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Applied Biosystems® Twister® Robot Automation Accessory

Pub. No. 4468146   **Rev.** C

About this Quick Reference

This quick reference contains abbreviated instructions for operating an Applied Biosystems® Twister® Robot Automation Accessory that has been installed with an Applied Biosystems® QuantStudio™ 12K Flex, QuantStudio™ 7 Flex, or ViiA™ 7 Real-Time PCR System.

Note: For safety and biohazard guidelines, refer to the "Safety" appendix in the *Applied Biosystems® Twister® Robot Automation Accessory User Guide* (Pub. no. 4470689). Read the Safety Data Sheets (SDSs) and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.

Workflow

The following figure illustrates the workflow for the automated operation of the Twister® Robot and the instrument.

Prepare the experiment consumables.

▼

Prepare the files and software.

Generate the experiment files individually.   *or*   1. Create a barcode file.

2. Create the template file.

3. Create experiment files.

▼

Add the experiment files to the plate queue.

▼

Start automated operation.

▼

Monitor the runs and unload the Twister® Robot

Prepare the experiment consumables

You can prepare reaction consumables before and during operation of the Twister® Robot and instrument.

Guidelines for consumable preparation

When preparing consumables (reaction plates or array cards) for use with the Twister® Robot and instrument:

• Wear appropriate protective eyewear, clothing, and gloves.

• Use consumables that are designed for use with the instrument. Non-standard consumables might not fit correctly in the gripper of the Twister® Robot, or in the sample block or plate adapter of the instrument.

• Do not allow the bottom of the consumables to become dirty. Fluids and other contaminants that adhere to the consumables can contaminate the instrument sample block and cause an abnormally high background signal.

• Store prepared consumables in the dark until they can be loaded into a rack. The dyes in the consumables are photosensitive. Excessive exposure to light can affect the fluorescent probes or dyes.

• Prepare consumables as close as possible to the time at which they will be run, minimizing the time that prepared reactions sit in the Twister® Robot racks.

Additional guidelines for reaction plates and array cards

When preparing reaction plates or array cards for use with the Twister® Robot and instrument, mark *only the sides* of the consumables. The ink of permanent markers and pens can fluoresce along with the probes and dyes.

Mark here

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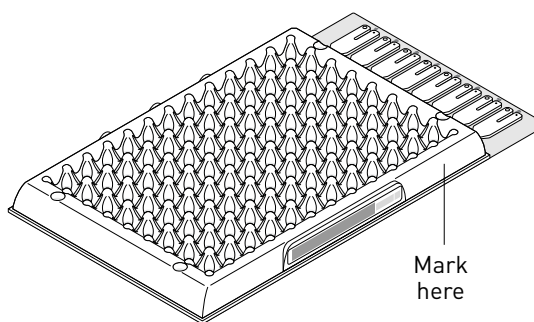
Load the consumables

IMPORTANT! Confirm that the sample block, heated cover, and plate adapter installed to the instrument match the format of consumables that you intend to run. If the consumable format does not match, the Automation Controller II Software will not run the consumable.

Load the reaction plates or array cards into the racks of the Twister® Robot. The order of the consumables is not important and can differ from the order in which the experiments are added to the plate queue. The Automation Controller II Software will match each consumable to the corresponding experiment before it starts the run.

When you load the consumables into the racks:

- Before loading a rack, confirm that the racks are clean and dry. Wet, dirty, or dusty surfaces can contaminate the reaction consumables.

- Before loading a reaction plate onto a rack, vortex the plate for 5 seconds, centrifuge it for 2 minutes at less than 1500 rpm, then confirm that the liquid in the plate is at the bottom of the wells. If not, centrifuge the plate again at a higher rpm and for a longer time.

IMPORTANT! Reaction plates must be well mixed and centrifuged. Do not centrifuge plates at greater than 2000 rpm.

Correct	Incorrect
  Liquid is at bottom of well.	 – Not centrifuged with enough force, *or* – Not centrifuged for enough time.

- Before loading a reaction plate onto a rack, remove all excess adhesive from the perimeter of the adhesive cover.

IMPORTANT! When the film is applied, the glue from the optical adhesive cover can adhere to the edges of the plate. If the excess glue is not removed, the plate can adhere to the gripper of the Twister® Robot or to the heated cover of the instrument.

- Before loading an array card into a rack, trim the array card foil so that the edge is even with the plastic carrier.

IMPORTANT! You must *completely* remove the fill reservoirs from each array card so that the edges are free of residual plastic. The plastic from the fill reservoirs that extends beyond the edge of the card can prevent the card from seating properly on the sample block and can affect amplification.

Correct trim	Incorrect trim
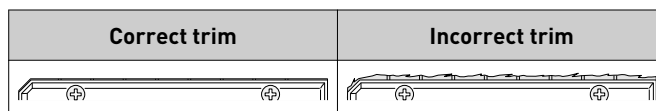
- Load the reaction plates or array cards into racks 1 and 2 in any order.

- After loading consumables, confirm that:

    – Each consumable is oriented in the rack so that its barcode faces away from the instrument.

    – Rack 3 is empty. Rack 3 receives the consumables after they are run. It must be empty before starting automated operation.
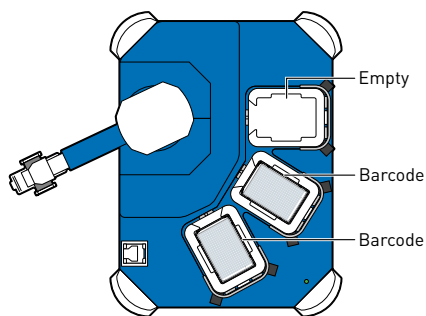
Prepare the files and software

You must prepare experiment files and add them to the plate queue before you can begin automated operation. You can prepare each experiment file individually or you can generate experiment files in batches.

Prepare experiment files individually

For instructions on creating experiment files individually, refer to the appropriate Getting Started Guide for your instrument.

IMPORTANT! When creating experiment files individually, you must enter the barcode of the associated consumable (plate or array card) into the Barcode field of each new experiment. The Automation Controller II Software uses the Barcode field to associate the experiment with the correct consumable during automated operation.
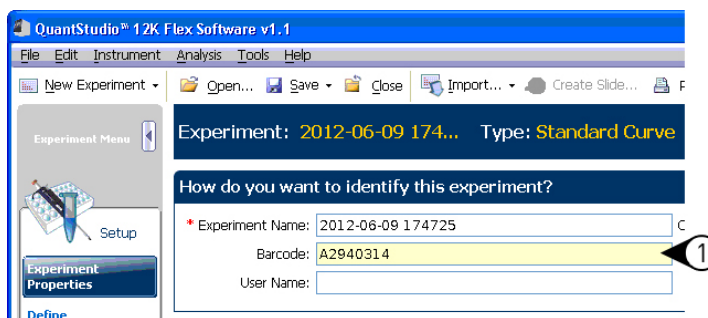
Prepare batches of experiment files

Create the barcode file

1. In the desktop, select **Start ‣ All Programs ‣ Accessories ‣ Notepad**.

2. In the Notepad window, click inside the text field, then use the handheld barcode scanner to scan the barcodes of the plates or array cards that you intend to run.

3. Save the barcode file:
   a. Select **File ‣ Save**.
   b. In the Save As dialog box, navigate to the desired location, enter name for the barcode file, then click **Save**.

4. Select **File ‣ Exit** to exit the Notepad software.
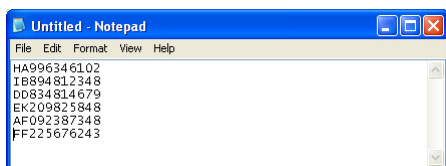
Create the template file

1. In the desktop, double-click the appropriate icon to start the instrument software.

2. Create the experiment data template (edt) file.

   For instructions on creating template files, see the appropriate Getting Started Guide for your instrument.

3. Save the template:
   a. After you have defined the experiment properties, select **File ‣ Save as Template**.
   b. In the Save As dialog box, enter a name for the template, then click **Save**.

Generate the experiment files

1. In the desktop, double-click the appropriate icon to start the instrument software.

2. In the instrument software, select **Tools ‣ Batch Experiment Setup**.

3. In the Batch Experiment Utility Setup dialog box, click **Browse** to the right of the Experiment Template File field, select the template (edt) file that you created, then click **Select**.

4. (Optional) Click **Browse** beside the Assay Information File field, select the assay information file (aif), then click **Select**.

   Note: Assay information files are tab-delimited data files on the CDs shipped with each assay order. Each aif contains technical details about all assays in the shipment.

5. (Optional) Click **Browse** beside the Plate Setup File field, select the plate setup (.txt) file to use, then click **Select**.

6. In the "Barcode(s) and Naming Convention" step, click **Browse** to the right of the Barcode field, select the barcode file that you created, then click **Select**.

7. Click **Browse** to the right of the Export setup files to field, select the directory to which you want to save the experiment files, then click **Select**.

8. Click **Create Experiments**, then wait while the instrument software creates an experiment (eds) file for each barcode scanned into the barcode file.

Add the experiment files to the queue

1. In the desktop, double-click the **Automation Controller II Software** shortcut (or select **Start ‣ All Programs ‣ Applied Biosystems ‣ Automation Controller II ‣ Automation Controller II**).

2. In the login dialog box, select (or enter) the serial number of the instrument that you want to use in the Instrument Name field, then click **OK**.

   IMPORTANT! Before you can control an instrument, you must add the instrument to the "My Instruments" group within the instrument software. For more information, see the appropriate Getting Started Guide for your instrument.

   An initialization pop-up will appear displaying the status of the instrument connection and other verifications. If experiments have already been added to the queue, then the Plate Queue tab displays the existing experiments.

3. In the Automation Controller II Software window, click **Add Plates**, then select the desired EDS files.

   Note: To remove a plate, click the plate name then click **Remove**. To remove all plates, click **Remove All**.

4. In the Automation Robot Settings, select the stack location(s) to which you have loaded consumables.
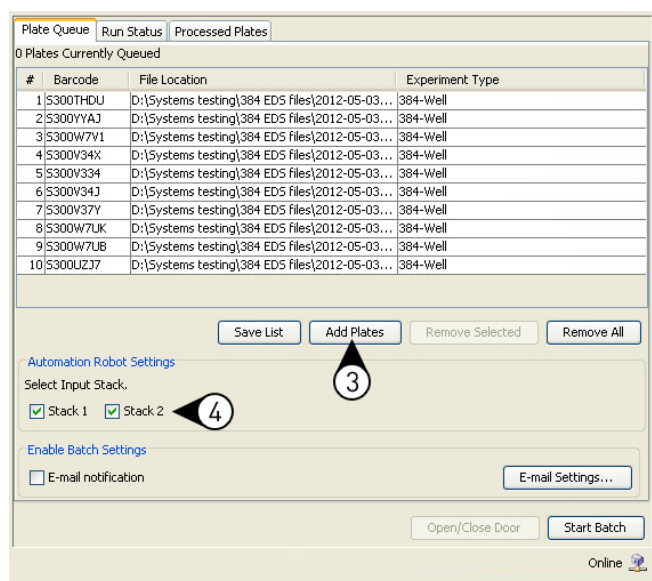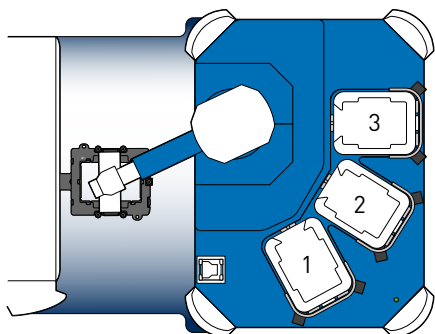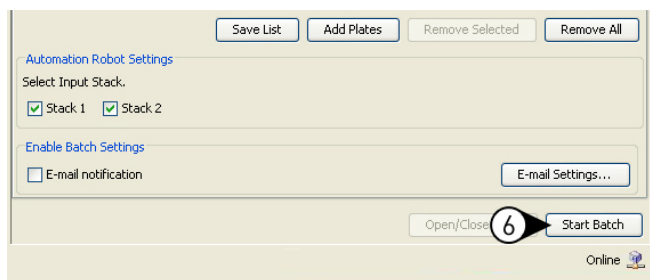
Start automated operation

After you have loaded consumables into the storage racks and added experiments to the plate queue, you can begin automated operation of the instrument and the Twister® Robot.

Start the plate queue

1. Remove all consumables from the:
   - Plate adapter of the instrument.
   - Output rack (position 3) of the Twister® Robot.

2. Power on the Twister® Robot, then wait until the LED illuminates indicating that the robot is ready to use.

   > ⚠ **WARNING!** When the robot is switched on, it may move. To prevent injury, ensure body, hair, jewelry, and all objects are out of the path of the robotic arm before switching on.

3. Power on the instrument, then wait until the touchscreen displays the Home screen.

4. Power on and log into the instrument computer.

5. Start the Automation Controller II Software:
   a. Double-click the **Automation Controller II Software** shortcut in the desktop.
   b. In the login dialog box, select (or enter) the serial number of the instrument that you want to use in the Instrument Name field, then click **OK**.

6. Click **Start Batch** (or select **Instrument ▸ Start Batch**).

   > ⚠ **WARNING!** To prevent injury, always keep body parts, hair, jewelry, and clothing away from the robot while it is operating. Keep all objects out of the path of the robotic arm.

   IMPORTANT! During automated operation, do not interfere with the movement of the Twister® Robot arm, or close the Automation Controller II Software.

   Note: To stop the run, click **Stop Batch**. You will see a warning message asking you to verify stopping the run.

Actions during automated operation

> ⚠ **CAUTION!** To prevent injury, always keep body parts, hair, jewelry, and clothing away from the robot while it is under operation. Keep all objects out of the path of the robotic arm

You can perform the following actions during automated operation of the instrument and Twister® Robot:
- Monitor a run in progress
- Load additional consumables during operation
- Stop automated operation
- Review the run log

Monitor a run in progress

Select the **Run Status** tab to display the data from the run in progress.

The Run Status tab of the Automation Controller II Software displays a temperature plot for the run in progress. The plot tracks the temperature of both the instrument sample block and the heated cover. You can toggle the presence of the plots by selecting the Sample or Cover check boxes.
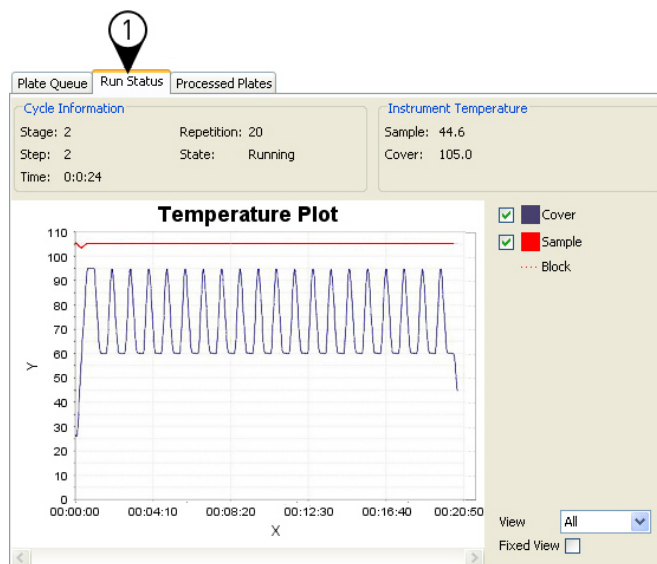
Load additional consumables during operation

You can add consumables to the racks during operation as follows:

1. Create an experiment (.eds) file for each additional plate or array card to be run.

2. In the Automation Controller II Software, add the experiments to the plate queue:

   a. Select the **Plate Queue** tab.

   b. Click **Add Plates** to add plates or array cards to the queue.

   c. In the Open dialog box, select the desired .eds files.

   Note: To remove a plate, click the plate name then click **Remove**. To remove all plates, click **Remove All**.

3. In the Batch Status settings of the Automation Controller II Software window, note the **Current Input Stack** field.

   The Current Input Stack is the stack from which the Automation Controller II Software is currently loading consumables. The following figure illustrates the location of the Current Input Stack field and the positions of the stacks on the robot.
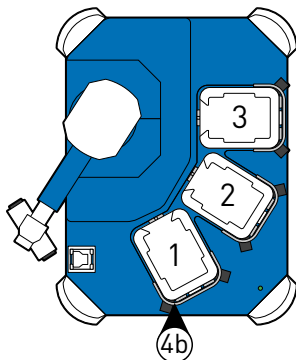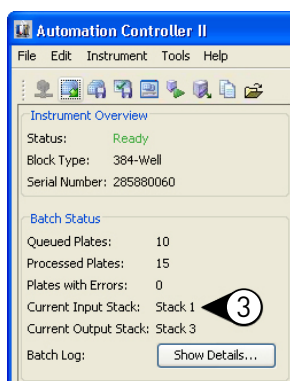
4. Load the plates or array cards into the current input stack of the Twister® Robot:

   a. Wait until the Twister® Robot arm loads a consumable into the instrument and the system starts the run.

   b. When the Twister® Robot arm stops moving, load the consumables into the rack according to the guidelines in "Prepare the experiment consumables" on page 1.

   c. If necessary, remove consumables from stack 3 (the output stack) to make room.

Stop automated operation

You can use the Automation Controller II Software to stop the Twister® Robot during operation.

To stop the run:

1. In the Automation Controller II Software, click **Stop Batch**.
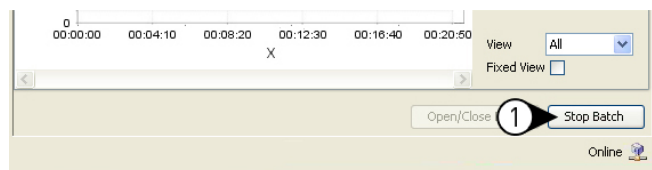
2. Click **OK** when you are prompted to stop the run.

The Automation Controller II Software terminates the current action of the Twister® Robot without the possibility of resuming operation. If the Twister® Robot is stopped, it immediately halts all movement. To recover after stopping a run, see the *Applied Biosystems® Twister® Robot Automation Accessory User Guide* (Pub. no. 4470689).

IMPORTANT! If the instrument is running a consumable, stopping the automated operation does not stop the run. For instructions on pausing or stopping an experiment, refer to the appropriate Getting Started Guide for your instrument.

Review the run log

Select the **Processed Plates** tab to view information about the plates and array cards run by the Automation Controller II Software.

Note: While a plate is being run, the experiment file does not appear in the Processed Plates tab or the Queued Plates section of the Batch Status box.

Shut down the instrument and Twister® Robot

The instrument and Twister® Robot operate in low-power mode when not in use; however, they can be powered off completely so that the components draw no power.

Note: If the instrument and Twister® Robot will be inactive for extended period of time, prepare it for storage instead of powering off the components.

To power off the components:

1. Power off the instrument:

   a. If the instrument touchscreen is not blank, touch ⏻ to place the instrument into stand-by mode.

   b. Toggle the power button on the rear of the instrument.

2. Power off the computer:

   a. In the desktop, select **Start ▸ Shut Down**.

   b. In the Shut Down Windows dialog box, select **Shut Down**, then click **OK**.

3. Power off the monitor.

4. Toggle the power button on the rear of the Twister® Robot.

Limited product warranty

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