

VPG200

Carrier Exposure Wizard

Introduction

The VPG200 graphical user interface (GUI), «Menu», contains a large number of windows to control all the modules of the equipment.

The «Carrier Exposure Wizard» is a user friendly procedure which guides the user through a series of steps to perform simple exposure jobs.

The Carrier Exposure Wizard specifications are as follow:

- Automatic loading and unloading of substrates (mask or wafer) from carriers.
- Single or multiple (batch) substrate mode.
- Sharing with other user (night jobs).
- Exposure with single exposure fields.
- Option: wafer optical pre-alignment.
- Option: exposure with edge alignment or multi-marks alignment scripts.

Requirement: Convert your design with «x-convert» on the Linux conversion PC (see separate guide)

Login / Startup

1) Login on the CAE PC

Username: Password:

13:18:29

		Login / Logout Time		Timer	User	Booking
	Z05 ASML PAS 5500/350C - DUV Stepper	20.09.2022	11:27:39	01:50:50		Available
	Z05 Heidelberg VPG200 - Laser lithography system	20.09.2022	13:05:02	00:13:27		Available
	Z05 TEL ACT8 - Track coater developer for DUV Resist	20.09.2022	11:27:40	01:50:49		Available

2) Login on the «Menu» GUI on the User PC

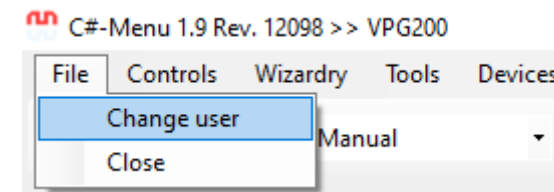
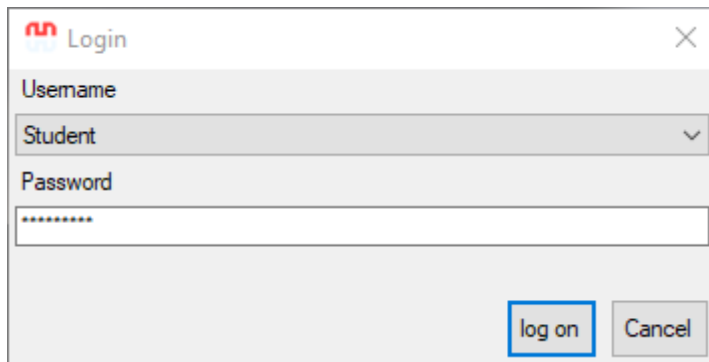
Username : **Student**
 Password : **cmi123cmi**

Notes:

1. The «menu» is started by clicking on the desktop application :



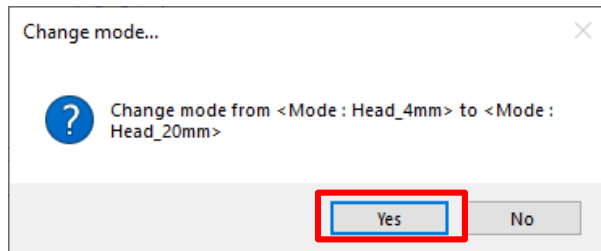
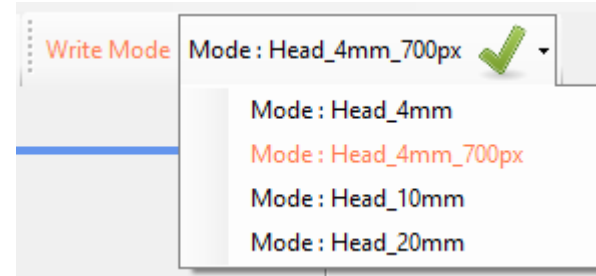
2. The user can be changed by going to the menu «File» → «Change user»



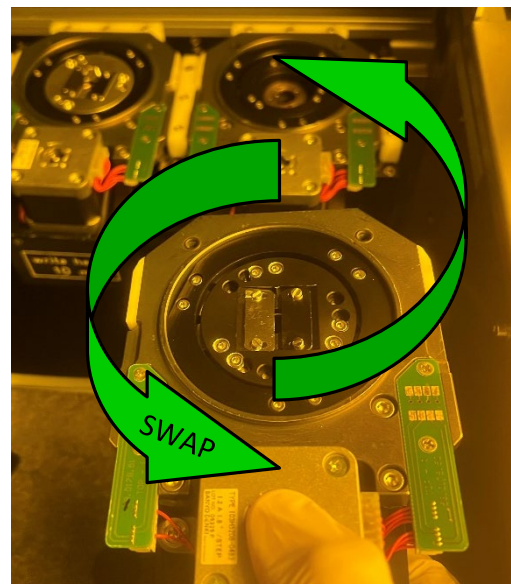
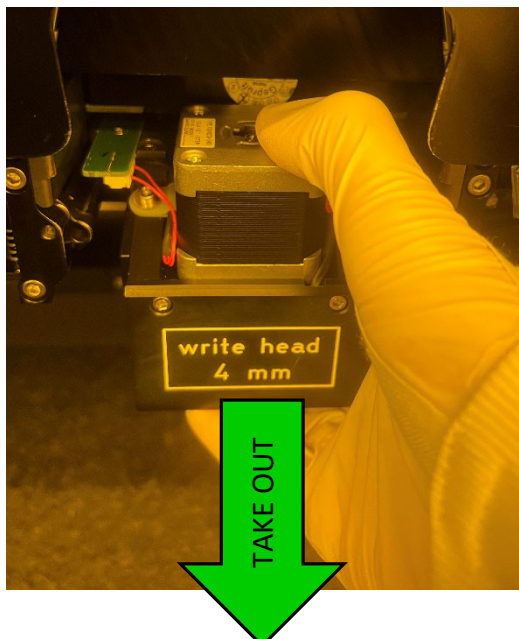
Write Mode selection & change

The first operation that the user should perform is to change the writemode (if necessary), based on the chosen parameters for the conversion (writehead and stripe width) :

- 1) Select the appropriate mode from the list →
- 2) Click «YES» in the confirmation window.



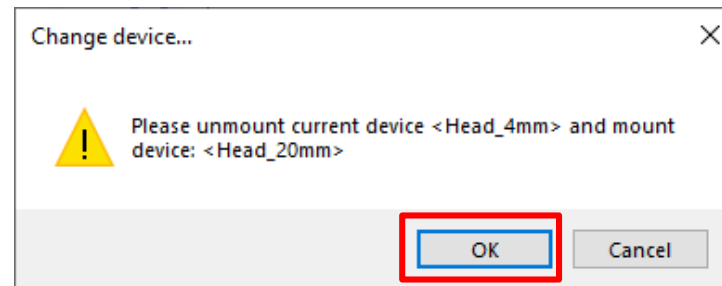
- 3) Change the writehead



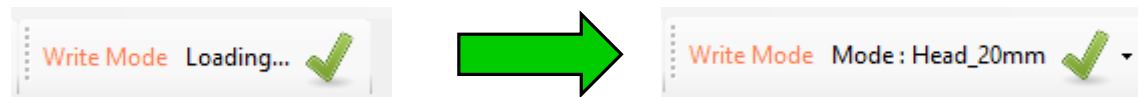
Write Mode selection & change

The first operation that the user should perform is to change the writemode (if necessary), based on the chosen parameters for the conversion (writehead and stripe width) :

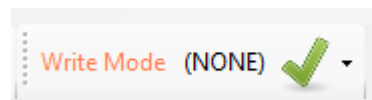
- 4) Acknowledge the change by clicking on «OK»



- 5) Wait for the completion of loading procedure.

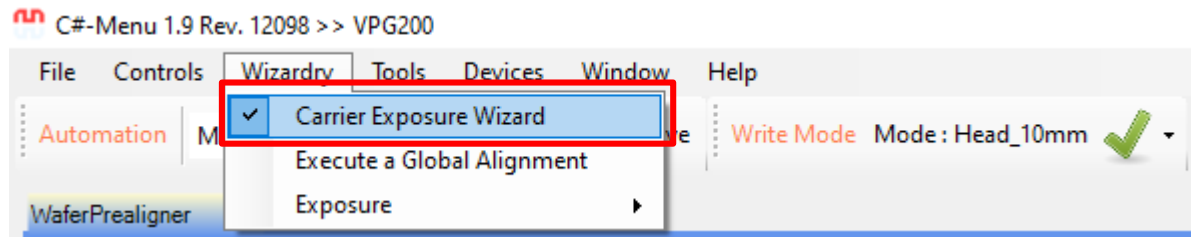


Note : If the writehead has not been inserted properly, an error will pop up and the WriteMode will show “(NONE)”. In that case, the procedure should be repeated from step 1).



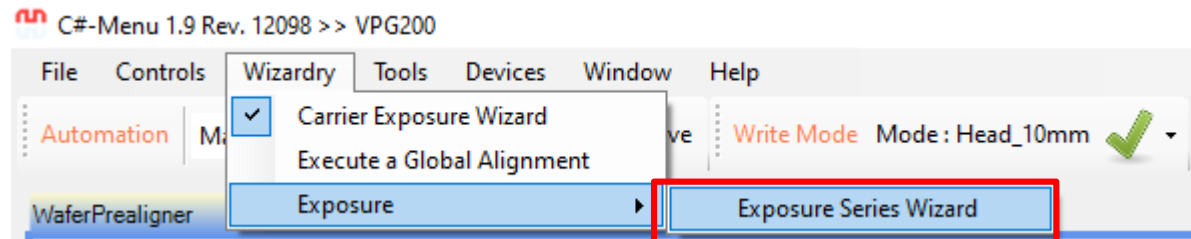
Carrier Exposure Wizard

If the Carrier Exposure Wizard window is not opened, it is loaded from the « Wizardry » menu.



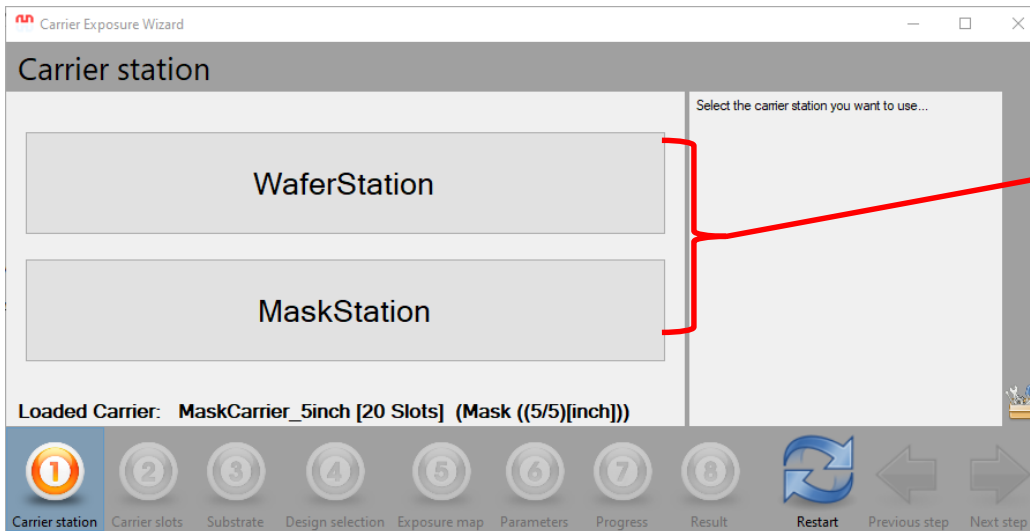
The following slides explain the step by step procedure.

Note: An additional wizard for «series exposure» is available in the same menu. This wizard can be used to expose, on a single substrate, a small test design in a matrix with intensity/focus sweeps for calibration purpose.



Step - 1

Carrier station



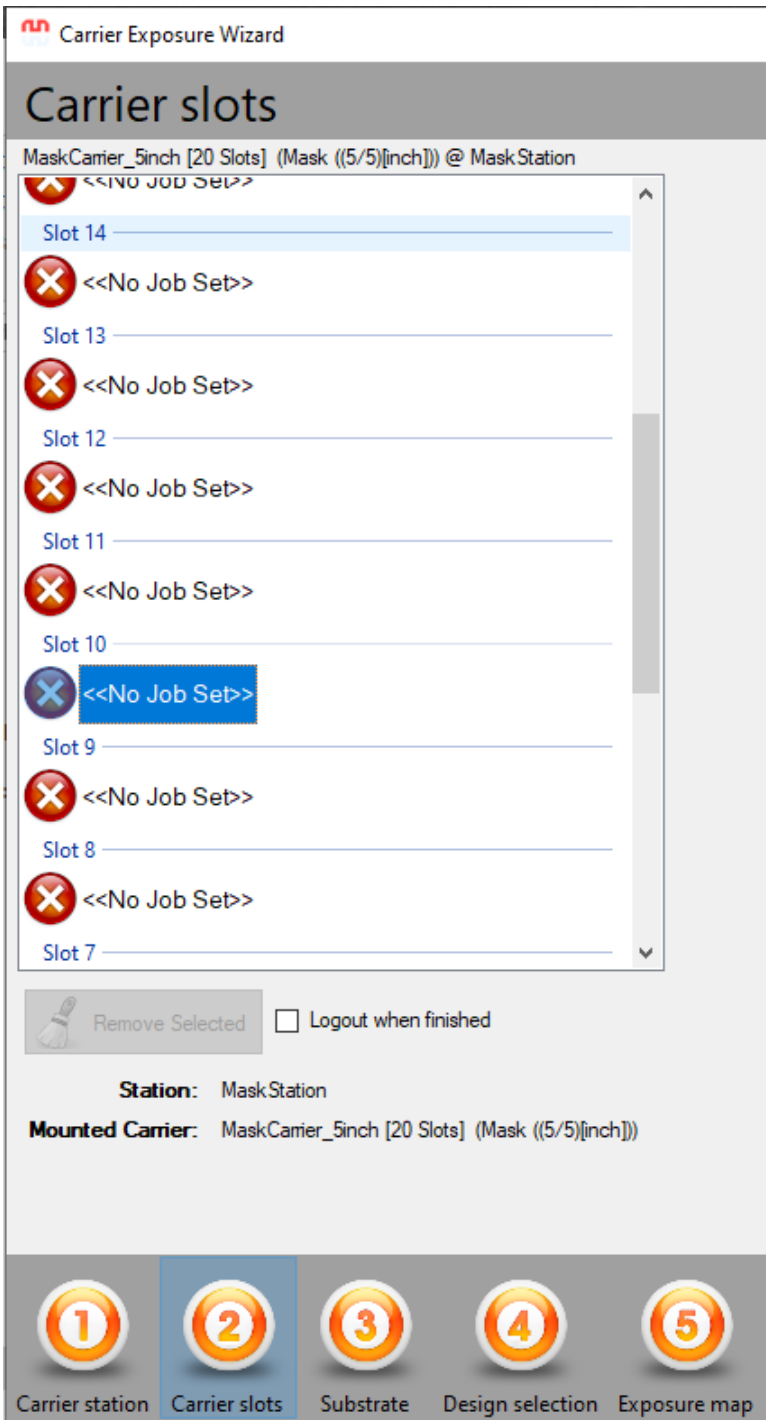
MaskStation /WaferStation

Available cassette sizes:

- Cr-Blanks: 4", 5", 6", 7"
- Wafers: 100mm, 150mm

- 1) Open the window.
- 2) Change the cassette size (if necessary). **Take care of the detection switches!**
- 3) Slide the Cr-Blank in an empty slot, **or**, take the wafer cassette out to load wafers with wafer flats aligned at the back of the cassette.
- 4) **Verify substrates (masks or wafers) are sitting horizontally in one slot!**
- 5) Close the window.
- 6) Click on the appropriate station.





Step - 2 Carrier slots



Automatic detection of size

Carrier slots are numbered from **bottom to top**.
A batch is processed in ascending order

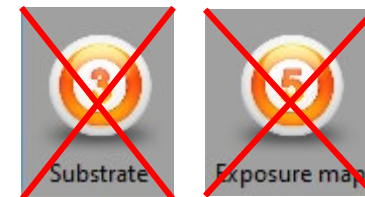
Select your slot (e.g. slot#10 is loaded with a Cr blank)

Note: Multiple slot selections are allowed (for multiple wafers exposed with the same design)

Click on **“Design selection”** →



Note: “Substrate” and “Exposure map” can be ignored (default parameters are used).



Carrier Exposure Wizard

Design selection

Available Designs

vec740 Convert

- General
 - 04_103_CR_Clear20mm_v2
 - 04_128_CR
 - 2022013control
 - 20220831_economou_tip_h
 - 20220831_economou_tip_h_
 - 20220831_economou_tip_t
 - 20220901_economou_h
 - 20220901_economou_t
 - 20220907_shaktimask
 - 20220908control3
 - 20220908flow3
 - 20220913control
 - 20220913flow

Design Information

Design

General

Provider: vec740

User:

Job: 20220908control3

ConversionType: offline

Name: 20220908control3

Category: General

Conversion Identifier: 20mm

Exposure

ExposureTime: 0:02:42

PossibleWriteModes: Mode : Head_20mm

NOver: 1

Bidirectional: True

ScanWidth: 1000000[mm]

BeamMode: 0-0-0-0

PixelResolution: Binary

SpeedScale: 1

FocalLength: 20[mm]

Dimension

NumberOfStripes: 88

FilledStripes: 88

Size: (87.2425/63.0935)[mm]

DesignOffset: (-43.6685/-31.5594)[mm]

Update button (refresh icon)

Navigation buttons: 1 Carrier station, 2 Carrier slots, 3 Substrate, 4 Design selection, 5 Exposure map, 6 Parameters, 7 Progress, 8 Result

Step - 4

Design selection



Make sure the “vec740” conversion account is selected.

To view recently converted designs, open the “**General**” folder by clicking on “+”

Click on “update” button to synchronize the User PC with the conversion PC



Find & select your design in the list.

Properties are displayed (number of stripes, design size, **WriteHead**)

Click on “Parameters” →



Step - 6

Parameters - Part 1



Carrier Exposure Wizard

Parameters

Exposure parameters

WriteMode
Mode : Head_20mm

FocusMode
Pneumatic

Pen

Focus (-100..100%)
-60

Laser power (0..1mW)
Fixed by laser

Intensity (0.1%...97%)
42

Exposure count (1..10)
1

XY offset
0 0 μm

Global Alignment
None

Perform PreAlignment

Set Job for slot 10

1 2 3 4 5 6 7 8
Carrier station Carrier slots Substrate Design selection Exposure map Parameters Progress Result

WriteMode: Can be changed only for the 4mm WriteHead with two options:

- 1) Mode : Head_4mm (default, GLVs using 1000 pixels),
- 2) Mode : Head_4mm_700px (GLVs using 700 pixels).

The chosen option should match with the one used during conversion!

FocusMode: Use «Pneumatic». Optical autofocus can be setup by the staff on request.

Focus [in %]: check the calibration table for the optimal defocus value!

Intensity [in %]:

- Cr blanks → check the calibration table for optimal value!
- Wafers → convert the dose [mJ/cm^2] given by the PR supplier or from the CMI website to laser intensity using the illumination factor formula. Check the calibration table.

Exposure count: used to reach more than 100% total intensity (mainly to expose thick PR)

Step - 6

Parameters - Part 2



Carrier Exposure Wizard

Parameters

Exposure parameters

WriteMode

Mode : Head_20mm

FocusMode

Pneumatic

Pen

Focus (-100..100%)

-60

Laser power (0..1mW)

Fixed by laser

Intensity (0.1%..97%)

42

Exposure count (1..10)

1

XY offset

0 0 μm

Global Alignment

None

Perform PreAlignment

Global Alignment: scripts for edge detection (using the pneumatic autofocus) or marks alignment (using the TTL cameras)

- Cr blank options:
 - 1) «FindMaskCenter_Pneum» = offset correction, for mask-aligners
 - 2) «FindMaskCenter_Pneum_EdgeDetect» = offset + rotation correction, mandatory when exposing 6" (stepper) reticles
- Wafer options:
 - 1) «FindWaferCenter_Pneum» = offset correction, ignores the flat angle
 - 2) «FindWaferCenter_Pneum_Flat» = offset + rotation correction
 - 3) «Point Alignments.XX» = offset + rotation correction with TTL alignment with marks (check the advanced guide)

Perform PreAlignment: checkbox available only with 4inch wafers to perform optical prealignment

NB: Rotation corrections require that the substrate is already loaded within an angle range of +/- 10mrad → For Cr blank, the position in the cassette is critical; For wafers, optical prealignment is mandatory.

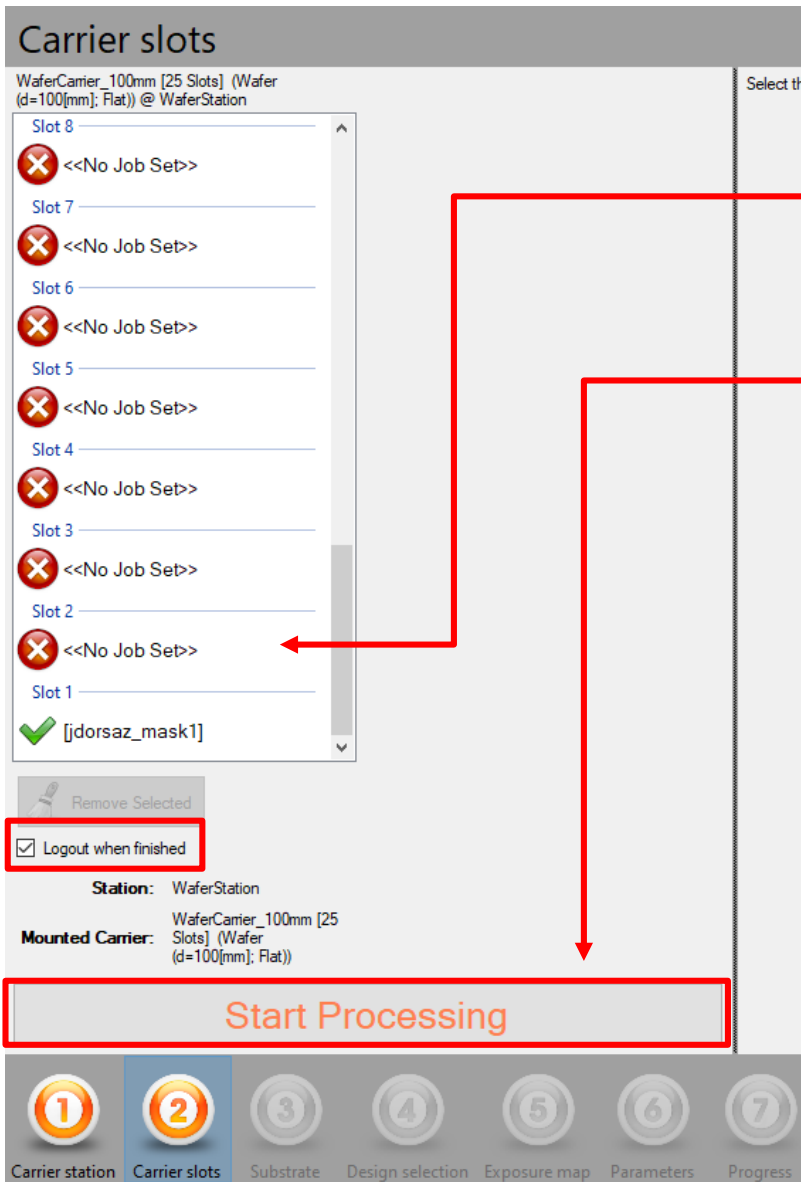
Set Job for slot 10

Finish with "Set Job for slot XX".



Step - 7

Start processing



“Carrier slots” is selected again with following options:

- Select next slot to setup additional substrates (loop until all designs are setup)
- or
- Start Processing

Check the "Logout when finished" check box to quit application automatically (= file/change user)

This is the **last moment to load the substrates** into the carrier slots before proceeding. **Close the door of the loading bay.**

Click on “**Start Processing**” to launch the batch for fully automatic processing.

Billing stops automatically at the end of the batch.

Step - 8 - Progress

The screenshot displays the 'Carrier Exposure Wizard' software interface at the 'Progress' step. The interface is divided into several sections:

- Job List (Left):** A tree view showing the active job: 'CarrierJob' with sub-items '1: [jdorsaz_mask1]' and 'Empty: 2..25'.
- Carrier Visualization (Center):** A large teal square representing the carrier, with a large number '1' in the top-left corner and a circular progress indicator in the center.
- Exposure Parameters (Right):** A panel with the following information:
 - Map:** (1/1) Mode: Head_20mm, Pneumatic (1 of 1)
 - Currently Exposing Design:** Name: jdorsaz_mask1
 - Progress with stripes & remaining time:** Stripes done (3/68) with a progress bar, Current stripe: 4, Elapsed Time: 0:00:24, Remaining Time: 0:02:42.
 - Currently Exposing Die:** Die Parameters: Intensity 42%, FocusOffset -60. Design(s): jdorsaz_mask1, jdorsaz_mask1/jdorsaz_m...
- Status Bar (Bottom):** A row of buttons for navigation: Carrier station, Carrier slots, Substrate, Design selection, Exposure map, Parameters, Progress (highlighted), and Result. Below these buttons, a text box displays the current action: 'Executing expodie command for design <jdorsaz_mask1/jdorsaz_mask1>'. A 'Stop after current slot' button is also visible.

List of active jobs

Progress with stripes & remaining time

Exposure parameters

Stop the batch after the current job

Current action

Stop the exposure & unload

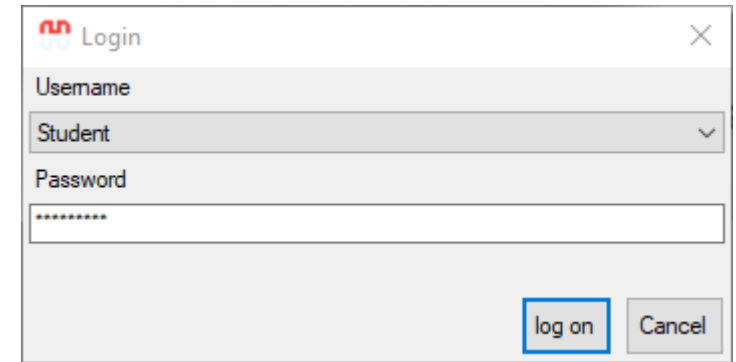
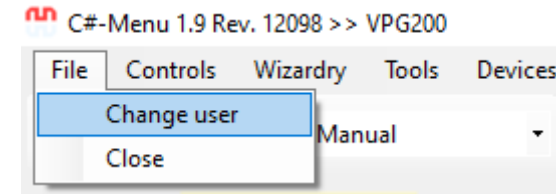
Logout / Close

“Logout when finished” will cause an auto-logout at end of job.

- Without “Logout when finished”, a report page is display for your records. Save it before leaving.
- **Switch user** or logon again to start a new batch.
- Unload your substrate from the carrier.
- Release equipment & logout form CMi -user access PC / Zone PC

Username: Password: 09:49:02

		Login / Logout Time		Timer	User	Booking
	Z05 ASML PAS 5500/350C - DUV Stepper	27.09.2022	14:07:33	19:41:28		Available
	Z05 Heidelberg VPG200 - Laser lithography system	28.09.2022	09:48:56	00:03:00	jdorsaz	gbunke
	Z05 TEL ACT8 - Track coater developer for DUV Resist	27.09.2022	14:07:33	19:41:27		Available



Do not close the application!

Closing the application will ask for the laser shutter status to be changed. Do not close the laser shutter.

Click → “No”.

