

TFX Head

V-Speed Upgrade Procedure

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Revision History

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1. SCOPE

This document describes the procedure upgrading the imaging speed of Thermoflex® 5067/5280 devices with TFX imaging heads. This document does not apply to other Creo output devices or to ThermoFlex engines equipped with TH1.x or fibre-optic heads.

This document explains procedures for determining correct exposure settings, assuming that the user has good hands-on knowledge of the TFX and Thermoflex. For more information on exposure setup on the TFX head, refer to the *Thermoflex Media Setup Procedure* (for details refer to the Related Documents section).

This procedure assumes that the TFX head has been installed in the engine and that the user has a basic understanding of the firmware syntax, structure and commands.

The formatting for this document is as follows:

- The prompts “TFX>” and “>>” indicate commands and parameters corresponding to the TFX head and MPE respectively.
- *all nvs and TFX head parameters are in italics,*
- `commands typed into the diagnostic port or workstation are in Courier font`

2. RELATED DOCUMENTS

- Digital Flexography Troubleshooting Guide, available from: **TechPlanet** > **Consumables** > **Media** > **Troubleshooting** (http://techplanet.creo.com/output/heads/tfx/content/docs/flexo_troubleshooting.pdf)
- Flexo Plate Specifications Spreadsheet, available from: **TechPlanet** > **Consumables** > **Media** (http://techplanet.creo.com/consumables/media/content/docs/Flexo_Plate_Specifications.xls). Enable macros when prompted.
- MPE firmware upgrade software and documentation is located on the CD software kit for the ThermoFlex 3648/5067/5280 CR2.0 controlled release. See also **TechPlanet** > **All CTP Devices** > **Controlled Releases** (http://techplanet.creo.com/output/computer_to_plate/all_ctp/nav/control-set.htm)
- Product Status Application website: http://intranet.creo.com/applications/ProjectStatus/projectTableLayout.asp?Param1=1&Param1a=1&str1='elaine%20oum' Restrict your search by “Imaging and Media” product group, and “Media” sub-category.
- Service Shell, available from: **TechPlanet** > **Output** > **Service Tools** > **Service Shell** > **Downloads** (http://techplanet.creo.com/output/service_tools/service_shell/nav/v2-x/downloads.htm)

- TFX Airjet Setup Procedure, available from: **TechPlanet** > **Output** > **Heads** > **TFX** > **Procedures** (http://techplanet.creo.com/output/heads/tfx/content/docs/TFX_airjet_setup_proc.pdf)
- TFX Firmware software and documentation, available from: **TechPlanet** > **Output** > **Heads** > **TFX** > **Downloads** > **Firmware Releases** (http://techplanet.creo.com/firmware/ctp/Head/TFX/versions.htm)
- TFX Head Installation, available from: **TechPlanet** > **Output** > **Heads** > **TFX** > **Installation** (http://techplanet.creo.com/output/heads/tfx/content/docs/TFX_headinstall.pdf)
- TFX Media Technical Notes, available from: **TechPlanet** > **Consumables** > **Media** > **Flexo** (http://techplanet.creo.com/consumables/media/nav/flexo.htm)
- Thermoflex Media Setup Procedure (for TFX Head only), available from: **TechPlanet** > **Consumables** > **Media** > **Flexo** (http://techplanet.creo.com/output/heads/tfx/content/docs/tfx_flexosetup.pdf)

3. FIRMWARE

Heads being upgraded for V-speed should be running:

- TFX firmware version 1.14
- MPE firmware version 1.41.

Current TFX and MPE firmware versions can be confirmed respectively with the following commands:

```
TFX> ver

>> list version
```

For information on the upgrade software and documentation for TFX firmware and MPE firmware, refer to the Related Documents section.

Note: For debugging purposes, you should have two terminal windows open: one for TFX, and one for MPE. This may require using a terminal on the workstation and a laptop as well.

4. MEDIA STATUS

Consult the *Flexo Plate Specifications spreadsheet* to check the status of a specific media type for Vspeed on a Thermoflex **3648V/5067V/5280V** device with a TFX head. To find the spreadsheet refer to the Related Documents section.

Note: 3648V is currently not included in the spreadsheet. The status for 5067V applies to this device as well. The upgrade should *only* be performed on medias qualified for the speed upgrade.

5. UPGRADE INFORMATION

This document describes the general exposure setup for all media types. Refer to the Media Technical Note for all other setup procedures.

- The speed upgrade is done on a per-media basis. *Not all medias will run at the same speed.*
- To determine the V-speed imaging specification and drum speed, refer to the *Flexo Plate Specifications spreadsheet.* This is the preferred method of finding plate specifications.

Note: Imaging times and drum speeds may change, so be sure to download the most recent copy of the spreadsheet. Refer to the Related Documents section.

- The V-speed imaging times can also be found under the appropriate media specification document for the media being upgraded. The media specification sheets are located on the *Product Status Application* website. For details on how to access this site refer to the Related Documents section. Drumspeeds corresponding to these imaging times can be calculated as described in the *Setting Drumspeed* section of this document.
- If you are upgrading a 3648 device, use the information for the 5067V.

6. TFX HEAD SETUP

1. Type `TFX> eng` in the TFX terminal to gain access to all functions.
2. Not all TFX heads in the field have been set up to run at the higher powers for V-speed imaging. To determine whether the current head has been set up for this, in the TFX terminal, type

   ```
   TFX> dpc points
   ```

   - If the output looks like the following:

     150 200 250 300 800 1200 0 0

     with “1200” as the last non-zero number on the list, then the head has been set up for the V-speed upgrade. Skip forward to *Section 8: Configuring Image Quality*.
   - If “1200” is *not* on the list, the power curves will need to be backed up and re-generated, as described in the following sections.

Note: To do this, Procomm must be running and connected to the TFX diagnostic terminal.

3. Before starting the upgrade, first image a workstation plot at current settings at 320 rpm (F-speed). This will be used as a benchmark to compare the V-speed image quality later.

6.1 Backing Up Power Curves

The current power curves and parameters must be backed up in case of errors during the generation of new curves.

Procedure

1. Ensure that Procomm is connected to the TFX diagnostic terminal and is set up to use Ymodem protocol. From the **Main Menu**, select **Options** > **Data Options** > **Transfer Protocol**.
2. From the drop-down menu, select **Ymodem**.
3. In the TFX terminal, type `TFX> parm send`.
4. From the **Main Menu**, select **Data** > **Receive file**.
5. When the download is completed, locate the file. To find the download path, from the **Main Menu**, select **Options** > **Data Options** > **Paths**. The path is listed under **Download path:**. The filename will be headprm.prf. Rename the file to HT##headprm_*date*.

Note: Once the power curves have been backed up successfully, new ones can be generated.

6.2 Generating Power Curves

Procedure

1. In the TFX terminal, type

   ```
   TFX> dpc points 150 200 250 300 800 1200
   ```

   Wait for the `*** Command Success***` message. Ignore the message to run `cal pcurve`.

2. In the TFX terminal, type

   ```
   TFX> vbs enable dpc 2
   ```

3. Ensure that the head stage is in the home position:

   ```
   >> stage home
   ```

   and then generate the new curve by typing

   ```
   TFX> cal
   ```

4. Type `y` to start the calibration, and wait for the command to complete. It may take a few minutes and will scroll a few messages, but wait until the message `DSC: calibration complete` appears.
5. Inspect the list of messages generated by the cal command. If there are any that say `DPC: Diode <number> marked as dead`, make note of all the diode numbers identified.
6. If the cal command did *not* generate any diodes marked as dead, skip ahead to *Section 8: Configuring Image Quality*.
7. If there were diodes marked as dead during the cal, enter an override on *each* diode identified as dead:

```
TFX> set dio override <diode number> true
```

then redo the cal command:

```
TFX> cal
```

This time the cal command should not show any diodes listed as dead. Type

```
TFX> vbs disable dpc
```

8. If the power curves did not generate successfully, refer to Appendix B for instructions on re-loading the old power curves, and notify the Product Specialist.

7. CONFIGURING IMAGE QUALITY

7.1 Setting Surface Reflectivity and Surface Depth

If the desired media type is already installed on the device (and TFX head) being upgraded, the surface reflectivity and surface depth value should already be specified. These same values can be used for the upgrade.

If the media type being upgraded is *not* already installed on the device, locate the appropriate Media Technical Note and follow the *Setting Surface Reflectivity* and *Setting Surface Depth* procedures. This *must* be done before continuing with this upgrade.

7.2 Setting Drumspeed

1. In the MPE terminal, type `>>list media` and record the MPE media index number <n> for the plate type being upgraded.
2. In the head terminal, type `TFX> set med name` to determine the corresponding med index number <k> (usually k = n-1).
3. If the Vspeed drumspeed is not known for the media type being upgraded, it can be calculated from the imaging speed specification (see *Section 6: Upgrade Information* for location of drumspeed and imaging times). The drumspeed corresponding to a specific V-speed imaging speed can be calculated using the following formula:

$$ds = \frac{(\text{imaging speed})(\#\,\text{overwrites})(\text{head dpi})}{\text{N}} \quad \text{in RPM}$$

where

- *imaging speed* is the required inches per minute to meet the media V-speed specifications (locate specification sheets as described in *Section 6: Upgrade Information*). If the specification speeds are listed in inches^2/minute, divide this value by the maximum mainscan plate size. For example, 5067V speed = (137.5 in^2/minute)/(50 inches) = 2.75 in/min.
- *#overwrites* is the imaging mode being used. This should be equal to 4 on all Thermoflex 3648/5067/5280 medias.
- *head dpi* is 2400 for the TFX.

- *N* is the number of pixels being used (is 60 for the TFX).

For example, if the imaging speed is indicated as 2.75 in/min, then

$$ds = \frac{(2.75)(4)(2400)}{60} = 440 \text{ rpm}$$

4. Enter this value into the head media parameters by typing

```
TFX> set med <k> drumspeed <drumspeed>
```

This value is automatically saved in the head.

5. In order for this change to take affect, you *must* type `TFX> reset head` to ensure that the drumspeed value gets transferred over to the hdm <k+1> *ds* location. Alternatively, enter `>>set hdm <k+1> ds <drumspeed>` to ensure consistent drumspeed values in both locations.

7.3 Setting Exposure

Tools Required

- CCDot dot meter (if one is not available on-site, contact the PSM)
- Procomm script TFX_PowerSeries
- Scripts for Service Shell may also be available. The same procedure applies when using Service Shell.

The exposure series must be done with the head in focus (that is, at the correct *sd*).

Procedure

1. Manually load a small piece of media. For flexo plates, the preferred thickness is <0.100 inches (<2.5 mm) but any thickness is acceptable. Small pieces are preferred over larger pieces for reasons of convenience and cost, but it should be a **minimum** of 10 inches (around drum) x 15 inches (along drum). A procedure for manually loading media is given in Appendix B.

Note: TFX firmware version 1.14 does not allow imaging at V-speeds with a mainscan image size less than 8 inches.

2. Update the active media parameters for the media type

```
>> mode media <n>
```

3. Set the *mis* to a convenient size for the procedure

```
>> set mode 1 mis 19200
```

4. Make a note of the current subscan shift setting by typing

```
>> set mode 1 sssa
```

5. Record this value somewhere to be restored once the setup is complete.

6. Type >> stage zero

   After the command completes, run the Procomm script TFX_PowerSeries with the following parameters:

Mode #	1
Initial Offset (in.)	0.5
Pattern Width (in.)	0.4
MPE Plot Patterns	50, 12 (50% and 100% patterns)
Media #	<n>
Pattern Spacing (inches)	0.2
Start power Volcano film)	1000 (if using flexo medias, use 200 for
Increment	50
# steps	5

7. Check that the CCDot is set up as follows:
   - Reflection/Transmission: set for transmission
   - Positive/Negative dot area: set on negative

Note: To change or check these settings, consult the CCDot Manual. The method for doing this varies slightly from model to model.

8. When the power series script finishes, remove the media and use the CCDot to measure the dot area of the 50% pattern. Do the measurement on a light table.Take at least 3 measurements per strip and calculate the average measurement to the nearest 0.5%.

   At the time of this document, all flexo plates are set to an exposure which gives a measurement of 50% on the plot 50 pattern. Kodak Volcano film is set such that a plot 50 gives a measurement of 55%. To ensure an accurate exposure setting, check the *Flexo Plate Specifications spreadsheet* or the most up-to-date copy of the applicable Media Technical Note for the target measurement.

9. Select the power that corresponds with the strip with the appropriate dot measurement. If necessary, interpolate between power readings. Inspect the plot 12 strip imaged at the same power for good quality.

10. Set the power in the head to that determined from the power series. Type

```
TFX> set med <k> stroke all <value determined above>
```

11. Turn the drum vaccuum off

```
>> drumvac off
```

12. Reset the device settings

```
>> set state plate_loc d status 0

>> set mode 1 sssa <original value>
```

13. Disconnect the TFX diagnostic cable from the head, or terminate the cable.

8. TROUBLESHOOTING GUIDE

Trouble shooting information for all flexo media is given in the document *Digital Flexo Troubleshooting*.

Problem	Symptoms	Action
Unable to achieve appropriate reading on plot 50.	Even at 1200 mW, the plot 50 still measures lower than it should.	Double-check that the correct drumspeed is being used for the specific media being upgraded. If the problem persists, reduce the drumspeed as required and contact the media specialist.
"Woodgrain" patterning visible across diagnostic tint patterns.	Pattern is random, and also shows up when imaging Dylux at 440 rpm, 600 mW, escan 4, plot 50 image.	This is likely caused by a faulty FDPE board. Reset drumspeed to 320 rpm and replace the FDPE board as soon as possible.

Increased 15-pixel banding.	Banding in solids, moire on workstation plots.	1. This may be caused by diodes that cannot maintain the high powers required for V-speed.
		Ensure that the maximum current is set to 2000 mA:
		`TFX> set dio limit`
		should yield a value of 2000. If not, set the value to 2000 and re-generate the power curves.
		2. Check output powers from all diodes by:
		`TFX> ld all 800 mW`
		`TFX> ld`
		Check the table of "currents when on". If any diodes are showing a current of 2000 mA, then these diodes are likely dead. A head swap might be required.

Carriage stalling or incorrect subscan image size.	Unimaged areas of a workstation file are shorter in the subscan direction than they should be.	Check carriage maximum skip speed parameter: `>> set carriage msspeed` The value should be set and saved

		as 800.

Focus errors when trying to plot diagnostic plots.	Error from MPE terminal:
	`*** Exposure Head error (Plot command 0): code 17040 [ Tfx / Thermal 2: [03518] System: Failure configuring the focus driver]`
	Error from TFX terminal:
	`[01344] Focus: Image too small: Not enough focus samples`
		TFX firmware version 1.14 will only allow a minimum mainscan plotting size of 8 inches at V-speeds to ensure proper focus learning.
		The head must be reset:
		`>> reset head`
		and then the plot can be re-imaged, using a minimum *mis* value of 19200 (8 inches).

APPENDIX A: PROCEDURE FOR RELOADING POWER CURVES

Note: Original backed-up head settings can be reloaded using Procomm connected to the TFX diagnostic cable, with the following procedure.

1. Ensure that Procomm is set up to use Ymodem protocol. From the **Main Menu**, select **Options** > **Data Options** > **Transfer Protocol**. From the drop-down menu select **Ymodem**.
2. In the TFX terminal, type `TFX> parm receive`.
3. From the Main Menu, select **Data** > **Send File**.
4. Select the appropriate HT**headprm_*date*.prf file to send.

APPENDIX B: PROCEDURE FOR MANUALLY LOADING MEDIA

Media whose dimensions are greater than [254 mm (10 inches) around drum] x [203 mm (8 inches) along drum] x [178 µm thick] can be loaded using:

```
>> load <mainscan size (mm)> <subscan size (mm)>
<index n> <thickness (µm)>
```

and unloaded with:

```
>> unload
```

A general procedure for loading any size or thickness is given below. For the >>`stage zero` command to work the media should be at least 6 inches around the drum and 6 inches along the drum. To image, media should be at least 8 inches around the drum.

1. >> `flashcvr unlock`
   (unlocks flash cover, if necessary)
2. >> drum idle
3. >> `drumvac on`
   (turn on the drum vacuum)

4. >> `set mode 1 mis <xx>`
   where xx is the desired length of the test plot in the mainscan direction. The units are in dpi. For example, setting xx = 2400 will result in a 1 inch plot; 9600 corresponds to 4 inches, etc. Minimum imageable *mis* for Vspeed is 19200 (8 inches).

5. Open the flash cover and spin the drum by hand until the registration bars are upright. Align the media against the registration bars and tape it on.

6. Close the flash cover

7. >> `mode media <n>`
   (where n is the appropriate MPE media index)

8. Set the correct thickness in the MPE so that scaling is applied (if used):

   ```
   >> set state plate_loc d thk <thickness in microns>
   >> set state plate_loc d status 1
   ```

9. To balance the drum, first ensure that the correct size of plate is identified:

   ```
   >> set state plate_loc d msz <mainscan size in mm>
   >> set state plate_loc d ssz <subscan size in mm>
   ```

   then start balancing by typing

   ```
   >> bal plate
   ```

   this uses the current settings specified in state plate_loc d to determine the correct position of the drum balance weights.

10. >> `stage zero`
    When the stage zero command finishes, the machine is ready for plotting.

11. After the plotting is finished, the media can be unloaded:

    a. Open the flash cover

    b. >> `drum idle`

    c. Rotate the drum by hand until the media is in position to be untaped and removed

12. When all testing is finished, or if a workstation plot is needed:

    a. `>> drumvac off`

    b. `>> set state plate_loc d status 0`

    c. `>> set mode 1 sssa <original value>`