

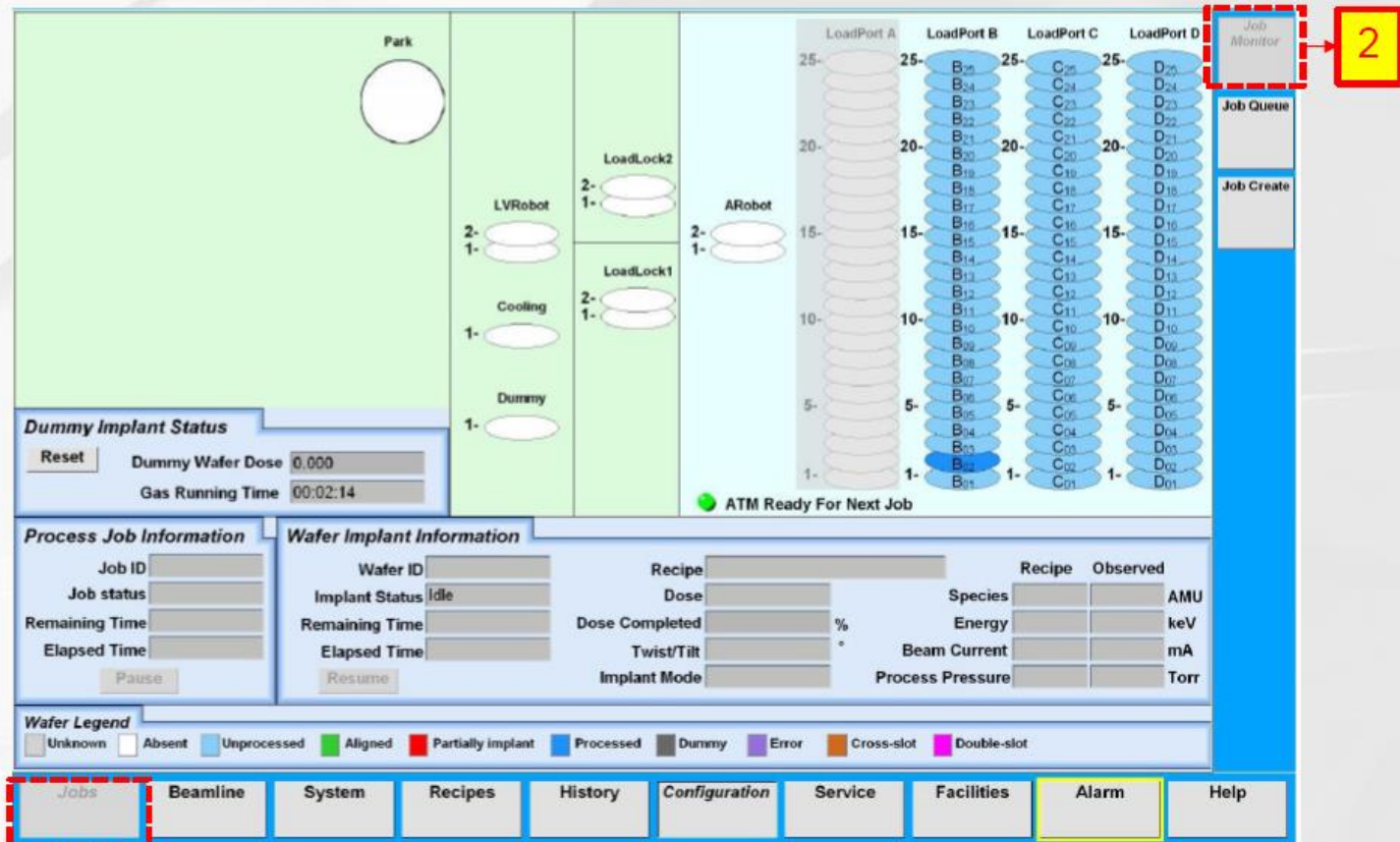
Ion Implantation System S.O.P.

1. Creating an Implantation Job
2. Aborting an Implantation Job and Automatic Wafer Return

1. Creating an Implantation Job

Step 1. Click the "Jobs" button.

Step 2. Click the "Job Monitor" button.



Confidential

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1. Creating an Implantation Job

Step 3. Select the wafer to be implanted.

Step 4. Select the implantation program.

Step 5. Click "Add Process Job" to generate a job sequence.

Step 6. Click "Create Control Job" to start the machine operation.

The screenshot shows the 'Select wafer(s) for the process job' and 'Select recipe(s) for the process job' windows. The interface includes a grid of loadports (A, B, C, D) with wafer slots, a list of available recipes, a process job list, and buttons for adding process jobs and creating control jobs. Red dashed boxes and yellow numbered callouts (3, 4, 5, 6) highlight the steps: 3 points to the 'Select All' button for Loadport A; 4 points to the 'Standby' recipe in the 'Available Recipes' list; 5 points to the 'Add Process Job' button; and 6 points to the 'Create Control Job' button.

Select wafer(s) for the process job

Loadport A	Loadport B	Loadport C	Loadport D
25	25	25	25
24	24	24	24
23	23	23	23
22	22	22	22
21	21	21	21
20	20	20	20
19	19	19	19
18	18	18	18
17	17	17	17
16	16	16	16
15	15	15	15
14	14	14	14
13	13	13	13
12	12	12	12
11	11	11	11
10	10	10	10
9	9	9	9
8	8	8	8
7	7	7	7
6	6	6	6
5	5	5	5
4	4	4	4
3	3	3	3
2	2	2	2
1	1	1	1

Select recipe(s) for the process job

Root

Available Recipes

PM dummy_B4K6E14_80scan
PM dummy_Ar40K2E15_2D
PM-dummy_AS2K5E14_80scan
Radiation Survey Ar-15mA-1D
Stability-B-0.5KeV-4mA
Standby
standby - drift
standby-C50
standby-C50-5
Out of range

Process Job ID (Optional)

Process Job List

ID	Recipe	Wafer ...
1	Standby	C1.6.D1

Remove Process Job

Control Job ID (Optional)

Start Method: Auto

2. Aborting an Implantation Job and Automatic Wafer Return

Step 1. Click the "Job Queue" button.

Step 2. Click "Pause" to pause the job.

Step 3. Click "Abort" to cancel the job; a confirmation window will appear.

Step 4. Click "OK" to confirm abortion of the job.

Control Job Queue

Job ID	Tag ID	Status	M...	Start	Complete	Wafer Origins	Destinations	Start Method
1-7.14.2017	PretendC	Aborted	Normal	07/14/2017 09:58:56		C1,6,D1	C1,6,D1	Auto

Buttons: Dequeue, Deselect, Move HQ, Start, **Pause** (Step 2), **Abort** (Step 3), Repair

Process Job Information

Job ID: 50-1

Control Job 1-7.14.2017(Process Job) will be aborted.

Please PAUSE THE JOB first then abort. Continuing current action may cause other jobs to hang!

Click OK if you want to abort anyway, otherwise please Cancel.

Buttons: **OK** (Step 4), Cancel

Species: 40 AMU, Twist Angle: 154°, Charge: 1.00, Tilt Angle: 0°, Energy: 3.000 keV, Scan Mode: 2D Scan, Beam Current: 2.50 mA, Expected Duration: 00:00:00, Dose: 3.00e14

Job State: ☐ Create, ☒ Paused, ☐ Stopped/Aborted, ☐ Completed

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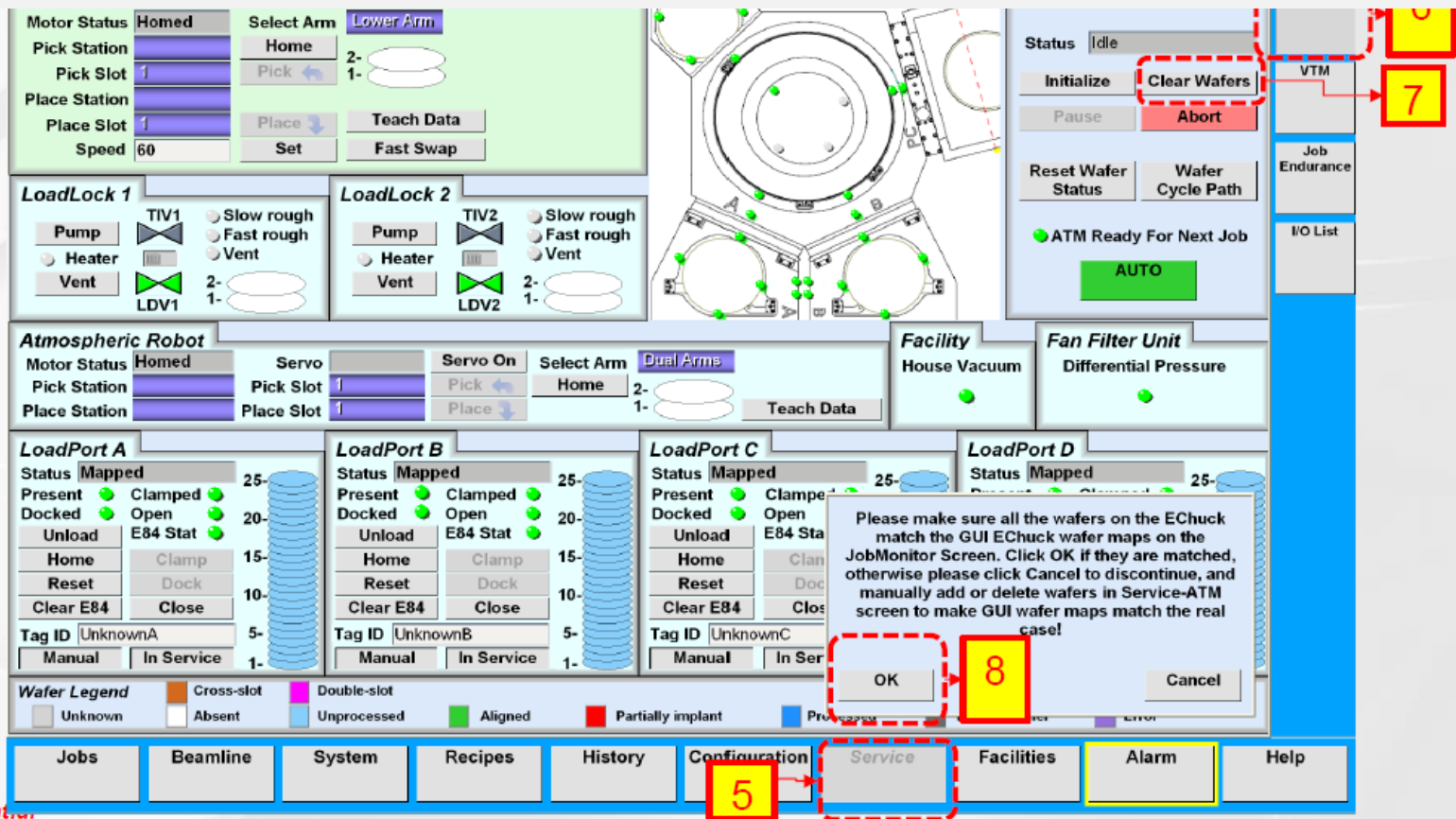
2. Aborting an Implantation Job and Automatic Wafer Return

Step 5. Click the "Service" button.

Step 6. Click the "ATM" button.

Step 7. Click the "Clear Wafers" button.

Step 8. A window will pop up to confirm the E-chuck wafer matches the actual wafer. Click "OK" if they are matched.



2. Aborting an Implantation Job and Automatic Wafer Return

Step 9. Confirm the VTM wafer matches the actual wafer. Click "OK" if they are matched.

Vacuum Robot

Motor Status: Homed
Pick Station: []
Pick Slot: 1
Place Station: []
Place Slot: 1
Speed: 60
Select Arm: Lower Arm
Home
Pick
Place
Teach Data
Fast Swap

LoadLock 1

Pump
Heater
Vent
TIV1
Slow rough
Fast rough
Vent
LDV1

LoadLock 2

Pump
Heater
Vent
TIV2
Slow rough
Fast rough
Vent
LDV2

Wafer Sensor Map

Wafer Handling System

Status: Idle
Initialize
Clear Wafers
Pause
Abort
Reset Wafer Status
Wafer Cycle Path
ATM Ready For Next Job
AUTO

Atmospheric Robot

Motor Status: Homed
Pick Station: []
Place Station: []
Servo: []
Servo On: []
Select Arm: Dual Arms
Home
Pick
Place
Teach Data

Facility

House Vacuum

Fan Filter Unit

Differential Pressure

LoadPort A

Status: Mapped
Present: Clamped
Docked: Open
Unload: E84 Stat
Home: Clamp
Reset: Dock
Clear E84: Close
Tag ID: UnknownA
Manual: In Service

LoadPort B

Status: Mapped
Present: Clamped
Docked: Open
Unload: E84 Stat
Home: Clamp
Reset: Dock
Clear E84: Close
Tag ID: UnknownB
Manual: In Service

LoadPort C

Status: Mapped
Present: Clamped
Docked: Open
Unload: E84 Stat
Home: Clamp
Reset: Dock
Clear E84: Close
Tag ID: UnknownC
Manual: In Service

LoadPort D

Status: Mapped
Present: Clamped
Docked: Open
Unload: E84 Stat
Home: Clamp
Reset: Dock
Clear E84: Close
Tag ID: UnknownD
Manual: In Service

Wafer Legend

Cross-slot
Double-slot
Unknown
Absent
Unprocessed
Aligned
Partially implant
Processing
Waiting wafer
Error

Please make sure all the wafers on the VTM Robot match the GUI wafer maps on the JobMonitor Screen. Click OK if they are matched, otherwise please click Cancel to discontinue, and manually add or delete wafers in Service-ATM screen to make GUI wafer maps match the real case!

OK Cancel

Jobs Beamline System Recipes History Configuration Service Facilities Alarm Help

2. Aborting an Implantation Job and Automatic Wafer Return

Step 10. Confirm the LL wafer matches the actual wafer. Click "OK" if they are matched.

The screenshot displays the SEMATECH Job Monitor interface with the following components:

- Vacuum Robot:** Motor Status: Homed; Pick Station: 1; Place Station: 1; Speed: 60. Select Arm: Lower Arm. Buttons: Home, Pick, Place, Teach Data, Fast Swap.
- LoadLock 1 & 2:** Controls for TIV1, TIV2, Pump, Heater, Vent, and LDV1/LDV2. Includes status for Slow rough, Fast rough, and Vent.
- Atmospheric Robot:** Motor Status: Homed; Servo: On; Select Arm: Dual Arms. Buttons: Home, Pick, Place, Teach Data.
- Facility & Fan Filter Unit:** House Vacuum and Differential Pressure status indicators.
- LoadPort A, B, C, D:** Each port shows status (Mapped), Present, Clamped, Docked, Open, Unload, E84 Stat, and buttons for Home, Clamp, Dock, Close, Reset, Clear E84, Tag ID, Manual, and In Service.
- Wafer Sensor Map:** A central diagram showing the wafer layout with green dots indicating wafer positions.
- Wafer Handling System:** Status: Idle. Buttons: Initialize, Clear Wafers, Pause, Abort, Reset Wafer Status, Wafer Cycle Path. A green "AUTO" button is present.
- Confirmation Dialog:** A pop-up window with the text: "Please make sure all the wafers on the LoadLock1 and LoadLock2 match the GUI wafer maps on the JobMonitor Screen. Click OK if they are matched, otherwise please click Cancel to discontinue, and manually add or delete wafers in Service-ATM screen to make GUI wafer maps match the real case!". It features "OK" and "Cancel" buttons, with a red dashed box around "OK" and a yellow box with the number "10" next to it.
- Wafer Legend:** A color-coded key for wafer types: Cross-slot (orange), Double-slot (pink), Unknown (grey), Absent (white), Unprocessed (blue), Aligned (green), Partially implant (red), Processed (dark blue), Damaging Wafer (light blue), and Error (purple).
- Bottom Menu:** Jobs, Beamline, System, Recipes, History, Configuration, Service, Facilities, Alarm, Help.

2. Aborting an Implantation Job and Automatic Wafer Return

Step 11. Confirm the ATM wafer matches the actual wafer. Click "OK" if they are matched.

Vacuum Robot

Motor Status: Homed
Pick Station: 1
Place Station: 1
Speed: 60

Select Arm: Lower Arm
Home
Pick
Place
Teach Data
Fast Swap

LoadLock 1

Pump
Heater
Vent
TIV1
LDV1
Slow rough
Fast rough
Vent

LoadLock 2

Pump
Heater
Vent
TIV2
LDV2
Slow rough
Fast rough
Vent

Atmospheric Robot

Motor Status: Homed
Pick Station: 1
Place Station: 1
Servo: Servo On
Pick Slot: 1
Place Slot: 1
Select Arm: Dual Arms
Home
Teach Data

Facility

House Vacuum

Fan Filter Unit

Differential Pressure

Wafer Handling System

Status: Idle
Initialize
Clear Wafers
Pause
Abort
Reset Wafer Status
Wafer Cycle Path
ATM Ready For Next Job
AUTO

LoadPort A

Status: Mapped
Present
Docked
Unload
Home
Reset
Clear E84
Tag ID: UnknownA
Manual
In Service

LoadPort B

Status: Mapped
Present
Docked
Unload
Home
Reset
Clear E84
Tag ID: UnknownB
Manual
In Service

LoadPort C

Status: Mapped
Present
Docked
Unload
Home
Reset
Clear E84
Tag ID: UnknownC
Manual
In Service

LoadPort D

Status: Mapped
Present
Docked
Unload
Home
Reset
Clear E84
Tag ID: UnknownD
Manual
In Service

Wafer Legend

Cross-slot
Absent
Double-slot
Unprocessed
Aligned
Partially implant
Processed
During Wafer
Error

Jobs **Beamline** **System** **Recipes** **History** **Configuration** **Service** **Facilities** **Alarm** **Help**

Please make sure all the wafers on the ATM Robot match the GUI wafer maps on the JobMonitor Screen. Click OK if they are matched, otherwise please click Cancel to discontinue, and manually add or delete wafers in Service-ATM screen to make GUI wafer maps match the real case!

OK 11 Cancel

2. Aborting an Implantation Job and Automatic Wafer Return

Step 12. Confirm all wafer positions match the actual wafers. Click "OK" if they are matched.

The screenshot displays the NTA-RTS control interface with the following components:

- Vacuum Robot:** Motor Status: Homed; Select Arm: Lower Arm; Pick Station: Home; Pick Slot: 1; Place Station: 1; Place Slot: 1; Speed: 60; Buttons: Teach Data, Fast Swap.
- LoadLock 1:** TIV1, LDV1, Pump, Heater, Vent, Slow rough, Fast rough, Vent; Buttons: 2-, 1-.
- LoadLock 2:** TIV2, LDV2, Pump, Heater, Vent, Slow rough, Fast rough, Vent; Buttons: 2-, 1-.
- Wafer Sensor Map:** A top-down diagram of the wafer stage showing sensor positions.
- Wafer Handling System:** Status: Idle; Buttons: Initialize, Clear Wafers, Pause, Abort, Reset Wafer Status, Wafer Cycle Path; Indicator: ATM Ready For Next Job; Button: AUTO.
- Atmospheric Robot:** Motor Status: Homed; Servo: 1; Servo On: 1; Select Arm: Dual Arms; Buttons: Teach Data.
- Facility:** House Vacuum; Indicator: Green dot.
- Fan Filter Unit:** Differential Pressure; Indicator: Green dot.
- LoadPort A, B, C, D:** Each panel shows Status: Mapped, Present, Docked, Unload, Home, Reset, Clear E84, Tag ID, Manual, In Service, and a vertical scale from 1 to 25.
- Wafer Legend:** Cross-slot, Double-slot, Unprocessed, Aligned, Partially implant, Processed, Dummy wafer, Error.
- Bottom Menu:** Jobs, Beamline, System, Recipes, History, Configuration, Service, Facilities, Alarm, Help.

A confirmation dialog box is overlaid on the interface with the text: "Are you sure all the wafer maps of the stations are correct? Click OK to start clear the wafers, click Cancel to discontinue." The dialog has "OK" and "Cancel" buttons. The "OK" button is highlighted with a red dashed border, and a red box with the number "12" is next to it, indicating the step number.

2. Aborting an Implantation Job and Automatic Wafer Return

Step 13. After all wafers are returned to the FOUP, the machine will display "Clear wafer completed."

The screenshot displays the SEMATECH JobMonitor interface. The top section shows the 'Vacuum Robot' and 'LoadLock 1' controls. The 'Vacuum Robot' section includes 'Motor Status' (Homed), 'Pick Station' (1), 'Place Station' (1), and 'Speed' (60). The 'LoadLock 1' section includes 'Pump', 'Heater', 'Vent', and 'TIV1' controls. The 'Wafer Sensor Map' shows a top-down view of the wafer stage with green dots indicating wafer positions. The 'Wafer Handling System' section shows 'Status' (Idle), 'Initialize', 'Clear Wafers', 'Pause', and 'Abort' buttons. The 'Atmospheric Robot' section includes 'Motor Status' (Homed), 'Pick Station' (1), 'Place Station' (1), and 'Servo' controls. The 'LoadPort A' through 'LoadPort D' sections show 'Status' (Mapped), 'Present', 'Docked', 'Unload', 'Home', 'Reset', 'Clear E84', and 'Tag ID' controls. The 'Facility' section shows 'House Vacuum' and 'Fan Filter Unit' controls. The 'Wafer Legend' section shows 'Unknown', 'Cross-slot', 'Double-slot', 'Unprocessed', 'Aligned', 'Partially implant', and 'Processed' indicators. The bottom section shows a navigation bar with 'Jobs', 'Beamline', 'System', 'Recipes', 'History', 'Configuration', 'Service', 'Facilities', 'Alarm', and 'Help' buttons. A confirmation dialog is displayed in the center, asking the user to match the GUI EChuck wafer maps on the JobMonitor Screen. The dialog includes 'OK' and 'Cancel' buttons, and a red box highlights the number '13'.

Vacuum Robot
Motor Status: Homed
Pick Station: 1
Place Station: 1
Speed: 60
Select Arm: Lower Arm
Home
Pick
Place
Teach Data
Fast Swap

LoadLock 1
Pump
Heater
Vent
TIV1
Slow rough
Fast rough
Vent
LDV1

LoadLock 2
Pump
Heater
Vent
TIV2
Slow rough
Fast rough
Vent
LDV2

Wafer Sensor Map

Wafer Handling System
Status: Idle
Initialize
Clear Wafers
Pause
Abort
Reset Wafer Status
Wafer Cycle Path
ATM Ready For Next Job
AUTO

Atmospheric Robot
Motor Status: Homed
Pick Station: 1
Place Station: 1
Servo
Servo On
Select Arm: Dual Arms
Home
Pick
Place
Teach Data

Facility
House Vacuum

Fan Filter Unit
Differential Pressure

LoadPort A
Status: Mapped
Present
Docked
Unload
Home
Reset
Clear E84
Tag ID: UnknownA
Manual
In Service

LoadPort B
Status: Mapped
Present
Docked
Unload
Home
Reset
Clear E84
Tag ID: UnknownB
Manual
In Service

LoadPort C
Status: Mapped
Present
Docked
Unload
Home
Reset
Clear E84
Tag ID: UnknownC
Manual
In Service

LoadPort D
Status: Mapped
Present
Docked
Unload
Home
Reset
Clear E84
Tag ID: UnknownD
Manual
In Service

Wafer Legend
Unknown
Cross-slot
Double-slot
Unprocessed
Aligned
Partially implant
Processed

Jobs **Beamline** **System** **Recipes** **History** **Configuration** **Service** **Facilities** **Alarm** **Help**

Please make sure all the wafers on the EChuck match the GUI EChuck wafer maps on the JobMonitor Screen. Click OK if they are matched, otherwise please click Cancel to discontinue, and manually add or delete wafers in Service-ATM screen to make GUI wafer maps match the real case!

OK 13 Cancel