APPLICATION NOTE

Supporting regulatory compliance through LabChip GxP option and LabChip GX reviewer software.

Regulatory compliance

The LabChip™ GX/GXII Touch™ platforms provide automated electrophoresis to analyze quality, size, and concentration, of DNA, RNA, and proteins. LabChip GxP Software facilitates GLP (Good Laboratory Practice), GCP (Good Clinical Practice), or GMP (Good Manufacturing Practice) environments. It enables:

Software Automation

- Self-diagnostics
- Chip/assay compatibility check
- IQOQ Electronic report assistance

Access Management

- Account Hierarchy
- Risk-based access controls
- Password aging controls
- Login attempt tracking

Data Integrity

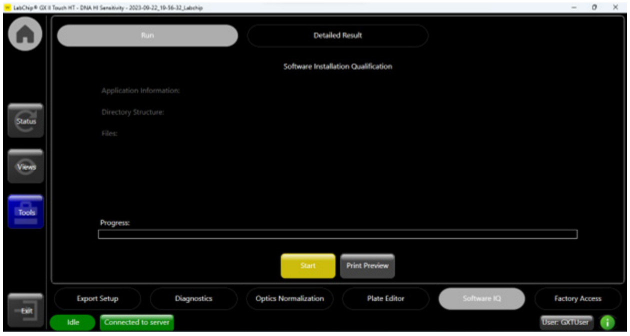
- Central data repository
- Device check
- Record retention
- Electronic signature

Design qualification

Revvity's Hopkinton site is ISO 9001 certified for the design, manufacture, sales and support of laboratory automation equipment and services. The Hopkinton site's processes are based on the ISO 9001 Quality Management System requirements.

Installation qualification

Revvity provides full services for on-site installation qualification. In addition, a checklist and step-by-step instructions for installation qualification allow customers to perform installation qualification on an 'as needed' basis. LabChip GX Touch GxP Software has a built-in IQ tool to automate the software installation qualification (Figure 1) which may be saved, archived or printed.



LabChip® GX II Touch HT - DNA HI Sensitivity - 2023-09-22_19-56-32_Labchip

Software Installation Qualification

Application Information:

Directory Structure:

Files:

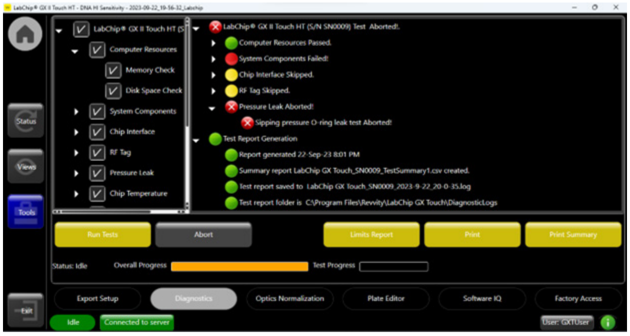
Progress:

Figure 1: Software Installation Qualification Tool.

The IQ tool is a convenient reference for documenting software installation qualification after each computer system maintenance or service routine, such as disk cleanup, installing antivirus software, or installing Microsoft® service packs. This IQ tool checks LabChip GX Touch GxP Software registry settings, the directory structure, and the integrity of each file specified for the software application.

Operation qualification

The LabChip OQ tool is also designed to automate the operation qualification process. The left pane of the Instrument Diagnostics graphical user interface (GUI) lists each instrument component subject to OQ testing (Figure 2). Users have options to select or deselect items for testing to tailor their needs. Once the "Run Tests" button is activated, the software guides the user through the process through a series of prompts. For example, in the step of checking the chip cartridge interlock, a dialog box pops up asking the user to unload the chip in order to proceed. Once each test item is completed, the test result is listed on the right pane of the OQ GUI.



LabChip® GX II Touch HT - DNA HI Sensitivity - 2023-09-22_19-56-32_Labchip

- ☑ LabChip® GX II Touch HT (S
  - ☑ Computer Resources
    - ☑ Memory Check
    - ☑ Disk Space Check
  - ☑ System Components
  - ☑ Chip Interface
  - ☑ RF Tag
  - ☑ Pressure Leak
  - ☑ Chip Temperature

```
☒ LabChip® GX II Touch HT (S/N SN0009) Test  Aborted!.
    ● Computer Resources Passed.
    ● System Components Failed!
    ● Chip Interface Skipped.
    ● RF Tag Skipped.
    ☒ Pressure Leak Aborted!
        ☒ Sipping pressure O-ring leak test Aborted!
● Test Report Generation
    ● Report generated 22-Sep-23 8:01 PM
    ● Summary report LabChip GX Touch_SN0009_TestSummary1.csv created.
    ● Test report saved to  LabChip GX Touch_SN0009_2023-9-22_20-0-35.log
    ● Test report folder is  C:\Program Files\Revvity\LabChip GX Touch\DiagnosticLogs
```

Status: Idle

Figure 2: Automated OQ Tool.

Performance qualification

Depending on the type of application, for example, quality control (QC) testing for RNA, DNA or protein, users may want to establish custom application specific performance qualification and monitoring procedures. Revvity is available to assist the design of performance qualification procedures that are specific to these applications.

21 CFR part 11 compliance

The LabChip GX Touch and Reviewer Software contain built-in technical controls and features specifically designed to support the users for 21 CFR Part 11 compliance. These features include a shared user account database, access controls, device check, enforced sequencing of run steps, audit trails, record copying, record retention, system documentation, and electronic signature controls. LabChip Touch instruments generate data records in electronic form which are archived in a Central Data Repository. The LabChip GX (GxP) Reviewer application can be run from any computer connected to the instrument network and allows modification and maintenance of the records with the ability to perform electronic signatures on the records generated from instruments in the lab system.

User account management and access controls

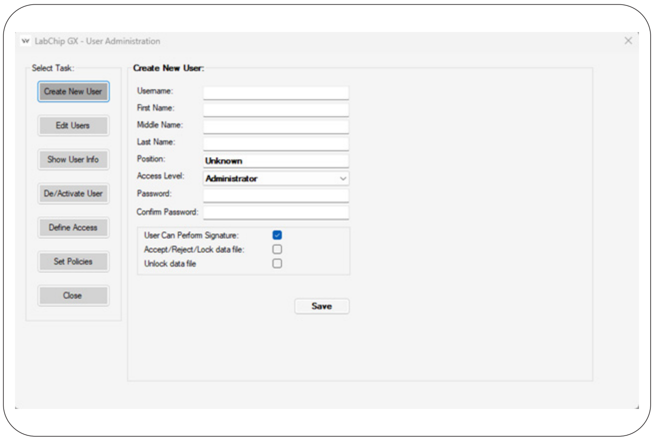
The network of Revvity LabChip GX/GXII Touch instruments connected to a centralized data server constitutes a 'closed system' (21 CFR 11.10). The system can be in a designated laboratory room to limit system access to authorized individuals (21 CFR 11.10(d)). The software contains an application security module for user account management and for access of controls to meet the requirement of 21 CFR 11.10(g). The system administrator can do the following:

- Manage user accounts
- Define access
- Set policies

Only valid users are permitted to log on the system. Depending on the role of each user, a user can be assigned to one of the following five user groups:

- Restricted User
- Operator
- Service
- Supervisor
- Administrator

The system has a set of predefined permissions allowing the system administrator to enable or disable for each group. The access settings can be printed out for documentation purpose (Figures 3, 4).

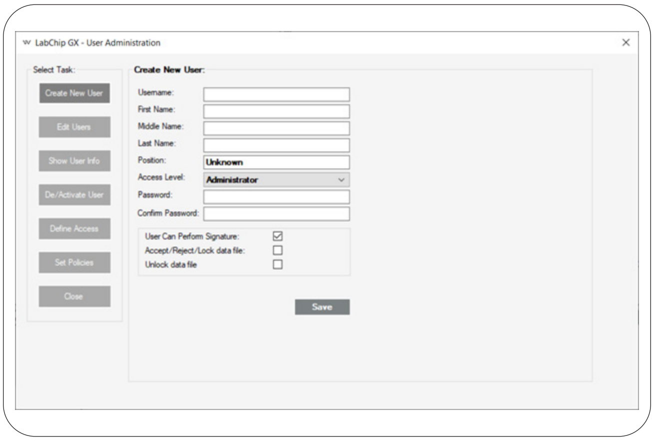


Create New User:

Username:
First Name:
Middle Name:
Last Name:
Position: Unknown
Access Level: Administrator
Password:
Confirm Password:

User Can Perform Signature: ☑
Accept/Reject/Lock data file: ☐
Unlock data file ☐

Figure 3: User Administration.

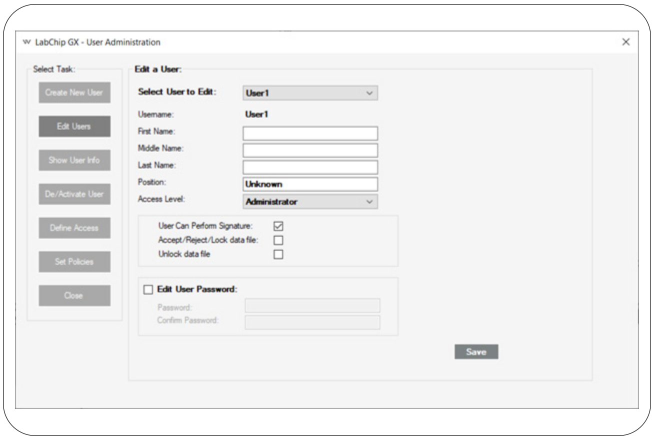


Create New User:

Username:
First Name:
Middle Name:
Last Name:
Position: Unknown
Access Level: Administrator
Password:
Confirm Password:

User Can Perform Signature: ☑
Accept/Reject/Lock data file: ☐
Unlock data file ☐

Figure 4: Role Access Control – create new user



Edit a User:

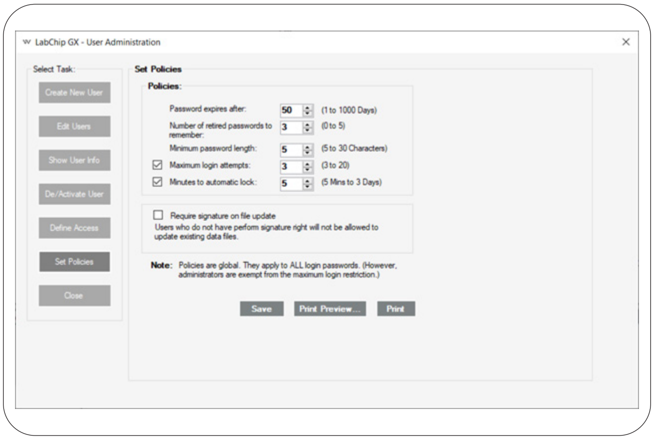
Select User to Edit: User1
Username: User1
First Name:
Middle Name:
Last Name:
Position: Unknown
Access Level: Administrator

User Can Perform Signature: ☑
Accept/Reject/Lock data file: ☐
Unlock data file ☐

☐ Edit User Password:
Password:
Confirm Password:

Figure 5: Role access Control – edit existing user

LabChip GxP Software uses a user authentication and role-based access control mechanism for authority checks to ensure that only authorized individuals can use the system, perform the operation at hand, electronically sign a record, or alter a record (21 CFR 11.10(g)). Each user ID (identification) is unique (21 CFR 11.300(a)). The system administrator can set the password and login policies to prevent password aging (21 CFR 11.300(b)), and to limit the attempts of unauthorized use of the system (21 CFR 11.300(d)). After the limited number of failed login attempts, the account is locked out and only the administrator can unlock the account (Figure 6).



Set Policies

Policies:

Password expires after: 50 (1 to 1000 Days)
Number of retired passwords to remember: 3 (0 to 5)
Minimum password length: 5 (5 to 30 Characters)
☑ Maximum login attempts: 3 (3 to 20)
☑ Minutes to automatic lock: 5 (5 Mins to 3 Days)

☐ Require signature on file update
Users who do not have perform signature right will not be allowed to update existing data files.

Note: Policies are global. They apply to ALL login passwords. (However, administrators are exempt from the maximum login restriction.)

Figure 6: Policies Setting.

The system has both a manual and automatic lock feature to prevent the unauthorized access to the unattended system that is running. Similar to password protected screen saver application after logging on and idle for specified time limit, the system allows the jobs to continue running in the background while it does not allow users access any functions without logging on again with valid password.

Device check

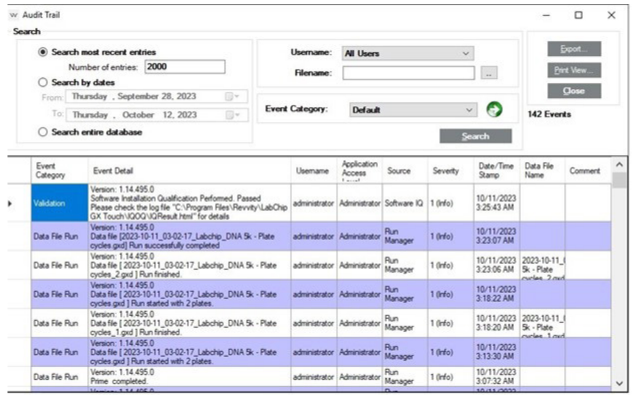
User credentials are required to access instrument operation before allowing the creation of data records to be archived in the CDR. Each GxP instrument and reviewer application employs encrypted user and application credentials to gain access to the server CDR. (21 CFR 11.10(h)). The instrument serial number is embedded in the result of each run as part of the data records.

Enforcing permitted sequencing of steps

Each assay provides its own sequence of steps which cannot be modified, and which are automatically enforced by the instrument software (21 CFR 11.10(f)). Each assay is maintained in the CDR so can be shared by instruments within the same server network.

Audit trails

LabChip GXP Software uses secured, computer-generated, time stamped audit trails to independently record the date and time of operator entries and actions that create, modify, or delete electronic records (Figure 7). The audit trails can be printed out for documentation purposes. The audit trail documents can be made available for agency review and copying (21 CFR 11.10(e)). The system uses an append-only versioning mechanism so that record changes do not obscure or jeopardize previously recorded information. The users can always retrieve the previously recorded information by selecting a corresponding version of the records. To facilitate the review of audit trails, the user can customize the audit trails view (see Figure 8) and search the audit trails based on date range, username, or file name.



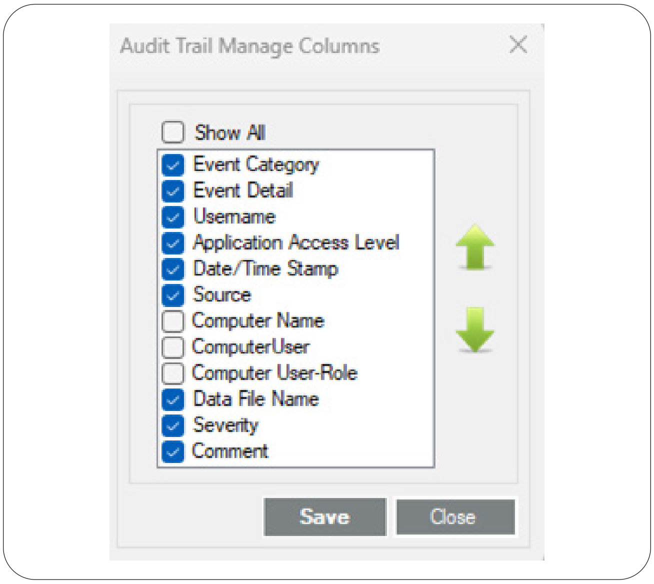
● Search most recent entries
Number of entries: 2000
○ Search by dates
From: Thursday , September 28, 2023
To: Thursday , October 12, 2023
○ Search entire database

Username: All Users
Filename:
Event Category: Default

142 Events

Event Category	Event Detail	Username	Application Access Level	Source	Severity	Date/Time Stamp	Data File Name	Comment
Validation	Version: 1.14.495.0 Software Installation Qualification Perfomed. Passed Please check the log file "C:\Program Files\Revvity\LabChip GX Touch\IQOQ\IQResult.html" for details	administrator	Administrator	Software IQ	1 (Info)	10/11/2023 3:25:43 AM		
Data File Run	Version: 1.14.495.0 Data file [2023-10-11_03-02-17_Labchip_DNA 5k - Plate cycles.gxd] Run successfully completed	administrator	Administrator	Run Manager	1 (Info)	10/11/2023 3:23:07 AM		
Data File Run	Version: 1.14.495.0 Data file [2023-10-11_03-02-17_Labchip_DNA 5k - Plate cycles_2.gxd] Run finished.	administrator	Administrator	Run Manager	1 (Info)	10/11/2023 3:23:06 AM	2023-10-11_ 5k - Plate cycles_2.gxd	
Data File Run	Version: 1.14.495.0 Data file [2023-10-11_03-02-17_Labchip_DNA 5k - Plate cycles.gxd] Run started with 2 plates.	administrator	Administrator	Run Manager	1 (Info)	10/11/2023 3:18:22 AM		
Data File Run	Version: 1.14.495.0 Data file [2023-10-11_03-02-17_Labchip_DNA 5k - Plate cycles_1.gxd] Run finished.	administrator	Administrator	Run Manager	1 (Info)	10/11/2023 3:18:20 AM	2023-10-11_ 5k - Plate cycles_1.gxd	
Data File Run	Version: 1.14.495.0 Data file [2023-10-11_03-02-17_Labchip_DNA 5k - Plate cycles.gxd] Run started with 2 plates.	administrator	Administrator	Run Manager	1 (Info)	10/11/2023 3:13:30 AM		
Data File Run	Version: 1.14.495.0 Prime completed.	administrator	Administrator	Run Manager	1 (Info)	10/11/2023 3:07:32 AM		

Figure 7: Audit Trails.



☐ Show All
☑ Event Category
☑ Event Detail
☑ Username
☑ Application Access Level
☑ Date/Time Stamp
☑ Source
☐ Computer Name
☐ ComputerUser
☐ Computer User-Role
☑ Data File Name
☑ Severity
☑ Comment

Figure 8: Audit Trail Manage Views.

Copies of records

LabChip GxP Software generates accurate and complete copies of records suitable for inspection, review and duplication for regulatory inspection. These records include run results, assay settings, signatures and audit trails. These records can be printed on paper marked as controlled documents. Run results can also be exported to ASCII files at which point they become uncontrolled records.

Record retention

In addition to the hard copy record requirement to support 21 CFR 11.10(c) compliance, LabChip GxP stores and retrieves data records in electronic form from the central data repository (CDR). During the installation of the LabChip GxP Software, the administrator has the option to locate the CDR on the instrument computer for a stand-alone deployment or on a network server computer for a distributed deployment. The CDR and database can be backed up to an archive store for long-term data retention and recovery from server failures.

System documentation

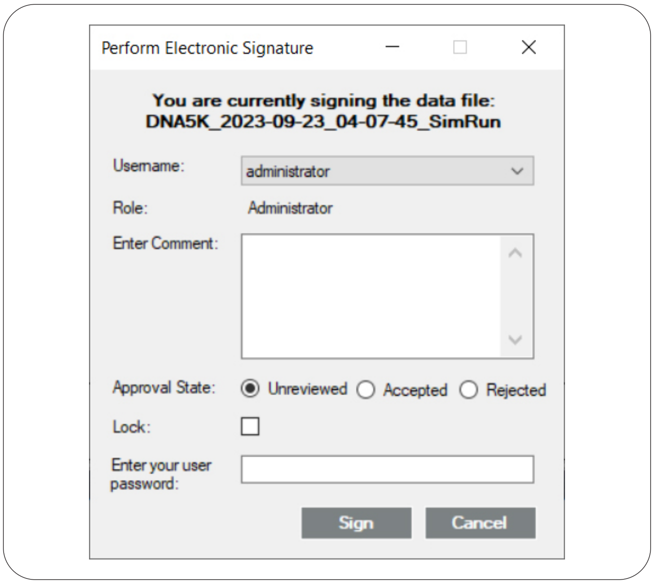
Revvity provides version-controlled documentation for system operation and maintenance that is consistent with the released system. The built-in IQ tool automatically checks if the correct version of online document is installed.

Electronic signature

LabChip GxP Software uses unique combinations of user ID and password for electronic signature (21 CFR 11.100(a)). Each signature contains the following information (21 CFR 11.50(a)):

- The printed name of the signer
- The date and time when the signature was executed
- The meaning associated with the signature including any state change made to the data record (accepted, rejected, locked)

Once locked, a record cannot be further modified without a separate signed Unlock action which can only be performed by a special class of users with Unlock rights (Figure 9). The signature becomes an integral part of the record undersigned (21 CFR 11.70) as well as being recorded in the audit trail and so is subject to the same controls as for electronic records and is included as part of electronic display or printout of the electronic record (21 CFR 11.50(b)).


Perform Electronic Signature

You are currently signing the data file:
DNA5K_2023-09-23_04-07-45_SimRun

Username: administrator

Role: Administrator

Enter Comment:

Approval State: ● Unreviewed ○ Accepted ○ Rejected

Lock: □

Enter your user password:

Figure 9: Perform Signature.

For more information, please visit www.revvity.com

www.revvity.com

For research use only.
Not for use in diagnostic procedures.