CreoScitex

Trendsetter NEWS 200 (Hydra)
Functional Description

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1. SCOPE

This document describes the normal operation of the Trendsetter NEWS 200 (a.k.a. Hydra). It will be a guide to help understand how the machine should operate. It does not go into any detail about implementation.

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. PRODUCT DEFINITIONS

The Trendsetter NEWS 200 is a machine targeted specifically for the Newspaper market. It can load, image, and unload two plates side-by-side. The two plates are imaged simultaneously with two heads.

The throughput as a plates-per-hour (pph) number is dependant on head resolution, drum speed and plate size, but the target is 200pph for 360mm plates. Some definitions below:

- **dual-plate loading**: the act of loading two plates at a time.
- **broadsheet plate**: a single newspaper page. Typical sizes are 500-600mm (mainscan) by 315-400mm (subscan).
- **panorama plate**: a double newspaper page. Roughly the size of two broadsheet plates.
- **right-hand** or **home plate/head**: plate/head nearest the carriage home position.
- **left-hand** or **away plate/head**: plate/head farthest from the carriage home position.

4. DEVICE FUNCTIONALITY

The Trendsetter NEWS 200 is based on the existing Trendsetter NEWS product, but runs on an MCE platform. The basic functionality is described here, with most attention given to the changes required to create the Trendsetter NEWS 200 product (i.e., support for two heads).

4.1 Maximum Resolution is 1200dpi

Reaching 200pph requires a 1200dpi Thermal 2 head. This machine cannot run at 2400dpi.

4.2 Maximum and Minimum Plate Sizes

The following table shows the absolute maximum and minimum plate sizes supported by the device:

	Minimum Broadsheet	Minimum Panorama	Maximum Broadsheet	Maximum Panorama
Around the drum (msz)	18” (457mm)	18” (457mm)	26” (660mm)	26” (660mm)
Along the drum (ssz)	11.4” (290mm)	17.8” (451mm)	17.8” (450mm)	37.2” (960mm)

Wide option: the maximum panorama size along the drum is 45” (1143mm).

B1 option: the maximum panorama size along the drum is 45” (1143mm), and the maximum size around the drum is 32” (813mm) for broadsheet and panorama plates.

Note: a plate as small as 14.5” (370mm) around the drum can be supported, but only if loaded and unloaded through manual-bypass.

4.3 Plate Positioning

In the default configuration, there are four registration pins in a Trendsetter NEWS 200 drum, installed so that the two outer pins are higher than the two inner pins. If the pins are numbered one through four, starting with the one closest to the carriage home position, a broadsheet plate will sit on pins one and two, or pins three and four. Small panorama plates will sit on pins one and three, while larger panorama plates will sit on pins one and four.

The pin locations are stored in NVS (*gc pinloc*). The default locations are roughly as follows:

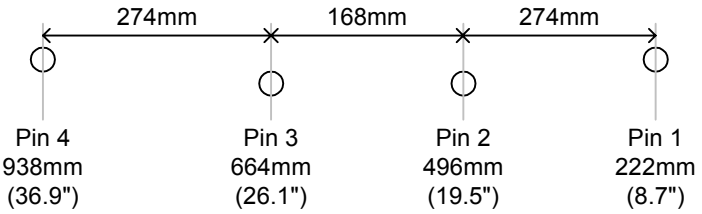


Figure 1: Default pin locations

In general, plates should be centered on these pins. However, there are exceptions to this rule as described in the following sections.

4.3.1 Broadsheet Plates

Broadsheet plates should be positioned in the bay so that the home edges are roughly 400mm apart. This separation is equal to the head spacing, so allows maximum throughput. The home plate must sit on pins 1 and 2, while the away plate must sit on pins 3 and 4.

The following diagram shows the configuration:

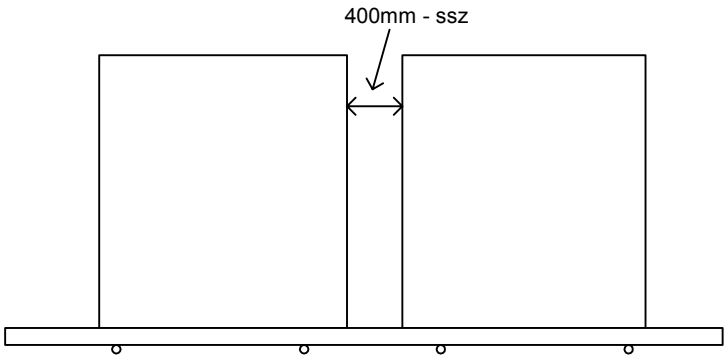


Figure 2: Plate positioning for broadsheet plates

Plate positioning stickers can then be put on the load table for reference.

Note: the firmware uses the pin locations to calculate the expected edge position, and assumes the plates are centered. If the plates need to be off-centre relative to the pins to achieve optimal throughput, it may take the firmware longer to find the edge on the first try. Note also that we require roughly 10mm between plates to allow for edge detection.

4.3.2 Panorama Plates

Panorama plates smaller than 750mm should be loaded so that they are centered on pins 1 and 3. This means that they are off-centre by 137mm relative to the machine, so the right-most edge should be (137mm + 1/2 ssz) from the centre position.

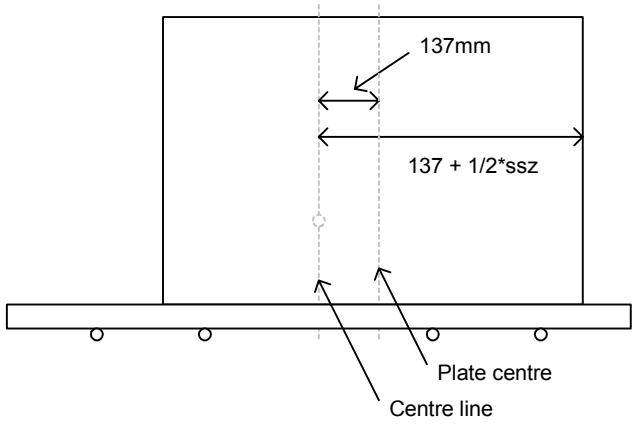


Figure 3: Plate positioning for small panorama plates

Panorama plates larger than 750mm should be loaded centered in the machine, sitting on pins 1 and 4.

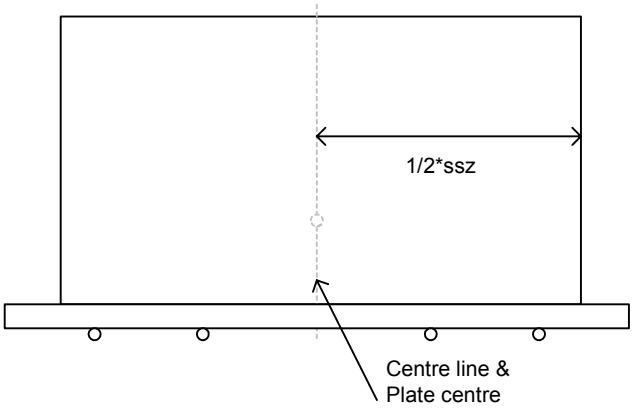


Figure 4: Plate positioning for large panorama plates

Plate positioning stickers can then be put on the load table for reference.

Note: the 750mm threshold is a programmable value – *set gc sscansizemax 2*.

4.3.3 Panorama Plates with One Head

It may be possible to image small panorama plates with a single head. This will allow the centre of the plate to be imaged without having to stitch two images together. The throughput will be lower because only one head will be active, but this will likely be a feature some customers will like. See Section 4.6.3 for details about stitching.

The maximum travel for the carriage is roughly 1160mm minus the head separation. The head separation will be roughly 400mm for most machines[1], which leaves 760mm of carriage travel.

Panorama plates between 451mm and about 630mm can be centered on pins 1 and 3. Plates larger than 630mm will have to sit off-centre, shifted towards home. These plates should be positioned as shown below:

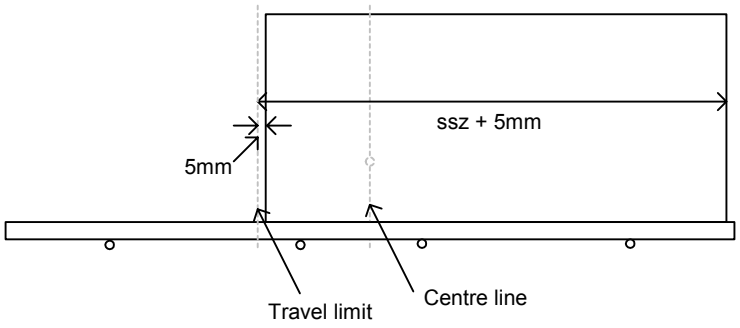


Figure 5: Plate positioning for panorama plate, single head

[1] Some machines which run only broadsheet plates may be configured with a head spacing of 442mm. This matches the pin spacing, so allows plates to be centered on the pins while also maintaining optimal throughput.

Note: the firmware uses the pin locations to calculate the expected edge position, and assumes the plates are centered. In the case above, it will take the firmware longer to find the edge on the first try. Subsequent searches will remember the edge, so will be faster.

4.4 Edge Detection

The firmware stores the most recent edge position. If the next media loaded is the same size, it will use that last edge as the starting point. Use the **plot edge** command to view the last edge.

When searching for the edge of the second broadsheet plate, the carriage will not search past the middle line of the device. This limit is imposed to avoid having the focus laser see the first plate while searching for the second.

If, after finding the edge of the plate, the firmware determines that the plate was sitting on the wrong set of pins, the following error will be reported:

[38132: Media not on <home/away> registration pin]

4.4.1.1 Edge detect only when needed

The Trendsetter NEWS 200 machine can load plates repeatable within about 2mm side-to-side error. If the customer has an optical punch, then edge detection is not required if the edge has been previously detected. If the bay is opened, or the media size changes, then edge detection is required on the first set of plates, but can be remembered after that.

The operator can select the mode of operation – to do edge detection always, or only when needed. They can change the mode using a menu option on the Device menu in Print Console.

Skipping edge detect saves several seconds off the cycle time – roughly 4s or 10%.

4.5 Focus Learn

On the Trendsetter NEWS 200, there is always a margin of at least 6mm around the image. We don't care too much about the focus of this part of the image, so we do only a single focus learn at least 5mm from the edge. After the first set of plates, the focus profile is remembered, and that is used as the starting focus for the next set of plates.

We may need a way to enable two focus learns vs. just one. This machine may be used for other than newspaper work, in which case we may image right to the edge of the plate.

Theoretically, once the focus profile has been learned once, it can be remembered until the media type changes. But work still needs to be done to determine when and if it is feasible to simply remember the last profile and start imaging.

Skipping focus learn saves several seconds off the cycle time – roughly 4s, or 10%.

4.6 Imaging

4.6.1 Plate Rotation

As described earlier (Section 4.3), a single panorama plate will sit on either pins one and three or pins one and four, depending on its size. The two broadsheet plates will sit on the two right-hand pins or the two left-hand pins, and will be rotated towards each other.

During Integration, the following gc rotation parameters will be configured:

- *rotation 1* media sitting on pins 1 & 2 (i.e., media < 450mm; home side)
- *rotation 2* media sitting on pins 1 & 3 (i.e., media < 750mm)
- *rotation 3* media sitting on pins 1 & 4 (i.e., media > 750mm)
- *rotation 4* *media sitting on pins 2 & 4 (i.e., only slave head imaging. This is not yet supported)*
- *rotation 5* media sitting on pins 3 & 4 (i.e., media < 450mm; away side)

Note: the 450mm and 750mm thresholds are NVS parameters – *gc sscansizemax*

Use the **gc** command to display the current gc settings for each set of pin combinations.

4.6.2 Imaging Speeds

The maximum drum speed of the Trendsetter NEWS 200 is 360rpm. For currently available media, the drum speed will be 345rpm. Assuming a swath width of 224 pixels, this works out to roughly 27mm/s plotting speed.

4.6.3 Head Separation

The head separation will be stored as a gc parameter. It will be measured during Integration, and must be re-measured if either head is replaced. This parameter should not need adjusting during normal operation.

Temperature compensation may be required for stitching.

4.6.4 Stitching Images

Stitching the images from the two heads together into one continuous image is not supported at this point. If imaging one plate with two heads, there must be a gutter down the centre of the plate between the two images.

4.7 Diagnostic Commands

- **plot** – several new commands to support the second head.

  plot slave enable – enable plotting on the slave.

plot slave disable – disable plotting on the slave.

plot slave xx – tell the slave to do pattern xx.

plot slave default – tell the slave to do the same pattern as the master.

plot yy – will plot pattern yy on the master, and the slave pattern on the slave.

plot slave – display the current settings for a slave plot.

- **edge test** – finds the edge of all plates on the drum. If the slave is disabled, will only find the master edge.
- **plot edge** – displays the most recent edge position(s)
- ***mh loadawayside*** *– the next load will assume a plate on the away side only. This is useful when loading a single broadsheet onto the left side during Integration.*
- **option** – configure various options on the machine, specifically the Autoloader option, the Dual-head option, and the Dual-plate option.

4.8 Miscellaneous

- Picking of a single broadsheet is not supported. A single broadsheet can only be loaded through manual-bypass.

4.9 Normal Operation from the Workstation

On startup, the workstation queries the device to find out what it supports. The queries include: how many heads and/or plates the device supports; the minimum/ maximum plate sizes for a single stack and double stack of plates loaded from the bay; and the minimum/maximum plate sizes for a manual-bypass load.

4.9.1 External Connections

There will be one serial cable running between the workstation and the Trendsetter NEWS 200 and two SCSI cables. There can be one or two diagnostic serial cables also connected to the workstation.

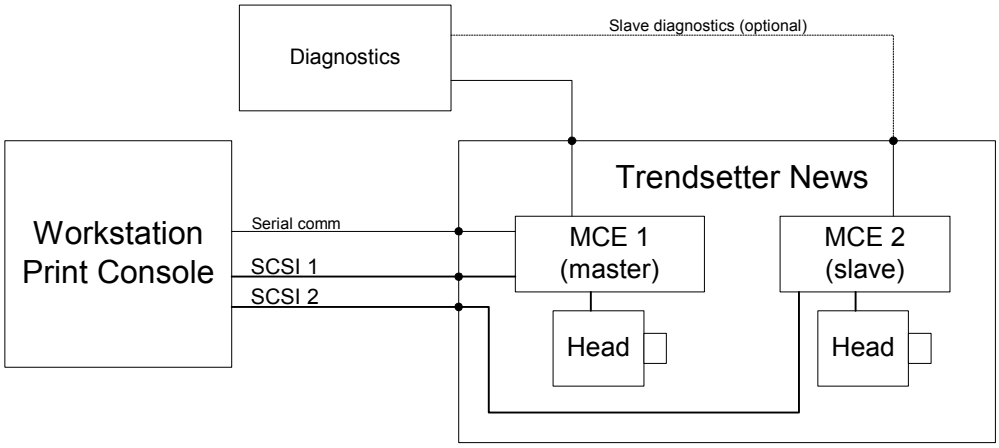


Figure 6: System block diagram

Please refer to Section 4.12 for more information on the optional slave diagnostics.

4.9.2 Loading the Bay

The operator will select a plate type (plate size, media type, etc. defined within that plate type) and the number of stacks to load. If two stacks are selected, the workstation will display two plates side-by-side in the load-bay window. Otherwise, a single plate will be shown. Print Console will verify the selection based on plate size information returned from the device (i.e., won't allow two stacks of 800mm plates, or one stack of 300mm plates), then sends down the new parameters to the Trendsetter.

When specifying the number of plates to load in the bay, the number of plates in each stack should be used. That number is decremented by one for each pick sequence completed.

4.9.3 Submitting Jobs

For any machine that supports more than one plate or head, images will be sent in groups from Print Console to the device. The workstation will send down a "Group Start" command, including the head number and plate number for each image in the group, followed by "Image

Start" commands for each image in the group. Loading can start at the point, but imaging will not begin until all the required parameters are received for each image in the group.

The workstation tells the device which image will go to which head, and sends the SCSI data appropriately.

Terminology

Separation: a single image

Group: one or more separations tied together, either manually or automatically

Job: one unit sent from the workstation

For the Trendsetter NEWS 200, one separation in a group will be imaged by one head. If there is only one separation in a group, only the head specified for that separation will be active.

4.9.4 Manual-bypass Jobs

Single-plate or dual-plate jobs can be loaded through manual-bypass. There is a check-box in Print Console that can be used to specify manual-bypass loading. Beside this is a spot to indicate if a single plate or two should be loaded.

Also, if the bay is not loaded with the requested media when the job is approved, Print Console will bring up a prompt asking if the plates should be loaded through manual-bypass.

Currently, if plates are loaded through manual-bypass, they must also be unloaded through manual-bypass.

4.9.5 Possible groups

All possible groupings supported by the Trendsetter NEWS 200 are listed below:

4.9.5.1 If two broadsheet plates are loaded:

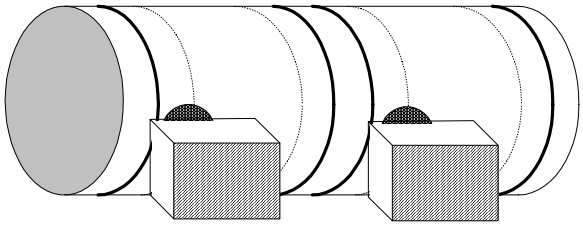
- (plate 1 head 1) & (plate 2 head 2) normal dual-head operation
- (plate 1 head 1) imaging home plate only
- *(plate 2 head 2) imaging away plate only (not supported)*

4.9.5.2 If a single panorama plate is loaded:

- (plate 1 head 1) & (plate 1 head 2 (shifted)) normal dual-head operation
- (plate 1 head 1) single image using home head only
- (plate 1 head 2) single image using away head only

The (shifted) comment indicates that the image must be shifted relative to the edge of the plate. That shift is sent from the workstation, and specifies the absolute shift from the edge of the plate.

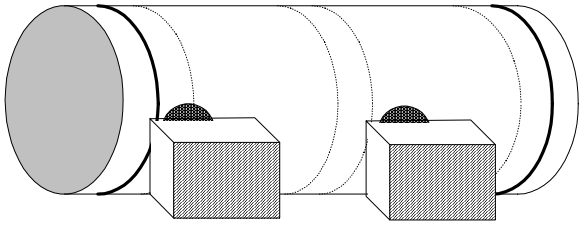
The following diagrams shows the possible configurations of plates on the drum:



NEWS 200:
2 Heads
2 Plates
2 Images

Figure 7: Two heads two plates two images

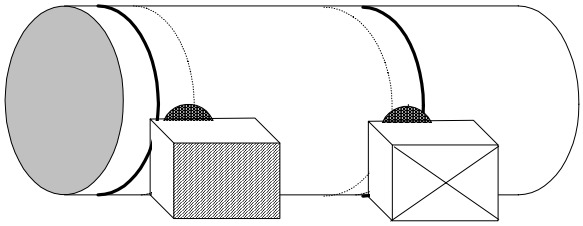
The configuration below is only supported through GDAPI. The position of the second image relative to the edge of the plate must be sent from the workstation with the image command.



Hydra:
2 Heads
1 Plate
2 Images

Figure 8: Two heads one plate two images

The configuration below can only be used with small panorama plates. The maximum plate size is limited by the carriage travel, and is determined by the head spacing. For machines with the default 400mm head spacing, the maximum plate size allowed in this configuration is 750mm.



NEWS 200:
1 Head imaging
1 Plate
1 Image

Figure 9: Two heads but only one imaging

4.9.6 Examples

Following is an example of the imaging sequence:

Example 1: Groups of two images are submitted

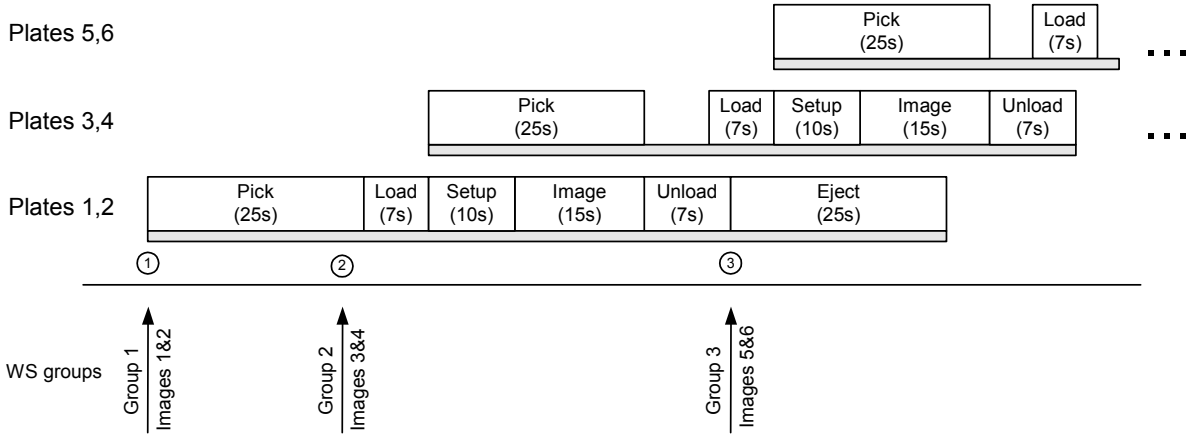


Figure 10: Groups of two images are submitted

Decision Points:

1. Group #1 is submitted to the device, the device starts picking two plates.
2. Group #2 is submitted. Picking cannot begin because the picker is busy.
3. Group #3 is submitted. There are now six images active in the device.

4.10 Splitting up a large file into two

Many jobs will come to Print Console as a large TIFF file. Print Console must split that file up into two parts, ready to send to the device.

Because the heads will never line up perfectly, we must image the centre area with both heads. For positive plates, this overlap is required to clear the plate. It is not needed immediately for negative plates, but will be in the future if we need to stitch the images together.

Only Print Console and/or Tiff Downloader sees the entire file, so the overlap between sides must be generated at that level before being sent to the device.

Print Console must query the device to find out about how to divide the file. This query still needs to be worked out.

4.11 Error Handling for Workstation Jobs

4.11.1 Suspends

During loading, the first separation in the group will suspend. If the response to the suspend is anything but Resume, both separations in the group will be recorded as having failed.

During plot setup and imaging, either separation in the group can suspend. If one separation suspends during plot setup or imaging and is cancelled, the other separation cannot continue.

During unload, only the second separation is still active in the device, so it will suspend. If the plates are removed, the separation that suspended will fail, and the entire group will be recorded as having failed.

4.11.2 Canceling jobs

A group can be cancelled at any time. It is not possible to cancel individual separations in a group.

If cancelled during loading, the load will continue unless it is possible to back out. *The plate(s) will be left on the drum as free plates, and can be reassigned if possible.*

If cancelled during plot setup or imaging, the plot will stop and the plates will be unloaded.

During unload, a cancel has no effect.

4.12 Diagnostic Interface

The block diagram (Figure 6: System block diagram) shows a diagnostic cable connection to the master MCE and an optional diagnostic cable connection to the slave. The slave connection is optional for the following reasons:

- most diagnostic information is available through the master MCE. Pretty much the only time communication to the slave MCE is needed is to access information on the slave head.
- there will be a direct connection to the slave via the master MCE.

Currently, the direct connection to the slave via the master is not working, so it is recommended to always have the slave diagnostic cable installed and the connection configured in Service Shell.

As for the intended direct connection to the slave via the master, ideally we would follow what is done for Thermal 2:

- *normal mode: talk to the master only, and see only its output*
- *passthrough mode: can also send commands to the slave and see its responses*
- *redirected mode: talk to the slave only, and see only its output*

It will be possible to download MCE firmware to the slave MCE via the master. Hopefully, it will also be possible to download Thermal head code to the slave through the master.

5. DEVICE CONFIGURATION PROCEDURE

The system defaults to only support 1200dpi imaging. The system can be upgraded to support 2400dpi imaging, but this requires an expensive upgrade. To enable the feature though firmware, use the following command.

option commercial enable <password>

This is not a common upgrade – please contact the Trendsetter News Core Team to get the password.

6. 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:

6.1 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 this has been entered by typing **bay 1** from the diagnostic terminal. The MainScan length parameter should be equal to the plate mainscan size measured in millimeters.

Type **load cal** through diagnostics. This will cause a plate to be picked and loaded. The plate size will be measured and the *DistSensorToLEC* parameter will be calibrated as the plate is wound onto the drum. This parameter can only be set using this command – it cannot be changed using the **set** command. This parameter will be saved automatically.

6.2 Adjusting Eject Speed and Distance

6.2.1 Eject distance

The plate will be pushed towards the processor at fast speed, then slowed down to match the processor intake speed. (If a stacker is installed, the slow speed portion will be skipped.)

1. 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.

2. 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.

These parameters will be saved automatically as soon as they are changed.

6.2.2 Eject speed

1. Enter **set exit velocity** to see the current speed setting.
2. Enter **table move <pos> <nn>** to move the traveler to a specified location at <nn> mm/s. The travel limit is roughly 600mm, so we can't move beyond that distance.
3. Enter **set exit velocity <nn>** to set the desired speed setting.

6.3 Enabling Manual Unloading

Note: this is not yet implemented.

You can enable manual unloading for a media type by setting the media type parameter manual_unload *to a value other than zero: any plate of this particular media type will then unload back up the load table and will have to be removed from the machine manually. Set the value to zero when you manually load a plate of the same media type but of a different size than those stacked on the machine and you want to unload that plate automatically to send it to the processor. Set* manual_unload *to a non-zero value when you want to manually unload plates and process them on a different processor than that attached to the Trendsetter.*

In theory, any plate can be manually unloaded whether it has been loaded manually or automatically. However, manual unloading should be reserved for plates that have been manually loaded. There will be no workstation prompt to remove the plate at the end of a manual unload if the plate was loaded automatically.

Steps to enable manual unloading for plates of media type <n>

*Enter **set media <n> mu 1** where <n> is the media type.*

*Enter **nvs save media <n> mu** to save the new setting.*