ThermoFlex WIDE II
MCE Firmware Version 1.08 Release Notes

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1. SCOPE

This document describes the 1.08 release of firmware for the ThermoFlex Wide II device. This release of firmware supports sheet and sleeve imaging. V-speed imaging and blank skipping support are supported with this release. Common acronyms used are defined in Appendix A.

2. FORMATTING CONVENTIONS

The formatting conventions used in this document are as follows:

All NVS parameters are in *italics* and commands to be typed into the diagnostic terminal are in **bold** as well as the diagnostic command responses.

3. PRELIMINARY CHECKLIST (READ BEFORE YOU BEGIN!)

Please ensure the following checklist is performed before the upgrade is started. This upgrade will only apply to either a newly integrated device or a beta device running beta firmware for this release.

1. ☐ Using the **list version** command, record the following:

   current MCE FW version: _____

   current Xilinx version: _____

2. ☐ Record the head firmware version.

   current TFX FW version: _____

   To determine the head firmware version, you must ensure that the safety loop is closed. Close the load table and all other doors on the device and type **table lock**. After the head comes online, use the **redirect enable** to access the head, type **ver** to determine the head version, and use **redirect disable** to return back to the MCE.

   NOTE: Always perform a **table lock** command and wait for the head to come online (approx. 30 seconds) before issuing head commands.

3. ☐ Ensure you have the controlled release package available.

4. ☐ Ensure that the load table is locked and the head is online.

5. ☐ Run the Version Checker applet[1] with the new controlled release version specified.

   Identify all components that need to be updated.

[1] Available from the Default Views of Service Shell 2.5; ensure the machine is on before running the applet.

- ☐ Head compatibility (TFX V1.32 or higher).
- ☐ Print Console compatibility (Version 3.16.1.xx or higher).
- ☐ Xilinx compatibility (Version 2.11 or higher).

6. ☐ Check for any updates to the controlled release.
7. Ensure that you allocate at least 4 hours for upgrading and testing the system.

4. UPGRADE PROCEDURE

To upgrade the MCE firmware, please perform the following steps:

1. Use the Version Checker applet to identify all firmware components that need to be upgraded.
2. For the Upgrade Procedure, please see the detailed upgrade document *FirmwareUpgrade.pdf*. This document can be opened from the script view in ServiceShell by right-clicking on the Firmware Upgrade script, and clicking Help for selected script. Then click the link to the pdf file:



   The *FirmwareUpgrade.pdf* file can also be found in the d:\ServiceShell\Scripts\device folder..

3. After the upgrade is complete, run the Version Checker applet again to make sure all components are correct.
4. Perform the Product Configuration procedures in Section 6 as required.

5. FEATURES

This section describes some of the features in this release of firmware that are unique or new to the ThermoFlex Wide II device.

5.1 NVS Parameters

The following discusses parameters in the firmware not discussed in the release notes for 1.04 and explains their use. Many of these parameters deal with sleeve functionality.

mandrel Loaded [range True/False, default False, no units]

Indicates whether the mandrel is loaded or more specifically, that the arbor is loaded and that the device is operating in sleeve mode. Do not modify this value without guidance from product development as it maintains the current state of the machine and will cause problems if incorrectly set.

mandrel Diameter [range 0-340000, default 0, microns]

Specifies the diameter of the mandrel. This value is based on the repeat length for the current job sent down by the workstation. Do not modify this value without guidance from product development.

mandrel Inertia [range 0.100-10.000, default 2.000, kg/m^2]

Specifies the inertia of the mandrel (arbor, sleeve, shell combination) calculated during loading. This value can also be determined using the **drum inertia** command.

mandrel ExchangeState [range 0-3, default 0, no units]

Indicates whether we are in the middle of a drum exchange. This parameter is used for recovery purposes should an exchange fail or the machine be reset in the middle of an exchange. Do not modify this value without guidance from product development as it maintains the current state of the machine and will cause problems if incorrectly set.

The values are as follows:

0 = No exchange in progress.

1 = Exchange from sheet to sleeve mode.

2 = Exchange from sleeve to sheet mode,

3 = Exchange between different sleeve sizes.

mandrel ShellLoaded [range True/False, default False, no units]

Indicates whether a shell has been loaded on the arbor. Do not modify this value without guidance from product development as it maintains the current state of the machine and will cause problems if incorrectly set.

mh DBLowerLimit <n> [range 0-1024, default 0, counts]

Sets lower limits for One-touch loader operation. The values in this array determine when One-touch operation transitions states.

mh DBUpperLimit <n> [range 0-1024, default 0, counts]

Sets upper limits for One-touch loader operation. The values in this array determine when One-touch operation transitions states.

gc FocOffset [range -10000-10000, default 0, microns]

Specifies the distance between the focus laser and the write laser. This is used when performing plate-on-sleeve imaging to offset the imaging position from where the focus

laser detects the seam. This is typically a small adjustment and is required for plate-on-sleeve work with very small seams (less than 1mm).

gc SeamDetectType [range 0-2, default 0, no units]

Indicates how the seam is detected when performing plate-on-sleeve imaging. This parameter will most likely be removed in future versions of firmware when more data has been collected regarding seam detection. The values are defined as follows:

0 = No fine search, coarse search only using threshold of 200.

1 = Fine search using threshold of 100 (sum-based).

2 = Fine search using threshold of 200 (sum-based).

blankskip Enable [range True/False, default True, no units]

Enables/disables blank skip support for all media.

blankskip EnableSleeve [range True/False, default True, no units]

Enables/disables blank skip support for continuous sleeve imaging. Note that if the *blankskip Enable* parameter is False, this parameter will have no effect.

blankskip EnablePOS [range True/False, default True, no units]

Enables/disables blank skip support when performing plate-on-sleeve imaging. Note that if the *blankskip Enable* parameter is False, this parameter will have no effect.

focus LearnMarginAdjust [range -5000 – 5000, default 0, microns]

Adjusts the minimum distance that the carriage is positioned from the edge of the plate for learning focus. The nominal margin is 2500 microns if focus learn is performed over two swaths, and 5000 microns if focus learn is performed over only one swath. This parameter will typically not be required on the Thermoflex Wide II device as focus is learned well onto the plate in sheet mode and a 5mm adjustment is made in sleeve mode.

prd DrumSpeedSafety [range 0 – 800, default 100, RPM]

This sets the maximum speed of the drum when using the key override switch..

prd SimulationState [range 0 – 65535, default 0, no units]

Used to maintain the simulation state of the machine across resets. Cannot be modified via the diagnostic monitor but only through the use of the **sim** command.

Note that the *sag* NVS subsystem is available but is not currently used until it is determined what requirements are for sag compensation of sleeve and plate-on-sleeve work.

5.2 UDRC-L Port Change

It was discovered that limited buffering on the current port used for SCON communications with the UDRC-L cabinet LIONEL board caused communication errors resulting in corrupt or

incorrect filter usage readings. As part of this firmware upgrade, please move the SCON connector (9-pin D-sub connector) from connector J40 to J37 on the MCE board. These connectors are along the top of the MCE board grouped with the other serial ports for RCON and diagnostics serial port connections. It may be necessary to remove and replace wire ties when performing this change.

5.3 Sleeve Functionality

This release contains usable sleeve functionality including seam detect and blank skipping capability on Plate-On-Sleeve and Continuous Sleeve. This functionality is still considered beta and sites that want to run sleeve mode should be upgraded to the next release as soon as possible after Sleeve functionality goes to early production status and a new release is available.

5.4 Blank Skipping Support

Blank skipping has now been added to this release of Thermoflex Wide II firmware. The NVS parameters discussed in section 5.1 allow enabling and disabling of this functionality based on the mode of operation. In order to use this functionality, the versions of head firmware and Xilinx specified in section 3 must be loaded. Please also ensure that *carriage Iplot* is modified from 3 to 5 amps in order to support the higher demands on the carriage due to blank skip accelerations.

5.5 Test Plot Applet Support

Thermoflex Wide II firmware now contains support for Test Plot Applet with Service Shell 2.5 SP2 RC3 and higher along with DCAPI 0.800.799.11 and higher. A new series for Thermoflex Wide II called the “Stroke Power Series” has been added since TFX does not support the *head wpower* parameter.

6. PRODUCT CONFIGURATION

6.1 Model Type

Currently shipping devices should be configured as one of the following types:

1. **TF4836F** – 48” mainscan/36” subscan maximum plate size, F-speed[2]
2. **TF4260F** – 42” mainscan/60” subscan maximum plate size, F-speed
3. **TF5280F** – 52” mainscan/80” subscan maximum plate size, F-speed
4. **TF4836V** – 48” mainscan/36” subscan maximum plate size, V-speed[2]
5. **TF4260V** – 42” mainscan/60” subscan maximum plate size, V-speed
6. **TF5280V** – 52” mainscan/80” subscan maximum plate size, V-speed

To change the model type, use the following commands:

```
Flexo>> access enable
Flexo>> config <password> <model type>
Flexo>> reset
```

Please contact Creo Service or your PSM if you do not know the password.

Note that previous versions of firmware did not include the “**TF**” prefix in the model type. Upgraded devices will not require reconfiguration as the underlying representation of the model type has not changed, only the model type name it is associated with.

6.2 Product Options

The Thermoflex Wide II device monitor will display the following options:

```
Product Option commands
-----------------------
option edgedetect     enable|disable
option buzzer         enable|disable
option debris udrcb   enable|disable
option debris udrcl   enable|disable
```

[2] This configuration’s product designation is “3648”. “4836” is used for firmware configuration only.

```
option drumvacuum     enable|disable
option sprayon        enable|disable
option sheetmode      enable|disable
option sleevemode     enable|disable
option doblo          enable|disable
```

when the **option** command is entered. For sheet mode only devices, please enable only the options in **bold** above (debris option depends on hardware configuration but will be typically **udrcl**). All other options should be disabled. For combined sheet/sleeve mode devices, please ensure that **sleevemode** is enabled in addition to **sheetmode**. If "One-touch loading" is available, **doblo** will also have to be enabled. Please see section 6.5 for information in setting up the One-touch loader offsets (*mh DBLowerLimit* and *mh DBUpperLimit*).

The commands for enabling/disabling options are displayed in the output of the **option** command. Note that you must use **access enable** to enable access to the option command.

6.3 Product Features

As a result of the fixed nature of sleeve size imaging, the model types (e.g. 5280F, 4260V) specify only sheet size limitations. Sleeve size limitations are set separately based on the install and can be done via the **feature** command. Using the **feature list current** command should give the following in its output:

```
38  Maximum sleeve size in mainscan          :   1067 mm        [Optional]
39  Minimum sleeve size in mainscan          :    381 mm        [Optional]
40  Maximum sleeve size in subscan           :   1829 mm        [Optional]
41  Minimum sleeve size in subscan           :    304 mm        [Optional]
```

To modify these values, you must have access via the **access enable** command and use **feature <password> <tag> <value>** where <tag> is the number in the first column and <value> is the value to change it to. For example, to change the maximum mainscan sleeve size from 1067 to 914, use the following command:

```
Flexo>> feature <password> 38 914
```

Please contact Creo Service or your PSM if you do not know the password.

6.4 UDRC External Venting

This release supports the use of external venting. When using external venting, ensure you have the following ECO implemented:

ECO CA03915

- Assy 500-01699A = UDRC-xF upgrade kit (w/o cable required for Wide 2 EP and earlier (post-July 2004) upgrade)

- Assy 500-01913A = 500-01699A + Cable for Wide 2 pre-July 2004 device

The device should be configured to use an UDRC-B cabinet via the **option** command as follows:

```
Flexo>> access enable

Flexo>> option debris udrcl disable

Flexo>> option debris udrcb enable

Flexo>> reset
```

Additionally, the "backpack" containing the LIONEL board on LF cabinets should be removed. As a result, in order to monitor the nozzle flow, it is necessary to connect the new cable to the Setra 100WC sensor in the power box (left wall). Please follow the following instructions:

1. Disconnect two fork type terminals (cable 10-5166A) to the Setra debris sensor inside the power box. Use electrical tape to cover up the conductor part of these two terminals.
2. Connect two fork terminals of cable 220-00629A to the Setra debris sensor's screw terminals, as indicated on the labels.
3. Route the cable 220-00629A nicely and plug the other end of this cable to J1 of the GENINE board. Use sufficient cable ties to secure the cable.

After making these changes, ensure that the sensor is working correctly by using the following commands.

```
Flexo>> debris poc

Flexo>> debris poc on

Flexo>> debris poc
```

The initial **debris poc** command should show no nozzle pressure or flow while the second **debris poc** should indicate that there exists pressure at the nozzle. Further troubleshooting can be performed using **debris blower on** and **scan AI_UDRC_PocNozzPress** commands to turn on the cabinet without monitoring and to read the raw value of the pressure sensor, respectively.

Note that if you are changing an existing install with an LF cabinet to an external venting configuration, you will have to ensure that the *Media <n> DebrisOptions* for all media types is set to 3 as 9 (Flexo PACC and whisker jet) is not longer available when configured as a "B" system.

6.5 One Touch Loader NVS Setup

This is the current procedure to setup the offsets required for One-Touch loader operation. Future versions of firmware will have an automated procedure to perform this calibration.

1. Push lever fully forward (this position is the end of Load sequence)

   Type **doblo** in service shell, write down the Sensor Position value:

A: _____

Subtract 10 from “A” and write this number down:

1 LOW: _____

In service shell, enter **set mh dblowerlimit 1 <1 LOW>**

2. Pull lever to next detent position

   Type **doblo** in service shell, write down the Sensor Position value:

   B: _____

   Subtract 5 from “B” and write this number down:

   1 HIGH: _____

   In service shell, enter **set mh dbupperlimit 1 <1 HIGH>**

   Add 5 to “B” and write this number down:

   2 LOW: _____

   In service shell, enter **set mh dblowerlimit 2 <2 LOW>**

3. Pull lever to next detent position

   Type **doblo** in service shell, write down the Sensor Position value:

   C: _____

   Subtract 5 from “C” and write this number down:

   2 HIGH: _____

   In service shell, enter **set mh dbupperlimit 2 <2 HIGH>**

   Add 5 to “C” and write this number down:

   3 LOW: _____

   In service shell, enter **set mh dblowerlimit 3 <3 LOW>**

4. Pull lever to next detent position (should be on UNLOAD side of vertical)

   Type **doblo** in service shell, write down the Sensor Position value:

   D: _____

   Subtract 5 from “D” and write this number down:

   3 HIGH: _____

   In service shell, enter **set mh dbupperlimit 3 <3 HIGH>**

   Add 5 to “D” and write this number down:

   4 LOW: _____

   In service shell, enter **set mh dblowerlimit 4 <4 LOW>**

5. Pull lever to next detent position

Type **doblo** in service shell, write down the Sensor Position value:

E: _____

Subtract 5 from "E" and write this number down:

4 HIGH: _____

In service shell, enter **set mh dbupperlimit 4 <4 HIGH>**

Add 5 to "E" and write this number down:

5 LOW: _____

In service shell, enter **set mh dblowerlimit 5 <5 LOW>**

6. Pull lever to farthest position possible and hold (spring loaded, may need assistance)

Type **doblo** in service shell, write down the Sensor Position value:

F: _____

Add 5 to "F" and write this number down:

5 HIGH: _____

In service shell, enter **set mh dbupperlimit 5 <5 HIGH>**

Once this procedure is complete, test operation by using the **doblo load** and **doblo unload** commands. Either command can be aborted using **doblo abort**.

7. BUG FIXES

This section lists bug fixes from 1.04 and thus will deal with sheet mode operation only.

7.1 Media Settings Corrected When Focusing on Media

In the previous version, the head was not set to the correct media type when focusing on media during the load sequence. This caused random behavior because the head is powered down between loads and hence used a possibly incorrect media setting when trying to focus on the media. Note that when loading media via the diagnostic interface, the media index (the **mi** parameter) is now used correctly when focusing.

7.2 Carriage Left in Place after Plot

In the previous version, the carriage was incorrectly moved to the next edge position when a plot was done. This has been eliminated and should speed up performance slightly.

7.3 Pixel Counting Fixes

Pixel counting is now fixed as the previous release did not correctly count pixels for decrementing filter usage associated with the chemical filter. Changes in the firmware and in Xilinx have corrected this problem. Devices that have disabled LF operation (i.e. **option debris**

udrcl disable) due to this bug should now be returned to their original configurations. Please note the information in section 5.2 regarding a port change for the UDRC-L cabinet SCON connection.

7.4 Diagnostic Interface Changes

More information was added to diagnostic commands to allow CSE's and other service personnel to obtain more information when troubleshooting. These commands include **loader**, **safety**, **door**, and **gc**. In most cases more information is made available and/or is made to conform to the conventions used by other MCE devices.

7.5 Cancelling Before Taping Trailing Edge Fix

In previous versions, canceling or ejecting after a sheet of media is fully loaded onto the drum but before taping the trailing edge would require the user to close the table and wait for the system to move the media to the trailing edge unload position. Now, the table can be left open and the drum simply moved back to the trailing edge unload position with the drum control buttons. The unload proceeds as usual from this point. As a result of this fix, the drum control button operation has also been modified so that whenever the current position is not "on media", movement will stop at the first edge encountered. When "on media", the drum control will not allow the media past the edges as in previous versions.

7.6 Incorrect Speed Limiting for Sheet Mode

Previous versions of firmware did not limit the speed correctly in sheet mode for F and V models. Thus, a device configured to be F speed would limit the drum speed to 450 RPM across all sizes of drum. However, setting the surface velocity for V speed would still fall under 450 RPM when using the drum. As a result, an additional feature tag was added (*Maximum sleeve throughput*) which defines the maximum throughput for a sleeve job. The *Maximum plating throughput* tag now only defines the limit for sheet mode operation. Note that when configured as a **TF5280V**, the maximum output limits both default to the 600 RPM limit (640000 um/s) and are configurable on a case by case basis. This allows sites that run about our current V speed limit to continue to run. If after an upgrade to this version of firmware, the device no longer plots due to a limit error, please check that the machine is configured correctly. Surface velocities of 7.24 m/s and 9.73 m/s correspond to F and V speeds, respectively.

8. KNOWN DEFICIENCIES AND PROBLEMS

Known deficiencies and problems in the device firmware to be worked on for the next release.

- Device does not recover properly from all emergency stop situations. This varies from situation to situation.
- When rotating drum with drum control buttons, the response lags and it may sometimes be necessary to hold the buttons longer than one might expect before the drum starts to rotate.

- When starting the loading process, the side taping step may be confused with the actual media load if care is not taken. This can result in the operator loading the plate without drum vacuum and thus dropping the plate into the device. A possible future fix is to prevent forward rotation of the drum during the side taping step. Currently, the operator must ensure that the drum vacuum button is pressed and the vacuum is on before attempting to load media.

- Although the firmware crash during the focusing on media step has not been seen in testing with this release, we have not been able to track down its origin and it still may be a problem. If a customer experiences such a crash, please forward the log files from that device to the firmware developer.

- The headstock collision sensor (the side facing optical sensor on the nozzle assembly) appears to trip occasionally when imaging a plate. This may be due to noise or other as yet undetermined factors. Currently, it is recommended that if a customer experiences the tripping of this sensor (as characterized by error 43308: **Carriage travel limit (none?) unexpectedly hit**) that washers be added to move the sensor further back away from the drum and other possible sources of reflection. Please contact product development for more information if a customer experiences this problem.

- The **zdrive focus <drum diameter> calibrate** routine relies on the drum diameter being correct. It sets the *zac BaseFocusDist* parameter based on the distance the zstage has traveled added to ½ the drum diameter supplied. For instance, if the zstage focuses at 40mm of travel and the drum diameter supplied is the typical 432mm, then *BaseFocusDist* will be set to 256mm. If you are unable to focus the zstage onto the drum, it may easier to focus on a known thickness of media and calculate and set the *BaseFocusDist* parameter manually. Knowing that the *BaseFocusDist* is the distance from the home of the zstage to the center of the drum, it can be calculated by adding together the position of the zdrive when focused on media (found using the **zdrive** command), the thickness of the media, and ½ the drum diameter.

Appendix A: Common Acronyms

BBR	Boot-block Recovery
CTP	Computer to Plate (this includes Trendsetters and Platesetters)
GENINE	Generic I/O Node Electronics Board
kPa	kilopascals
LIONEL	Little I/O Node Electronics Board
MCE	Master Control Electronics
NVS	Non-Volatile-Storage
PC	Print Console
PDB	Power Distribution Board
POST	Power-On Self Test
TFX	TFX Head
TS	Trendsetter – base model
UDRC	Universal Debris Removal Cabinet
WS	Workstation

APPENDIX B: NVS BACKUP/RESTORE AND LOADING FIRMWARE

Service Shell is required to load new firmware, and to backup or restore NVS parameters. A script has been written to simplify these tasks.

As part of the Service Shell install, a script named **FirmwareUpgrade.spt** is copied to the Device scripts folder. A document describing how to configure Service Shell and how to use the script is also included in the **d:\ServiceShell\scripts\device** folder. Service Shell is installed on every workstation before it leaves the factory, so this document will be present on every workstation.

Inside Service Shell, left-click on the Scripts icon, then left-click on the Device group. Double-click on FirmwareUpgrade.spt to start the script. It is very important to use this script for the upgrade to make sure a full NVS backup is performed. Furthermore, this release of firmware requires a new BOOT module to be installed on the MCE, and requires the POST, Xilinx and OVWR modules to be re-installed. **If the new BOOT module is not installed before the new firmware is, the new firmware will not execute!** The upgrade script will take care of this for you, so it is important that you use it.

RAM vs. FLASH Parameters in MCE Machines

There are two separate types of NVS parameters that are accessed by the MCE firmware. Most parameters are stored in RAM. A few parameters that are not expected to be changed frequently are stored in Flash. Both sets of parameters must be backed up to fully capture the state of the machine; and both sets of parameters must be loaded onto a new board to restore the machine to its previous state. The FirmwareUpgrade.spt script automatically creates two separate files, one for each type of NVS, and expects both files when restoring parameters.

NVS parameters in general provide the following:

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

All parameters are saved immediately as soon as they are changed.

When firmware is upgraded on a device, any new parameters will automatically be set to their default value. If a more complicated upgrade procedure is required, a script will be created to perform this upgrade, and this script will be released with the firmware.

IMPORTANT: BEFORE UPGRADING THE FIRMWARE OF DEVICE YOU MUST BACKUP THE CONTENTS OF THE CURRENT NON-VOLATILE STORAGE IN CASE IT BECOMES NECESSARY TO REVERT TO THE PREVIOUSLY INSTALLED VERSION OF FIRMWARE!