InnoSpectra Corporation

ISC NIRScan GUI User's Guide

Sep. 27, 2019

RISE

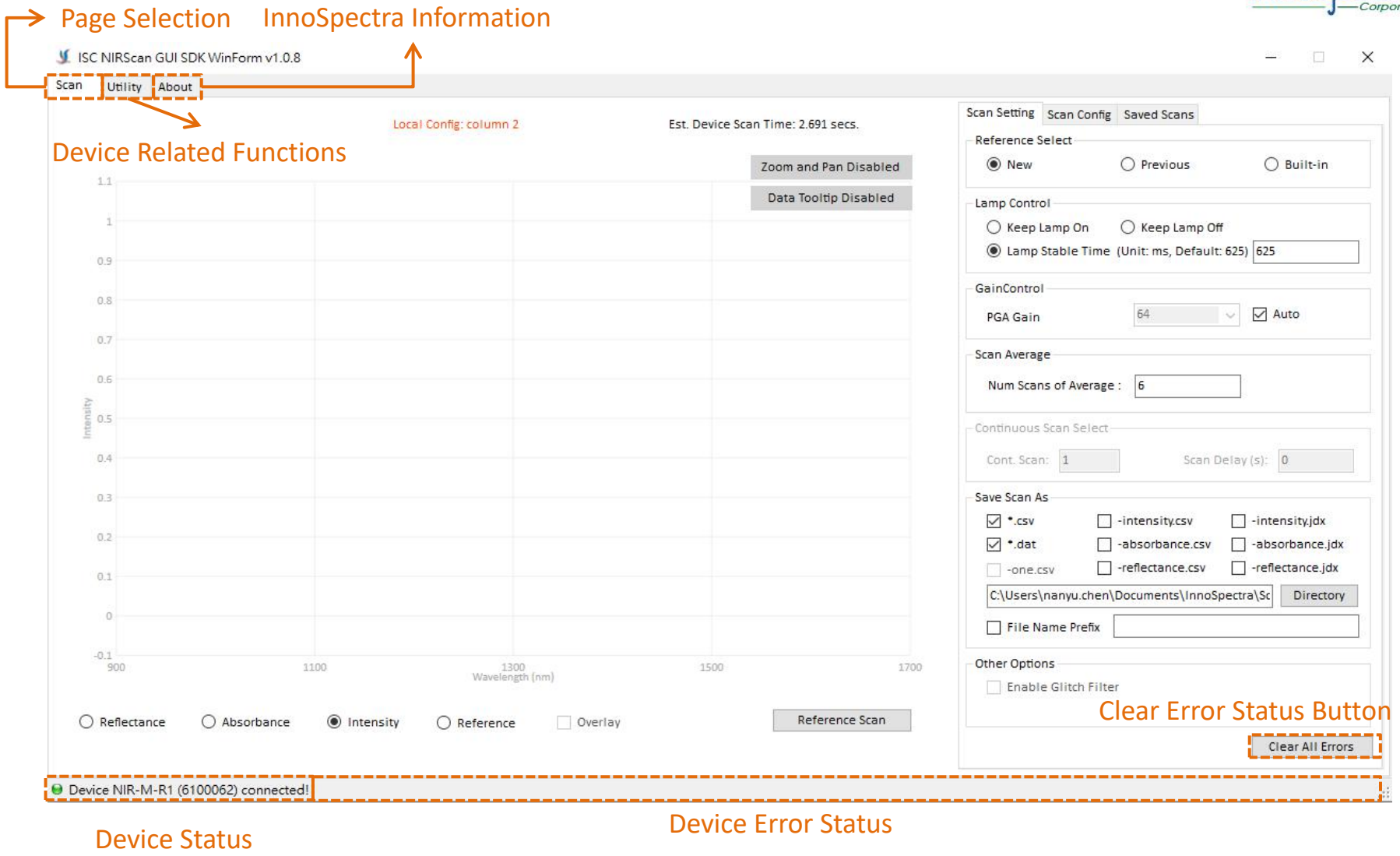
Responsibility Innovation Superiority Entrepreneurship

Contents

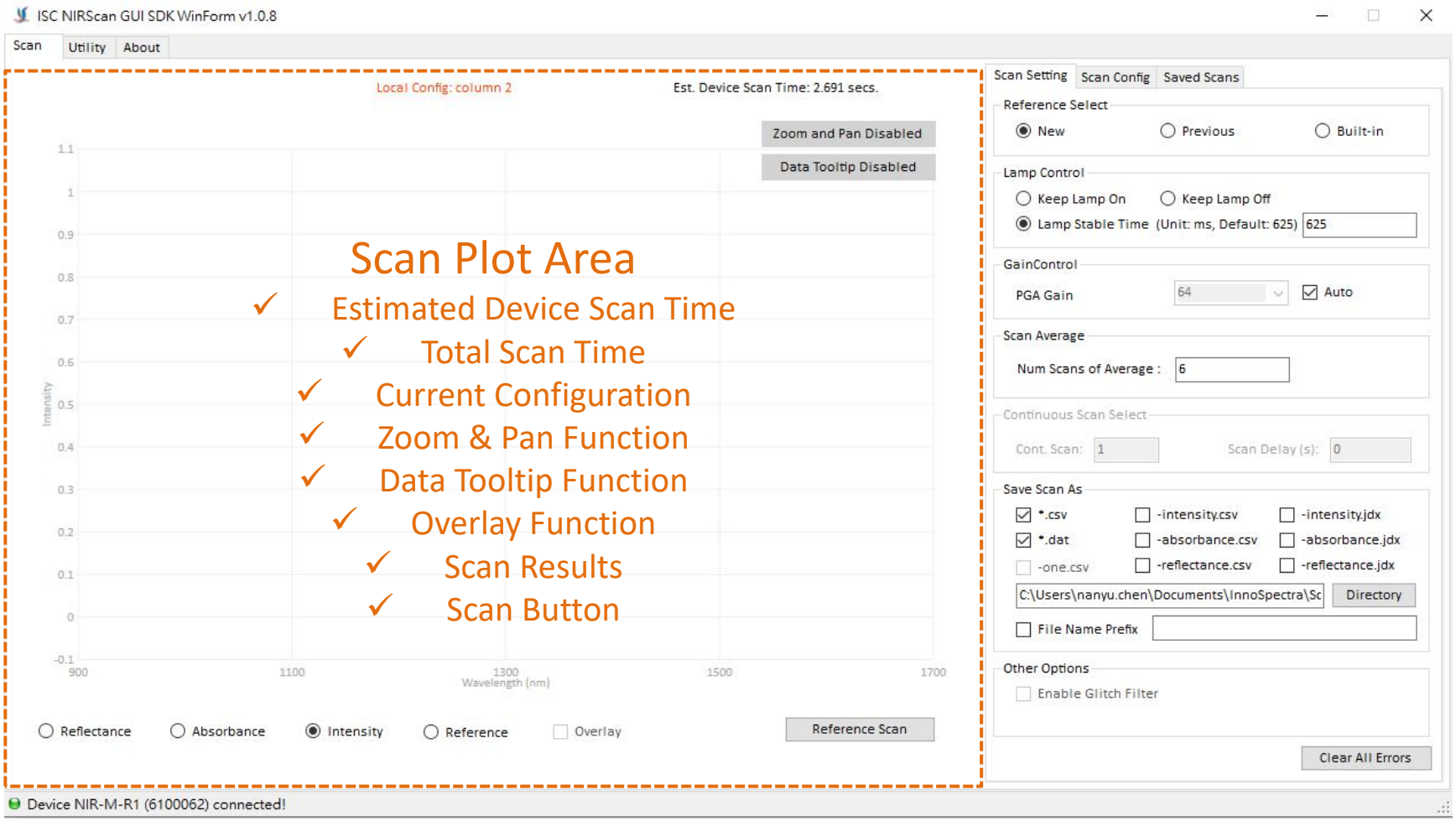
- Introduction
- Performing A Scan
- Update Built-in Reference Data
- Firmware Update

INTRODUCTION

Main Window


Page Selection
InnoSpectra Information
ISC NIRScan GUI SDK WinForm v1.0.8
Scan
Utility
About
Device Related Functions
Local Config: column 2
Est. Device Scan Time: 2.691 secs.
Zoom and Pan Disabled
Data Tooltip Disabled
Intensity
Wavelength (nm)
Reflectance
Absorbance
Intensity
Reference
Overlay
Reference Scan
Scan Setting
Scan Config
Saved Scans
Reference Select
New
Previous
Built-in
Lamp Control
Keep Lamp On
Keep Lamp Off
Lamp Stable Time (Unit: ms, Default: 625)
625
GainControl
PGA Gain
64
Auto
Scan Average
Num Scans of Average :
6
Continuous Scan Select
Cont. Scan:
Scan Delay (s):
Save Scan As
*.csv
-intensity.csv
-intensity.jdx
*.dat
-absorbance.csv
-absorbance.jdx
-one.csv
-reflectance.csv
-reflectance.jdx
C:\Users\nanyu.chen\Documents\InnoSpectra\Sc
Directory
File Name Prefix
Other Options
Enable Glitch Filter
Clear Error Status Button
Clear All Errors
Device NIR-M-R1 (6100062) connected!
Device Status
Device Error Status

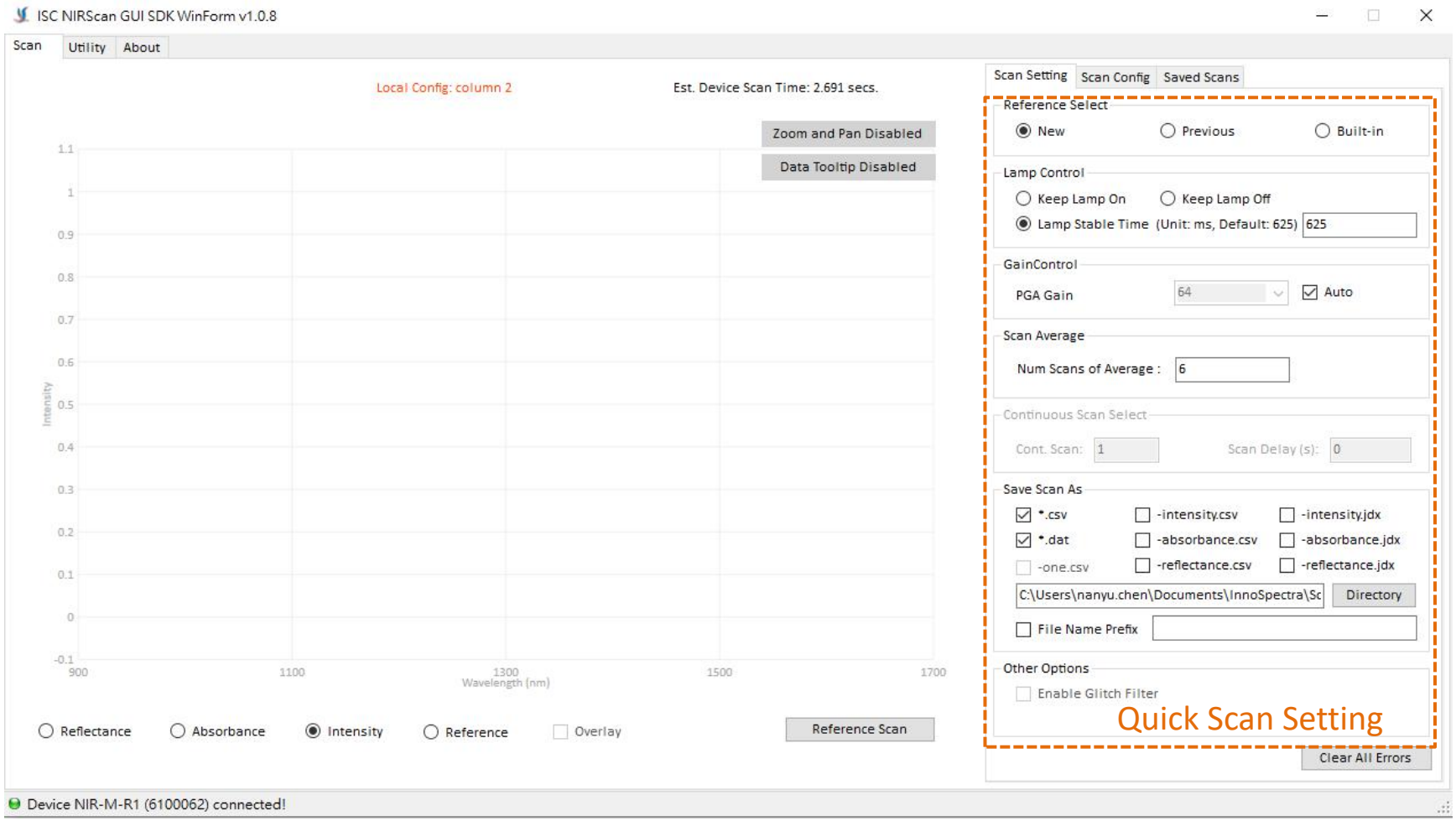
Scan Page



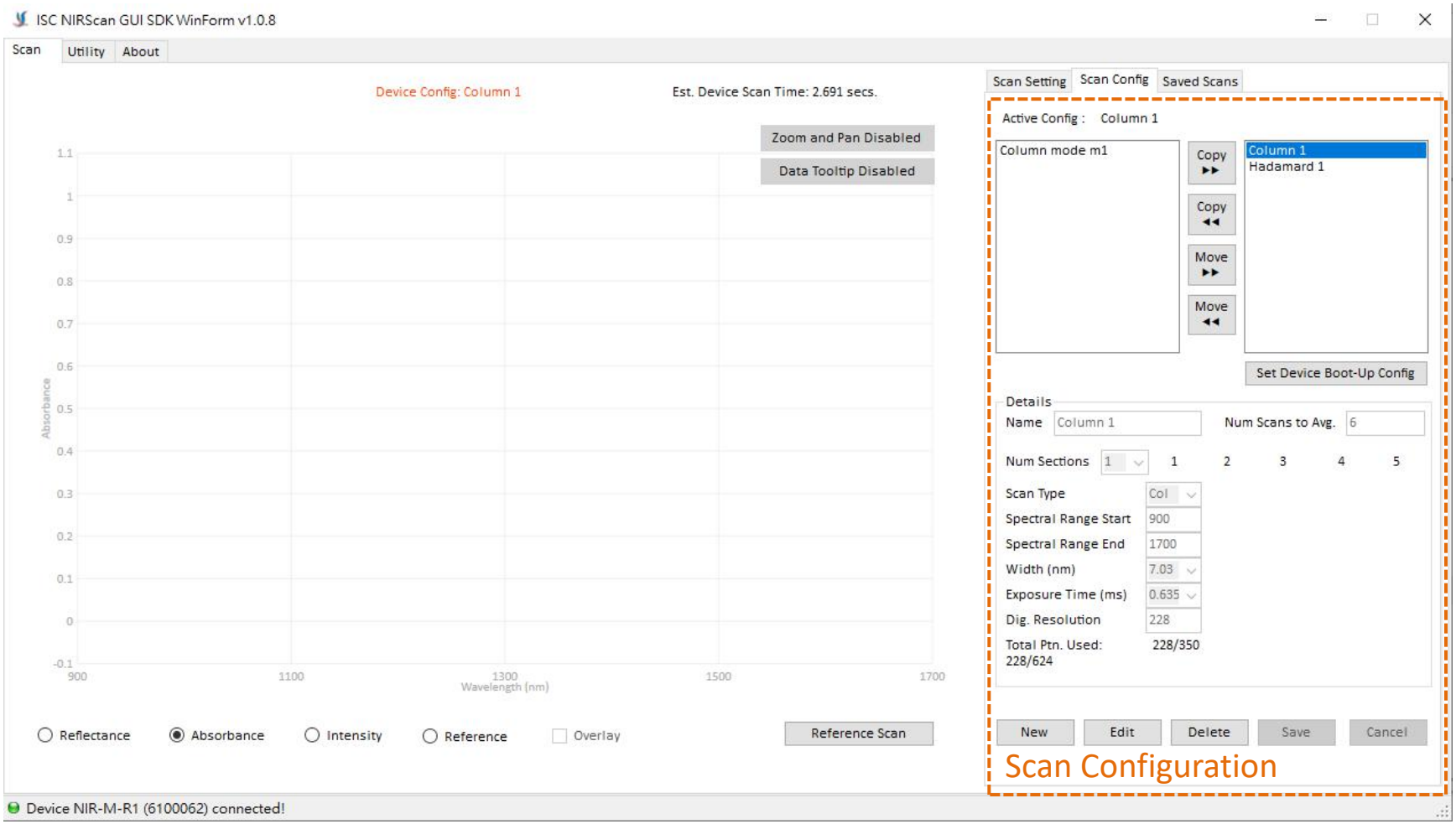
Scan Plot Area

- ✓ Estimated Device Scan Time
- ✓ Total Scan Time
- ✓ Current Configuration
- ✓ Zoom & Pan Function
- ✓ Data Tooltip Function
- ✓ Overlay Function
- ✓ Scan Results
- ✓ Scan Button

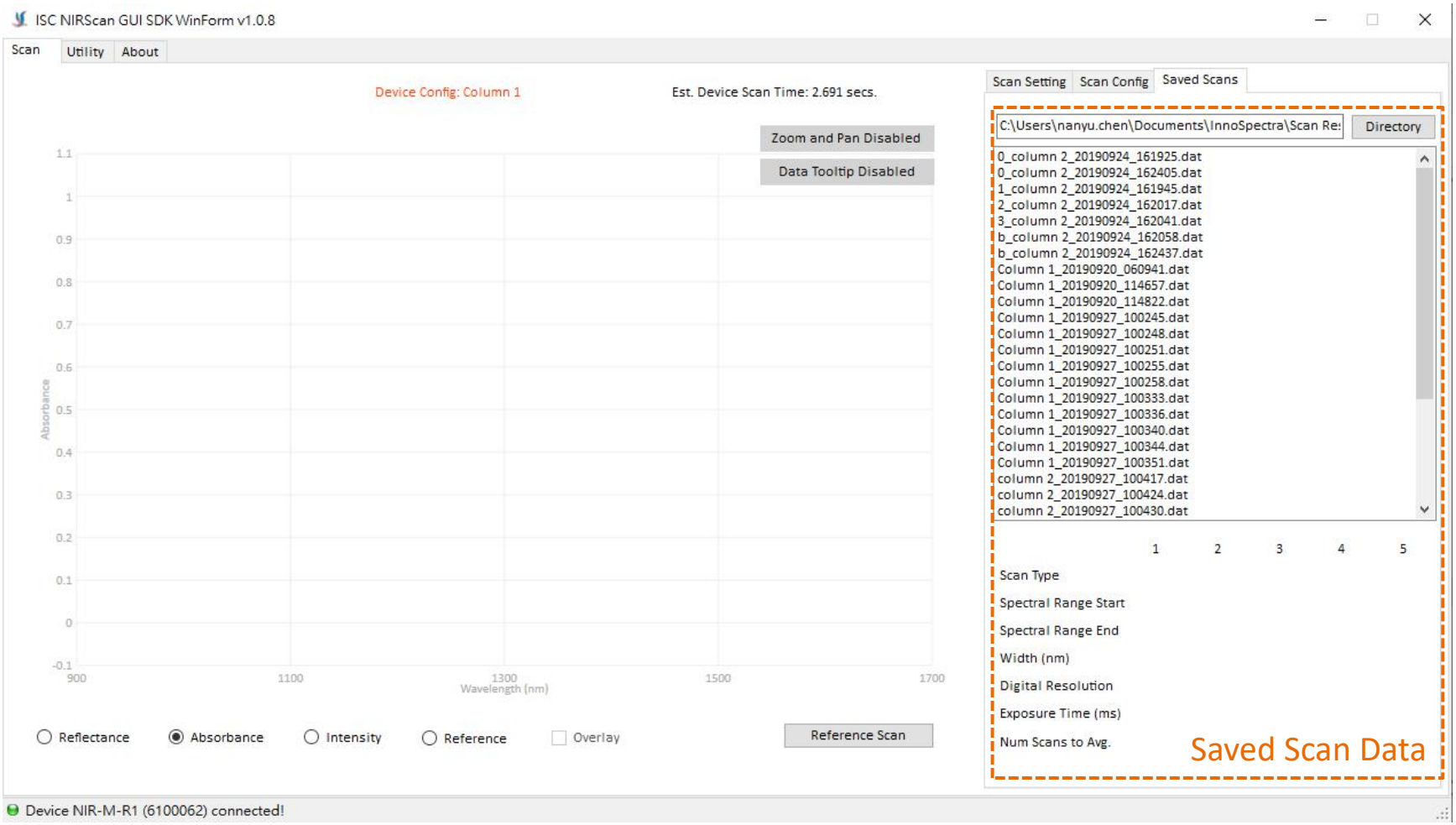
Scan Page


ISC NIRScan GUI SDK WinForm v1.0.8
Scan
Utility
About
Local Config: column 2
Est. Device Scan Time: 2.691 secs.
Zoom and Pan Disabled
Data Tooltip Disabled
Intensity
Wavelength (nm)
Reflectance
Absorbance
Intensity
Reference
Overlay
Reference Scan
Scan Setting
Scan Config
Saved Scans
Reference Select
New
Previous
Built-in
Lamp Control
Keep Lamp On
Keep Lamp Off
Lamp Stable Time (Unit: ms, Default: 625)
625
GainControl
PGA Gain
64
Auto
Scan Average
Num Scans of Average :
6
Continuous Scan Select
Cont. Scan:
1
Scan Delay (s):
0
Save Scan As
*.csv
-intensity.csv
-intensity.jdx
*.dat
-absorbance.csv
-absorbance.jdx
-one.csv
-reflectance.csv
-reflectance.jdx
C:\Users\nanyu.chen\Documents\InnoSpectra\Sc
Directory
File Name Prefix
Other Options
Enable Glitch Filter
Quick Scan Setting
Clear All Errors
Device NIR-M-R1 (6100062) connected!

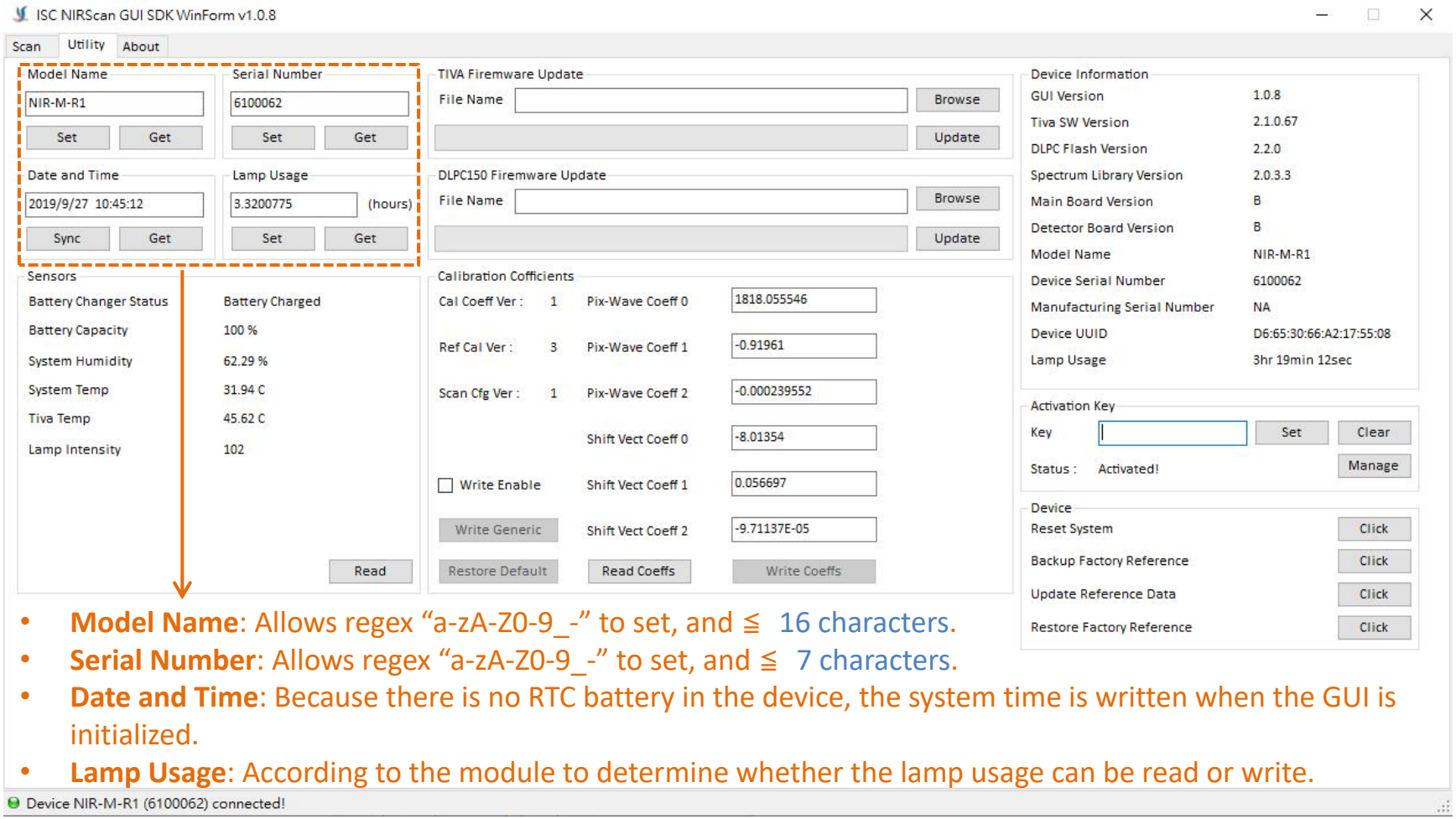
Scan Page


ISC NIRScan GUI SDK WinForm v1.0.8
Scan
Utility
About
Device Config: Column 1
Est. Device Scan Time: 2.691 secs.
Zoom and Pan Disabled
Data Tooltip Disabled
Absorbance
Wavelength (nm)
Reflectance
Absorbance
Intensity
Reference
Overlay
Reference Scan
Scan Setting
Scan Config
Saved Scans
Active Config : Column 1
Column mode m1
Copy
Copy
Move
Move
Column 1
Hadamard 1
Set Device Boot-Up Config
Details
Name
Column 1
Num Scans to Avg.
6
Num Sections
1
2
3
4
5
Scan Type
Col
Spectral Range Start
900
Spectral Range End
1700
Width (nm)
7.03
Exposure Time (ms)
0.635
Dig. Resolution
228
Total Ptn. Used:
228/624
228/350
New
Edit
Delete
Save
Cancel
Scan Configuration
Device NIR-M-R1 (6100062) connected!

Scan Page

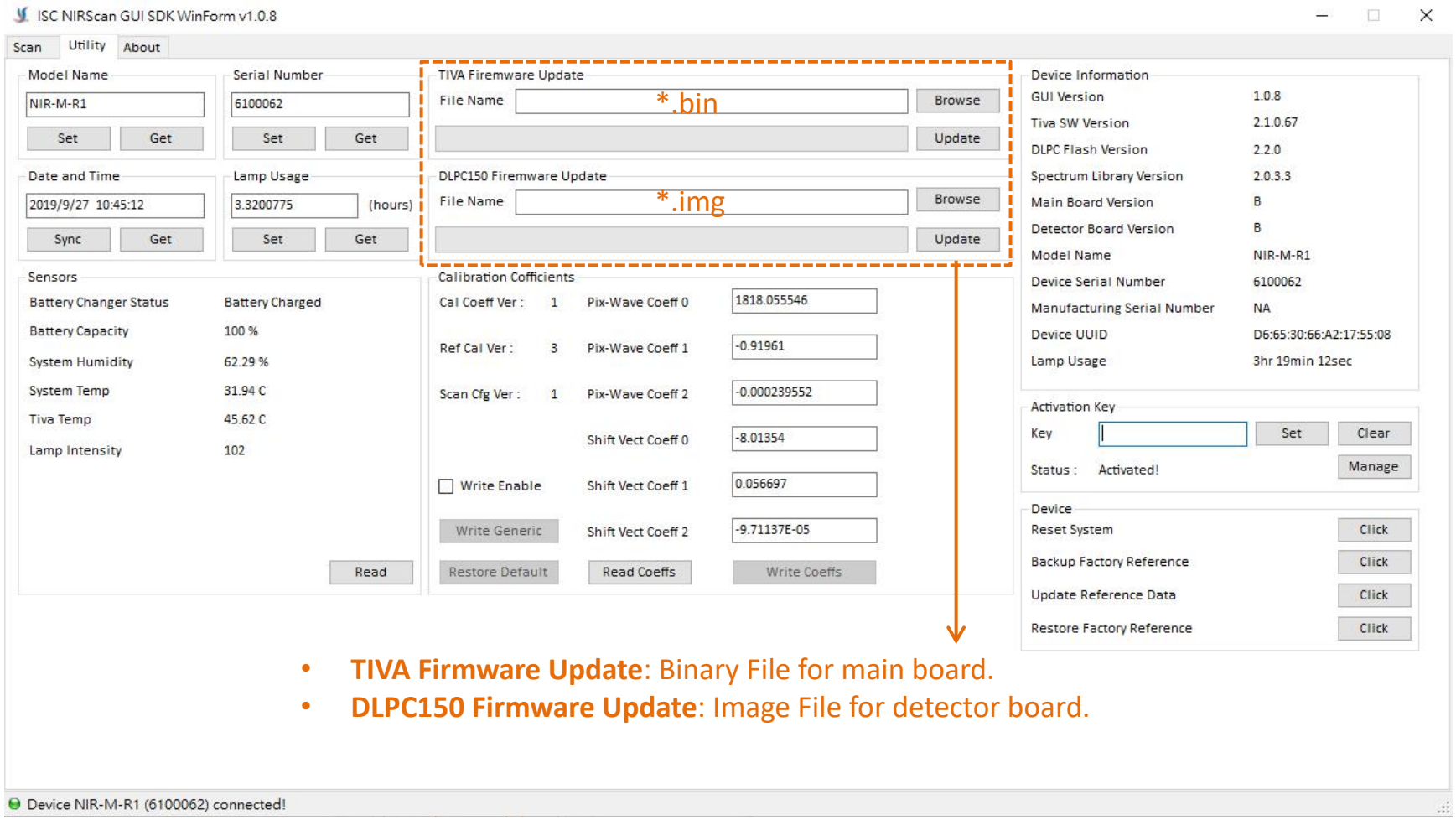

ISC NIRScan GUI SDK WinForm v1.0.8
Scan
Utility
About
Device Config: Column 1
Est. Device Scan Time: 2.691 secs.
Zoom and Pan Disabled
Data Tooltip Disabled
Absorbance
Wavelength (nm)
Reflectance
Absorbance
Intensity
Reference
Overlay
Reference Scan
Scan Setting
Scan Config
Saved Scans
C:\Users\nanyu.chen\Documents\InnoSpectra\Scan Re:
Directory
0_column 2_20190924_161925.dat
0_column 2_20190924_162405.dat
1_column 2_20190924_161945.dat
2_column 2_20190924_162017.dat
3_column 2_20190924_162041.dat
b_column 2_20190924_162058.dat
b_column 2_20190924_162437.dat
Column 1_20190920_060941.dat
Column 1_20190920_114657.dat
Column 1_20190920_114822.dat
Column 1_20190927_100245.dat
Column 1_20190927_100248.dat
Column 1_20190927_100251.dat
Column 1_20190927_100255.dat
Column 1_20190927_100258.dat
Column 1_20190927_100333.dat
Column 1_20190927_100336.dat
Column 1_20190927_100340.dat
Column 1_20190927_100344.dat
Column 1_20190927_100351.dat
column 2_20190927_100417.dat
column 2_20190927_100424.dat
column 2_20190927_100430.dat
1
2
3
4
5
Scan Type
Spectral Range Start
Spectral Range End
Width (nm)
Digital Resolution
Exposure Time (ms)
Num Scans to Avg.
Saved Scan Data
Device NIR-M-R1 (6100062) connected!

Utility Page



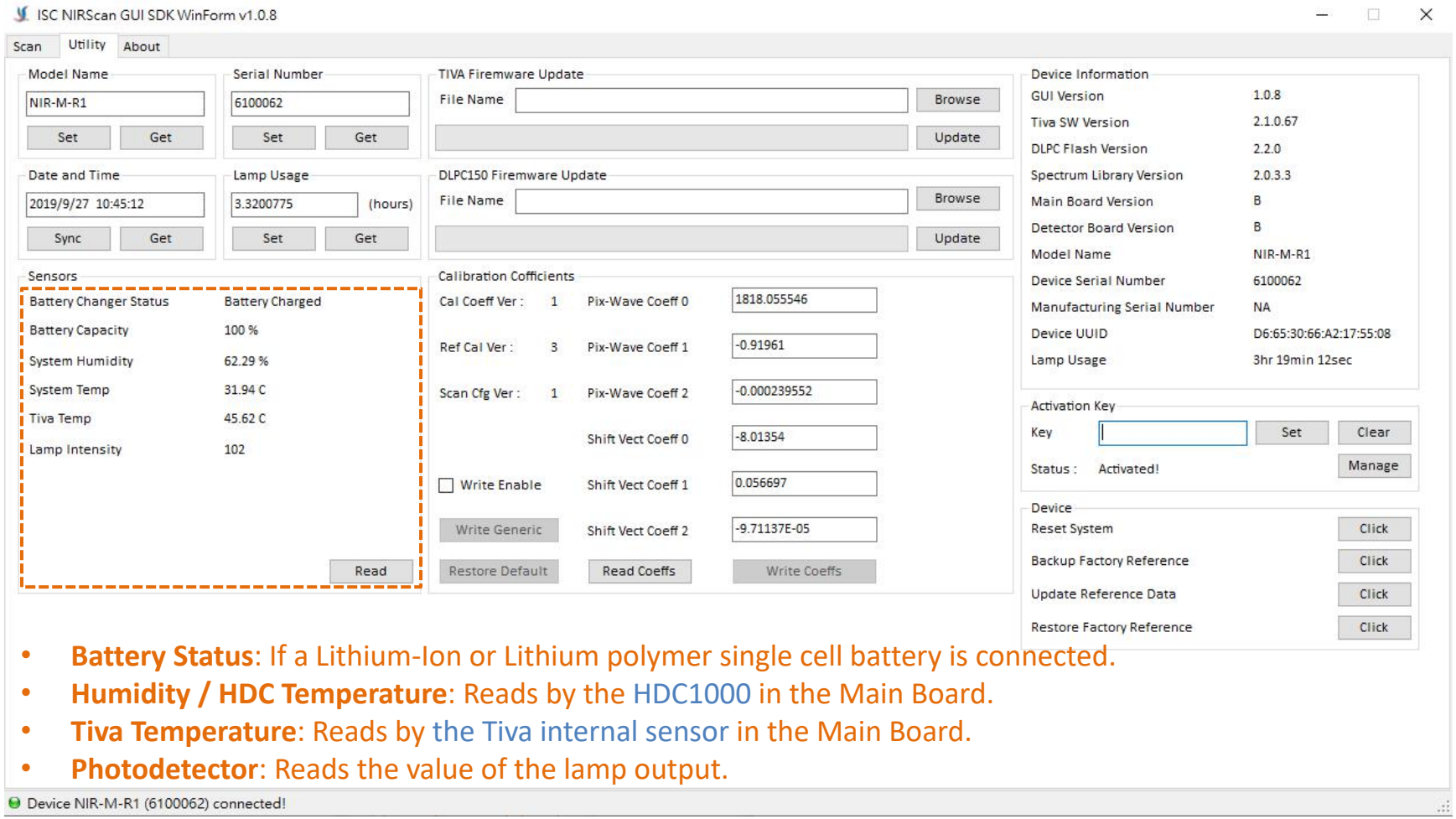
- **Model Name**: Allows regex “a-zA-Z0-9_-” to set, and ≦ 16 characters.
- **Serial Number**: Allows regex “a-zA-Z0-9_-” to set, and ≦ 7 characters.
- **Date and Time**: Because there is no RTC battery in the device, the system time is written when the GUI is initialized.
- **Lamp Usage**: According to the module to determine whether the lamp usage can be read or write.

Utility Page



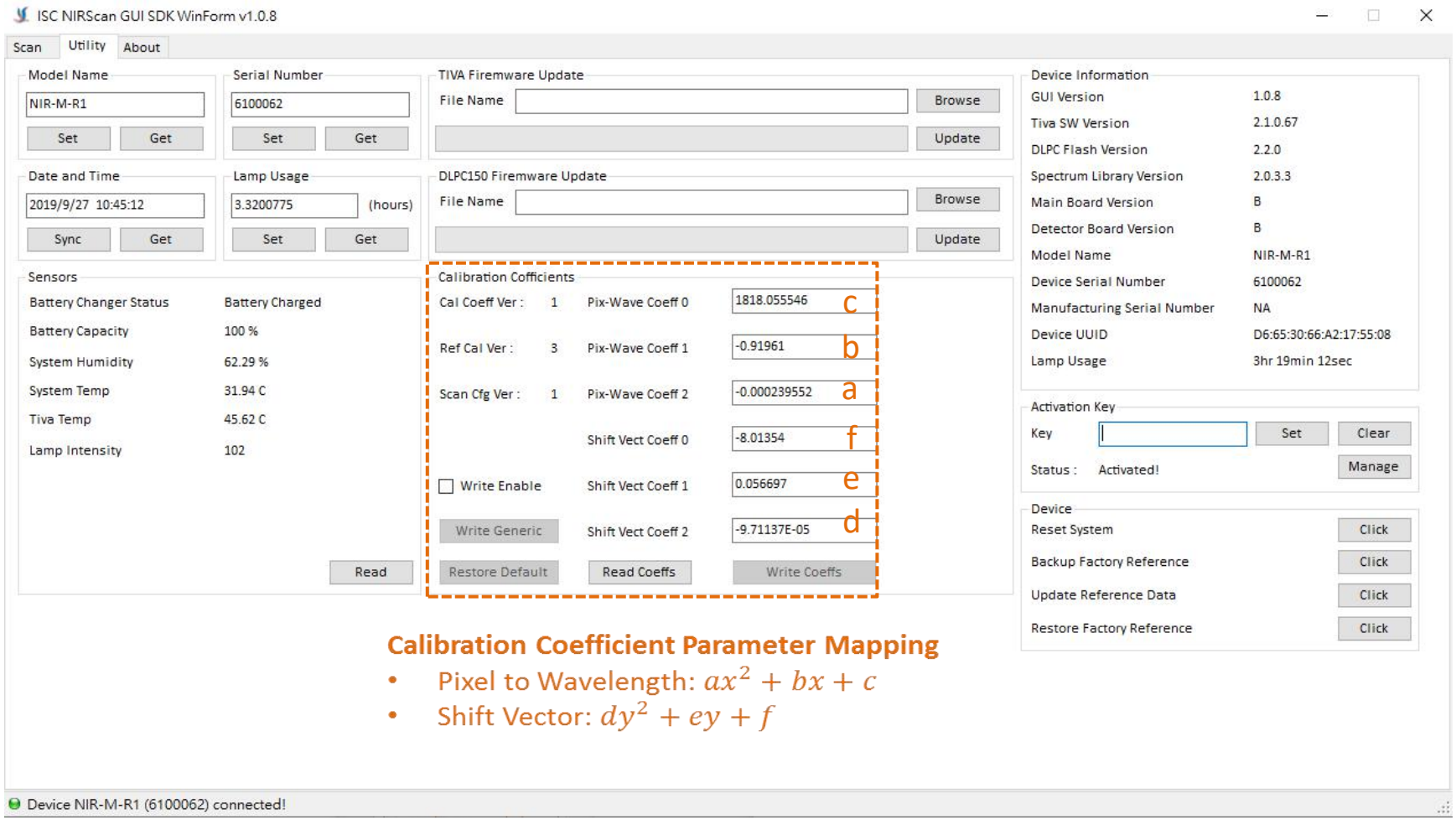
- **TIVA Firmware Update**: Binary File for main board.
- **DLPC150 Firmware Update**: Image File for detector board.

Utility Page



- **Battery Status**: If a Lithium-Ion or Lithium polymer single cell battery is connected.
- **Humidity / HDC Temperature**: Reads by the HDC1000 in the Main Board.
- **Tiva Temperature**: Reads by the Tiva internal sensor in the Main Board.
- **Photodetector**: Reads the value of the lamp output.

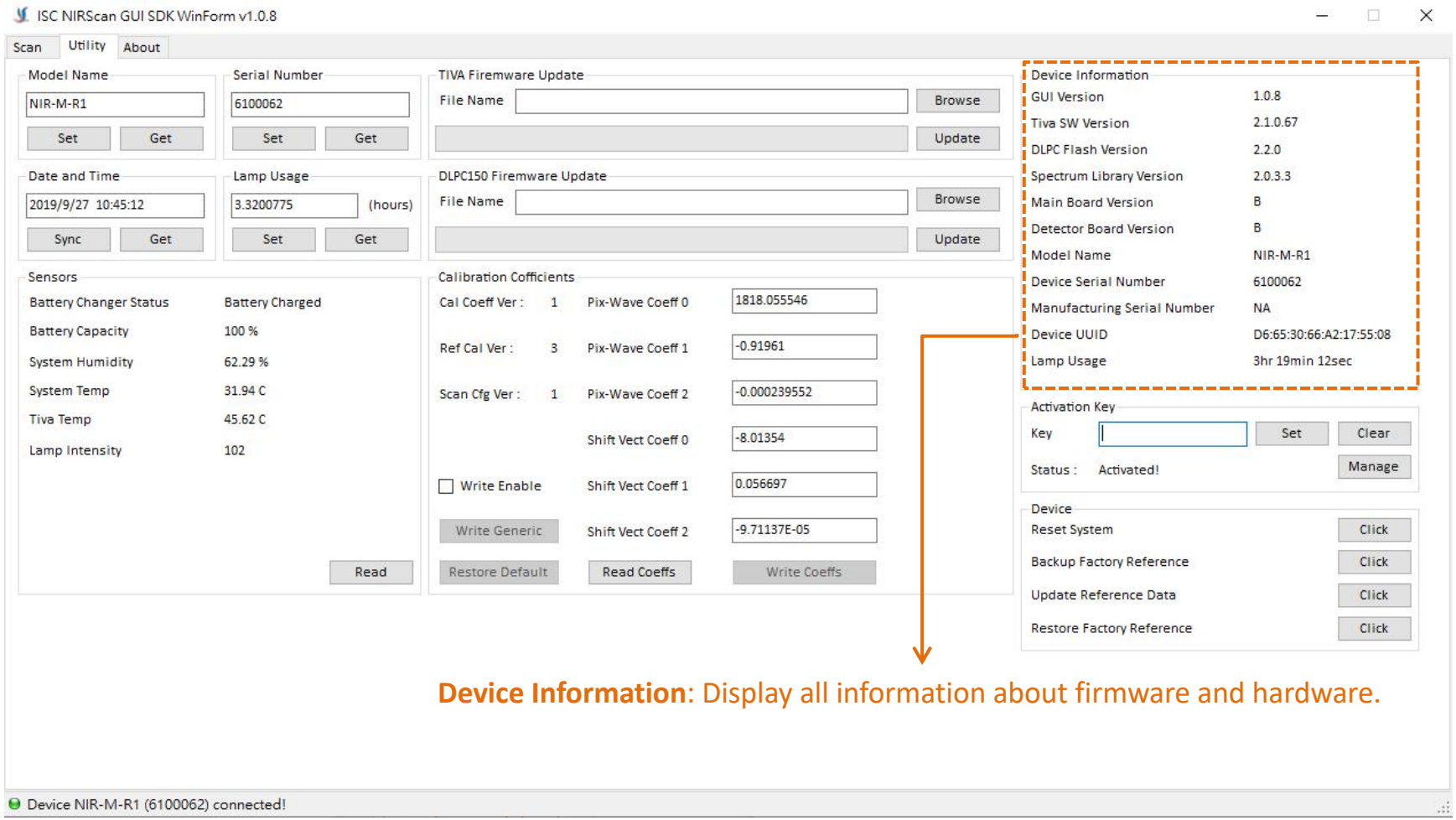
Utility Page



Calibration Coefficient Parameter Mapping

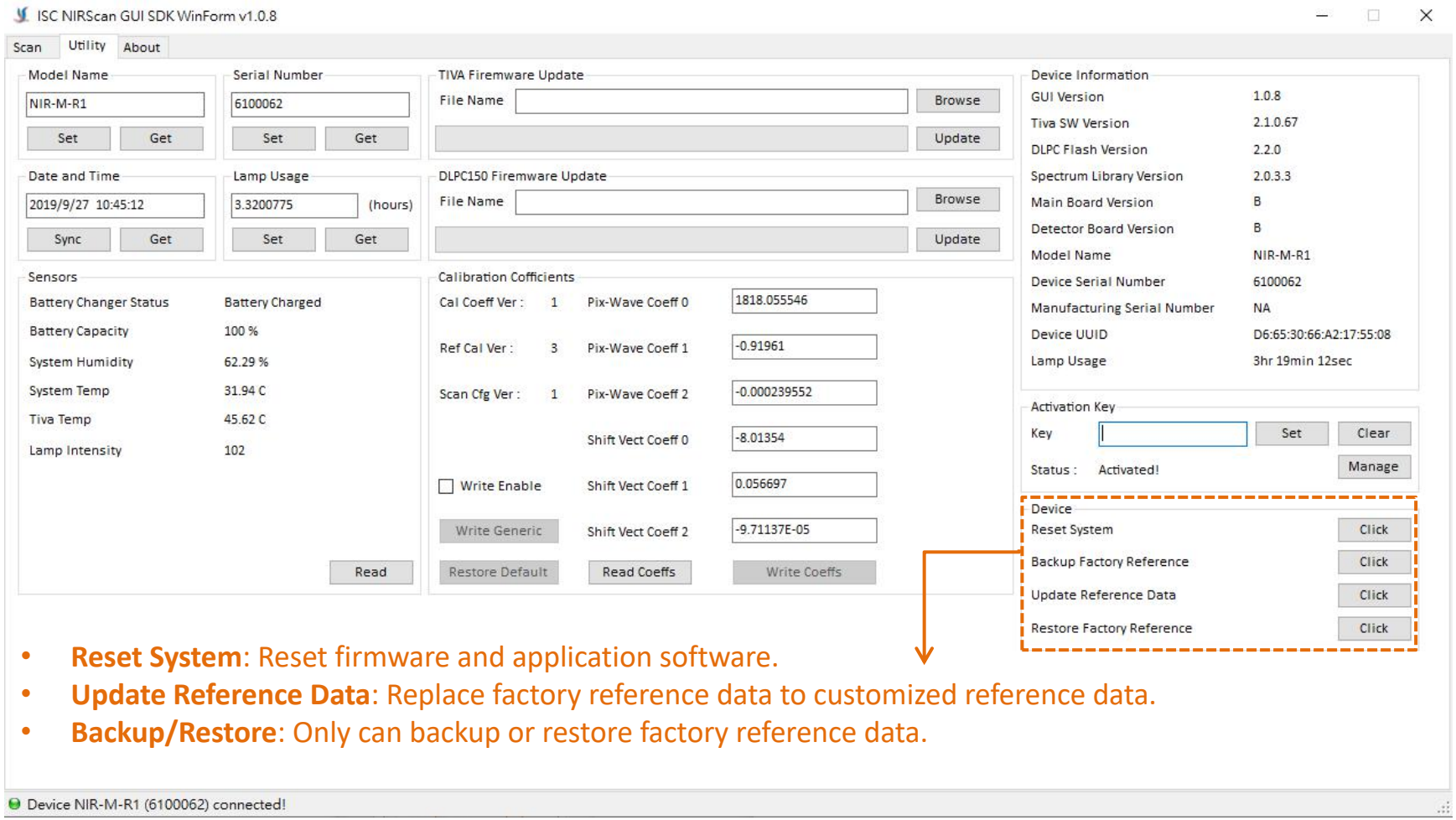
- Pixel to Wavelength: $ax^2 + bx + c$
- Shift Vector: $dy^2 + ey + f$

Device



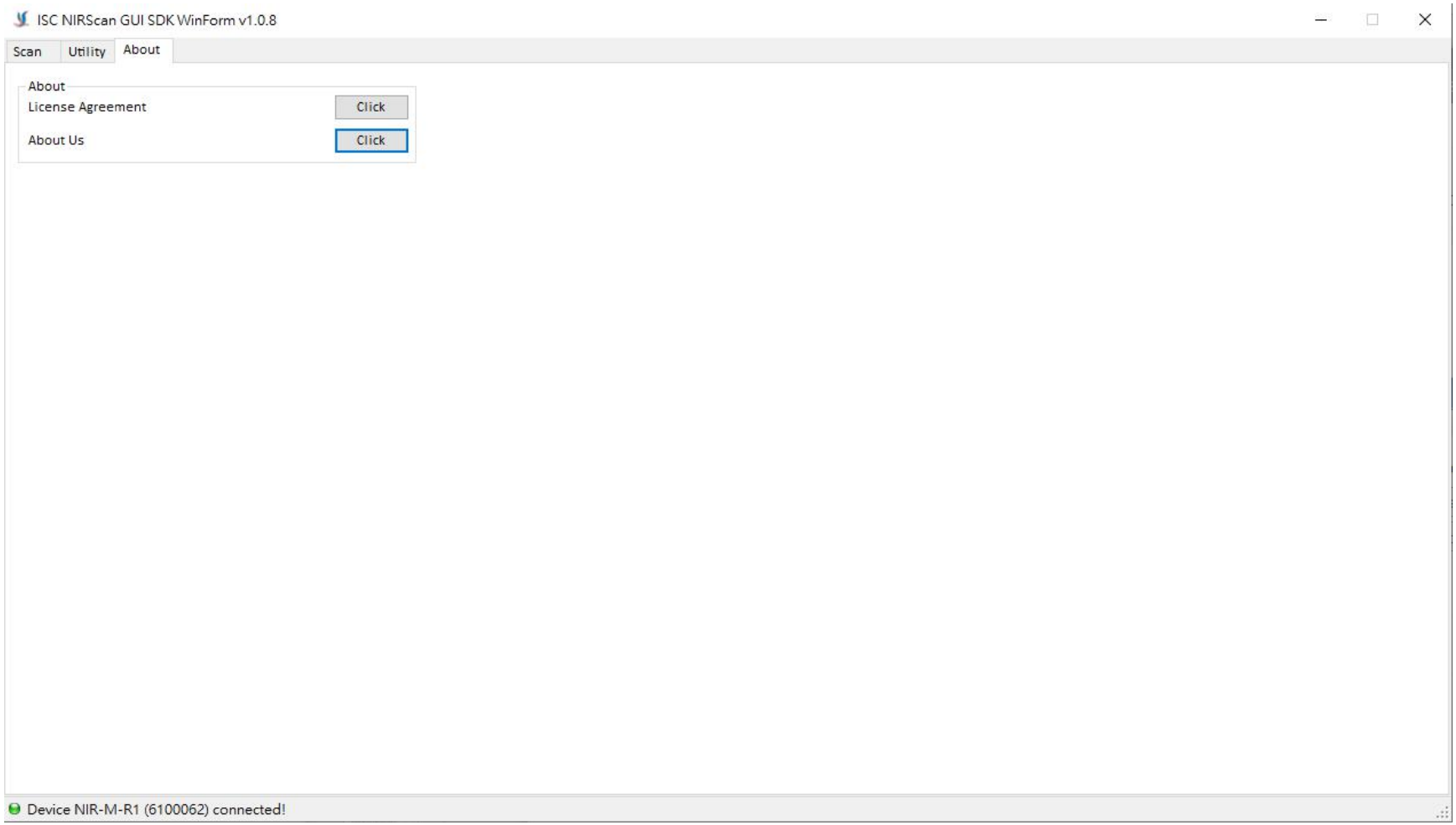
Device Information: Display all information about firmware and hardware.

Device



- **Reset System**: Reset firmware and application software.
- **Update Reference Data**: Replace factory reference data to customized reference data.
- **Backup/Restore**: Only can backup or restore factory reference data.

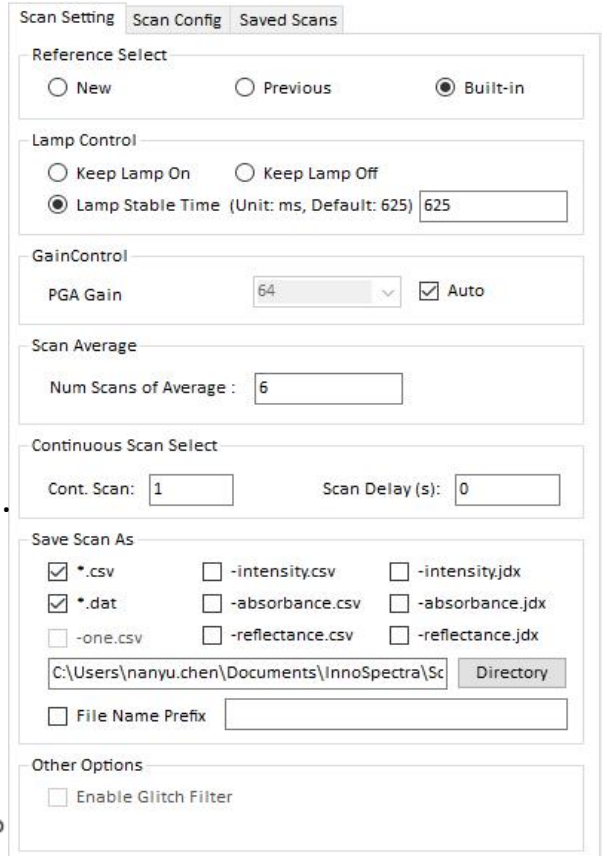
Help


ISC NIRScan GUI SDK WinForm v1.0.8
Scan
Utility
About
About
License Agreement
Click
About Us
Click
Device NIR-M-R1 (6100062) connected!

PERFORMING A SCAN

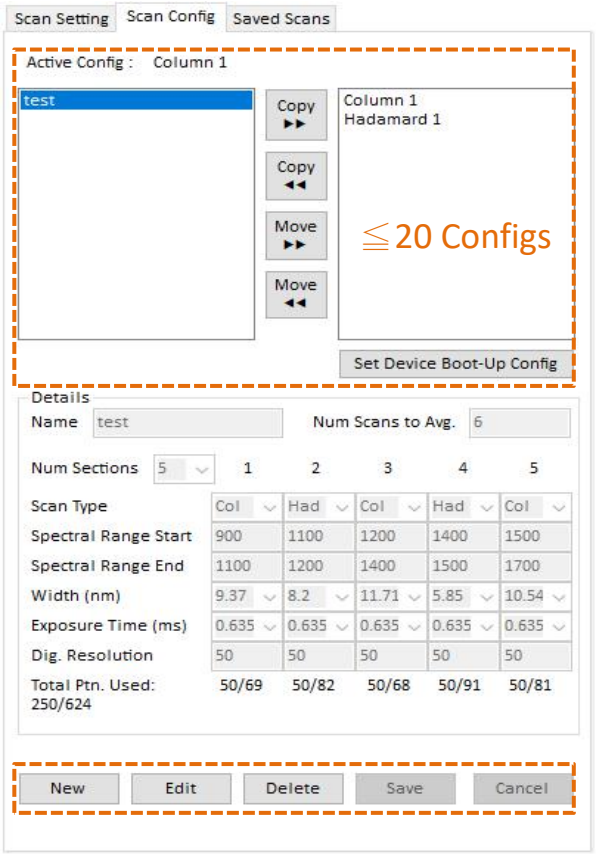
Scan Setting

- **Reference Selection**: Allows the user to choose the reference for the absorbance or reflectance graph. The reference options include:
  - Built-In: Interpolates the reference stored on TIVA EEPROM at the factory to match the current scan configuration parameters.
  - Previous: Choose the reference from the previous use of the “New” option.
  - New: Place a highly reflective material like a metal coated with Spectralon on the sample window and perform a scan. This new scan is stored on the PC and can then be selected with the “Previous” reference radio button.
- **Lamp Control**: Controls lamp on/off and lamp stable time. When “Lamp Stable Time” is selected, user can set lamp stable time to extend lamp stabilization. This allows the user to avoid any lamp stability issues and reduce lamp wear caused by turning on and off the lamps, as well as the additional time needed to wait for the lamps to stabilize before executing a scan.
- **Scan Average**: Allow the user to change average times.
- **Gain Control**: Allows the user to choose the gain setting for scan.
  - Auto: System will calculate a suitable gain value.
  - Fixed: User select one gain value.
- **Continue Scan**: Allows the user to do auto repeat scan.
- **Save Scan As**: Allows the user to save which kind of file and where to store them.



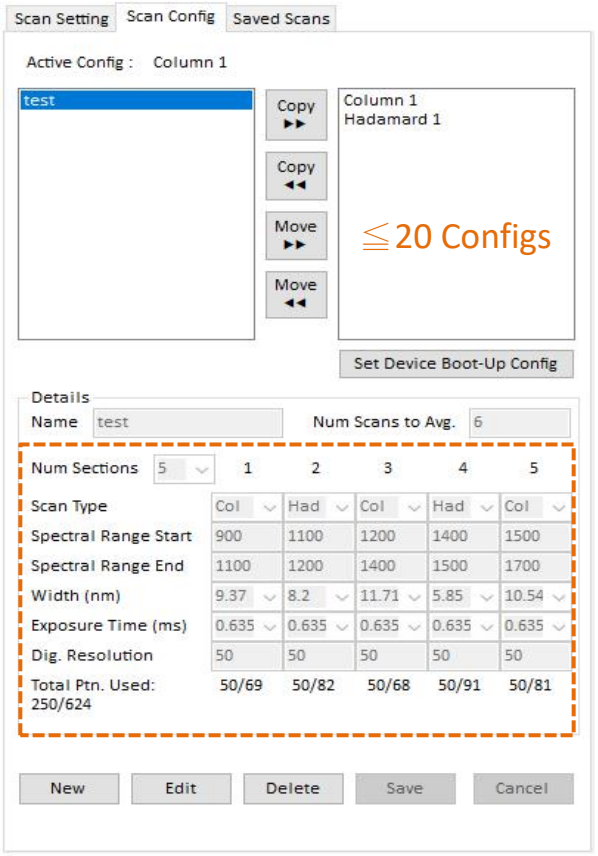
Scan Configuration

- Local configuration saved to the PC. Device configuration saved on the device at most 20 sets.
- Built-in configurations: Column 1, Hadamard 1.
- *Italic* is the system boot-up configuration which can be set from "*Set Device Boot-Up Config*" button.
- The "Copy" and "Move" buttons allow copying or moving scan configurations stored on the PC to the device or from the device to the PC.
- Single click one configuration that can display data to the Details block.
- Double click one configuration that can set to the device, and display with orange color.
- "New" button can create a configuration.
- "Edit" button can edit the selected configuration.
- "Delete" button can delete the selected configuration.
- "Save" button can save editing to local or device.
- "Cancel" button can quit editing without saving.



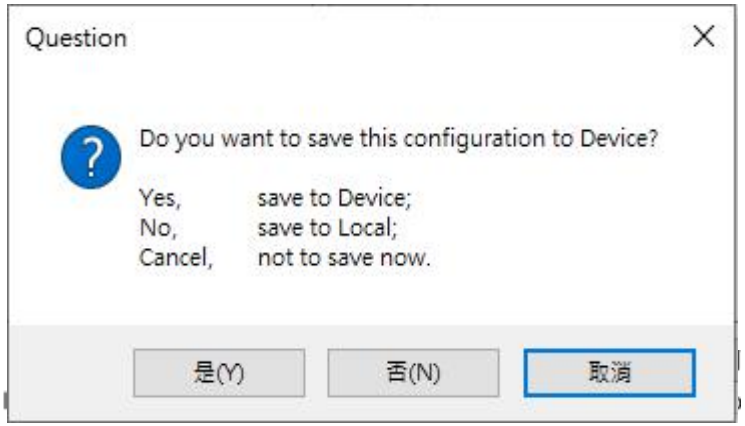
Scan Configuration

- **Name**: Configuration name which display to the list.
- **Number of Scans to Average**: This is the repeated coutinous scans that are averaged together.
- **Number of Sections**: A scan can be broken up into 1 ~ 5 sections. Each section can have individual set of the following parameters:
  - **Scan Type**:
    - Column: Selects one wavelength at a time.
    - Hadamard: Creates a set with several wavelengths multiplexed at a time and then decodes the individual wavelengths.
  - **Spectral Range (nm)**: Start and End wavelengths or spectral range of interest for the scan between 900 nm to 1700 nm.
  - **Width (nm)**: This number selects the width of the groups of pixels in the generated Column or Hadamard patterns.
  - **Exposure Time (ms)**: The exposure time can be individually set for each section in the range of 0.635 ms to 60.960 ms.
  - **Digital resolution**: This number defines how many wavelength points are captured across the defined spectral range. Each wavelength point corresponds to a pattern that is displayed on the DMD.
- **Total Patterns Used**: The GUI computes the maximum number of wavelength points and indicates then in the bottom of each section. The total maximum number of patterns for all sections of a scan is 624.



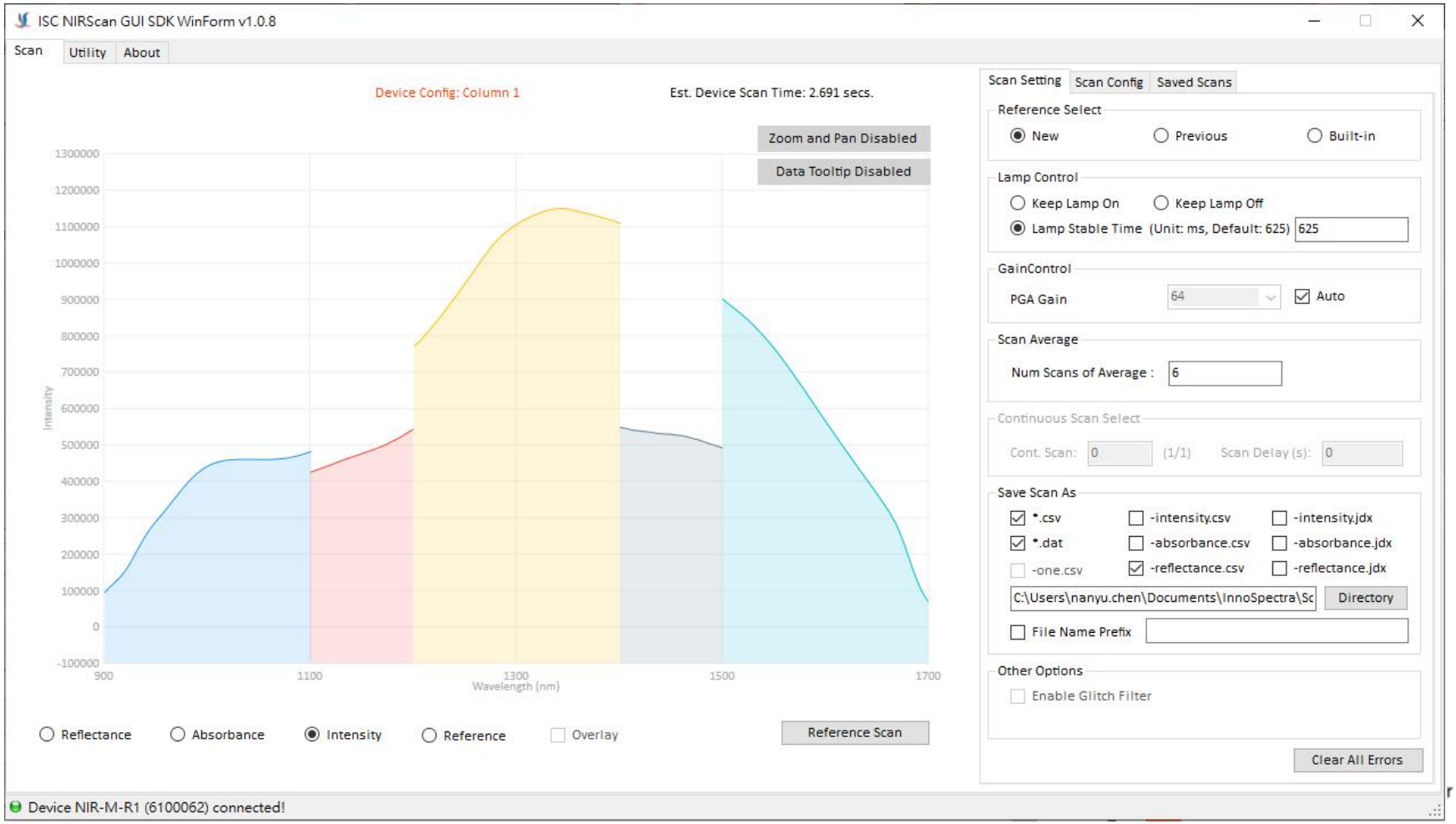
Create A Scan Configuration

1. Click “New” button.
2. Enter the configuration name.
3. Enter the number of scans to average for corresponding back-to-back scans averaged together.
4. Enter the number of sections. The section number doesn’t exceed 5 sections. Sections can overlap in start and end wavelengths.
5. For each section:
   a. Select the scan type: column or hadamaed.
   b. Type in the desired spectral range between 900 and 1700 nm.
   c. Select the width that corresponds to the smallest wavelength content that you want to resolve.
   d. Enter the desired exposure time.
   e. Enter the desired digital resolution which is number of wavelength points captured across the spectral range.
6. Select saving to local or device or cancel to continue editing. After saving the configuration, it will synchronize to Configuration List.



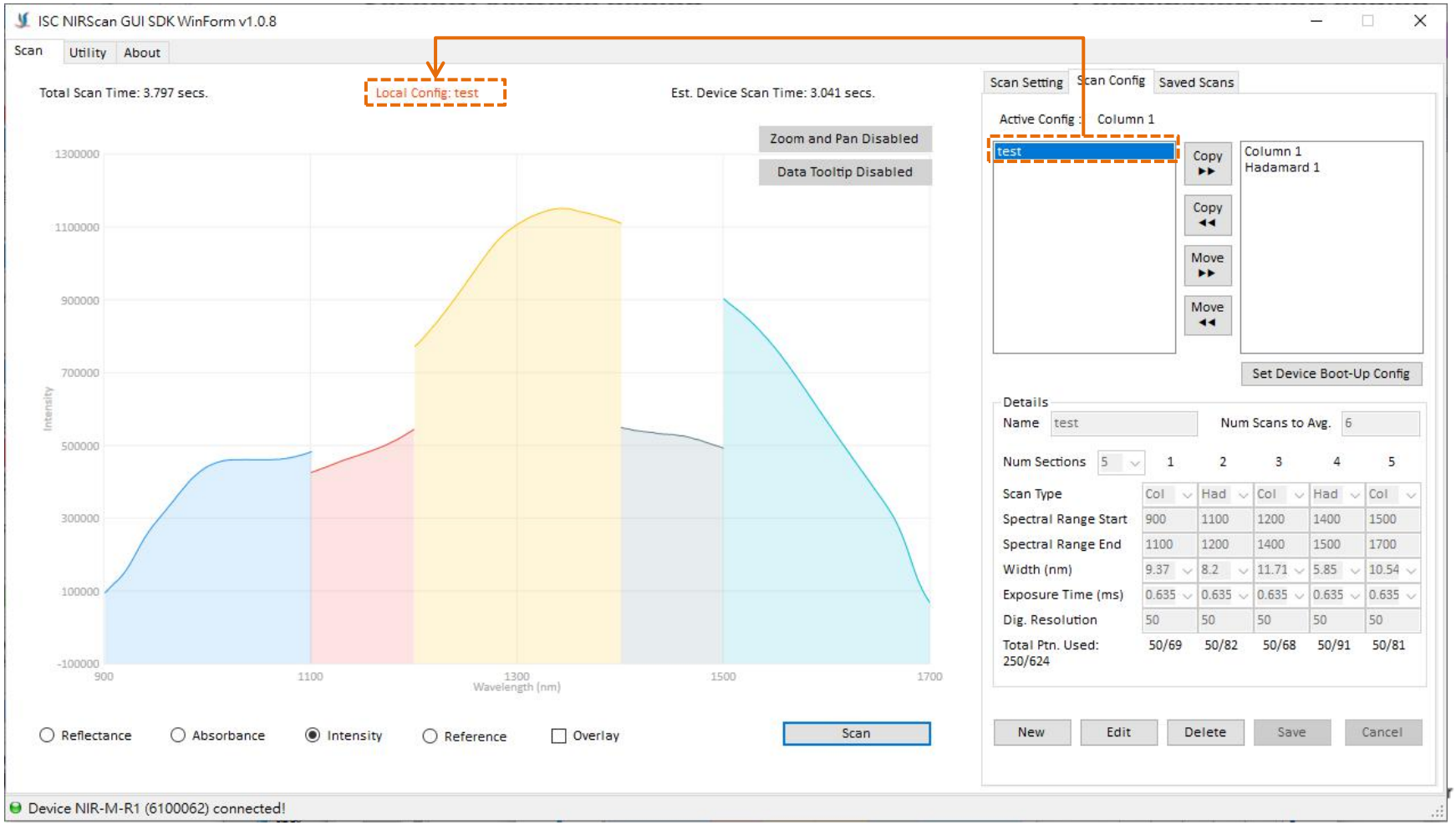
Scanning A Local Reference

- Select a configuration and double click to set to the device.
- Select “New” reference to perform a scan.
- This new scan is stored on the PC and can then be selected with the “Previous” reference radio button.



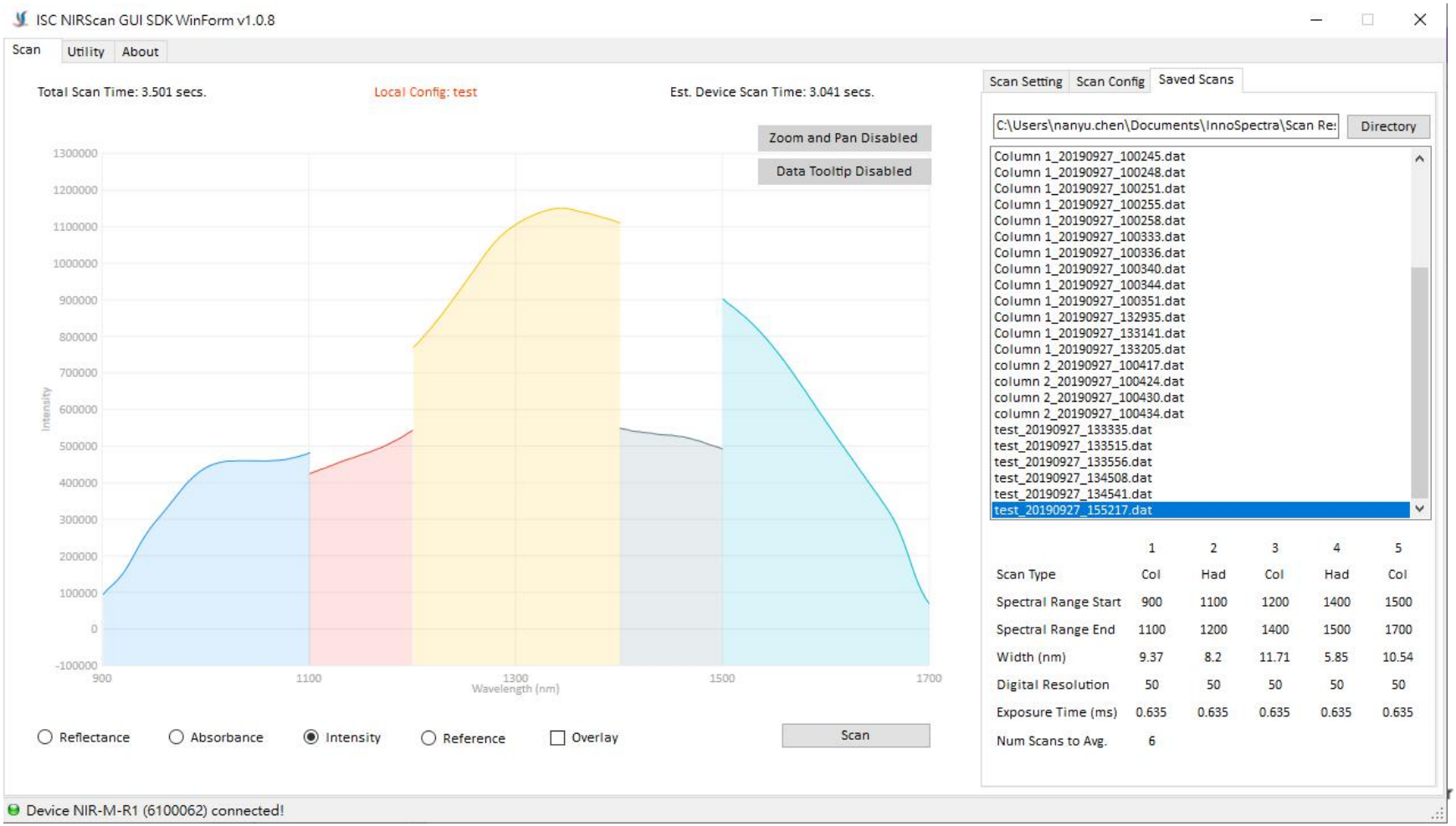
Scanning A Sample

- Select a configuration and double click to set to the device.
- Select the reference from built-in or previous.
- The location of the scan is saved under the “Save Scan As.”
- Click “Scan” button to perform a new scan.



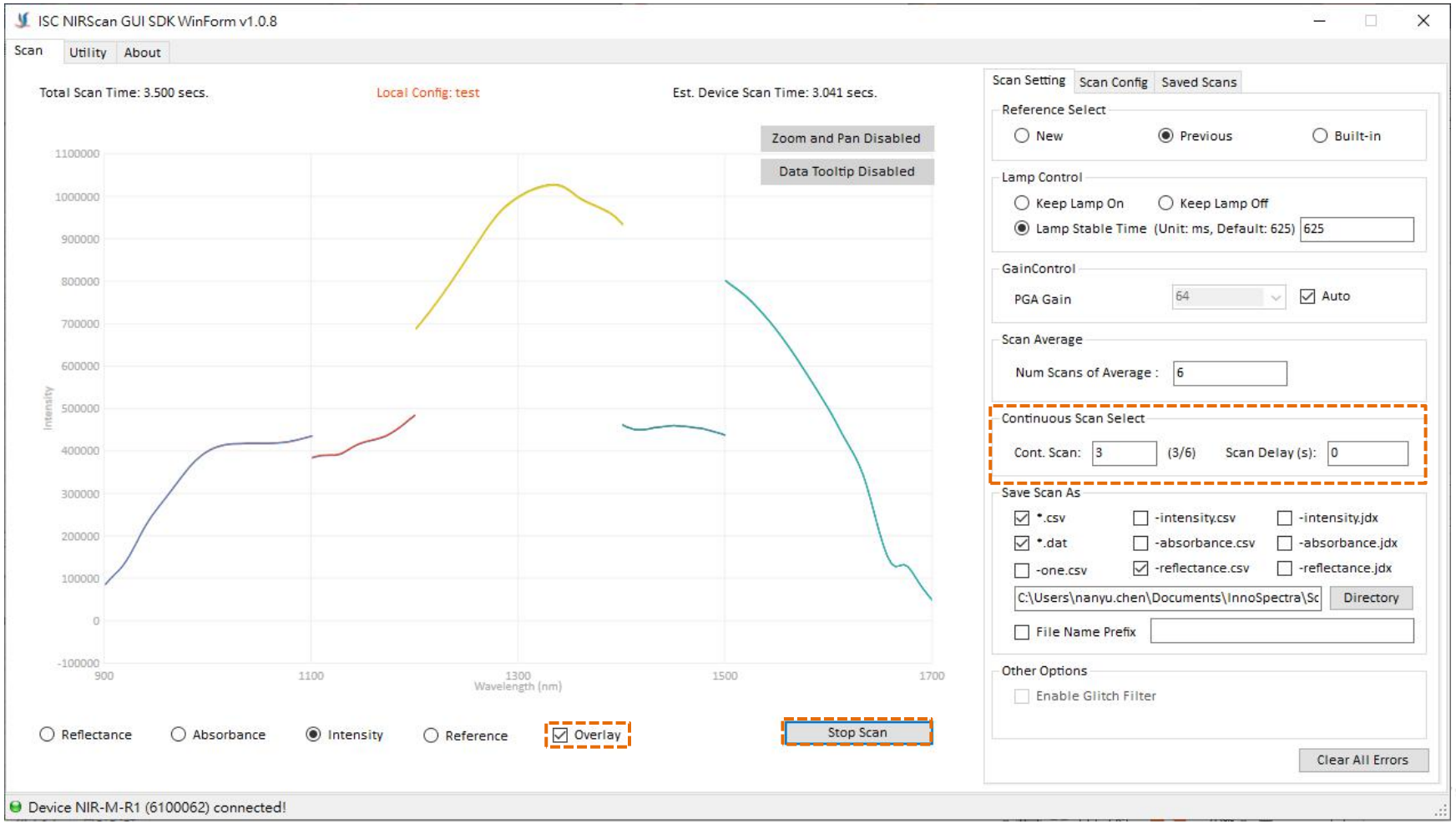
Saved Scans

- To display previous scans, select “Saved Scans” tab. The files are stored with the name of the scan configuration and date and time of the scan.
- To plot a file, select one of the files as shown in below.
- The “Saved Scans” tab can read the file offline.



Continuous Scan

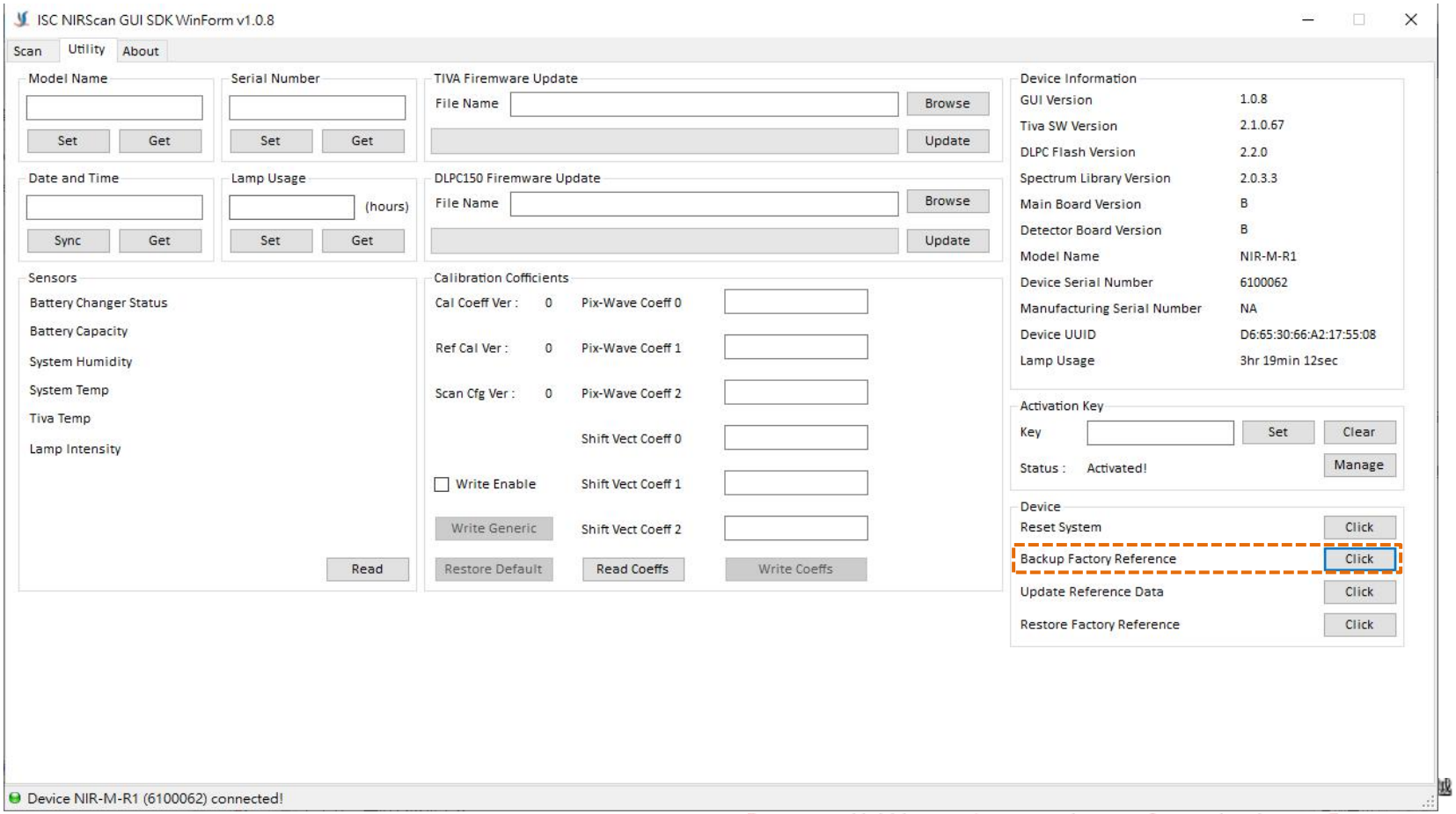
- In addition to a single scan also provides continuous scanning, and can overlay the scan results to view trends.
- Input the number of Continuous Scans and Scan Delay Time, and click “Scan” button to perform scans. Press “Stop Scan” to stop continuous scan if user wants.



UPDATE BUILT-IN REFERENCE DATA

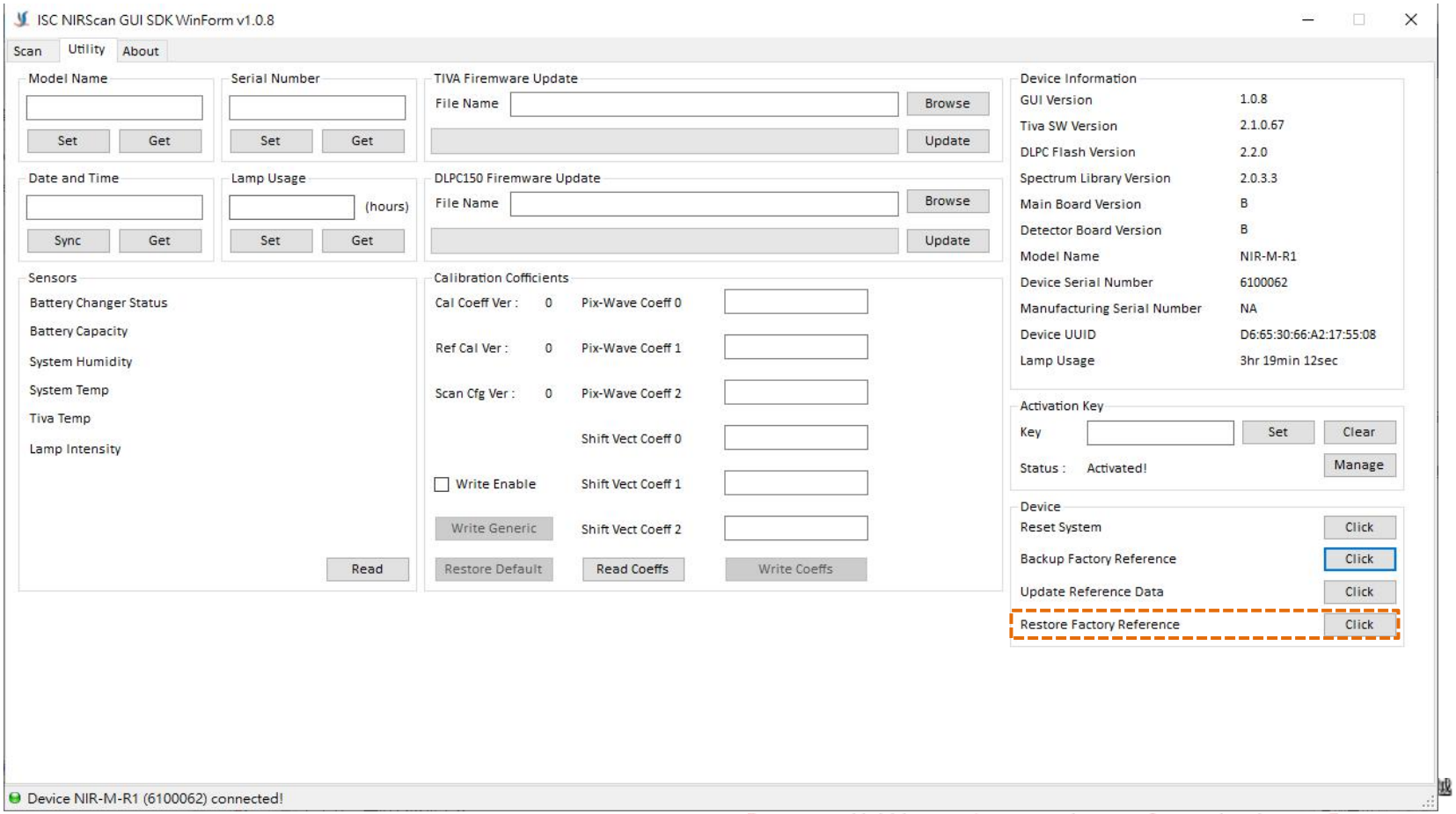
Backup Factory Reference

- This function only backs up the factory reference data and can not be executed once the built-in reference data has been modified.
- Before replacing device's factory reference data, user needs to back up the data. This data will be saved to the PC.



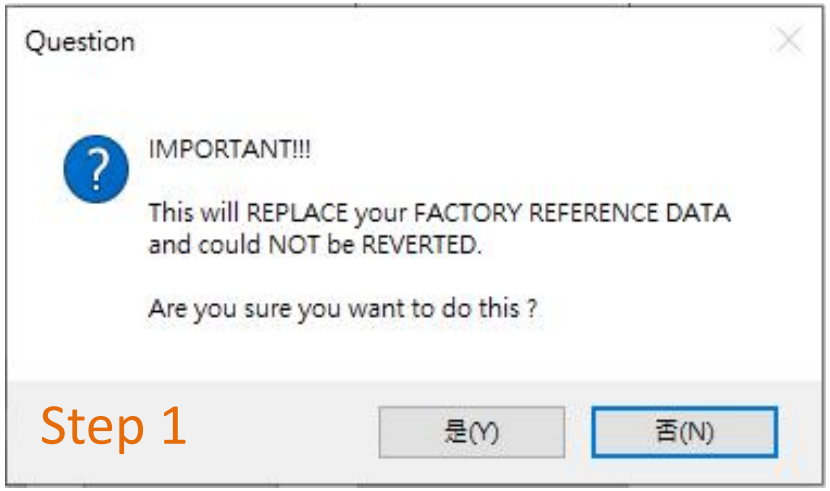
Restore Factory Reference

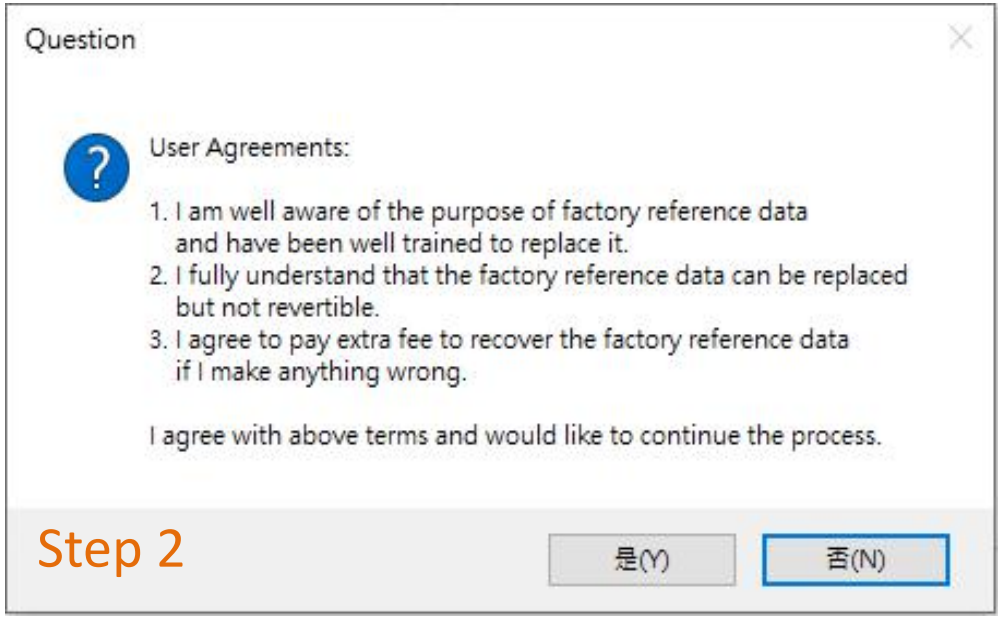
- This function only restores the factory reference data, which can not be performed without backing up the data.
- The factory reference data is restored from the PC.

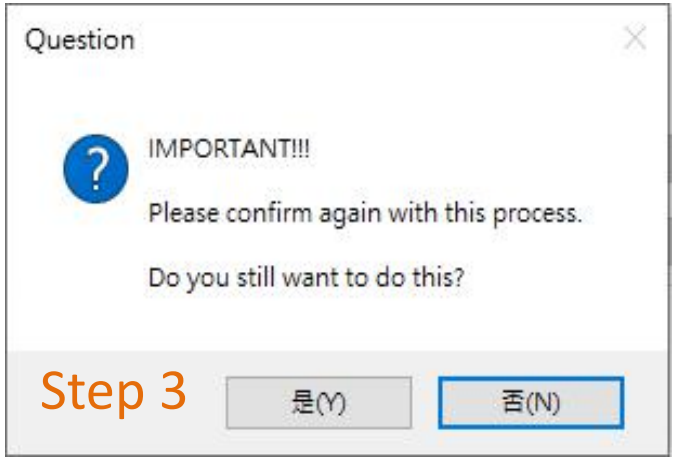


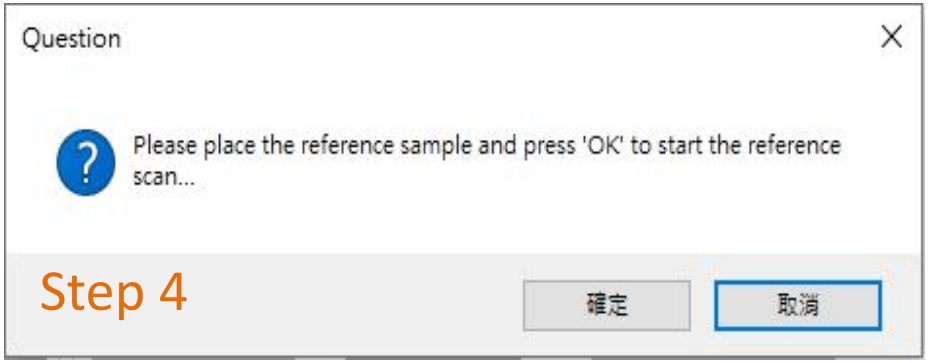
Replace Built-In Reference

- Before replacing stored reference data, preparing a highly reflective material. A 99% reflective material can be created by coating a metal with Spectralon®.
- Before replacing stored reference data, user needs to read User Agreements to agree to bear the consequences.









FIRMWARE UPDATE

Tiva Firmware Update

- To update the TIVA FW, click the “Browse” button to search for the TIVA FW file (for example, \\ISC-NIRScan-Tiva-v2.3.2.bin). Then, click the “Update” button. The firmware will be flashed on the TIVA internal Flash while the progress bar indicates the update process.
- The “Tiva Flash is empty/erased” check box needs to be enabled if no firmware was previously stored on the system or if the TIVA Flash was erased.

DLPC Firmware Update

- To update the DLPC150 firmware, click the “Browse” button to search for the DLPC150 firmware file (for example, \\DLPR150PROM_2.0.0.img). Then, click the “Update” button. The firmware will be flashed to the board while the progress bar indicates the update process.

InnoSpectra Corporation

Thank You

責任・創新・卓越・開創

Responsibility Innovation Superiority Entrepreneurship