



Families	Product Lines	Models
PHOENIX	PHOENIX	All models that use wafers

AML User Guide			
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Revision History: KLA requires users of this document to make sure they use the latest released version.
The details of the Revision History are located on the final page of this document.

Table of Contents

1.	Overview: AML User Guide.....	3
1.1.	AML: Equipment Description.....	4
1.2.	AML: Leveling UI.....	5
2.	Safety: AML User Guide.....	7
3.	Prepare to Check Leveling Using the AML.....	8
3.1.	Power Up the AML.....	8
3.2.	Start the Leveling UI and Select the Tool.....	8
3.3.	Calibrate the AML.....	11
4.	Check Leveling Using the AML.....	12
4.1.	Check the Leveling (Absolute Mode).....	13
4.2.	Check the Leveling (Relative Mode).....	17
4.3.	Use the AML as a Digital Level (QuickLevel).....	21
5.	AML: View History.....	23
6.	AML: Add a New Tool.....	26
7.	AML: Change the Spec.....	28
8.	AML Troubleshooting.....	30
9.	Additional Information.....	33
9.1.	Glossary.....	33
9.2.	Revision History: AML User Guide.....	33
9.3.	Copyright.....	34
9.4.	Trademarks.....	34
9.5.	Reprint Acknowledgments.....	34
9.6.	Branding Changes.....	34

1. Overview: AML User Guide

The AML is a leveling wafer tool that works with a dedicated laptop or tablet, or with the FEC of the tool whose leveling is being checked. Throughout this Guide, "computer" refers to whichever option you are using: laptop, tablet, or FEC.

The AML can be used:

- To check the leveling status of stations
- As a digital level during the leveling process of a station

In addition, the results of earlier leveling sessions can be viewed on the computer.

A typical work flow:

1. Run a leveling session for the tool to check the leveling statuses of the target stations.
2. If the leveling for any station is out of spec, run a QuickLevel session for that station and adjust the leveling until the station is within spec.
3. Run a second leveling session for the tool to confirm that the stations are now in spec and to keep a record of the results.

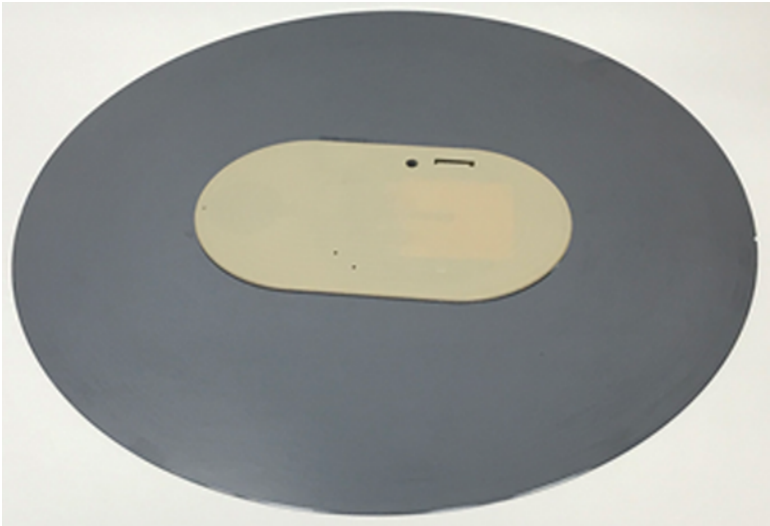
FRU Parts/Tooling Required

Part Number	Description	Quantity	FRU/Tooling
0749246-00x	ASSY,FINAL,CAL,AM WAFER,2.5MM,EXTND BATT (includes AML and charging shell)	1	Tooling
	One of the following options:		
0764100-00x	KIT,DONGLE,SW-UI,W/CASE,AML (dongle for use with FEC)	1	Tooling
0764553-00x	KIT,LAPTOP,DONGLE,W/CASE,AML (laptop plus dongle option)	1	Tooling
0764099-00x	KIT,TABLET,SW-UI,W/CASE (tablet option)	1	Tooling

Required Documents

Document Number	Title
9026876-000	AML Router Configuration

1.1. AML: Equipment Description



The AML system consists of the following:

- The AML (leveling wafer)
- The AML charging shell, including power supply
- The AML router (dongle) that is installed on the computer
- (optional) Dedicated laptop computer or tablet

Equipment Rating

Equipment	Rating
AML charger output	5V max 1A max
AML charger input	12VDC max 3.3A max

The AML wafer is for use only with batteries that have built-in protection. Wafer batteries must not be replaced by an operator.

Input and Output Ports

Equipment	Ports
AML wafer	3.7V input (from battery)

Environmental Conditions

Equipment	Environmental Parameter	Condition
AML wafer	Temperature	0°C - 60°C
	Pressure	760 Torr (atmospheric only) Air, CDA
AM Leveling Charger	Temperature	0°C - 85°C

Clean the AML wafer only with a lint-free cloth dampened with water and IPA in a 10:1 ratio.

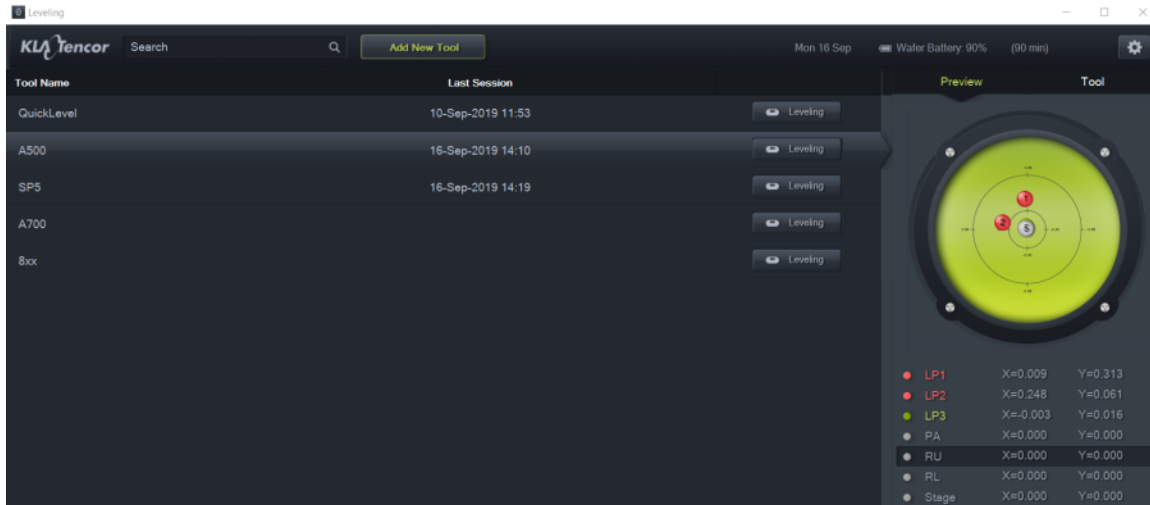
Supplier and Manufacturer

	Name	Address
Supplier	SensArray division of KLA Corporation	One Technology Drive Milpitas, California 95035 USA
Manufacturer	Flex Ltd.	HaMatechet 2 Migdal HaEmek 2307037 Israel

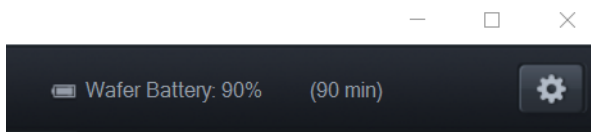
1.2. AML: Leveling UI

This section gives an overview of the 2 primary windows of the **Leveling UI**: the main window and the Leveling window. For operational information, refer to the sections of the document that discuss the task you want to perform.

- Main Window:



If the AML is connected to the computer, the wafer status is displayed at the top of the window.

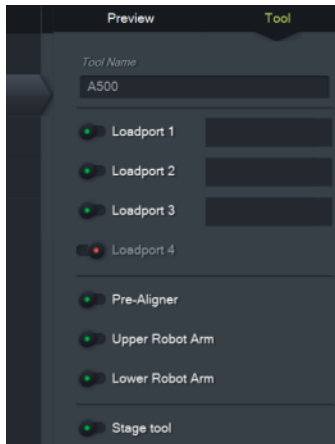


The main window lists every tool that has been defined on the computer, including the pre-defined QuickLevel (used when using the AML as a digital level).

The right side of the window has 2 tabs:

- **Preview** (default): Displays the results of the last session for the selected tool
- **Tool**: Shows which stations are defined for the selected tool





- Leveling Window:



2. Safety: AML User Guide

Warning: Cut and Sever Hazard	
	Consequence: Sharp objects could result in serious injury or death. Mitigation: Keep hands and arms clear. Turn off and lockout the subsystem before servicing.

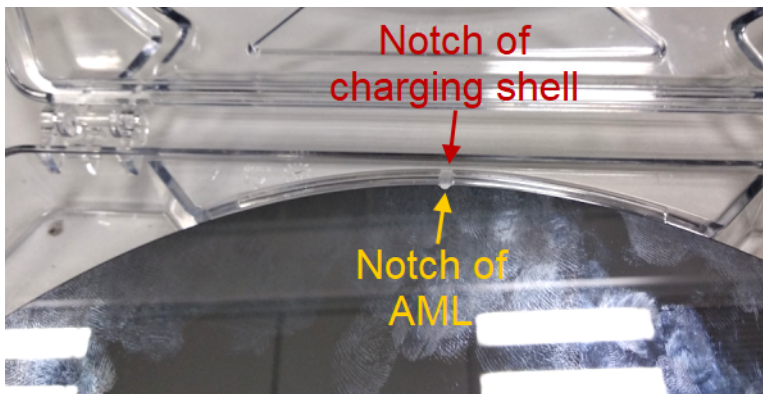
- Handle the AML with care.
- If the AML breaks, the broken pieces can be a cut or sever hazard.

3. Prepare to Check Leveling Using the AML

3.1. Power Up the AML

Steps to follow

1. Open the charging shell.
2. Install the AML in the charging shell so that the notch of the AML aligns with the notch of the charging shell.



3. Close the charging shell.
4. Connect the power supply cable to the charging shell.



Result: The AML beeps, indicating that it is powered up.

5. Remove the AML from the charging shell.

3.2. Start the Leveling UI and Select the Tool

Required conditions

- The external AML dongle was configured on the computer (refer to 9026876-000, *AML Router Configuration*)
- The AML was powered up.

Steps to follow

1. Install the AML dongle in the USB port that was used when the AML router was configured on the computer.

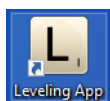
If the dongle is not installed in the USB port that was used when the router was configured, the AML UI might not function.

2. Power up the computer (unless it is already powered up).
3. On the computer, start the **Leveling UI** (unless it is already running):

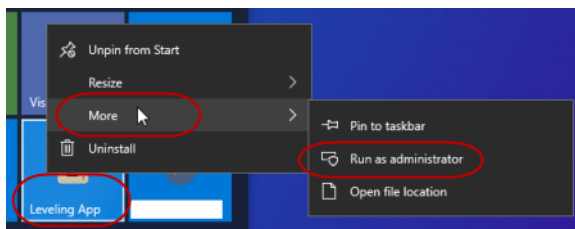
The specific steps depend on the computer's Operating System (OS): Windows 7 or Windows 10.

OS Step(s)

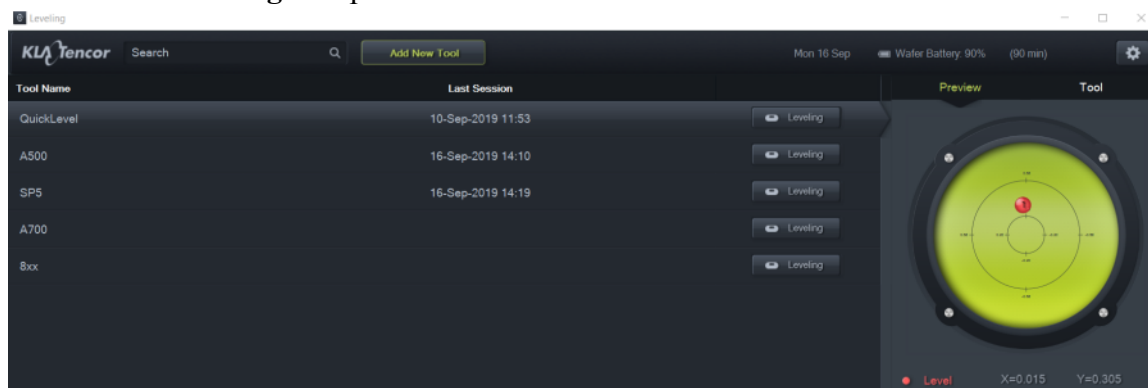
Windows 7 Double-click **Leveling App**.



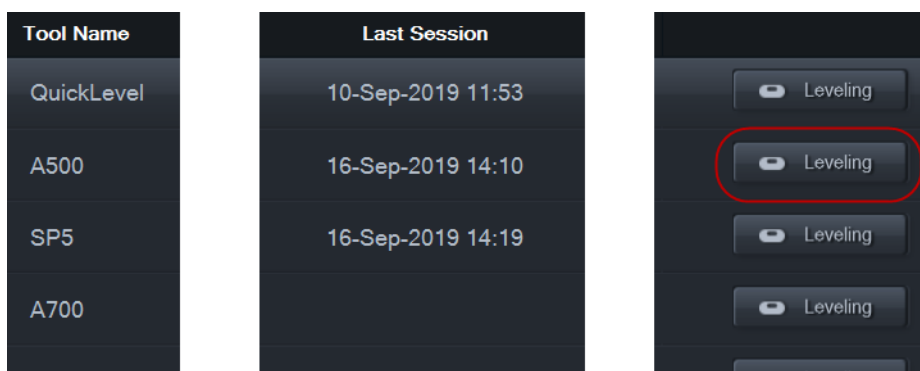
Windows 10 a. Right-click **Leveling App**.
b. Select **More > Run as administrator**.



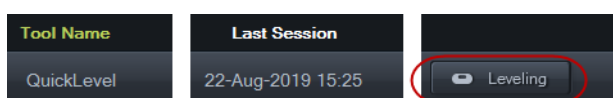
Result: The **Leveling UI** opens.



4. In the **Leveling** UI, click the **Leveling** button that corresponds to the **Tool Name**.

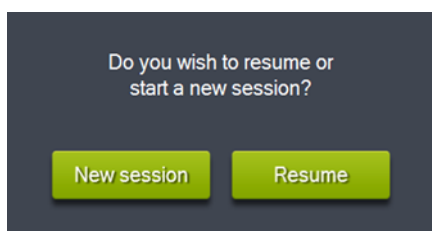


If you are going to use the AML as a Digital Level, click the **Leveling** button that corresponds to **QuickLevel**.



Troubleshooting: If the tool is not listed, [add a new tool](#).

5. If a previous session for that tool was not completed, the system asks whether you want to resume that session or start a new session. Click **New session** or **Resume**, as applicable.



6. Make sure the leveling window shows that the AML is in **ABS** (Absolute) mode. If the AML is in Absolute mode when the session begins, it has been calibrated.



Troubleshooting: If the leveling window does not display **ABS**, the AML is not calibrated. Refer to [Calibrate the AML](#).



Postrequisites

- To check the absolute leveling of one or more stations, continue with [Check the Leveling \(Absolute Mode\)](#).
- To check the leveling of one or more stations relative to another station, continue with [Check the Leveling \(Relative Mode\)](#).
- To use the AML as a digital level during the leveling process of a station, continue with [Use the AML as a Digital Level \(QuickLevel\)](#).

3.3. Calibrate the AML

Required conditions

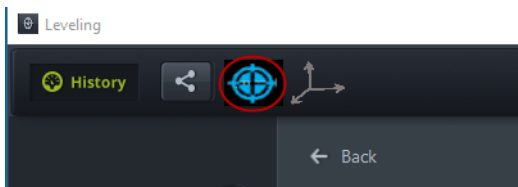
- The AML was powered up.
- The **Leveling UI** was started.
- A tool was selected from **Tool List**.
- The AML has not been calibrated after power up.

About this task

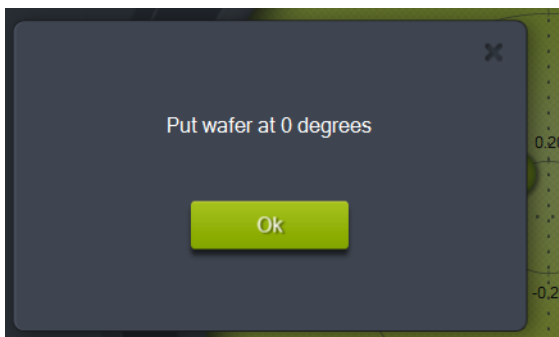
The AML must be calibrated after power up. After it is calibrated, it is in Absolute mode.

Steps to follow

1. Place the AML on a flat, solid surface.
The surface must be flat within 5°.
2. In the **Leveling UI** leveling window, click **Calibration**.



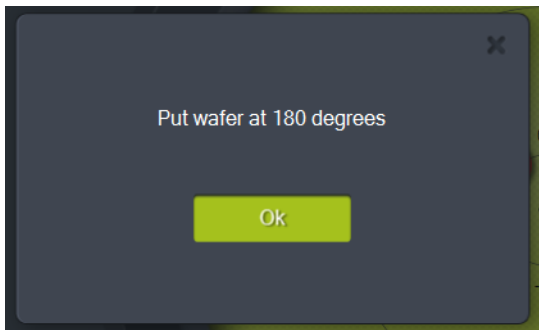
3. At the prompt, click **OK**.



4. Mark the exact location of the AML on the flat surface.
In the next step, you must keep the center of the AML in the same place.

CAUTION: Equipment Damage	
	Consequence: <i>Not following the procedure can damage the system.</i> Mitigation: <i>Follow all instructions below.</i>

- The 0° calibration and the 180° calibration must be performed while the AML is in the same place on the surface.
 - If the AML is not in the same place, the calibration will not be accurate and the leveling performed using the AML will not be accurate.
5. While keeping the AML in the same place on the flat surface, rotate the AML 180°.
 6. Click **OK**.



Result: The AML is calibrated and the Leveling UI shows it is in Absolute mode.



Postrequisites

- To check the absolute leveling of one or more stations, continue with [Check the Leveling \(Absolute Mode\)](#).
- To check the leveling of one or more stations relative to another station, continue with [Check the Leveling \(Relative Mode\)](#).
- To use the AML as a digital level during the leveling process of a station, continue with [Use the AML as a Digital Level \(QuickLevel\)](#).

4. Check Leveling Using the AML

Required conditions

- On the main **Leveling** UI page, the applicable tool's **Leveling** button was clicked.

- The **Leveling** UI displays **ABS**, showing that the AML is calibrated.



4.1. Check the Leveling (Absolute Mode)

About this task

In Absolute mode, the AML checks the leveling of each station individually. After the AML is calibrated, it is in Absolute mode by default.

Steps to follow

1. Place the AML on the first station so that the notch faces away from you (in the "12 o'clock" position).
2. In the **Leveling** UI, click the station.

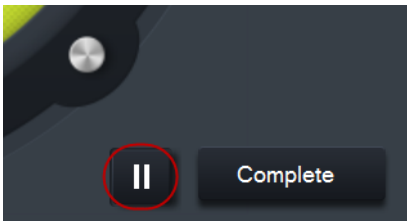


3. Click **Play**.

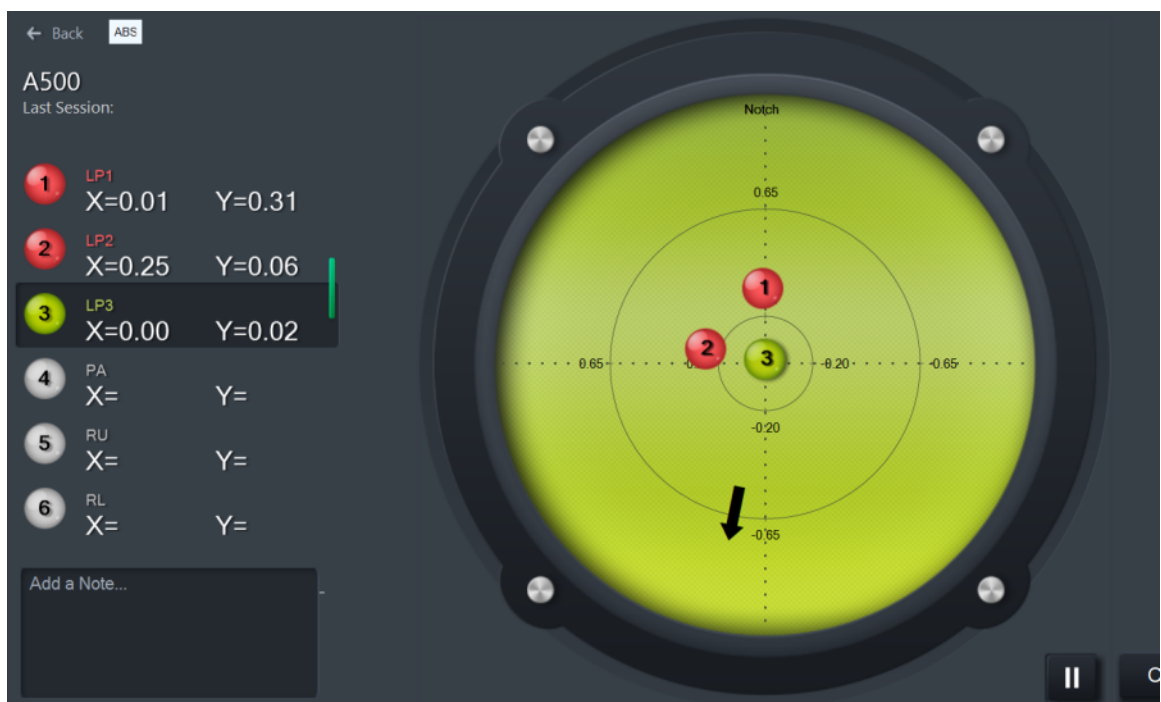
Result: The results for the station are displayed numerically and graphically.



4. Click **Pause**.

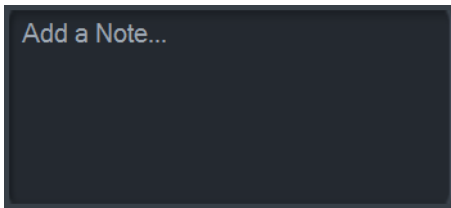


5. Repeat for all the other stations you need to check.

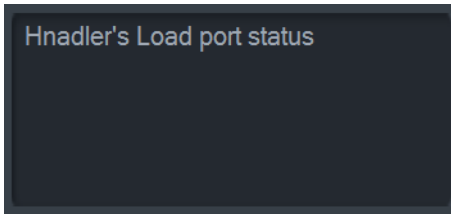


6. To add comments about the leveling session:

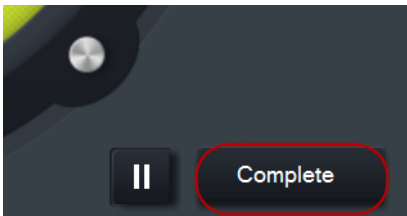
a) Click **Add a Note**.



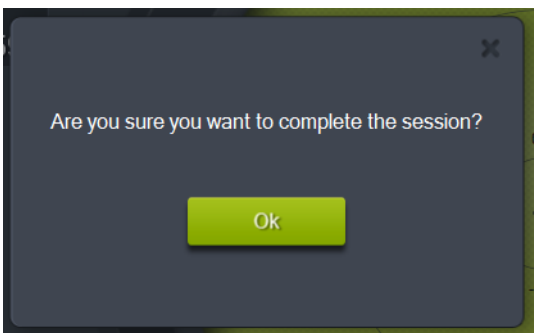
b) Write the comments.



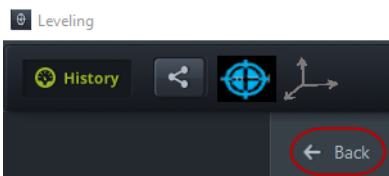
7. At the end of the leveling session, click **Complete**.



8. At the prompt, click **OK**.



9. To return to the main Leveling UI window, click **Back**.



4.2. Check the Leveling (Relative Mode)

About this task

Checking leveling in Relative modes has two parts:

1. Checking the Reference station in Absolute mode.
2. Changing to Relative mode to measure the subsequent stations with X and Y offsets defined by the leveling values of the Reference station.

Steps to follow

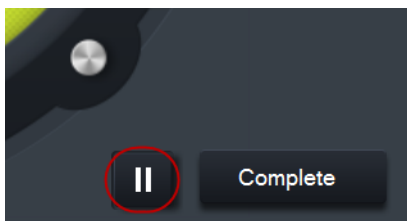
1. Place the AML on the reference station so that the notch faces away from you (in the "12 o'clock" position).
2. In the **Leveling UI**, click the station.



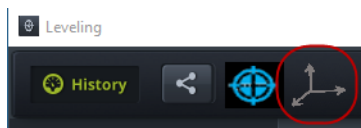
3. Click **Play**.
Result: The results for the station are displayed numerically and graphically.



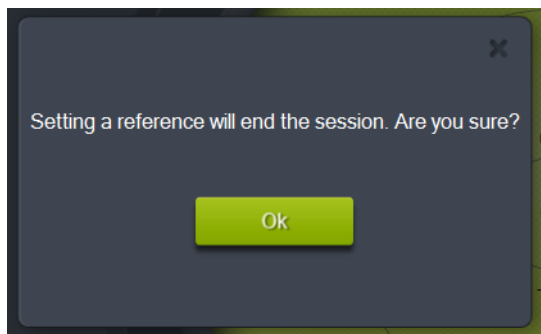
4. Click **Pause**.



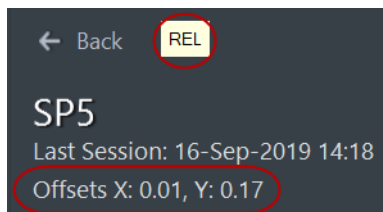
5. Click **Relative**.



6. At the prompt, click **OK**.



Result: The **Leveling** UI goes into **REL** (Relative) mode and displays the X and Y offsets that will be used during the session.



7. Measure the other stations relative to the reference station:

- Place the AML on the first station to measure relative to the reference station.
- In the Leveling UI, click the station.
- Click **Play**.

Result: The results for the station relative to the reference station are displayed numerically and graphically.



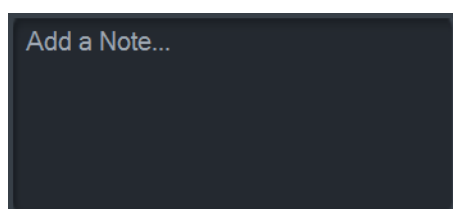
d) Click **Pause**.

e) Repeat for the other stations you want to check.

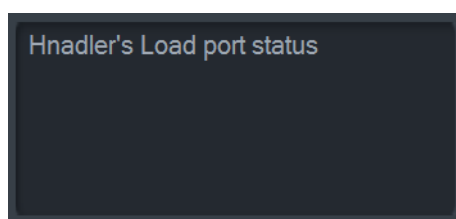


8. To add comments about the leveling session:

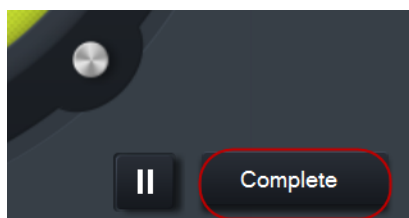
a) Click **Add a Note**.



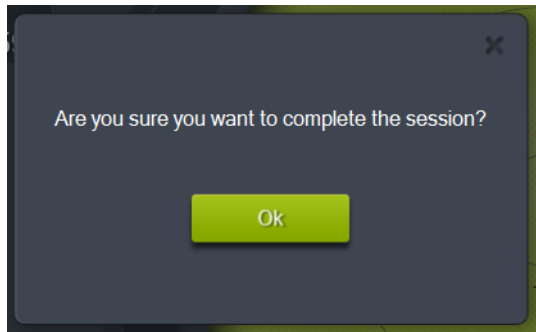
b) Write the comments.



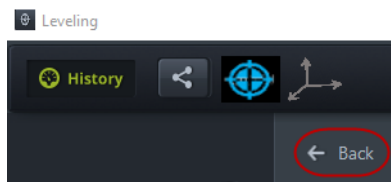
9. At the end of the leveling session, click **Complete**.



10. At the prompt, click **OK**.



11. To return to the main Leveling UI window, click **Back**.



4.3. Use the AML as a Digital Level (QuickLevel)

About this task

The **QuickLevel** leveling window displays a single, generic station, which displays the results for whichever station you are adjusting.

Steps to follow

1. Place the AML on the station you are adjusting so that the notch faces away from you (in the "12 o'clock" position).

2. Click **Play**.

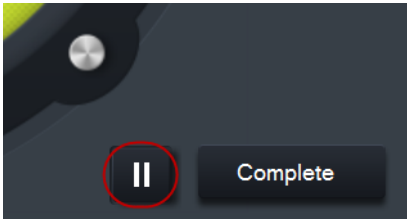


Result: The X and Y results for the station are displayed numerically and graphically.

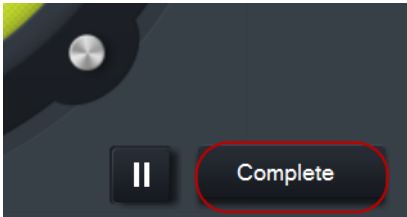
3. Adjust the leveling of the station until the display shows the leveling is within spec.



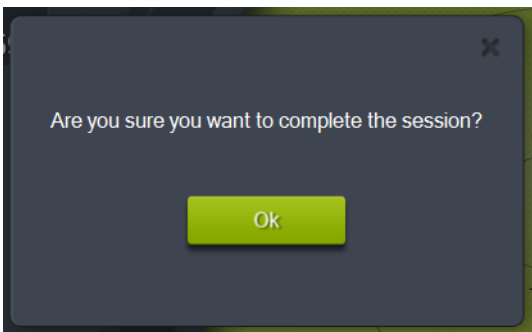
- Click **Pause**.



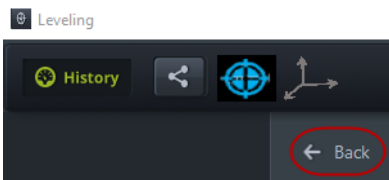
- Repeat for all the other stations you need to adjust.
- At the end of the leveling session, click **Complete**.



- At the prompt, click **OK**.



- To return to the main Leveling UI window, click **Back**.



5. AML: View History

About this task

It is not necessary to connect the AML to the computer in order to view History.

Steps to follow

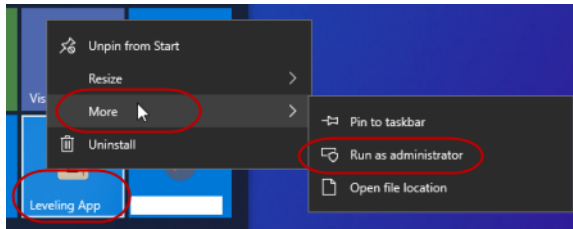
- Power up the computer (unless it is already powered up).
- On the computer, start the **Leveling UI** (unless it is already running):
The specific steps depend on the computer's Operating System (OS): Windows 7 or Windows 10.

OS **Step(s)**

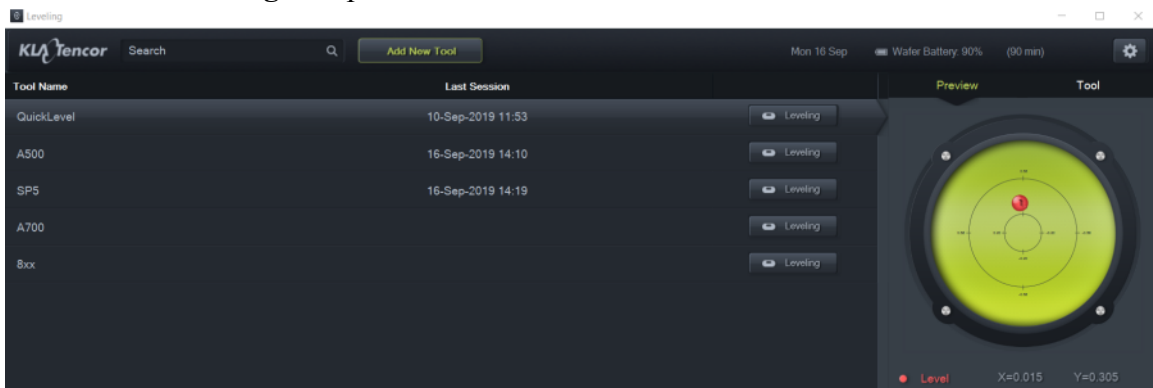
Windows 7 Double-click **Leveling App**.



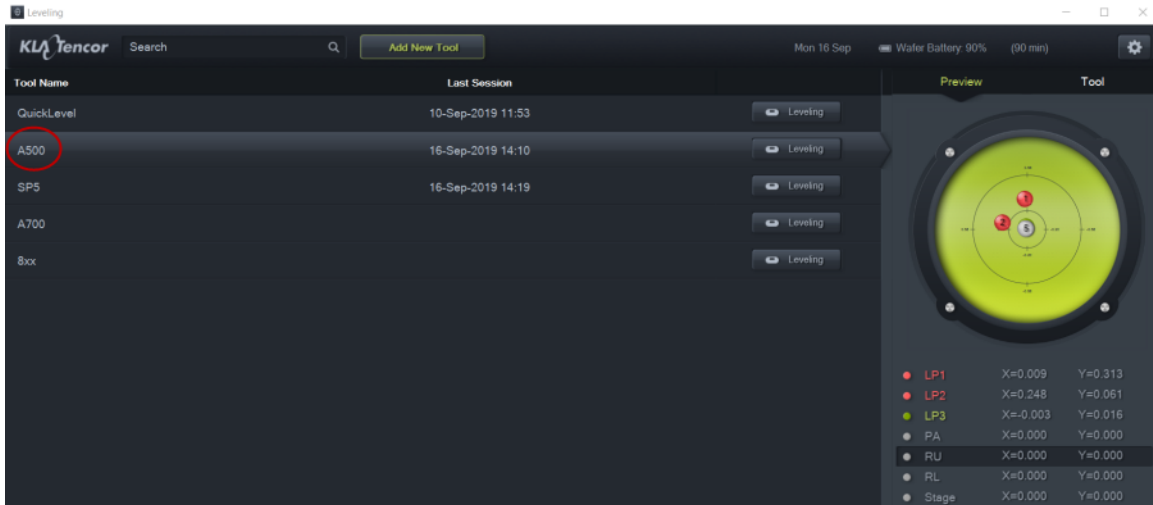
Windows 10 a. Right-click **Leveling App**.
 b. Select **More > Run as administrator**.



Result: The **Leveling UI** opens.



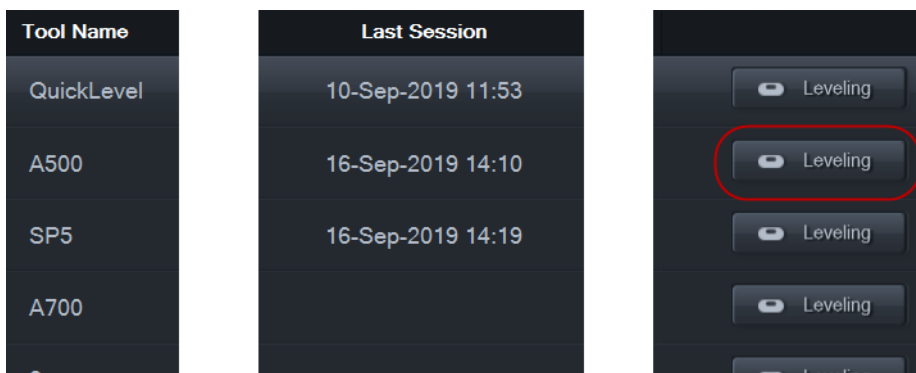
3. To view the results of a tool's last session, click the tool.
In the example in the figure, **A500** is clicked.



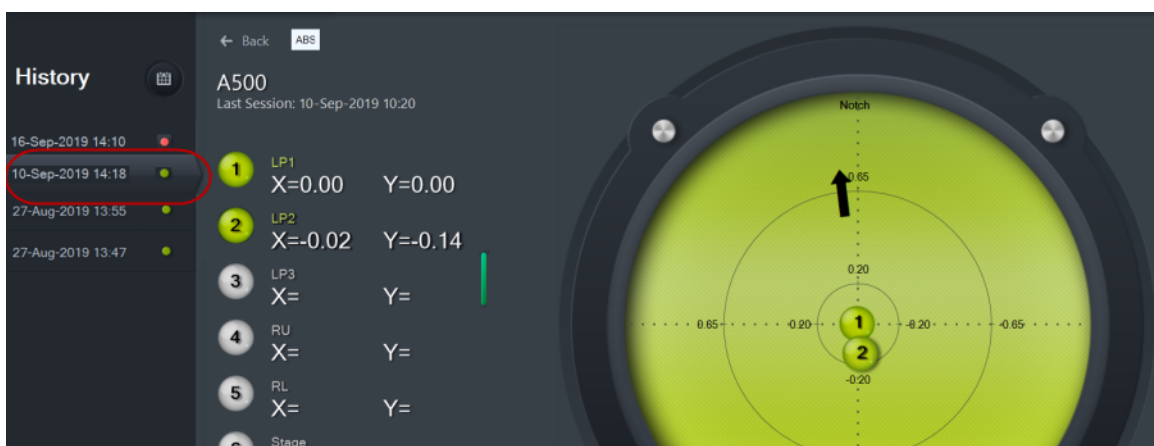
Result: The results of the tool's last session are displayed in the **Preview** tab.

4. To view the results of an earlier session:

a) In the **Leveling** UI, click the **Leveling** button that corresponds to the tool.



b) Under **History**, click the session that you want to view.



Result: The results for the selected session are displayed numerically and graphically.

6. AML: Add a New Tool

Steps to follow

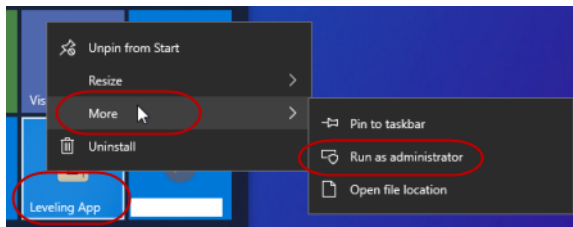
1. Power up the computer (unless it is already powered up).
2. On the computer, start the **Leveling UI** (unless it is already running):
The specific steps depend on the computer's Operating System (OS): Windows 7 or Windows 10.

OS **Step(s)**

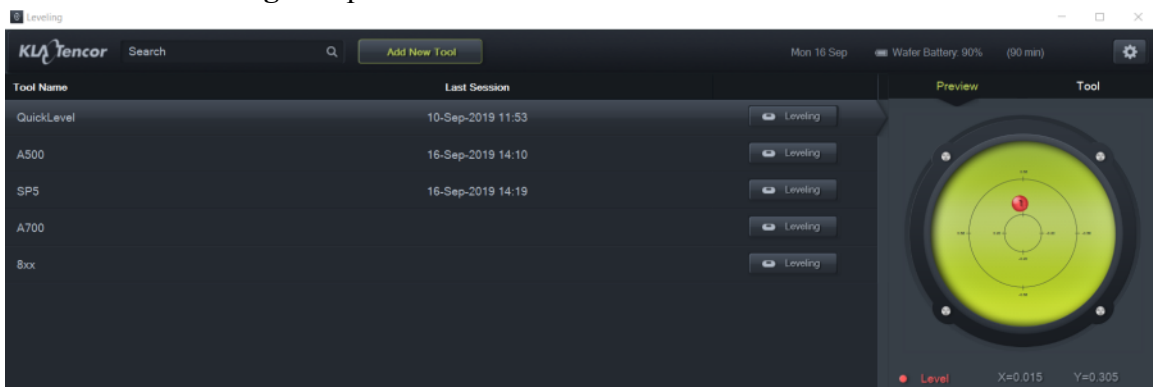
Windows 7 Double-click **Leveling App**.



- Windows 10** a. Right-click **Leveling App**.
 b. Select **More > Run as administrator**.



Result: The **Leveling UI** opens.

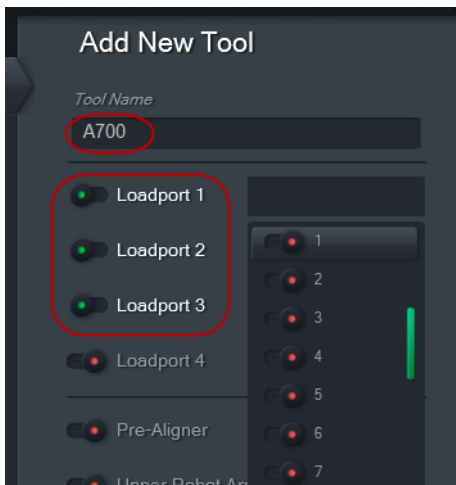


3. In the **Leveling UI**, click **Add New Tool**.



Result: The **Add New Tool** pane opens on the right side of the window.

4. Type the name of the new tool.



In the example in the figure, the name of the new tool is A700.

5. Select the stations to be included in the tool definition:

When a station is included in a tool definition, it is included in the list of stations whose leveling can be checked by the AML during the leveling operation.

- a) Click the stations to include in the tool definition.

Result: The indicator next to the selected station changes from red to green.

- b) When you select a Loadport, you are prompted to select one or more slots.

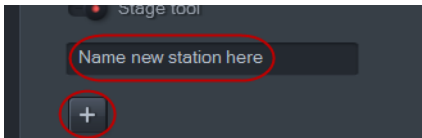
- If you select a slot, then the selected slot in a FOUP on the Loadport is a defined station of the tool.
- If you select more than one slot, then each Loadport/slot combination is its own defined station of the tool.
- If you do not select any slots, then the defined station is the Loadport itself.

To view additional slots, use the scroll bar.

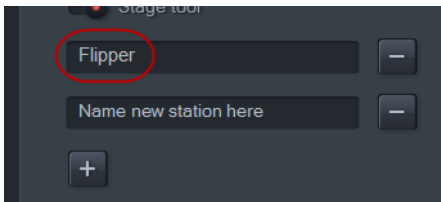


In the example in the figure, slots 1 and 5 of Loadport 1 are selected.

c) To add a station that is not listed:



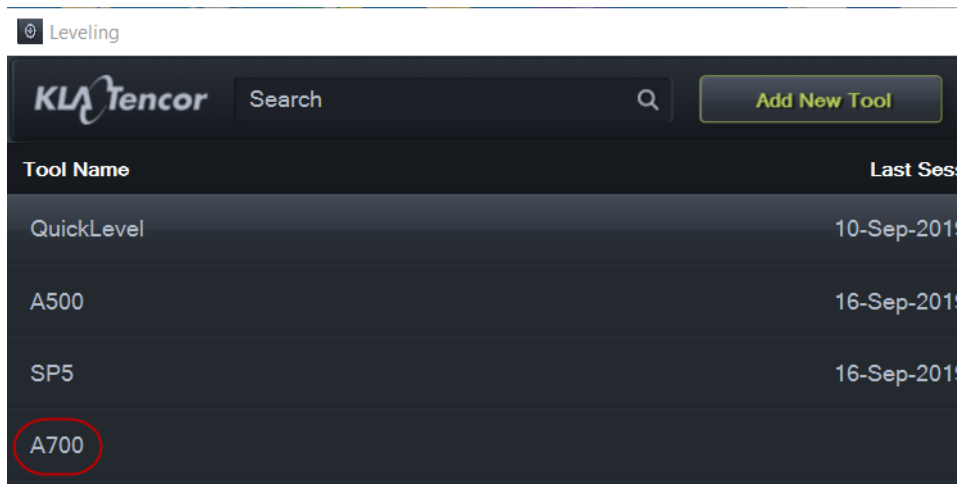
1. In **Name new station here**, type the name of the new station.
2. Click + (Add).



In the example in the figure, the name of the new station is **Flipper**.

Result: The new station is added to the list of stations and another **Name new station here** field is displayed.

- d) When you have selected all the stations you want to include in the tool definition, click **Done**.
Result: The name of the new tool is listed in the **Tool Name** column of the main **Leveling UI** window.



7. AML: Change the Spec

About this task

The default leveling spec of the Leveling UI is 0.2° calculated as absolute surface degrees (a combination of the two axes), and the default precision is 2 decimal places. These settings can be changed in the **Settings** window.

- The precision can be either 2 decimal places or 3 decimal places.
- The Leveling UI does not impose a limit on the value of the leveling spec.
- It is not necessary to connect the AML to the computer in order to change the spec.

Steps to follow

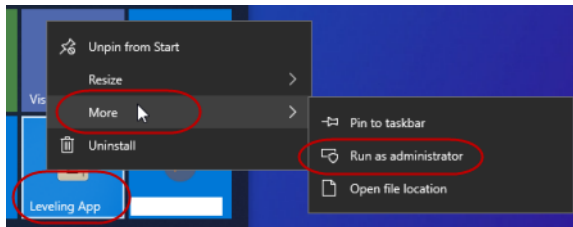
1. Power up the computer (unless it is already powered up).
2. On the computer, start the **Leveling UI** (unless it is already running):
The specific steps depend on the computer's Operating System (OS): Windows 7 or Windows 10.

OS Step(s)

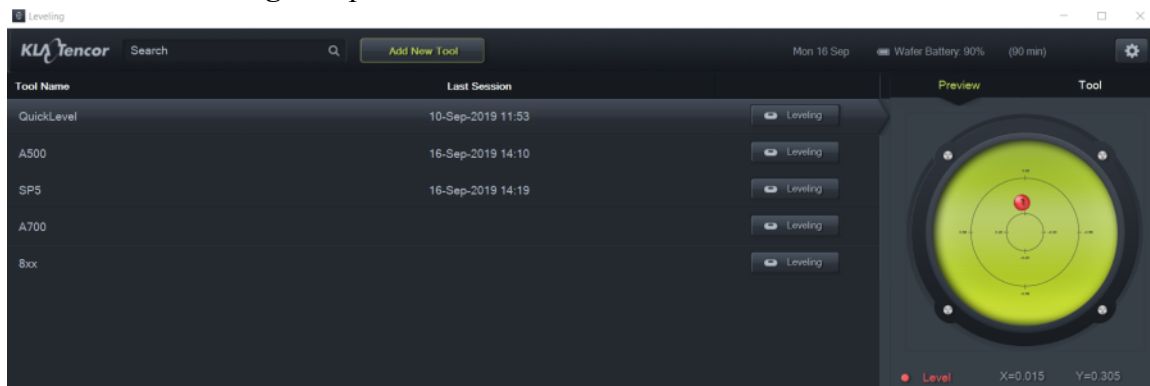
Windows 7 Double-click **Leveling App**.



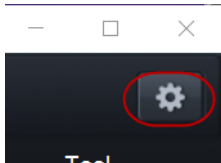
- Windows 10**
- a. Right-click **Leveling App**.
 - b. Select **More > Run as administrator**.



Result: The **Leveling UI** opens.

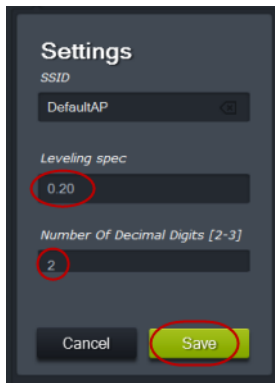


3. Click **Settings**.
Settings is located in the top right of the **Leveling UI**.



Result: The **Settings** dialog opens.

4. Change the spec:
 - a) Type the new value for the **Leveling spec**.



- b) (Optional) Change the value for **Number Of Decimal Digits [2-3]**.
 - c) Click **Save**.

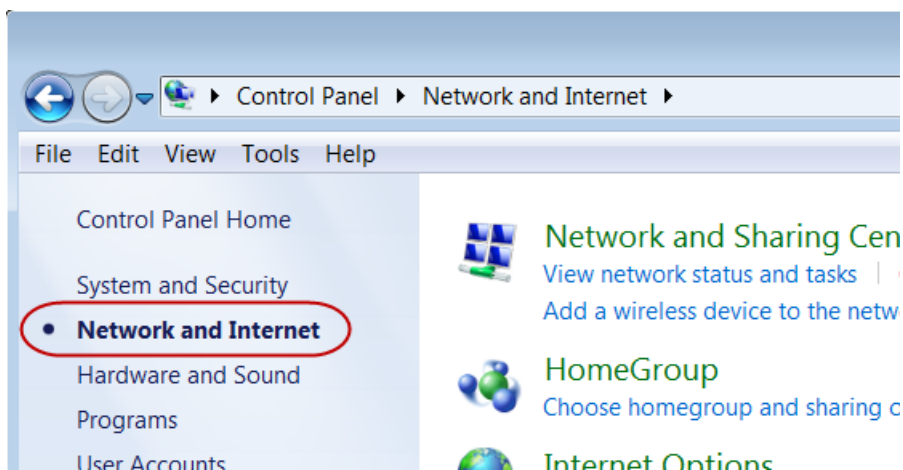
Do not change the **SSID**, otherwise the AML will not be able to communicate with the computer.

8. AML Troubleshooting

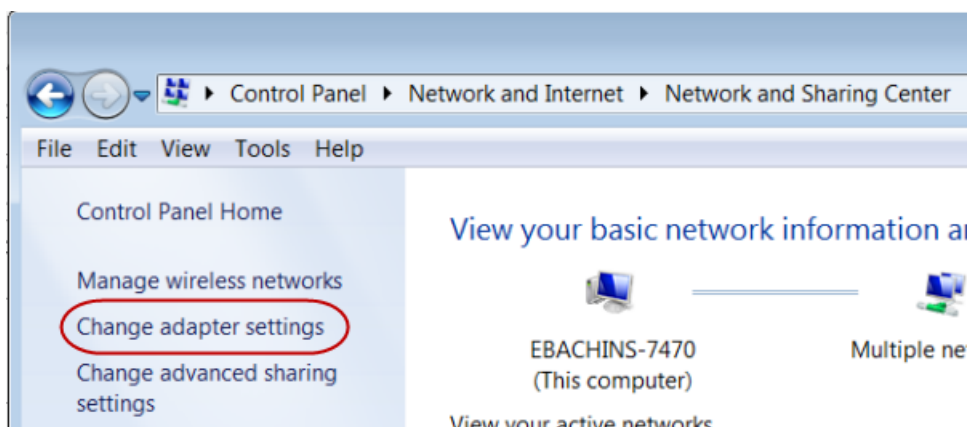
Symptom / Problem	Cause	Fix
The AML does not connect to the UI	The AML is not powered up (the LED is not blinking)	Power Up the AML
	The IP address is incorrect. The correct IP address is 192.168.100.1.	In a CMD window, run ipconfig to check the IP address. If the IP address is incorrect, refer to Correct the Static IP Address below.
	The AML needs to be reset.	Refer to Reset the AML below.
	The AML battery needs to be charged.	Refer to Power Up the AML and charge the AML for 2 hours.

Correct the Static IP Address

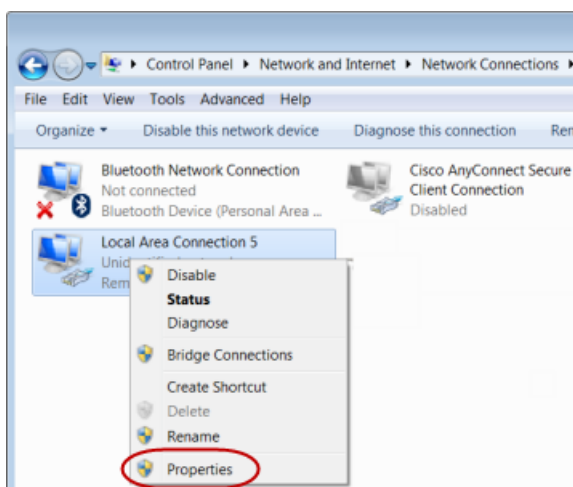
1. Open the computer's **Control Panel**.
2. Click **Network and Internet**.



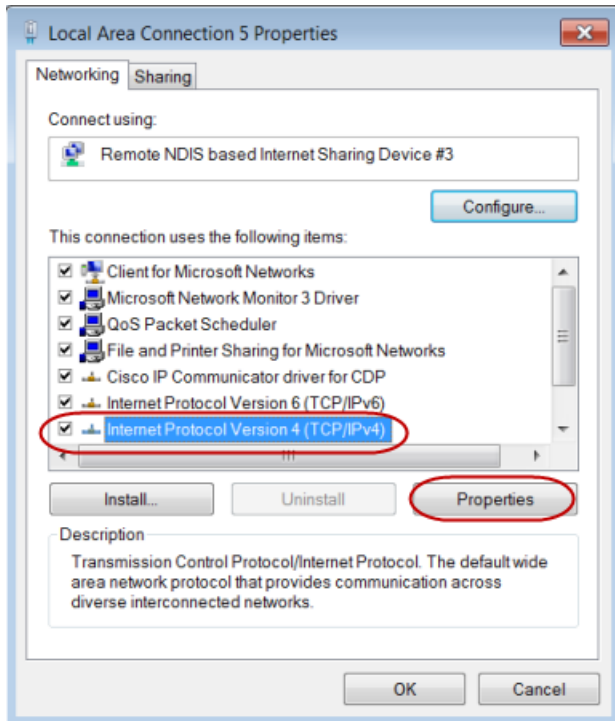
3. Click **Change adapter settings**.



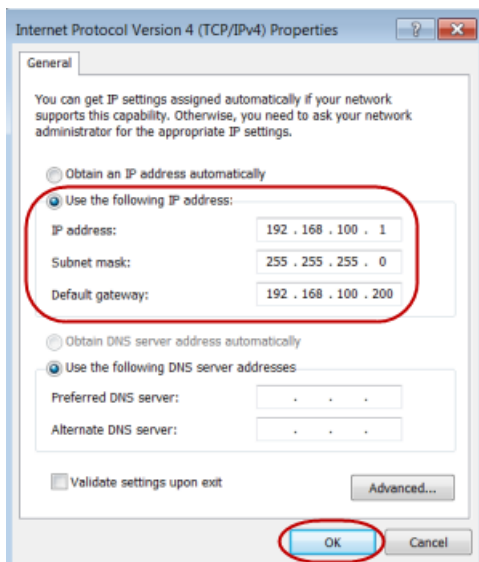
4. Right-click the Local Area Connection that corresponds to the AML dongle.



5. Click **Properties**.
6. Click **Internet Protocol Version 4 (TCP/IPv4)**.



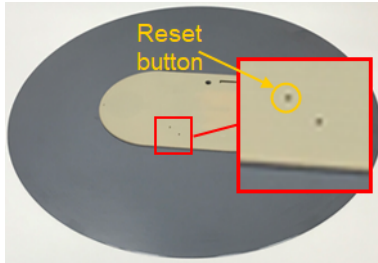
7. Click **Properties**.
8. Click **Use the following IP address**.



9. In **IP address**, type 192 . 168 . 100 . 1.
10. In **Subnet mask**, type 255 . 255 . 255 . 0.
11. In **Default gateway**, type 192 . 168 . 100 . 200.
12. Click **OK**.
13. Close the **Control Panel**.

Reset the AML

1. Place the AML on a flat surface.
2. Using the point of a pen or similar implement, press the **Reset** button on the AML.



9. Additional Information

9.1. Glossary

9.1.1. Glossary: AML User Guide Leveling Wafer (leveling tool)

AML

Front End Controller

The computer that controls the system.

FEC

Front Opening Unified Pod

FOUP

Isopropyl Alcohol

IPA

Substrate ID

SSID

User Interface

UI

9.2. Revision History: AML User Guide

This is the revision history of this document. Major changes such as task or spec changes will be documented. Minor changes like spelling and formatting issues will not be documented.

Rev	Date	Changes	Author	Reviewer	Approver
AA	11/2019	Initial Release	Caroline Ben-Ari	Eran Bachinski	Avi Zaban

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This document contains the original instructions prepared in standard English by KLA Corporation or a translation of the original instructions.

9.6. Branding Changes

KLA Corporation was formerly known as KLA-Tencor Corporation. The following document may contain content created before the name change and may use KLA-Tencor to refer to KLA.