A Geno Technology, Inc. (USA) brand name

Automatic Nucleic Acid Extractor

Cat. No. BT3701R, BT3701S

1-800-628-7730 ♦ 1-314-991-6034 ♦ info@BTLabSystems.com

Please read and understand this manual before operating the instrument. Failure to follow the instructions and safety precautions in this manual may result in personal injury, electric shock, instrument damage, or reduced protection provided by the instrument.

IMPORTANT SAFETY INFORMATION

- This product is an indoor instrument which conforms to Standard B style- I type- GB9706.1
- These units are designed for laboratory use by people knowledgeable in safe laboratory practices.
- Do not open, disassemble, or repair the instrument without authorization. Unauthorized service may create a safety hazard and may void warranty coverage.
- Before connecting the instrument to AC power, verify that the supply voltage matches the instrument requirements and that the power outlet has adequate rated capacity.
- If the power cord is damaged, replace it with a cord of the same type and specification. Do not place objects on the power cord or route it where it may be damaged or create a trip hazard.
- When connecting or disconnecting the power cord, hold the plug rather than pulling on the cord. Ensure that the plug is fully inserted into the outlet and instrument.
- Use the instrument in a clean, dry, well-ventilated location away from direct sunlight, heat sources, corrosive gases, strong magnetic fields, excessive dust, and moisture.
- Do not block or cover the ventilation openings. Maintain at least 70 mm of clearance between instruments when multiple units are operated together. Excessive temperature may affect performance or cause failure.
- Turn off the instrument after use. If it will not be used for an extended period, disconnect the power plug and cover the instrument to protect it from dust.
- Ensure that the deep-well plate is fully seated in the plate holder before operation. Incorrect placement may cause the moving mechanism to strike the plate and damage the instrument.
- Before operation, ensure that the magnetic rod sleeve is fully inserted and securely latched. When properly installed, the sleeve cannot be pulled out manually. An unsecured sleeve may collide with the deep-well plate and damage the instrument.
- Immediately disconnect the power and contact BT Lab Systems if any of the following occurs:
    - Liquid enters the instrument.
    - The instrument is exposed to rain or water.
    - Abnormal sounds, odors, or other unusual operating conditions occur.
    - The instrument is dropped or the outer shell is damaged.
    - Instrument performance or function changes significantly.

INTRODUCTION

BT Lab Systems' Automatic Nucleic Acid Extractor uses a precision transmission mechanism and an intelligent control system to perform magnetic separation during nucleic acid purification. It is designed for nucleic acid separation and purification in molecular biology and clinical laboratories.

Features

- Low-noise operation with a fully enclosed working chamber.
- Rapid extraction: typical run time of 15–30 minutes, with up to 16 samples processed simultaneously.
- Lysis and elution temperatures can be independently configured according to protocol requirements. Efficient heat transfer and uniform heating provide accurate temperature control.
- Programmable operating parameters accommodate a variety of extraction protocols and reagent requirements.
- Fully enclosed contamination-control design with a built-in UV sterilization function.
- High-precision purification. Protocols can be optimized for the selected reagent and combined with incubation steps to improve extraction efficiency. Extracted DNA/RNA can be used directly for PCR/RT-PCR applications.
- Power-off protection allows the user to choose whether the interrupted program should continue after power is restored.
- Built-in LED lighting allows convenient observation of instrument operation.
- The front door can be opened during operation to observe reagent status and support optimization of extraction protocols.
- 7-inch HD color touchscreen for program operation and editing.
- User management system allows each user to manage individual purification programs and helps prevent unintended operation between users.
- Large program storage capacity supports more than 5,000 programs.
- Open reagent system compatible with a variety of magnetic bead-based nucleic acid purification kits.
- Stable, reliable design supports continuous operation for more than 24 hours.
- Motor feedback provides collision protection. If a collision is detected, the instrument stops and reports an error to help protect the mechanical system.
- The rear exhaust fan incorporates an H11-grade HEPA filter to help reduce aerosol contamination and protect the laboratory environment and personnel.

TECHNICAL SPECIFICATIONS

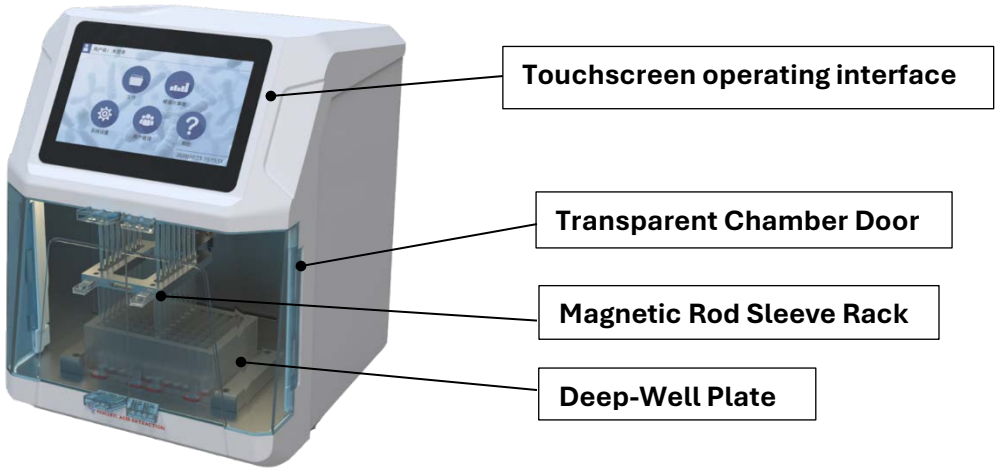
Normal Operating Conditions

- Ambient Temperature: 10°C - 45°C
- Relative Humidity: ≤80%

Basic Parameters

Model	BT3701R	BT3701S
Processing Volume	50 - 1000µL	
Sample Throughput	1 – 16 samples	
Magnetic Bead Recovery Efficiency	>98%	
Variation Between Purification Wells	CV <5%	
Plate Type	96-well deep well plate	
Heating Module	Round Bottom 	Sharp Bottom 
Magnetic Rods	16, fixed	
Heating Temperature	Lysis/elution: RT – 120 °C	
Mixing	Multiple modes; adjustable speed	
Magnetic Bead Size	≥100 nm	
Program Storage	>5,000 programs	
UV Lamp	Yes	
Internal Light	Yes	
Ventilation Fan	Yes	
Typical Operation Time	15 – 30 minutes/run	
Power	400 W	
Power Supply	100-120V/7.6A; 200-240V/4.4A, 50/60 Hz	
Fuse	100-120V/10A，200-240V/6A	
Dimensions (W x D x H)	254 x 305 x 350 mm	
Net Weight	13 kg	

STRUCTURE



Operation Guide

This section describes the basic operating controls, and preparation required before startup. Before operating the instrument for the first time, become familiar with the controls described below.

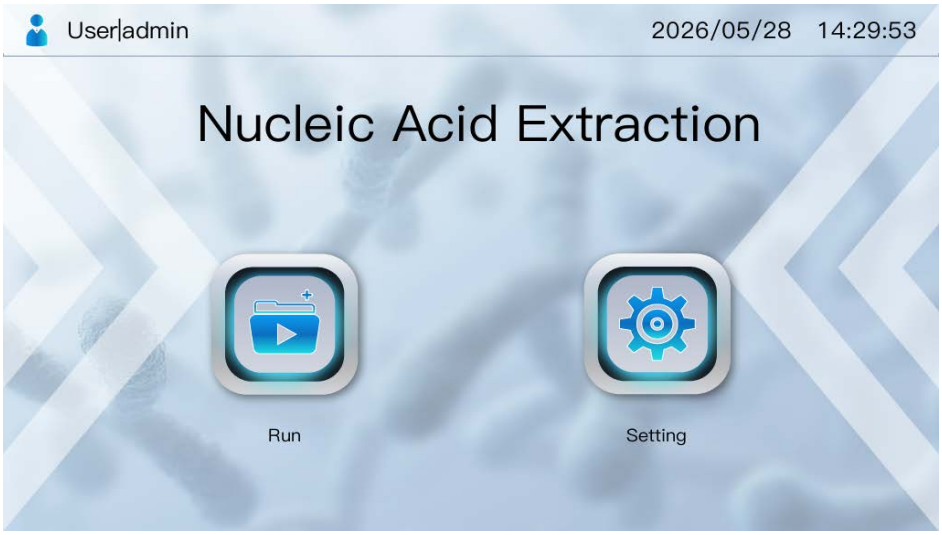
USER LOGIN



When the instrument is powered on, the **User Login** interface is displayed.
Two login methods are available:

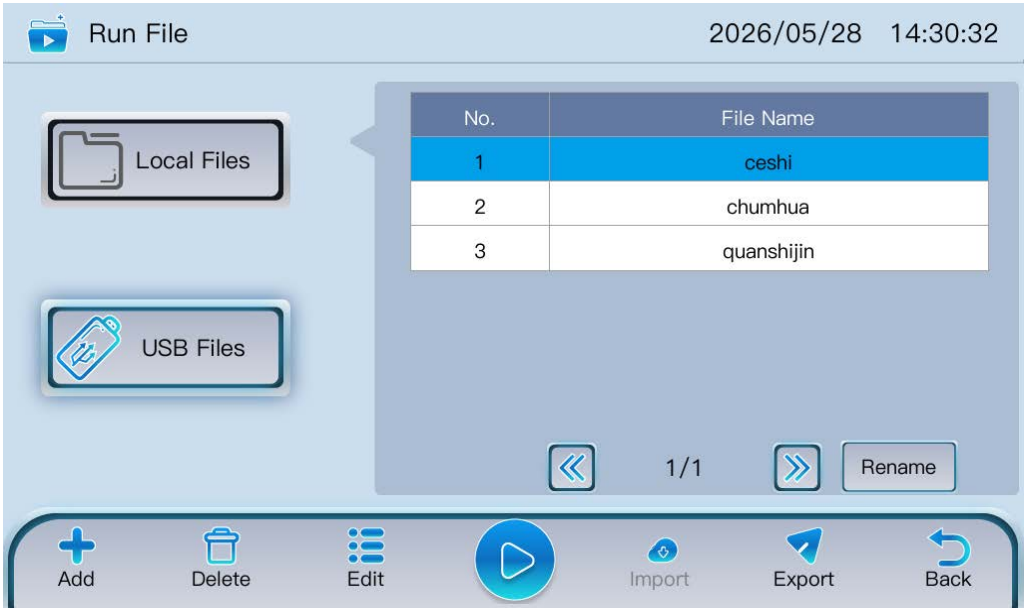
- Guest: Enter the system without a password.
- User/Admin Login: Enter the username and password, then select “Login”. The default password for the “admin” account is ***123456***.

MAIN INTERFACE



- Run: Opens the program selection and editing functions.
- Setting: Opens the System Settings interface.

PROGRAM SELECTION INTERFACE



Local Files: Displays programs stored in the instrument. Local programs can be added, edited, and exported.

USB Files: Displays programs stored on an inserted USB flash drive. USB files can be edited, deleted, and imported.

Rename: Renames the selected file. The file name cannot be blank.

Add: Creates a new program in the local file list.

Delete: Deletes the selected program.

Edit: Opens the selected program for step-by-step editing.

Open: Opens the selected program and enters the Run interface, ready for operation.

Export: Exports the selected local program to an inserted USB flash drive.

Import: Imports a program from an inserted USB flash drive to the instrument.

Back: Returns to the previous interface.

FILE EDITING INTERFACE



Step	Hole	Name	Mix Time	Mag Time	Wait Time	Volume(ul)	Mix Mode	Collect Mode
1	4	Beads	00:10	00:20	00:00	850	6 00:00:10	Cycle 00:10X2
2	1	Bind	00:30	00:30	00:00	600	5 00:00:30	Cycle 00:10X3
3	2	Wash	00:30	00:30	00:00	800	5 00:00:30	Strong 00:30
4	3	Wash	01:00	00:30	00:00	800	5 00:01:00	Strong 00:30
5	4	Wash	01:00	00:30	00:00	800	5 00:01:00	Strong 00:30
6	5	Elute	00:30	01:00	00:00	100	5 00:00:30	Strong 01:00
7	1	ThrowMag	00:30	00:00	00:00	600	5 00:00:30	Nomal 00:00

Add: Adds a new operating step after the currently selected step.

Delete: Deletes the selected step.

Edit: Opens the selected step for parameter configuration.

Temp: Opens the Temperature Settings interface.

Open/Run: Opens the current program and enters the Run interface. If the program has not been saved, it is saved automatically.

Save: Saves the current program.

Back: Returns to the previous interface.

STEP EDITING INTERFACE



Step Parameters

Name: Select from the six built-in names that are provided: Lysis, Magnetic Bead, Binding, Wash, Elution, and Discard Magnetic Beads.

Well Position: Sets the well position used for the current step. Setting range: 1–6.

Liquid Volume: Sets the liquid volume for the selected well position. Setting range: 20–1000 µL.

Wait Time: Sets the delay before the current step begins. A value of 0 indicates no waiting period.

Mixing Mode: Section to configure the mixing parameters for the current step.

Adsorption Mode: Section to configure the magnetic bead adsorption parameters for the current step.

Mixing Position: Sets the mixing position. Available options are “Half” and “Bottom.”

Cancel: Exit without saving the current changes.

Confirm: Save the current changes and exit.

Back: Return to the previous interface.

Mixing Mode Parameters

Mixing speed is adjustable from Level 1 to 6, where Level 1 is the lowest speed and Level 6 is the highest. Up to three speed settings can be combined within one mixing operation. Cyclic mixing can be configured for up to 100 cycles. If the mixing time is set to 0, the mixing operation is skipped.

Adsorption Mode Parameters

Three magnetic adsorption modes are available:

- **Normal Adsorption**: The magnetic rod remains at the bottom of the deep-well plate during magnetic bead collection.
- **Strong Adsorption:** The magnetic rod moves downward from the liquid level while collecting magnetic beads.
- **Cyclic Adsorption:** The magnetic rod repeatedly performs the segmented magnetic adsorption movement.

If the Adsorption Time is set to 0, magnetic adsorption is not performed.

TEMPERATURE SETTINGS



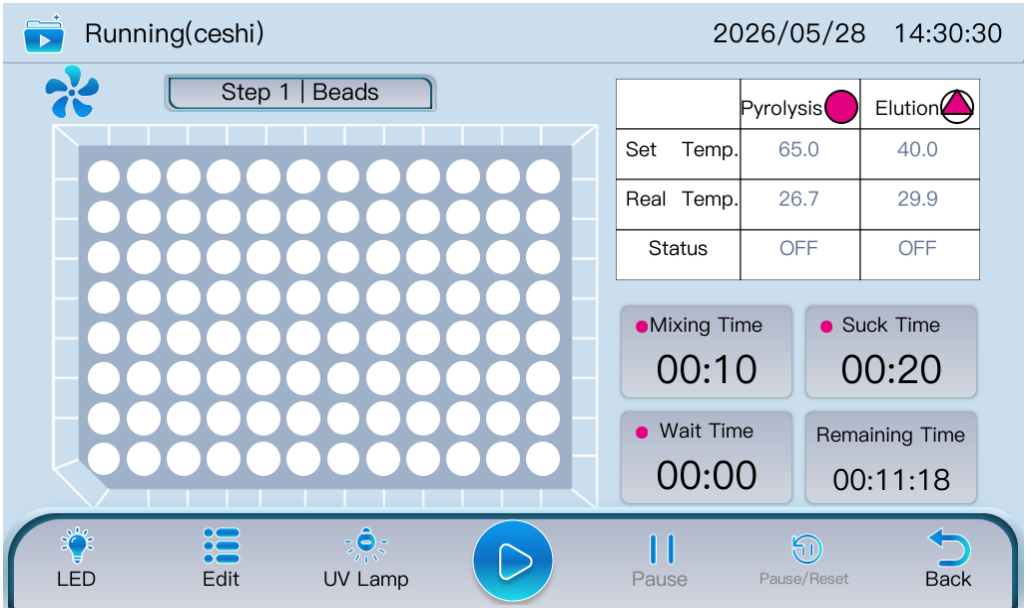
1. Set the lysis and elution temperatures. The available setting range is 0–120 °C.
2. Use the ON/OFF controls to enable or disable heating.
3. Set the program step at which lysis and elution heating begins. The heating start step must precede the applicable process steps.

Cancel: Exit without saving the current changes.

Confirm: Save the current changes and exit.

Back: Return to the previous interface.

RUN INTERFACE



The Run Interface displays real-time information about the active extraction program.

The deep-well plate graphic shows the well positions currently being processed and heated. Heated positions are displayed in red, while active processing positions are displayed in black and flash during operation.

The temperature display shows the set temperature, actual temperature, and heating status for the lysis and elution heating blocks.

The lower portion of the interface displays the remaining time for each operation within the current step and the total remaining program time.

Fan: Turns the exhaust fan on or off. The fan icon rotates while the fan is operating.
LED: Turns the chamber lights on or off.
Edit: Edits the currently loaded program.
UV Lamp: Turns the UV lamp on or off and sets the UV operating time.
Start: Starts the selected program.
Pause: Pauses instrument operation. This control is available while a program is running.
Reset: Pauses operation and returns the magnetic rod rack and mixing rack to their zero positions; the horizontal axis does not return to zero.
Back: Exits the current Run interface.

SYSTEM SETTINGS



Time: Sets the current system time using the 24-hour format.

Beep / Prompt Tone: Enables or disables key tones and the program-completion tone.

UV Lamp: Configures UV lamp operation and operating time.

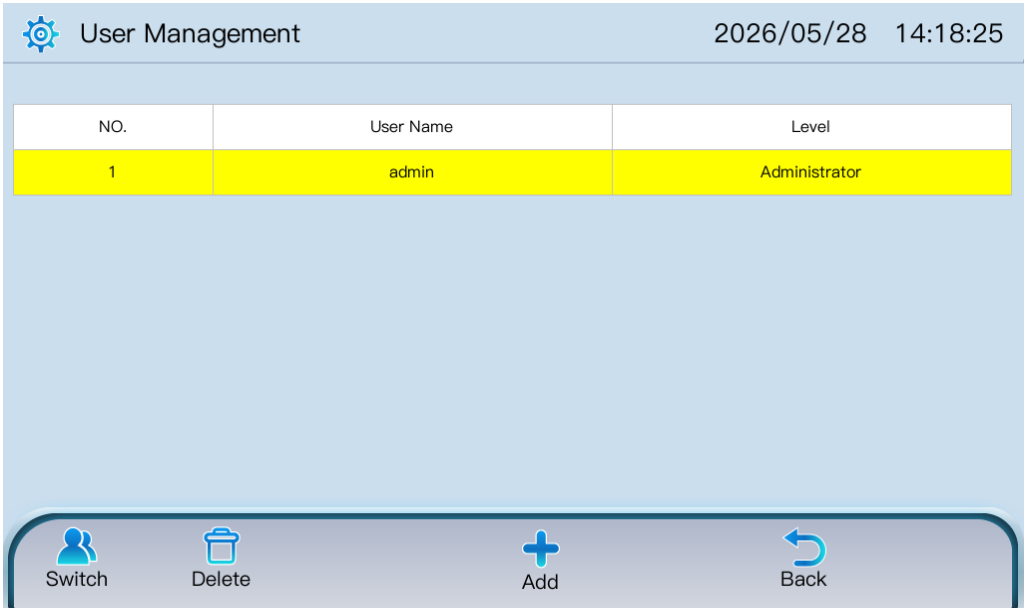
LED: Controls the internal chamber lighting.

User: Opens user management. Users can be added, switched, or deleted. Administrator permission is required to delete users.

Update: Updates the instrument software. Copy the software update file to a USB flash drive, insert the drive into the instrument, and select “Update” to begin the software update process.

Instrument Settings: Provides access to internal instrument configuration, calibration, and debugging functions. The default password is 123456.

USER MANAGEMENT



Switch User: Returns to the User Login interface so another user can log in.

Delete: Deletes a user account. You must be logged in as “admin” to delete other users. The “admin” account cannot be deleted.

Add: Creates a new user account.

Back: Returns to the previous interface.

TROUBLESHOOTING

Use the following table as a basic guide for identifying and correcting common operating problems. If the recommended action does not resolve the problem, contact BT Lab Systems.

Problem	Possible cause and solutions
Display does not turn on after the power switch is turned on	1. Power supply is not connected: check and connect the power supply. 2. Fuse is blown: replace the fuse. 3. Power switch is damaged: replace the switch. 4. Other cause: contact BT Lab Systems.
System reports a communication failure with the lower controller after power-up	Communication error. Contact BT Lab Systems.
Motor operation error is displayed after power-up	Self-test error. Contact BT Lab Systems.
Touchscreen controls do not respond	Touchscreen may be damaged. Contact BT Lab Systems.
Physical buttons do not respond	A button may be short-circuited, or a connecting wire may be loose. Contact BT Lab Systems.
Abnormal screen display	The display cable may be loose, or the control chip may be damaged. Contact BT Lab Systems.

WARRANTY

Our company warrants this product against defects in materials and workmanship for a period of one year from the date of shipment. During the warranty period, we will repair or replace defective equipment at no charge, provided that the equipment has been operated under normal laboratory conditions and in accordance with the instructions provided in this manual.

The warranty does **not** cover damage or defects resulting from:

- Accident, misuse, or abuse.
- Natural disasters or other events beyond reasonable control.
- Unauthorized repair, modification, or alteration of the equipment.
- Corrosion or damage caused by using incompatible solvents, samples, or chemicals.
- Improper installation, operation, or maintenance.
- Use of fittings, replacement parts, or accessories supplied by other manufacturers.

Platinum wire and all accessories are excluded from this warranty.

RETURNS AND SERVICE

A Return Authorization must be obtained from our company before returning any product for repair.

For technical support, warranty assistance, or repair service, please contact:

Email: info@BTLabSystems.com

WIRING DIAGRAM

