

# 9. Infrared (IR) Camera Workflow

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### 9.1 System Status and Initial Setup

Open SanjVIEW v7.0 from the desktop, then center the sample in the Project Manager to focus on the desired device.

1. Ensure all indicator lights are green for the connected system.
2. Select the camera to use. Available cameras: **Infrared (IR)**, **Visible - Thermoreflectance (TR)**, **Near Infrared (NIR)**. (Press **F1** to switch between camera selections.)
3. Click the **"Temp Control"** tab; turn ON/OFF and view readings for Stage, Thermal Coupler (TC), and ROI. Set **Set Point** to 75, then click **"Stage State"** to turn on the stage.
4. Click the **"Auto Focus"** tab (Piezo system control) and select the objective magnification (5X in the source example).
5. Click **"Enable Motion"** ON and click **"Center Stage"** ON to center the Piezo controller. (The microscope may need refocusing after centering the stage.)
6. Click the file browser icon, choose the folder to save your file to, then click **"Current Folder."**
7. Select the desired imaging operation.

“ **Note:** Transient Thermoreflectance is not available when using an INFRARED camera.

## 9.2 Steady State Measurement

In the main Project Manager, select "**Steady State**" to open a new window.

### Hardware:

1. Enter the desired **Base Temp (C)** — 75 in the example — and click "**SET**" next to Set Base Temp.
2. Turn **Stage State** "ON."
3. Set "**Vo ON Voltage**" to 7V.

**Timing/Illumination:** 4. Set **Device On Time** to 10. 5. Set **Image Averages (#cycle)** to 10.

**3D Alignment — Focus ROI:** 6. Select a region on the CCD image with the rectangle tool. Choose a unique feature on the sample, such as edges or scratch marks. 7. Press "**Focus ROI**" to set the selected region as the ROI. 8. Wait a few seconds until the region is focused and the Focus ROI light turns green. (The selected ROI region displays in green. Use the magnifying glass with Shift held to zoom out, Shift+Click to zoom in.) 9. Confirm "**Enable 3D NanoAlign**" is checked; check it if not.

**3D Alignment — Capture Reference:** 10. After selecting the ROI and waiting for focus, press "**Capture Reference**" to set the selected region as the reference region. 11. Wait for the "**Capture Ref**" light to turn green — "**Enable Digital Anti-vibration**" turns on automatically. 12. Set initial values for Focus Tolerance, Alignment %, and Vibration Filter; the lights turn green when the image is in range. (Increasing Alignment % and decreasing Vibration Filter improves alignment accuracy. Alternatively, load a prior reference for easier alignment.)

**Start Measurement:** 13. Click "**START Measurement**" to begin. 14. The System Status bar shows progress and displays "Turn OFF" after each cycle, with the cycle count under "**Loop Iterations.**" (For TR, 9–11 Loop Iterations is sufficient.) 15. Under **Save Path**, verify the directory and Save Path name are correct. 16. Click the "**Save Every Cycle**" box; click "**Save Data**" when ready to save. (Save the image before stopping the measurement.) 17. Click "**STOP MEASUREMENT**" to stop. 18. Click "**Return to Project Manager,**" or click **File > Quit**, to exit the current measurement.

## 9.3 Calibration Measurement

In the main Project Manager, select "**Calibration**" to open a new window.

### Hardware:

1. Set "**Magnification**" to match the objective (5x in the example).
2. Set "**High Temp**" to 120 C and "**Base Temp**" to 75 C.
3. Turn "**Stage State**" ON.

4. Click "**Set Low Temp**" to initialize the chuck temperature to the base temperature.
5. Click "**Use Chuck Sensor**" to use the embedded chuck thermal sensor for calibration, or leave it off to use an external thermal probe.

**Timing/Illumination:** 6. Set **Stage Heating Time** to 40. 7. Set **Image Averages** to 50.

**3D Alignment — Focus ROI:** 8. Select a region on the CCD image with the rectangle tool (a unique feature such as edges or scratch marks). 9. Press "**Focus ROI.**" 10. Wait a few seconds until the region is focused and the Focus ROI light turns green. 11. Confirm "**Enable 3D Nano Align**" is checked; check it if not.

**3D Alignment — Capture Reference:** 12. Press "**Capture Reference**" to set the selected region as the reference region. 13. Wait for the "**Capture Ref**" light to turn green — "**Enable Digital Anti-vibration**" turns on automatically. 14. Set initial Focus Tolerance, Alignment %, and Vibration Filter values; lights turn green when the image is in range.

“ **Notes:** (1) Increasing Alignment % and decreasing Vibration Filter improves alignment accuracy. (2) As an alternative to Focus ROI/Capture Reference, load a prior reference: click "**Load Reference,**" select the saved file, and wait until the "Load Reference" light turns green.

**Start Measurement:** 15. Click "**START Measurement**" to begin. 16. The calibration cycles through; the System Status bar shows progress and displays "Calibration Done" after each cycle, with the cycle count under "Loop Iterations." 17. Select a region on Thermal Image View to view the Calibration Factor of the sample while the measurement runs (shown in the "Mean CTR" bar). 18. Under Save Path, verify the directory/name are correct (example in source:

C:\Data\Qualification\Training). 19. Under Save Image, click "**Save Every Cycle**"; click "**Save Data**" when ready. (Save the image before stopping the measurement.) 20. Click "**STOP MEASUREMENT,**" then "**Return to Project Manager,**" or click **File > Quit**, to exit the current measurement.

## 9.4 Failure Analysis (FA) Mode

### Frame Rate Selection:

1. In Project Manager, change "**Cam Selection (F1)**" to "**INFRARED.**"
2. Uncheck the "**INT Vo 20mA Range**" box (green = checked, grey = unchecked).
3. Click **File > Options** to open a new window.
4. Go to the "**Software**" tab; set "**FA Mode Pulse Width**" to **Long (15 Frames)**.
5. Return to the main Project Manager and click "**FA Mode**" to open the FA Mode window.

**Process** (confirms the device is biased and has current flowing before using Movie Mode): 6. Go to the "**Biasing**" tab. 7. Change **Vo(V)** to 7.000. 8. Click "**Update Values**" to apply the voltage. 9. Check that "**Peak Voltage (V)**" and "**Peak Current (I)**" show values near 7V and 70mA for device 2 (Center Diode).

“ **Note:** If the current is much lower than expected, return to Project Manager and confirm "**INT VO 20mA Range**" is unchecked.

**Save Data:** 10. **File > Save Data.** 11. Click the File Browser, select the folder to save data in, and click "**Current Folder.**" (Source example path: `C:\Data\Qualification\Training`.) 12. Enter the desired file name (source example: "FA-file"). 13. Click "**Save**" to save the data. 14. Click "**Return**" to exit the Save Microsanj Data pop-up window.

“ **Note:** Remember to change the "Microsanj Data Save Path" before saving a new data set, to avoid overwriting previous data.

## 9.5 Movie Mode

In the main Project Manager, select "**Movie Mode**" to open a new window.

### Control Settings:

1. Set "**Voltage to Device (V)**" to 7V.
2. Click "**Update V**" to apply the voltage.
3. Set the "**DUT Pulse (s)**" (1 s in the example); click "**Update Timing.**"
4. Confirm "**Save Whole Series**" is on (default); click it if not selected.
5. Click the "**File Path**" icon, or type the desired path, and select a name.
6. Click "**Start Movie**" on "**Movie Mode Acquisition.**"
7. Click "**Save Image.**"

“ **Note:** Movie Mode saves a series of 105 files per cycle when "Save Image" is clicked.

## 9.6 SanjANALYZER — Process Data

## System Status:

1. Confirm the Camera is set to **INFRARED**.
2. Click "**SanjANALYZER**" to open the "SanjVIEW Image Analyzer" window.

**Process Data:** 3. Select the "**Calibration**" tab. 4. Select "**Point to Point**" under the "**Method**" drop-down (a "Load CTR Map" window appears). 5. Click the Browse icon and select the calibration image. 6. Click "**LOAD**" to overlay the calibration image onto the selected test image. 7. In the file window (top left), click the Browse icon and double-click the file to analyze. (If the file isn't listed, click "**UP Dir**" to update the directory.) 8. Drag the ROI box across the length of the specimen with the rectangle tool to measure temperatures in that range. Up to 5 ROI boxes can be drawn to measure and compare temperatures at different locations — hold **Ctrl** while selecting. 9. Adjust the temperature scale and image-averaging factors as desired (optional). 10. Select the "**Settings**" tab, choose a file save path via the Browse icon, and save the processed image by clicking "**Save Image Current View**." 11. To process a series of images, enter the number of files into "**Number of Images in Series**" and click "**Process Series**." The ROI Mean graph plots the mean temperature of the selected ROIs over time.

“ **Note:** Export the graph data to a table via right-click on the graph → Export → Export Data to Clipboard.

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Revision #1

Created 2026-08-26 18:17:32 UTC by Accounts

Updated 2026-08-26 18:17:32 UTC by Accounts