.23 or later.

4. Generate the plots `plot 1` and **inchgrid.ps** (if necessary) and compare with the plots run in section 4, step 3:

   - the quality of `plot 1` should be unaltered
   - the geometric correction and positioning of **inchgrid.ps** should be the same as the plot that you imaged before the upgrade

9.3 Upgrading Manually

If you encounter serious problems using the upgrade scripts, or if you are upgrading from head firmware version 1.97, you should manually upgrade the head firmware.

- To manually load firmware in ServiceShell, use the command **download <path and filename>**.
- For other terminal utilities, see *Manually Loading Thermal 1\1.7 Head Firmware* (for download details, see *Related Documents*).

For manual upgrades on MCE-based devices: The MCE does not provide automated NVS upgrade functionality like the MPE does. If you choose to upgrade the head firmware manually on an MCE platform, you must update the head parameters by running **mce_th1_upgrade_199.spt** immediately after the upgrade. This ensures that all of the NVS parameters are updated for firmware version 1.99. If you are upgrading the head from version 1.97 you do not need to run the **mce_th1_upgrade_199.spt** script.

10. GLOSSARY OF ABBREVIATIONS AND TERMS

MCE	Master Control Electronics
ICE	Imaging Control Electronics
MPE	Master Processor Electronics
Host	Refers to the MCE, ICE, or MPE, as a generic device interface.
CTP	Computer to Plate (this includes Trendsetters and Platesetters)
NVS	Non-Volatile-Storage
PHC	Parallel Head Controller
LVD	Light Valve Driver
LCA	Xilinx configuration file

11. APPENDIX A: TERMINAL PROGRAM SETUP

You need the Splot terminal utility to run the upgrade script. It is assumed that the terminal program will be run on the system workstation.

Note: If it is run on another PC, it may be necessary to change all the hard drive reference letters in the filenames. Any files created on the C: drive of a separate PC (a terminal) should be copied over to the workstation's system drive (S:, D:, or E:).

CAUTION: *You must use Splot version 2.84 or later in order for the script to run.*

If Splot is functioning properly, a terminal prompt should appear when you press **Enter**. If the terminal prompt does not appear, perform the following steps to ensure that the terminal link is set up correctly:

1. Under **Term,** ensure that **Input Mode** is checked. If no check-mark appears, select **Input Mode**.

2. Under **Term**, select **Port…** and ensure that the correct input port is selected.

3. Under **Term**, select **Port Settings…** and ensure that the following are selected:

    - baud rate selected is **9600**
    - parity is **none**
    - data bits is **8**
    - stop bits is **1**

12. APPENDIX B: BACKING UP AND RESTORING THE MPE NVS

Before upgrading any output device firmware, it is important to back up the current NVS memory in case it becomes necessary to revert to the previously installed firmware version.

What is NVS RAM?

The NVS RAM in output devices provides the following:

- Storage for device-dependent configuration and calibration parameters that must remain intact between power cycles.
- Storage for state variables that allow a device to resume where it left off if power is cycled during loading or imaging.

Saving individual NVS configuration parameters is a two-step process. A parameter is first *changed* in a volatile RAM copy of the NVS map and then *saved* (copied) to the NVS map itself. State variables are always accessed directly from NVS. Generally, there is no need to change state variables manually since they simply contain a record of where the machine is (or was) during various tasks.

- Typically, whenever firmware is upgraded in an output device, some of the NVS calibration and configuration parameters will need to be upgraded as well.

Note: Simply loading new firmware into a machine will *not* upgrade the NVS.

Steps must be taken to ensure that the NVS is properly configured for the new firmware. This process may be partly or wholly accomplished with the **nvs upgrade** command available from the device monitor. However, in some cases, it will be necessary for the installer to make certain upgrade configurations depending on the hardware that is present in the particular machine (plus state variables). The upgrade script will upgrade any necessary NVS parameters.

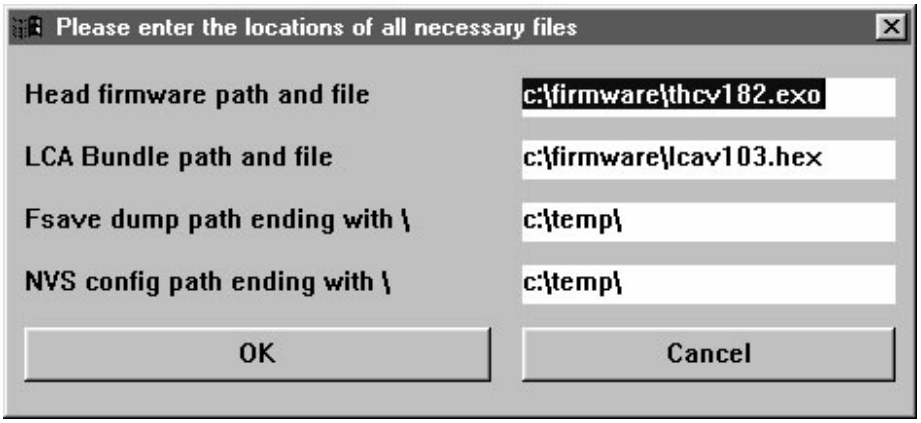
- The upgrade script will save all the NVS settings and produce a new script that can be used to revert to the current firmware version and settings, if necessary. For manual procedures on how to save and restore NVS, refer to the release notes for earlier versions of head code.
- Before loading firmware it is assumed that the installer is running Splot version 2.84 or later on the system workstation. It is also assumed that all the necessary program options have been set up as described in *Appendix A, Terminal Program Setup* and that the Allegro™ software is *not* running on the workstation.

13. APPENDIX C: USING THE UPGRADE SCRIPT THCV199X.SPT

The primary function of the upgrade script is to upgrade the firmware from version 1.96 or earlier to version 1.99. If you are upgrading from 1.97, use the manual upgrade procedure. When upgrading, the script performs the following steps:

1. Read current NVS data, along with stroke and scorr tables, and save to the NVS config script. The upgrade script will automatically generate the file and store it to the user-specified path. The config script will be called **ldTHxxxxVyyy.spt**, where **xxxx** is the head serial number, and **yyy** is the head code version before upgrade.
2. Type `fsave dump`, capturing the data to a file. The upgrade script will automatically generate the file and store it to the user-specified path. The dump file will be called **fsTHxxxxVyyy.txt**, where **xxxx** is the head serial number, and **yyy** is the head code version before upgrade.
3. Upload the head firmware from the user-specified file and location.
4. Load the fsave dump data in order to fully restore all NVS parameters and prevent corruption.
5. Save all head NVS parameters.
6. Type the command `nvs upgrade head` to ensure all NVS parameters are properly initialized.
7. Save the head mask.
8. Reset the system.

Note: During the upgrade, the script will prompt you to enter filenames and paths, using this dialog box:



- The **Head firmware path and file** should provide the full name and location of the head firmware file (**thcv199_Patch.exo**), as shown above. There should be no spaces in the path or filename, or the script will fail.
- The **LCA Bundle path and file** should provide the full name and location of the lca bundle file (**lcav503.hex**), as shown above.
- The **Fsave dump path** provides the location that the fsave dump file will be saved to. As shown above, the Fsave dump path must end with the '\' character.
- The **NVS config path** provides the location that the config script will be saved to. As shown above, the NVS config path must end with the '\' character.

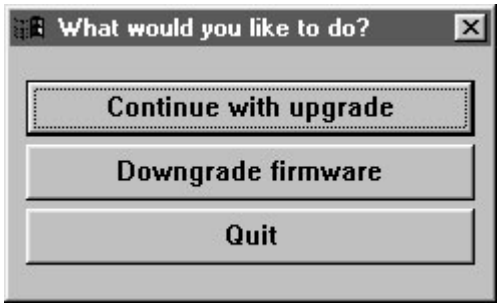
The NVS config script is an independent script that can be run in the event of loss or corruption of NVS data. Running the script will take approximately half an hour, and will completely restore the NVS to its state before the upgrade took place.

If NVS corruption occurs, you can either re-load the fsave all data saved in the fsave dump path, or you can run the config script stored in the NVS config path (this restores scorr tables as well as NVS data).

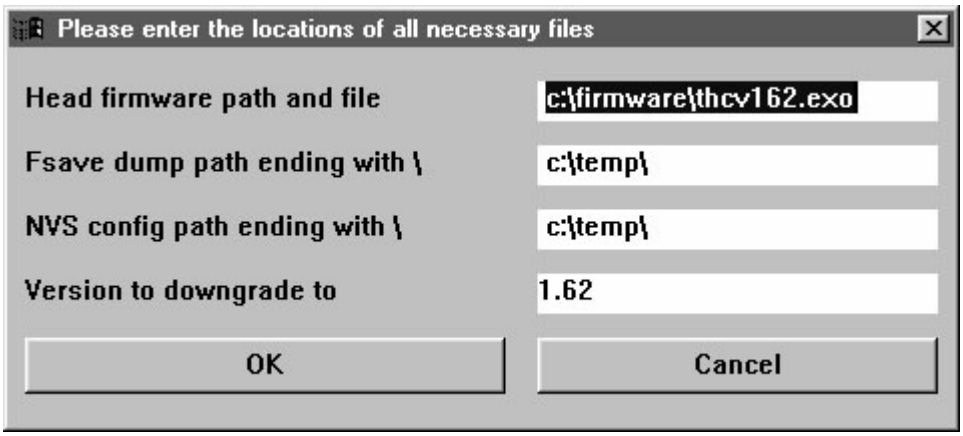
The script also offers the option of downgrading the firmware. When downgrading, the script performs the following steps:

1. Upload the head firmware from the user-specified file and location.
2. Load the fsave dump data in order to fully restore all NVS parameters and prevent corruption.
3. Save all head NVS parameters.
4. Save the head mask.
5. Reset the system.

If the current head firmware is already version 1.99 or later, and **thcv199x.spt** is executed, the following dialog box appears:



By selecting **Continue with upgrade**, the script will proceed to upgrade the firmware in the same way as outlined above. By selecting **Downgrade firmware**, the script will perform a firmware downgrade. The following dialog box appears:



- The **Head firmware path and file** should provide the location of the firmware version that you wish to downgrade to. As with the firmware upgrade, you must enter the full path and file name. There should be no spaces in the path or filename, or the script will fail.
- The **Fsave dump path** should provide the location of the fsave dump file previously generated during a firmware upgrade. That is, if you previously upgraded the firmware from version 1.38 to version 1.99, the upgrade script generated a file called **fsTHxxxxV138.txt**, which the script will search for. As with the firmware upgrade, you must enter the full path name ending with '\'.
- The **NVS config path** should provide the location of the NVS config script previously generated during a firmware upgrade. That is, if you previously upgraded the firmware from version 1.38 to version 1.99, the upgrade script generated a script **called ldTHxxxxV138.spt**, which the script will search for. As with the firmware upgrade, you must enter the full path name ending with '\'.
- The **Version to downgrade to** should be the same version as the head firmware file. Note that the downgrade will only work if you have previously upgraded from this version number.