

PicoTrack PCT-200CRS

Standard Operating Procedure

CORAL Name: **pTrack**
Model: PicoTrack PCT-200CRS Coat-Develop Track
Location: ICL Photo Room
Purpose: Coat and Develop Photoresist
Author: K. Payer, November 2017

Introduction

The PicoTrack PCT-200CRS is a fully automated coat and develop track system with integrated vapor prime and hotplate bakes. The system allows for the spin coating, spray developing, and puddle developing of 6" and 8" wafers for both GREEN (CMOS compatible) and RED (Au contaminated) processes. Two photoresists are available through integrated pumps: a positive, thin resist (SPR700-1.0), and image reversal resist (AZ5214e). Additionally the tool has syringe dispense capability to give users flexibility to run additional varieties of photoresist in small quantities. Two standard developers are available, each with spray, stream or puddle recipes: CD-26 is an industry standard 0.26N developer, and AZ-422 is a 0.215N developer.

The coater track and developer track operate independently and can be run simultaneously. Both tracks have redundant hotplate stacks for GREEN and RED processing. Recipe creation is controlled by MTL Staff to ensure separation of the hotplate stacks and prevent users from cross-contaminating the tool. Several standard recipes exist for a variety of thicknesses, but MTL Staff can create custom recipes for users upon request.

Safety

Read and understand this SOP before use. Only trained personnel may operate this system. This tool utilizes robot handling systems which can become pinch points; the handler also uses a low power laser to map the cassettes. Standard photolithography chemical hazards exist inside this tool, users should be familiar with the chemicals used in the tools and know where to find the appropriate SDS for these chemicals. The hotplate stacks have high temperature hotplates at various temperatures up to 250C, users should not attempt to access the hotplates. Please observe the following safety protocols:

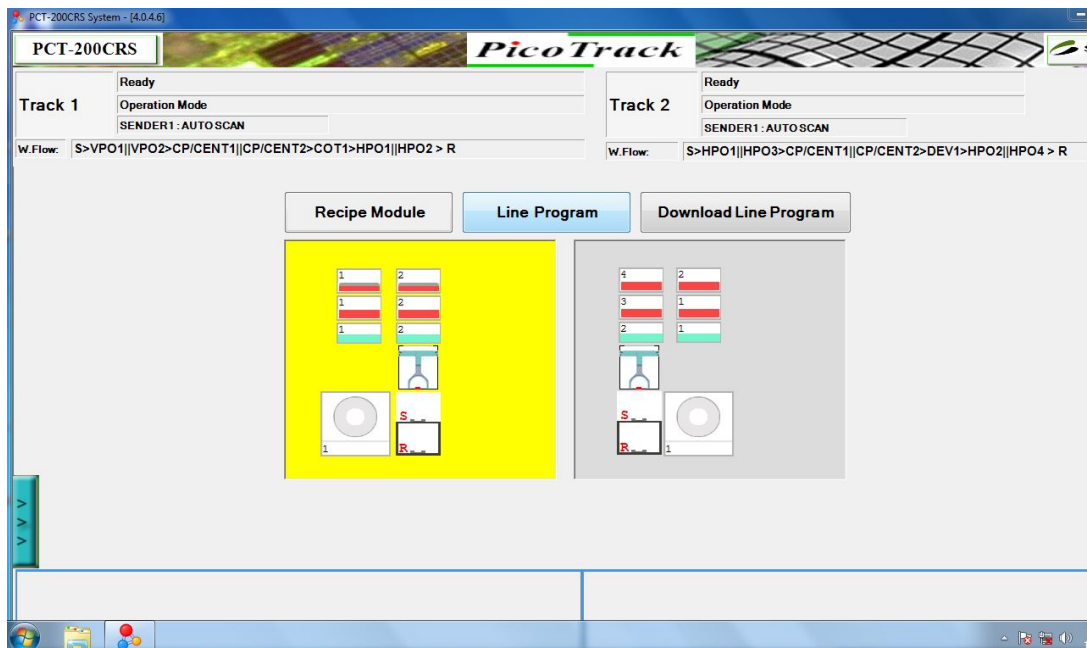
- Do not open the tool enclosure doors while the tool is in operation, with the exception of the send/receive cassette doors.
- Do not remove or open the enclosure panels on the lower part of the tool.
- Do not place your hand or other object in the path of the tool's robot handler, and do not manipulate the handler or transfer arm.
- Do not attempt to recover wafers from the system without talking to staff.

Procedure

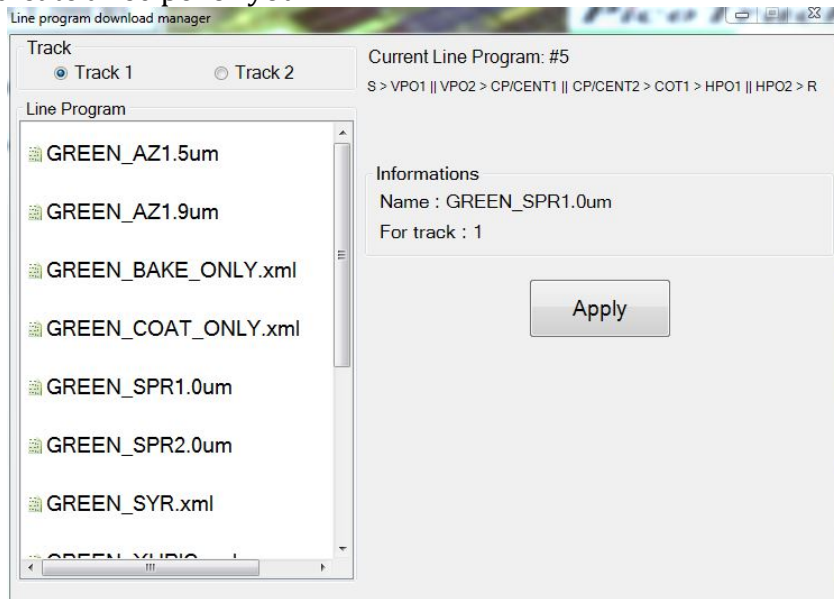
1. Check reservations in CORAL to ensure you have reserved the correct machine at the correct time. Engage the tool in CORAL.
2. Login to the GUI software with username USER and password USER. There are several tabs available in the GUI, most users will primarily access the MAIN, OPERATE, and R MONITOR tabs. If you try to access a tab that you do not have permission for then you will be sent back to the MAIN tab. The appendices contain descriptions of the tab operations.



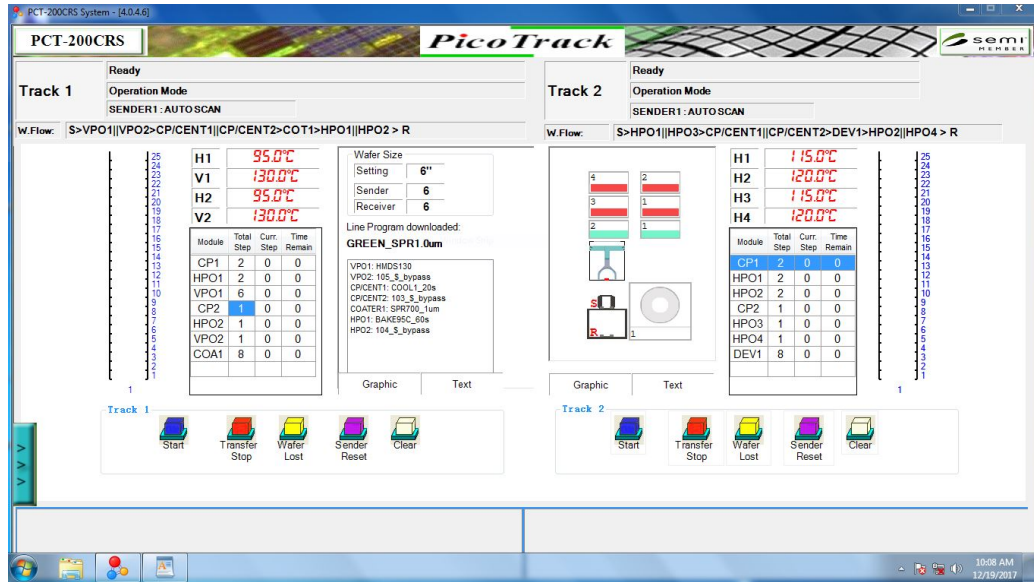
3. Select the OPERATE tab, then select LINE CODE.



4. Select Track 1 for coating recipes or Track 2 for developing recipes.
5. Find the recipe sequence for your process. Recipes are named based on the hotplate stack (RED or GREEN), be sure to select the proper recipe based on your wafers' properties.
 - a. Coat recipes are named based on resist type (SPR or AZ) and thickness.
 - b. Develop recipes are based on dispense type (Spray or Puddle) and developer type (CD26 or AZ422).
 - c. Other standard recipes exist for bake-only, etc. Standard recipes are listed in the appendices. If you have a need for a recipe that does not exist, make a comment in CORAL or contact MTL Staff and we will create a recipe for you.



6. Double click the recipe sequence for your process, then click APPLY.
7. Back on the OPERATE tab select DOWNLOAD LINE CODE. Once the code is downloaded, select YES to go to the MAIN tab.
8. Load your wafers into the SEND (top) cassette for the track that you wish to run (COAT or DEVELOP). Load an empty RECEIVE (bottom) cassette in the same side. Make sure when the cassette is placed onto the indexer that it lies flat and fits into the appropriate slots for a 6" cassette; failure to do so may result in the transfer arm crashing into wafers or wafer breakage.



9. When you are ready to run click START or press the START button to begin processing the wafers. The sequence will run automatically, when the process is complete the system will beep and the green light will flash on the RECEIVE indexer; remove the RECEIVE cassette to silence and reset the system.
 - a. NOTE: Once a wafer has entered into the sequence it must be processed through completion. Do not attempt to remove a wafer from the robot during the process. If you wish to abort the process for any wafers remaining in the SEND cassette, then click or press the SEND RESET button.
 - b. If the system alarms during the process and you are able to correct the problem (within your training), press CLEAR to acknowledge the alarm and press START again to resume the process.



10. When your process is complete, remove your wafers from the cassette. Log out of the user account, then disengage in CORAL. Be sure to enter the correct run data in the CORAL window.

Additional Procedures

- Additional Spin Module recipes are available aside from the Standard Sequence recipes. To use one of these recipes, select and download the correct sequence as described above.
 - When prompted to go to the MAIN tab, select NO
 - Select RECIPE MODULE, then in the graphic click on the Spin Module for Track 1 or Track 2 to bring up a menu with additional recipes.
 - Select the desired recipe, then select DOWNLOAD.

- Return to the MAIN tab and run your process as normal.
- NOTE: Do NOT use this method to change hotplate recipes. If a new hotplate sequence is needed please contact staff to create a new line code.

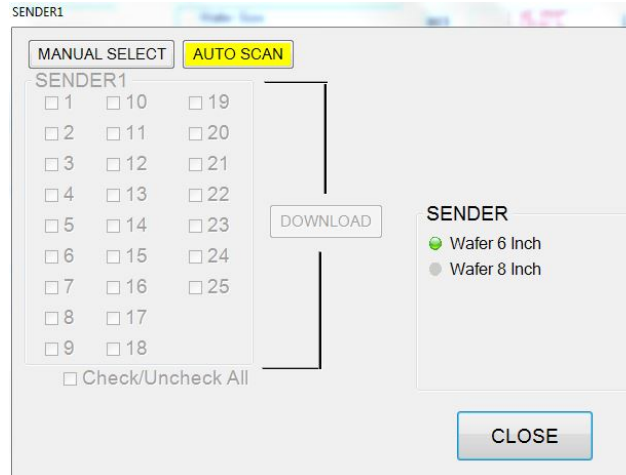
Download recipe module COATER1

Step	Process	Select...	Time(s)	Dir	Speed(rpm)	Accd(rpm/s)
1	Spin	DISP ...	2	CW	100	5000
2	Dispense 1	DISP ...	8	CW	500	5000
3	Spin	DISP ...	60	CW	500	10000
4	TEBR	TEBR ...	6	CW	500	10000
5	BEBR	DISP ...	5	CW	750	10000
6	Spin	DISP ...	15	CW	1500	10000
7	End					

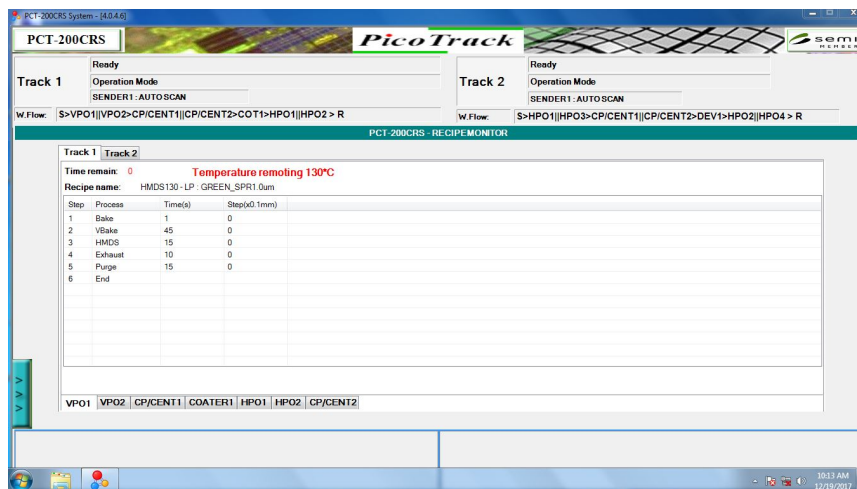
Step	Process	Time(s)	Step(x0.1mm)	Pivot

- In the MAIN tab, the track status can be displayed as either a graphical or as a text-based representation.

- The text-based representation displays the individual module recipes.
- The graphic representation allows users to change the load/unload modes for the indexers; auto or manual from the SEND cassette as well as wafer size.
 - Select the SEND or RECEIVE indexer to bring up a window which allows modification.
 - If you choose to run in manual mode, please return to auto mode when you are finished.



- The R MONITOR tab allows users to view the status of individual modules as wafers are being processed. Hotplate temperatures, spin speeds, step times can be monitored from this screen.



- To use the integrated syringe dispense system, refer to the PicoTrack Syringe Dispense SOP. This system requires additional training.

Appendix 1 – Menu Tab Descriptions

- MAIN: Default screen, monitor wafers and process, software control panel.
- OPERATE: Select and load various processes for Track 1 and Track 2.
- PROCESS: Create and edit module recipes and sequences (STAFF ONLY).
- DIAGNOSTIC: Status for sensors and solenoids.
- EVENT LOG: List of commands from all users that occur on the tool.
- REPORT: Report of wafer scan, wafer complete and lot complete.
- R.MONITOR: Monitor the individual modules and recipe progress (temperature, time, spin speed) in detail.
- MAINT.: Service mode for maintenance and calibrations (STAFF ONLY).

- HISTORY: Alarm and recipe download history log.
- E LOG: Customizable user log to track maintenance and recipe history.
- ADMIN: Manage user accounts (STAFF ONLY).

Appendix 2 – Standard Recipe Sequences

- GREEN_SPR1.0 or RED_SPR1.0
 - 1 minute HMDS cycle, 20 second cool plate, coat SPR700 at 4500rpm, softbake 60 second at 95C
- GREEN_SPR2.0 or RED_SPR2.0
 - 1 minute HMDS cycle, 20 second cool plate, coat SPR700 at 1000rpm, softbake 60 second at 95C
- GREEN_AZ1.5 or RED_AZ1.5
 - 1 minute HMDS cycle, 20 second cool plate, coat AZ5214e at 5000rpm, softbake 60 second at 95C
- GREEN_AZ1.9 or RED_AZ1.9
 - 1 minute HMDS cycle, 20 second cool plate, coat AZ5214e at 3000rpm, softbake 60 second at 95C
- GREEN_PUDDLE26_60S or RED_PUDDLE26_60S
 - 30 second post exposure bake at 115C, 20 second cool plate, develop CD26 with 3 puddles for 60 seconds total, 60 second hardbake at 120C
- GREEN_SPRAY26_45S or RED_SPRAY26_45S
 - 30 second post exposure bake at 115C, 20 second cool plate, develop CD26 with continuous spray for 45 seconds total, 60 second hardbake at 120C.
- GREEN_PUDDLE422_90S or RED_PUDDLE422_90S
 - 20 second cool plate, develop AZ422 with 3 puddles for 90 seconds total
- GREEN_IRB_120C or RED_IRB_120C
 - Image reversal bake: 120 seconds at 120C.