

Setup and Installation

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1. System Description (components)

Any Nano-THERM system consists of: Optical Microscope, Camera, Standard Rack Model(s), and (optionally) a Probe Station. The rack front panel is shown in the source as Figure 7  [diagram/image in source – not reproduced here], and includes:

- **SanjSCOPE** — the power control module, with Emergency Off, chiller power switch, and master power switch (Figure 8, not reproduced).
- **SanjSOURCE** — the illumination module (see Specifications above).
- **SanjCONTROLLER+** — an integrated desktop computer connecting all modules and hardware, supporting both Thermoreflectance (TR) and Infrared (IR) functions, all managed via SanjVIEW 7.0.
- **4D Nano Align** and **Piezo Controller for AF-100** — thermal stage TE power source and piezo controller housing (see Specifications above).
- **600W Rack Mount Chiller** — recirculating liquid chiller for the thermal stage (see Specifications and Maintenance).
- **ATEC302 Temperature Controller** — bi-directional stage temperature control (see Specifications above).

2. Connecting the Nano-THERM System

Before making any connections, ensure all modules are powered off. Complete all connections and power on modules before running SanjVIEW v6 or v7.

Components needed for a Nano-THERM system:

1. Visible camera and USB 3.0 cables (camera to SanjCONTROLLER; camera trigger to SanjSOURCE)
2. Microscope with lenses
3. Thermocouple TC-01 (connects to SanjCONTROLLER)
4. Thermal Electric cable (connects thermal stage to 4D-Nano)
5. National Instruments PCIe 6612 Counter/Timer I/O cable (between SanjCONTROLLER and SanjSOURCE)
6. IR cable (IR camera to SanjCONTROLLER+)
7. HDMI cable (monitor to SanjCONTROLLER)
8. Piezo cable (Piezo stage to Piezo Controller in 4D-Nano)
9. Liquid lightguide for visible or near-infrared LED (microscope to SanjSOURCE)
10. Test sample
11. Ethernet cable (optional, for SanjCONTROLLER network connection)

[diagram/image in source – not reproduced here: Section 4.7–4.10 rear-panel connector diagrams for AF200, SanjSOURCE, SanjCONTROLLER+, and 4D-Nano]

4D-Nano rear panel connectors (for AF-100):

1. Temp controller USB
2. Thermal couple
3. Thermal Electric (TE) cable
4. Piezo USB cable
5. XYZ Piezo
6. Power — connects to Chiller DPU
7. Power — connects to Master DPU

Power Distribution Units (DPUs):

- **Master DPU** — powers the monitor, SanjSOURCE, SanjCONTROLLER, and the 4D Nano.
- **Chiller DPU** — powers the chiller and the 4D Nano.

Power-up procedure (confirm the Main Power Strip is connected to the proper outlet — 110V or 220V — first):

1. Ensure the Red Emergency Off (EMO) button is released (turn counterclockwise).
2. Flip the Master and Chiller switches to the ON position.
3. Press the 4D-Nano power button.
4. Press the SanjSOURCE power button.
5. Press the SanjCONTROLLER power button.
6. Press the Chiller power button.

Notes:

- This power-up sequence covers the SanjSCOPE, the two DPUs, and the optional battery backup power supply.

- A **Battery Backup Power Supply** is available as an option to protect sensitive equipment during power surges and allow the user to save data.
- Chiller (internal or external) cooling fluid hoses connect to the 4-inch or 6-inch thermal stage of the system.

3. TEA Test Sample Setup

The Microsanj TEA test kit includes: a Microsanj-TEA test sample, (3×) 2 mm screws, non-conductive thermal paste, and a bias cable connector with a BNC connector (pre-wired to series resistors [D1] and a diode [D2] in the test sample). [diagram/image in source – not reproduced here: Figure 2, TEA sample layout photo]

Procedure — prepare hardware and connections:

1. Apply a small amount of thermal paste evenly to the center of the thermal stage (or the metal backside area of the sample) for good heat transfer.
2. Secure the Microsanj-TEA test sample to the thermal stage using screws or clamps.
3. Plug the BNC cable into the VO INT output.
4. Plug the connector from the BNC cable into the test sample.
5. Plug the thermal sense lead (attached to the test sample) into the thermal reader.

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