

Heat Gun/ IR Camera

Control Software

User Manual

K500 SEELine

Software Ver. 1.2.0

8/11/2022

1. Setup

Step 1:

Roll the computer cart with the control software PC and I/O Box into Cave 1 if it is not already there.

Step 2:

In Cave 1, connect a cat5 or cat6 Ethernet cable from the KVM Extender box on the cart to the HG/IR KVM patch on the patch panel. Do not use one of the standard numbered patches, be sure to use the one specifically labeled HG/IR KVM.

Step 3:

Plug in and power on the power strip on the cart. Press the power button on the computer. The power button should turn blue as the computer boots up. Log in to 'SEE Guest' and open the Heat Gun Control Software icon on the desktop.

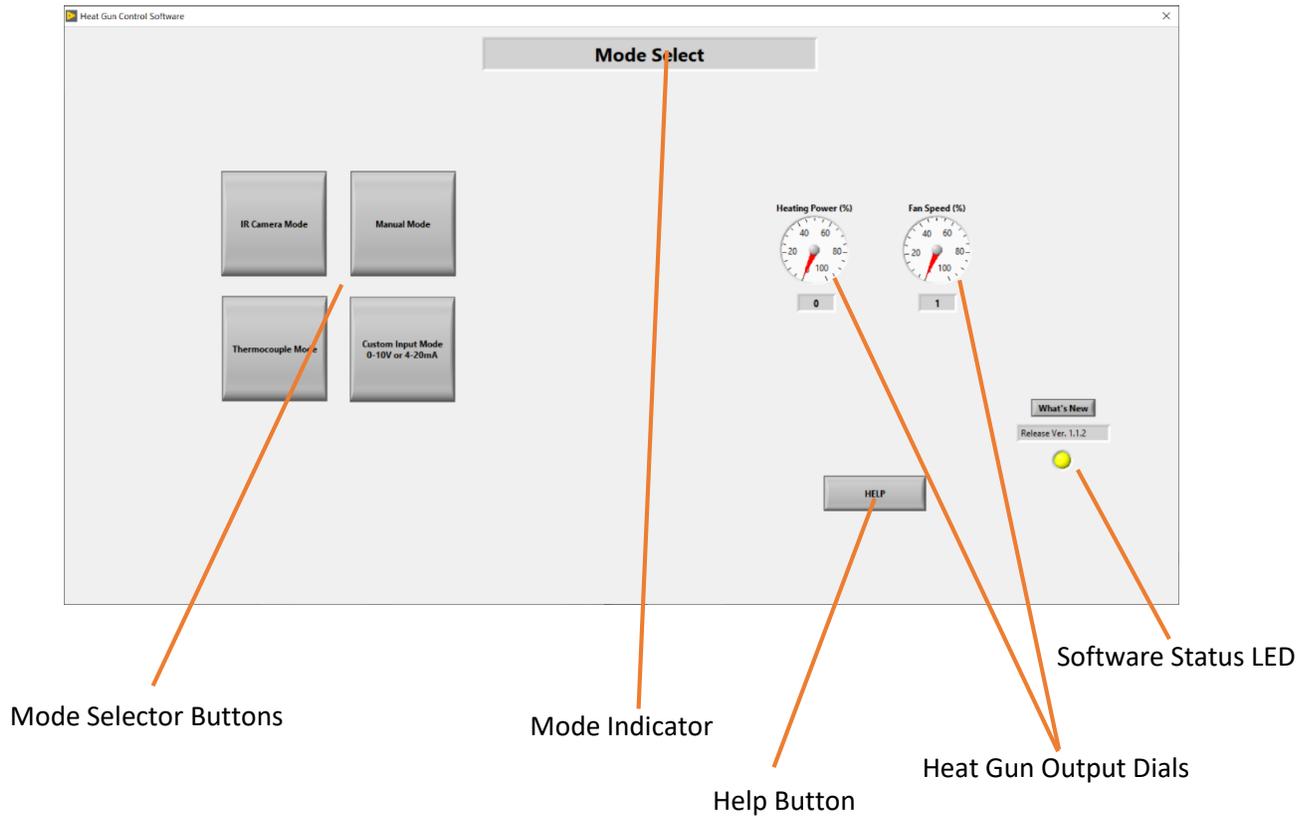
Step 4:

Plug in the heat gun to the wall outlet. Turn on the heat gun by pressing and holding its rotary button for two seconds. The fan should start up at minimum speed and there should be no heating. Use an Ethernet cable to connect the heat gun to the I/O box located on the cart (NOT the computer).

Step 5:

If you are using the IR camera, follow this step. If not, proceed to use the control software as needed. Point the IR camera at your DUT. The focal distance of the IR camera is approximately 1-2 feet and is fixed (non-adjustable focus). Ensure the IR camera has an Ethernet connection to the 'output' port on the PoE Injector on the power strip. Ensure the PoE injector has a cable from its 'input' port to the computer on the Cave 1 cart (not the I/O box). When facing the back of the computer (behind the left side of the monitor), the correct Ethernet port to use is the one towards the top (towards the ceiling). The Ethernet wires used should have metal connectors (they are already provided on the cart). Do not use a standard Ethernet wire.

2. The Main Interface



Mode Selector Buttons: Click to select the control mode.

Mode Indicator: Displays the selected mode.

Help Button: Click this to activate the help menu. From the help menu you can open the software manual, see contact information for support, and view common troubleshooting steps.

Heat Gun Output Dials: Show in real time the heating power and the fan speed.

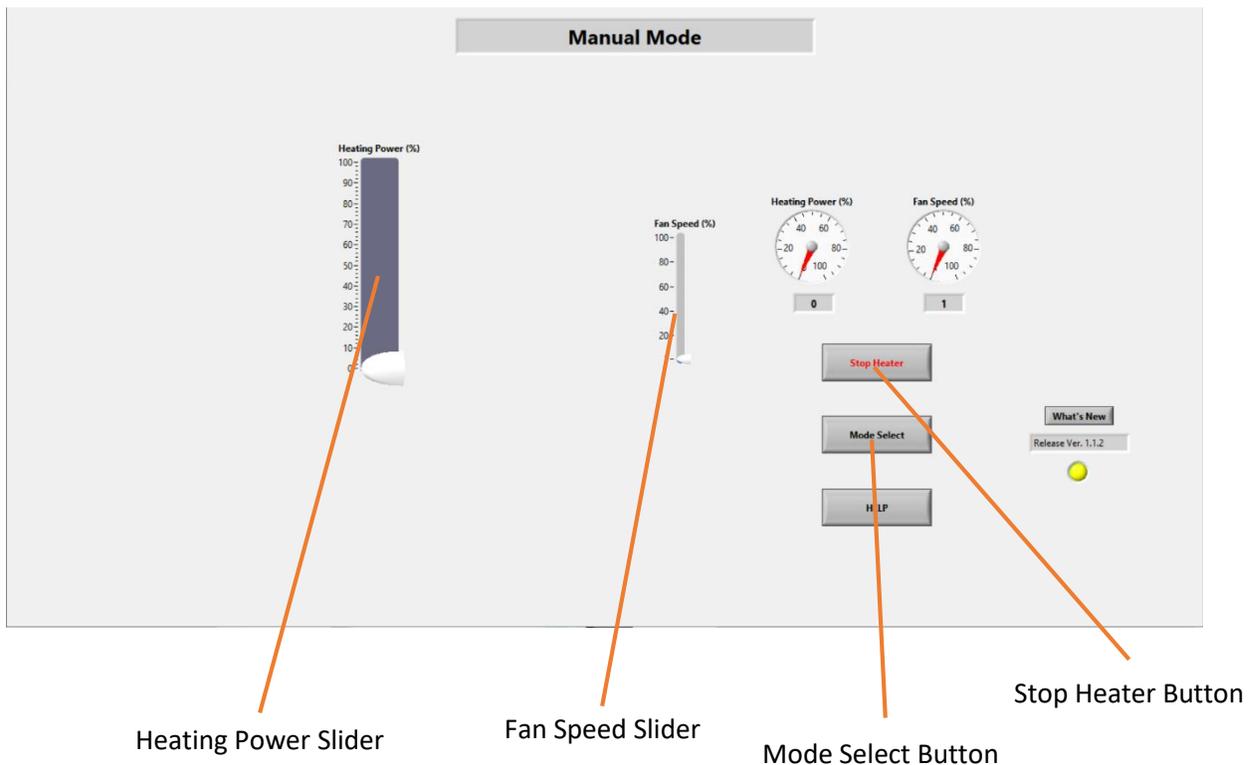
Software Status LED: When this LED is blinking, the software is running. If the light stops blinking, the software has locked up and needs to be restarted.

3. Manual Mode

To use Manual Mode:

Step 1: Click on manual mode. Two sliders should appear, one large and one small. The large slider controls the heating power. The small slider controls the fan speed.

Step 2: Adjust the fan speed and heater output to desired levels. The heat gun will maintain these settings as long as manual mode is maintained. There is no temperature monitoring or feedback loop in this mode.



Heating Power Slider: Drag the slider to select the percentage of the maximum heating power. The output temp of the heat gun can be viewed on the heat gun's LCD. At maximum heating power, the heater coil temperature is 650 °C.

Stop Heater Button: Click this to power down the heater (not the entire heat gun, just its heating element) to zero immediately. Click again to ramp heating power back to the previous setting. When restored, the heater will ramp from zero, with the exception of manual mode. In manual mode, the heater returns immediately to the previous value without ramping.

Fan Speed Slider: Drag the slider to select the fan speed. This slider is present in all modes.

Mode Select: Click this to return to the main (mode select) interface.

4. IR Camera Mode

To use IR Camera Mode:

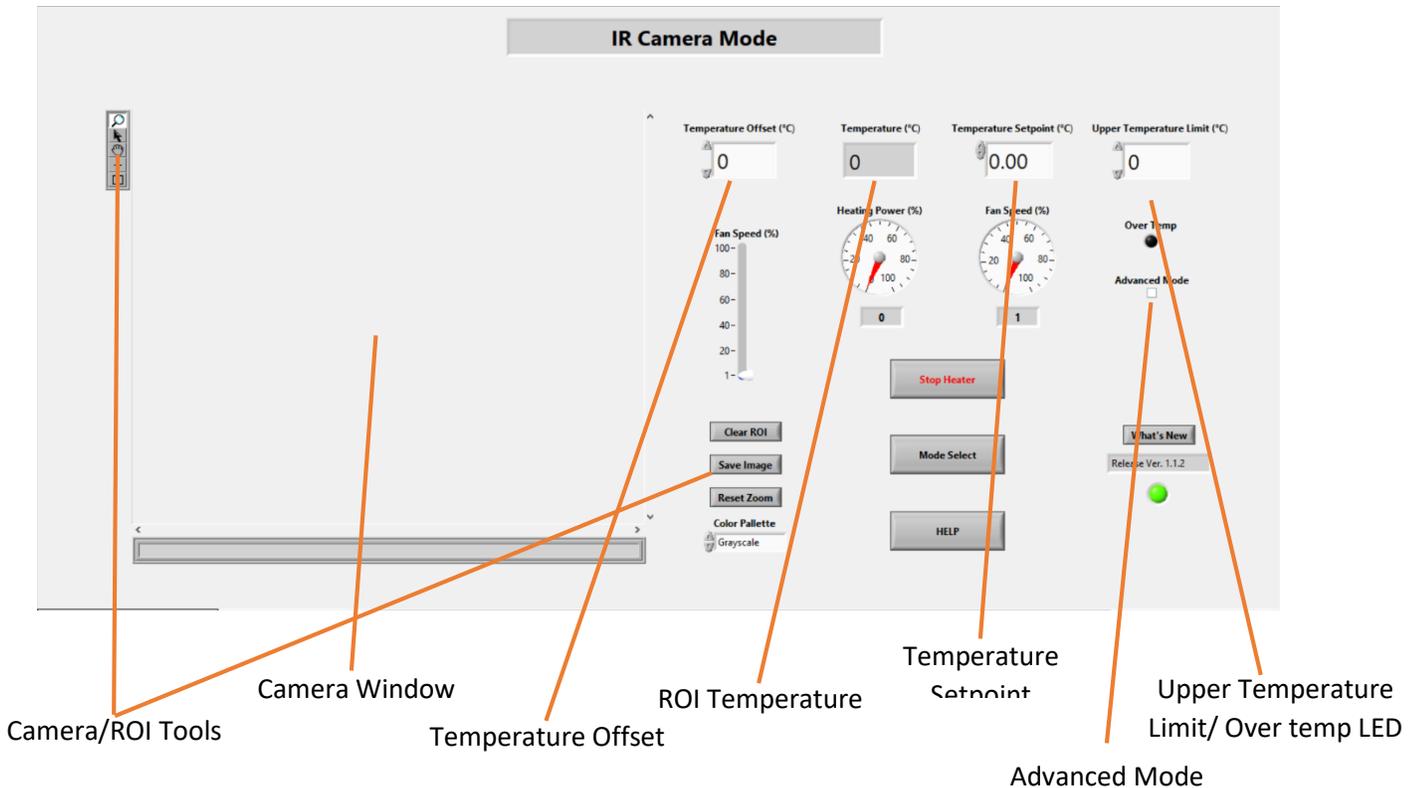
Step 1: Verify the IR camera is properly connected (see step 5 on page 2). Click on IR Camera Mode on the mode select screen. Wait a few seconds for the camera to initialize and produce the output image.

Step 2: Point the camera accordingly. Select your desired ROI tool. As of 12/08/20 there are two options: point and box. Create your ROI on your part. It may be necessary to clear a previous ROI by right-clicking on the camera view and selecting 'clear ROI.' The temperature box will display the average (or point) temperature of your ROI.

Step 3: Set your desired fan speed.

Step 4: Enter your temperature set point and upper temperature limit.

Note: To monitor your DUT with the IR Camera while manually controlling the heat gun or reading from a thermocouple or custom input, do not use IR Camera mode. Open "Research IR" on the desktop, and use the control software in manual, thermocouple, or custom input mode.



Camera/ROI Tools: Select which ROI type (point and box are currently available), then place the ROI in the camera window. You can also zoom, manipulate ROIs, and drag the image with the other ROI tools. The camera tools allow you to clear the selected ROI, reset the camera zoom to default, change the color palette, and save an image to the desktop (saves as "image.png" and overwrites itself every time the 'save image' button is pressed. Be sure to save or rename image.png every time).

Camera Window: Shows the IR camera's output and your selected ROI. The cursor always shows a temperature reading wherever it is pointing in the camera window.

Temperature Offset: Increase or decrease the reading of the ROI temperature. Useful if the external temperature of the part does not match a known internal temperature of the part.

ROI Temperature: Average temperature reading from the selected ROI.

Temperature Setpoint: Sets the temperature for the heat gun to maintain.

Advanced Mode: Check this box to enable manual adjustment of the Proportional, Integral, and Derivative gains of the PID temperature feedback controller.

Upper Temperature Limit/ Over temp LED: If the ROI temperature reaches this value, the heating power is automatically cut to zero until the ROI temperature drops below this value. The heating power will automatically ramp back from 0% when the ROI temperature falls below the upper temperature limit. The over temp LED lights up when the upper temperature limit has been reached. This value is recommended to be no less than 10 °C higher than the set point, as the ROI temperature may overshoot by around 5-10 °C while reaching the set point.

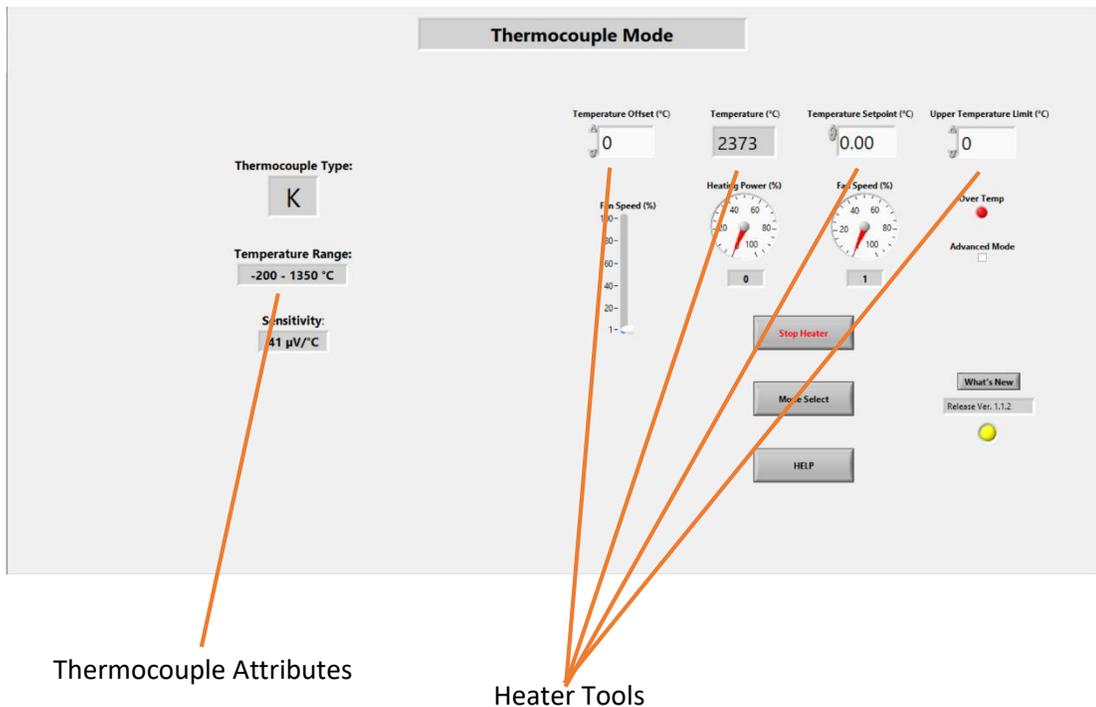
5. Thermocouple Mode

To use Thermocouple Mode:

Step 1: Select thermocouple mode on the mode select screen.

Step 2: Select the thermocouple type you wish to use. Verify that the thermocouple is plugged into the I/O box and is secured to your DUT. Ensure that the two leads of the thermocouple secured to your DUT are making contact with each other and with your part.

Step 3: Enter your temperature set point and upper temperature limit. See Page 5 for directions on setting the upper temperature limit.



Thermocouple Attributes: Automatically shows the type, effective temperature range, and sensitivity of the selected thermocouple type.

Heater Tools: See the IR Camera section (Page 5). These tools are the same in IR Camera Mode, Thermocouple Mode, and Custom Input Mode.

6. Custom Input Mode

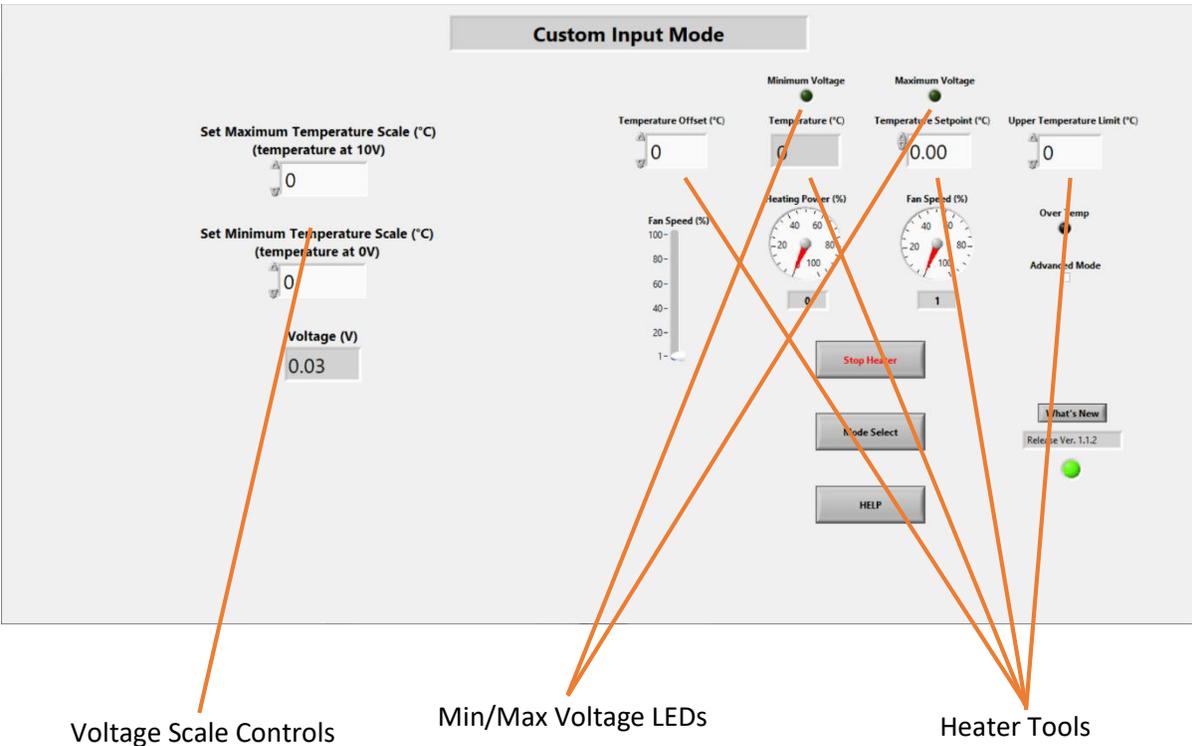
Note that this mode is only usable if your DUT is capable of outputting a linearized 0-10V DC signal. This mode is intended to be used when your DUT has its own temperature sensor that is capable of outputting the temperature as a linear function of the 0-10V DC signal.

To use Custom Input Mode:

Step 1: Plug in the BNC connector carrying your 0-10V DC signal to the BNC connection on the I/O box.

Step 2: Select custom voltage input mode in the mode selection screen. To the left of the screen you should see the voltage being read along with settings for what temperatures your temperature scale min and max out at. Set these values.

Step 3: The temperature box should show the temperature corresponding to the input voltage and the scale you set. Enter your temperature set point and upper temperature limit. See page 5 on directions for setting the upper temperature limit.

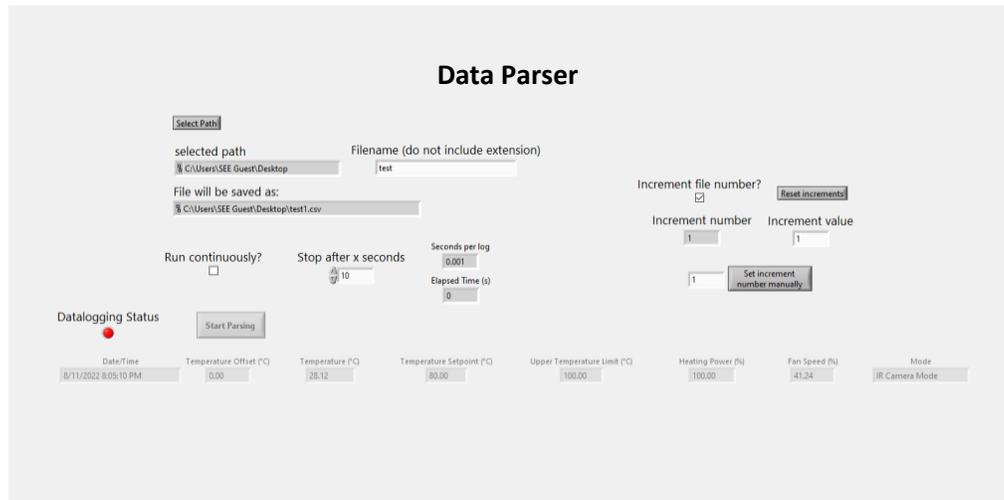


Voltage Scale Controls: Set the extremes of the temperature scale from your part. For example, if your part can read from -180 to 450 °C and these values correspond to 0V and 10V outputted by your part, respectively, and assuming the temperature scales linearly to voltage, enter in “-180” as the minimum temperature scale value and “450” as the maximum temperature scale value. The voltage value reads the raw voltage signal from the BNC connector.

Min/Max Voltage LEDs: These light up when the minimum (0V) or maximum (10V) voltage is read. The temperature display bottoms or maxes out at the values you set. For example, if you set 450 °C as the maximum temperature, and the voltage detected exceeds 10V, the temperature display will stay at 450 °C. Please do not exceed 10V. Negative voltages can be read but the temperature display will show the minimum (0V) value.

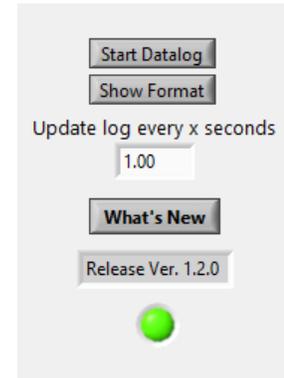
Heater Tools: See the IR Camera section (Page 5). These tools are the same in IR Camera Mode, Thermocouple Mode, and Custom Input Mode.

7. Data Logging and Data Parser



Heat Gun Control Software Version 1.2.0 incorporates datalogging in the IR Camera, Thermocouple, and Custom Input modes. To enable datalogging: at the bottom right of the window when in any of those three modes, adjust how often the log is updated by modifying the value in the box below “Update log every x seconds,” then click “Start Datalog.”

Click “Show Format” to show what attribute each value of the datalog corresponds to.



The data parser is a standalone application found on the desktop. It can be opened by clicking ‘Data Parser.exe.’ When first opening the application, the user is prompted for a file path for saving the datalogs. If Datalogging is active in the Heat Gun Control Software, the “Datalogging Status” LED switches to green and the “Start Parsing” button is enabled.

To datalog, first start the datalog in the Heat Gun Control Software. Then, in the data parser app, specify the file path and name for the datalog, specify the stop time or if the file will log continuously, and click “start parsing.” The data parsing can be aborted at any time. Files are saved as .csv for use with spreadsheet applications. Values are delineated with commas.

The data parser application allows the user to set whether the file name automatically increments with every subsequent run as well as how many increments the file name is incremented by. The file increment number can be set manually by setting the value in the box next to the “set increment number manually button” and clicking the button.

Please note that the data parser application appends files of the same name. If the user wishes to overwrite the file, it must first be deleted or renamed.

8. Shutdown:

Step 1:

Press and hold the rotary button on the heat gun for 5 seconds. This will put the heat gun into cooldown mode, in which the fan spins to maximum and the heater is turned off for two minutes. It will automatically go to sleep after the cooldown mode, at which point it is safe to unplug from the wall.

Step 2:

Close out of the control program and turn off the PC.

Step 3:

SWITCH OFF THE POWER STRIP ON THE CART. The IR camera is always on when it receives power. To preserve the lifetime of the camera, switch off the power strip to turn the camera off. Unplug the power strip.

Step 4:

Disconnect the cat-6 wire from the heat gun. Disconnect any thermocouple or BNC cables from your part to the I/O instrumentation box.

9. Troubleshooting:

The heat gun isn't accepting commands from the control software, even though the heater output % and fan output % dials are going up:

Verify the heat gun is connected via Ethernet cable to the I/O Box. On the heat gun itself, press and hold the rotary button for two seconds WHILE ALSO turning the button at least ¼ turn clockwise. You should enter an internal menu on the heat gun's display. Cycle one click of the rotary button counter-clockwise. The display should read "STORE." Press the rotary button.

The Temperature display in the control software is reading "N/A".

Restart the control software. There is no need to restart the computer.

The Status LED has stopped blinking:

Restart the control software. It may be necessary to open the task manager (control+shift+escape) if the program does not close from the 'X' button. Restart the PC if necessary.

There is no signal from the IR Camera to either Research IR or the control software:

Check the ethernet connection to the IR Camera and to the power strip. The cable going to the IR camera should be in the "output" port on the PoE injector, and the cable going to the computer should be in the "input" port on the PoE injector. Check the ethernet connection to the back of the computer. There are two ethernet ports on the back of the computer. When facing the back of the computer (looking towards the back of the monitor), the correct ethernet port to use is the one to your right.

The signal from the IR camera can only go to one program at a time. It cannot be called simultaneously to Research IR and the control software.

The Mode Select Button, or any other button, in the control software is not working properly:

Restart the control software. There is no need to restart the computer.

In Thermocouple Mode, the temperature display is showing an impossibly high or low number:

There is a break in the thermocouple wire. Verify the thermocouple is connected to the I/O box and ensure that both leads of the thermocouple wires are in contact with each other and your DUT.

The IR Camera signal in the control program has been lost

Check the IR Camera Ethernet connection. The IR Camera should be connected to the PoE Injector “output” port and the PoE Injector “Input” port should be connected to the computer. When looking at the back of the computer, the correct ethernet port to use is the one to your right. Restart the control program and re-enter IR Camera mode.