1. Scope....3

2. Formatting Conventions....3

3. Preliminary Checklist (read before you begin!)....3

4. Upgrade Procedure....4

Upgrade Procedure....4
4.1 BOOT and POST Upgrade Procedure....5

5. Changes Since V1.12....7
5.1 NVS Changes....7
5.2 Diagnostic Command Changes....7
5.3 Bug Fixes....8
5.3.1 Throughput Improvements....8
5.3.2 Flow Switch mapping....8
5.4 Re-mapped CH_SensorFlowSwitch and its presence CH_&SensorFlowSwitch correctly....8
5.4.1 Subscan Shift Fix....8
5.5 New Functionality for all NEWS Models....8
5.6 Input Raster CRC....8
5.6.1 2L1W Support....8

6. Known Problems....9
6.1 Image Artifact during Carriage Retrace....9

7. Device Configuration Procedures....9
7.1 Setting Up a Model....9
7.2 Thermal 2 Firmware Installation Notes....10

8. Device Calibration Procedures....11
8.1 Setting the Plate Measuring Sensor Offset....11
8.1.1 TEMargin Parameter....12
8.1.2 LEMargin Parameter....12
8.1.3 TEAdjust Parameter....12

8.2 Calibrating the Unload Table Cup Rotate Position....12
8.3 Enabling Plate Rotation....13
8.4 Adjusting Eject Speed and Distance....13
8.4.1 Eject distance....13
8.4.2 Eject speed....13
8.5 Enabling Manual or Automatic Unloading....13
8.6 UDRC location changes....14
8.7 RAM vs. FLASH Parameters in MCE Machines....15

APPENDIX A: Common Achronyms....17

APPENDIX B: NVS Backup/restore and Loading Firmware....18

APPENDIX C: BBRAM Corruption on MCE Devices....18

1. SCOPE

This document describes the important changes to the Trendsetter NEWS MCE firmware that comes with Controlled Release version 3.00. This firmware release consists of MCE Main Firmware Version 1.22 and MCE Slave Firmware Version 1.10.

Please refer to the TechPlanet firmware documentation pages or the Creo Service CD-ROM for information on commands, error messages, and NVS parameters for the Trendsetter NEWS.

Common acronyms used in this document 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.

- ☐ Use the list version command to display the current MCE version.
- ☐ Ensure you have the entire controlled release package available.
- ☐ Read “readme” notes on the controlled release CD.
- ☐ Run the Version Checker applet[1] with the new controlled release version specified. Identify all components that need to be updated.
  - ☐ Head compatibility (Thermal 1.7x V1.93 or higher; Thermal 2 V1.04c or higher).
  - ☐ Print Console compatibility (Version 3.10 or higher).
  - ☐ MCE POST 1.06
  - ☐ MCE BOOT 1.12

[1] Available from the Default Views of Service Shell 2.4; ensure the machine is on before running the applet.

- ☐ Carriage compatibility (Version 1.44 or higher).
- ☐ Xilinx compatibility (Version 1.79 or higher).

☐ Check for any updates to the controlled release – for example, new scripts not included in the official Service Shell release. These updates would be stored in the Patches folder of the controlled release package.

☐ **GENINE board Part Number 10-4227D-A**

☐ **Carriage Amplifier 503C01525B is needed to support carriage acceleration of 150 mm/s^2.**

☐ **16 teeth pulley (for unload table) Part Number 350-00018**

☐ Ensure that you allocate at least 4 hours for upgrading and testing the system. After the firmware upgrade, the entire system must be checked to make sure it is operating properly. This includes performing a visual check of plate handling, running a few plots to ensure proper image quality, and instructing the operators on any changes to the system operation. The customer should also be allowed to run a few plates to make sure the machine works to their satisfaction.

4. UPGRADE PROCEDURE

UPGRADE PROCEDURE

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

1. Service Shell 2.5 must already be installed. **This firmware cannot be downloaded without this version of Service Shell!**
2. Use the Version Checker applet to identify all firmware components that need to be upgraded.
3. Run the FirmwareUpgrade.spt script from within Service Shell (see Appendix B for details) and select Upgrade Firmware. The script will automatically create backup files for all the NVS parameters on the device, once this is done then upgrade the firmware. The script allows several firmware components to be loaded in sequence – for example, MCE Main firmware and Xilinx.
4. After the upgrade is complete, run the Version Checker applet again to make sure all components are correct.
5. Check out the major changes below and make sure to follow ALL the procedures below.

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.

4.1 BOOT and POST Upgrade Procedure

This is a manual alternative to the script upgrade procedure and is included here as a "backup" activity.

Before any attempt to upgrade firmware, any machine is supposed to have old version of firmware running normally.

If this is not the case, the machine needs to be set up properly with the old version of firmware.

When old version of main firmware is running, go through the following steps from the ServiceShell(version 2.5 or newer).

Alternatively, the current version of Bload program can also be used.

1. Download the new version of MCEBOOT.BIN.

   Command:

   download \path\MCEboot.bin, or,

   bload f=\path\MCEboot.bin i=boot p=port#

2. Reset MCE to boot mode.

   Command: **reset boot.**

When the boot starts up, it will build the FWD firmware directory table and the FWD structure header.

It displays a message while building the firmware directory table. This is only an operation at the first time the new version of MCE Boot starts up.

This may take 25 seconds. When it finishes, the “Boot” prompt shows up.

3. Download the new version of MCE POST.

   Command:

   download \path\MCEpost.bin, or,

   bload f=\path\MCEpost.bin i=post p=port#

   Reset to boot mode.

4. Download the latest version of Xilinx image.

   Command:

   download \path\MCElca.bin, or,

   bload f=\path\MCElca.bin i=lca p=port#

   Reset to boot mode.

5. Download the new version of the main firmware

   Command:

   download \path\mainfirm.bin, or,

   bload f=\path\xxxfmw.bin i=main p=port#

6. Reset to the new main firmware.

   Command: **reset**

   When the new main firmware starts up, type command ‘**fwd list’**.

This command should list all firmware components you have successfully installed.

5. CHANGES SINCE V1.12

5.1 NVS Changes

NVS System	Param Name	Old Default	New Default	Description	Refer to Section

5.2 Diagnostic Command Changes

New commands:

Command	Description	Refer to Section

Modified commands:

Command	Description	Refer to Section
		Application Protoc. 4.1

Removed commands:

Command	Description	Refer to Section

5.3 Bug Fixes

5.3.1 Throughput Improvements

Several code changes has been made to allow for better throughput, especially with broadsheet plates.

5.3.2 Flow Switch mapping

5.4 Re-mapped CH_SensorFlowSwitch and its presence CH_&SensorFlowSwitch correctly.

5.4.1 Subscan Shift Fix

Fixed a subscan shift bug that would occur on the master head. This would result in a subscan shift that would be smaller than a swath.

.

5.5 New Functionality for all NEWS Models

5.6 Input Raster CRC

New important feature: Input Raster CRC - needs PrintConsole 3.9 or higher.
Used to identify a plate with potential image artifact based on CRC mismatch between the device and the workstation image data. The device suspends on detecting a CRC mismatch. This way the defective plate is prevented to be processed further.
To enable the CRC checking make sure that the registry value:
HKEY_LOCAL_MACHINE\SOFTWARE\Creo\PrintConsole\V2.0\ScsiConfig\ PerformCRC16Check == 1

5.6.1 2L1W Support

Added new optional feature for NEWS: mainscan min size 395 mm (2L1W Japan).

6. KNOWN PROBLEMS

6.1 Image Artifact during Carriage Retrace

There is a known problem when carriage retraces are performed - image artifact. In such a case the image on the plate can contain residue from previous data already imaged. The problem pronounced itself with one or several incomplete vertical lines and other plate defects. Investigation is in progress for this problem. Please note that this problem is not expected to affect NEWS devices in normal operation because carriage retraces are not performed often (due to lower data rate).

The following is a brief summary of what is known about the problem:
Artifact has been discovered on News 150, with each machine running different firmware. Artifact happens with Thermal 1.7 head but not with Thermal 2.0 head. Artifact happens mainly at 1200 dpi. Artifact only happens when retraces are produced. Artifact can be reproduced. Artifact shows up on the TEC side of the plate, and shows up in the same part of the image. Artifact seems to be a result of data being duplicated a few inches from its correct location(in the subscan direction). Plates with dimensions 770x1029 have shown the problem. This problem does not show up on plates with a small mainscan size Atifact is generally about half a swath width wide and two to six inches long.

7. DEVICE CONFIGURATION PROCEDURES

7.1 Setting Up a Model

Ideally, all required NVS parameters would be configured automatically when the model is configured. This has not yet been done, in part because a single model can have different options that change its characteristics. The following list defines what settings must be verified when a model or feature is changed (do access dev first to gain access to commands):

- option autoloader enable — enabled for all models
- option dual-plate enable — if dual-plate functionality required
- option rotator enable — if rotator installed
- option dual-head enable — for NEWS 200
- mode n — ensure resolutions are set correctly

For Commercial options, set mode 1 as 2400dpi and mode 2 as 1200dpi; otherwise, set both mode 1 and mode 2 as 1200dpi.

Example: set mode 1 displays resolution parameters. Should be as follows:

News50 & 70: 1200

1200

1

2

News50C & 70C 2400

2400

1

1

News100 & 150 1200

1200

1

1

set mode 2 displays parameters. For single resolution, repeat the mode 1 parameters. For dual resolution:

News50C & 70C 1200

1200

1

2

7.2 Thermal 2 Firmware Installation Notes

Please note that if a pre-release version of Thermal 2 firmware version 1.02 is running and a new head firmware version is installed, the following procedure is required before installing the new head firmware:
- th2 "eng"
- th2 "set sys firmwareversion 1.01"
- reset

If you have replaced the 1.7x head on the device and the head fails to initialize, run the service shell script "InitHDM9to16" in the "devices" script list. This script is included in Service Shell 2.4 SP1 (Service Pack 1).
Please read the " readme" notes on the controlled release CD for more information.

7.3 Thermal Head 2 Install Procedure and Basethickness Parameter Setup

Proper use of the moving lens range is a basic requirement for host products to allow room for any bump tracking.

The head install procedure ensures that any plate thickness allowed by the product specification will work properly and have room for any bump tracking. NEWS devices support plates with thickness 02. to 0.3 mm. The head should be installed with an average error of 100 microns and the basethickness set to 305 if the plate loaded during the install is 205 microns thick. For example, if the head is installed to an error of +100 using a 205 micron thick plate, and then a 305 micron plate is loaded, there still will be 150 microns for plate bump tracking. In other words, one should NOT always do head install to 0 error.

The constraint is the equation: "BaseThickness" – "Thickness used to install head" equals "The error head was installed to". Choose a BaseThickness value that is the maximum of the different thicknesses that are expected to be used. The head install procedure is as follows:

a. Set the BaseThickness, BT to the maximum supported by the device. In case of NEWS this value is 305.

b. Choose which thickness of plate to install the head with, IT.

c. Install the head with a target error of (BT – IT).

8. DEVICE CALIBRATION PROCEDURES

If the firmware is being loaded into a new machine or the NVS parameters have been erased without making a backup, then the following NVS parameters must be calibrated:

8.1 Setting the Plate Measuring Sensor Offset

The mh DistSensorToLEC parameter specifies the nominal distance between the Leading Edge Clamps (LEC) and the optical plate measuring sensor on the load ramp. This parameter is used by the firmware to measure the main-scan size of plates as they are being wound onto the drum. To calibrate this parameter, place a stack of plates of a known size into the bay, load the correct plate size information from the workstation, and verify that the media mainscan size is correct by entering the bay 1 command from the diagnostic terminal.

Type load bay 1 calibrate through diagnostics. This will cause a plate to be picked and loaded onto the drum. The plate size will be measured and the mh DistSensorToLEC parameter will be calibrated as the plate is wound onto the drum. The new value is automatically saved.

8.1.1 TEMargin Parameter

This NVS parameter affects the mainscan (around the drum) distance from trailing edge of the plate to the last imaged pixel.

8.1.2 LEMargin Parameter

This NVS parameter affects the mainscan distance from leading edge of the plate to the first imaged pixel.

8.1.3 TEAdjust Parameter

This NVS parameter adjusts the amount that the trailing edge magnetic clamp covers the plate. Any changes in the parameter will affect the length of plate being clamped by the TEC.
Before adjusting this parameter, make sure the LoadPos and TECParkPos parameters are properly calibrated.

To verify or adjust the TE clamp cover:
1. Load a plate and using the TEC as guide, draw a line on the plate.
2. After unloading the plate, measure the distance between the edge of the plate and the line.
3. Calculate "desired TE clamp cover distance minus value from step 2"
4. For positive values in step 3, add the amount to the current TECAdjust parameter to increase the cover.
For negative values in step 3, subtract the amount from the current TECAdjust parameter to decrease the cover. Please note that the value stored in mm in NVS does not directly correspond to what the device will actually clamp. For example, if the value stored in NVS is 7 mm the device could only be clamping 5 mm.

8.2 Calibrating the Unload Table Cup Rotate Position

The mhauto UtRotatorPos parameter specifies the nominal position for the unload table traveler to move to before rotating the unload vacuum cups. The firmware moves the traveler to this position and checks the rotate position sensor before attempting to rotate the cups. If the sensor is not tripped, then the traveler is moved slowly towards the away end of the table until the sensor is tripped or the firmware gives up and suspends.

Calibrate this parameter with the unload table in the down position (use the table down command). Move the traveler home by typing table home. Then type table move rotate. This command will move the traveler to the position specified by mhauto UtRotatorPos. The center of the optical interrupter tab on the traveler should be 1-2 millimeters towards the home side of the rotate position sensor, and the sensor should be tripped (check the sensor using the table

command). Adjust the position by changing the mhauto UtRotatorPos parameter and re-typing table move rotate. The new value is automatically saved when it is changed.

On machines with short unload tables (most Trendsetter 400 and NEWS machines), the mhauto UtRotatorPos parameter should be set to 500 to make sure the traveler stops in the correct place when it is dragging a plate along the unload table.

8.3 Enabling Plate Rotation

The rotator is enabled in firmware by typing access expert then option rotator enable. Plate rotation is controlled from Print Console. If the rotator option is enabled, then a "Rotate Plate" checkbox will show up in the Media Size settings in Print Console. If this box is checked, Print Console will tell the Trendsetter to rotate the plate during unload.

Without Print Console, rotation can be tested by typing:

- load bay 1 r 1 to load a plate from the bay and tell it to rotate on unload, or
- unload r 1 to unload the plate on the drum and tell it to rotate.

8.4 Adjusting Eject Speed and Distance

8.4.1 Eject distance

The plate will be pushed towards the processor at fast speed, then slowed down to match the processor intake speed.

The exit FastDistance parameter determines when the traveler slows down. This parameter should be set to the distance (in mm) from the traveler home position to the position of the far end of plate when the speed changes. To adjust this distance, enter set exit fastdistance <nn> where <nn> is the new value in millimeters.

To adjust the distance that the plate moves at slow speed, enter set exit slowpush <nn> where <nn> is the new distance value in millimeters.

The new values will be saved automatically when they are changed.

8.4.2 Eject speed

Enter set exit velocity to see the current slow speed setting.

Use the table move <position> <velocity> command to test different speeds and determine the best speed. Enter set exit velocity <nn> where <nn> is the new speed setting. The new value will automatically be saved.

8.5 Enabling Manual or Automatic Unloading

Plates loaded through manual-bypass will be unloaded through manual-bypass or automatically based on a configuration setup in Print Console. Automatic loading should be configured to

automatic unloading only. Currently the device does not support automatic loading with manual unloading.

8.6 UDRC location changes

Modify the following parameters after typing "prm hazardous media enable" in Service Shell.
set debris NozzleFlowConst (from 2226.510 as default to 7280.0)
set debris NozzleFlowExp (from 2053.038 as default to 1822.0)
set debris PressMaxNozzle (from 4.977 as default to 6.0)

Check if modifications for UDRC are done properly by performing the following:
>>set debris nozzlesensortype 0

a) On the sensor change: make sure the 6 conductor cable has been used when connecting from GENINE J1 to the lower Pressure Sensor Daughter Card.

b) After downloading firmware, one can check the connections using these commands and expect these readings:

DVAC

NEWS>> dvac
Drum Vacuum Status
Drum Vacuum:
Drum Vaccum Reading: 0.00 kPa (-1 adjusted counts)
Drum Vacuum ADC Offset: 38
Drum Vaccum Drive: Off

Drum Vaccum Generator Drive: Off

*** Command Complete
NEWS>> dvac on
Turn on drum vacuum pump
*** Command Complete
C NET: PPP link is Down.
NEWS>> dvac
Drum Vacuum Status
Drum Vacuum:
Drum Vaccum Reading: 2.83 kPa (29 adjusted counts)
Drum Vacuum ADC Offset: 38
Drum Vaccum Drive: On

Drum Vaccum Generator Drive: Off

*** Command Complete

UDRC

NEWS>> scan ai_udrc
Group Name Status Value
AI_UDRC_POCNozzPress b 0000099Ah
AI_UDRC_POCNozzPressNF b 00000000h
AI_UDRC_PACCNozzPress ** 00000000h
AI_UDRC_DiffPress ** 00000000h
AI_UDRC_BellPress ** 00000000h
*** Command Complete
debris blower on
NEWS>> debris blower on
*** Command Complete
scan ai_udrc
NEWS>> scan ai_udrc
Group Name Status Value
AI_UDRC_POCNozzPress b 00000E4Dh
AI_UDRC_POCNozzPressNF b 00000000h
AI_UDRC_PACCNozzPress ** 00000000h
AI_UDRC_DiffPress ** 00000000h
AI_UDRC_BellPress ** 00000000h
*** Command Complete

8.7 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.

APPENDIX A: COMMON ACHRONYMS

MCE	Master Control Electronics
CTP	Computer to Plate (this includes Trendsetters and Platesetters)
NVS	Non-Volatile-Storage
PDB	Power Distribution Board
GENINE	Generic I/O Node Electronics Board
LIONEL	Little I/O Node Electronics Board
POST	Power-On Self Test
BBR	Boot-block Recovery
PC	Print Console
TH2	Thermal 2 Head
TH1.7x	Thermal 1.7x Head
WS	Workstation
TSAL	Trendsetter Autoloader
TS	Trendsetter – base model
TSSP	Trendsetter Spectrum
NEWS	Trendsetter NEWS

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. An updated copy with more MCE-specific information is available in the Trendsetter NEWS MCE Controlled Release V2.0.

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.

IMPORTANT: BEFORE UPGRADING THE FIRMWARE OF ANY RECORDER MACHINE YOU MUST BACKUP THE CONTENTS OF THE CURRENT NVS MEMORY IN CASE IT BECOMES NECESSARY TO REVERT TO THE PREVIOUSLY INSTALLED VERSION OF FIRMWARE!

APPENDIX C: BBRAM CORRUPTION ON MCE DEVICES

BBRAM corruption has been seen so far on NEWS 200 (both MCE boards) and NEWS 70. There is a Service Shell script RecoverCorruptBBRAM.spt, to be run on a MCE device which should be able to recover the BBRAM from the corruption that we have been seeing. The problem is still under investigation. The corruption occurs in an unused portion of BBRAM, so the actual real data in BBRAM is not affected. If corruption occurs in a real portion of the BBRAM, the firmware will automatically recover. One can upload corrupted BBRAM from one MCE boards, and corrupt a new MCE by downloading the corrupted file. BBRAM corruption will normally be noticed when a service engineer attempts to change a NVS parameter which results in the firmware crashing.
The symptoms will be the following:

1) Using the "set" command to change specific NVS parameters will cause the firmware to crash. This will seem inconsistent to the user, some parameters will always work while others will always result in a crash. Also this will also not be consistent from device to device. Some parameters that may work on one device, will not work on another.

2) One would see the following errors on device startup:

```
MCE Power On Self-Test (POST) v1.05, Dec 10 2001 03:45:06
```

```
Copyright (C) 2000-2001 Creo Products Inc. All Rights Reserved.
MCE Board Revision:02 Configuration:00 Boot Cycles:3
9010: 1M SRAM Test ..............................PASSED
9011: 32K NonVolatile SRAM Test .................PASSED
9012: Quad Uart Test A+B+C+D+....................PASSED
9013: 68376 Uart Test A..........................PASSED
9014: NVS SRAM Verification FAILED
9015: NVS Flash Verification ....................PASSED
*** Initializing Firmware Subsystems ***
NUC 376 MCE ERR URT MON MOP PRD MSG UTL NVS STG PRM PST LCA
376s MCEs ERRs URTs NUCs PRDs PSTs CAN SIF SIO DF1 IOS NET SST STA HLT
DPC HIF CEH EHI DTL CRG RIF WMD GIM MIC MPC DRS SMC MDH MPI MDS OWB KEY IBM
DEB CTP VBS
*** Firmware Subsystems Init Complete ***
TSMCE Firmware Diagnostic Monitor
Version: 1.01.06 Build No: 00761 Date: Feb 13 2003 15:37:41
Built using Baseline #2650 - Feb 13 2003
Engineering Version - Not for Production Use
Machine Serial Number:  **Not Available**
BBRAM Nvs Found: Addr:00C90000h Size:16384 bytes IS CORRUPT!
Flash Nvs Found: P1:00020000h P2:00040000h Size:131072 bytes VERIFIED OK
CAN Bus Baud Rate is 500KHz.
C ---: Using PPP Client Protocol
C ---: Starting Telnet Server
Access level is: developer
```