

EON-ID™

controller w/ integrated touchscreen

user guide

for vers. 3.1.0.63 software

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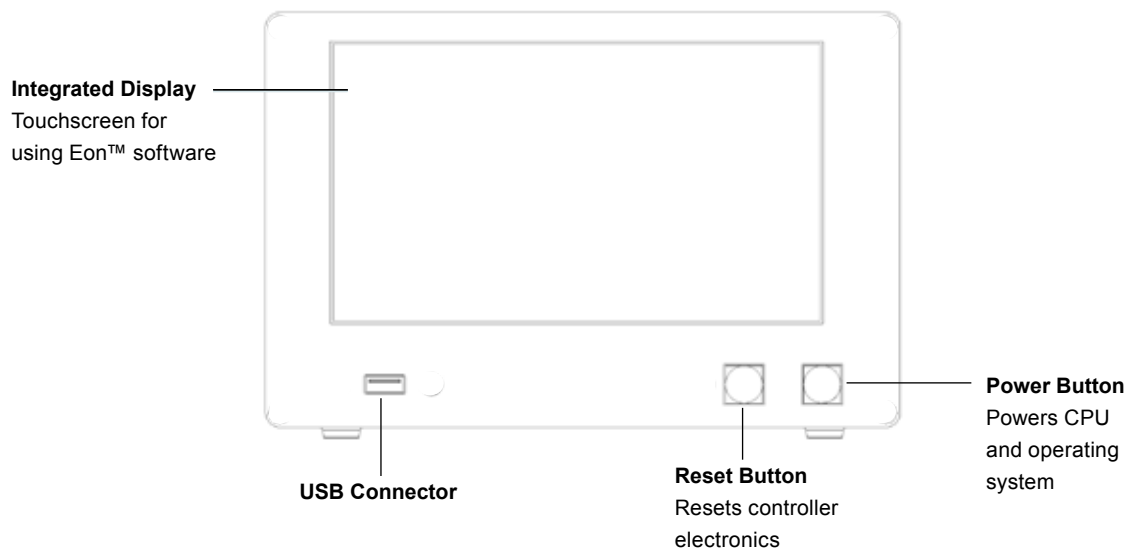
Eon-ID™ at a Glance

1

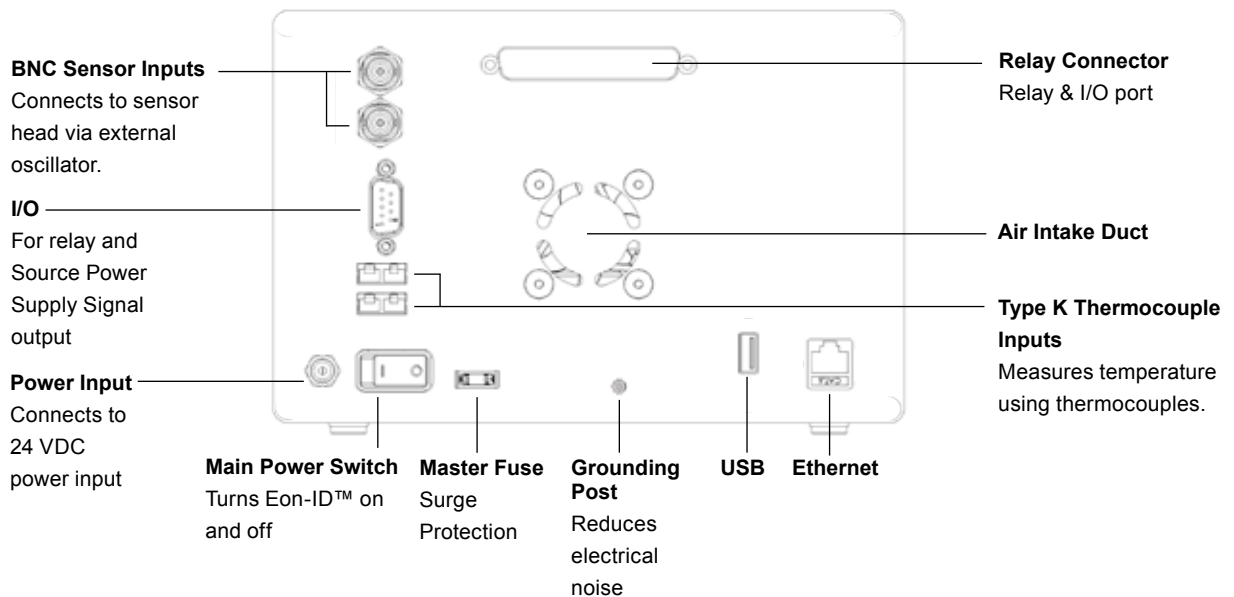
This guide describes Eon-ID™ controller with temperature control (3rd generation) and the pre-installed Eon™ software.

Exterior Features

Front



Back





WARNING Make sure the correct hardware is used with Eon-ID™ inputs and outputs. See proper setup procedures in this manual and in the Eon-ID™ quick reference guide.

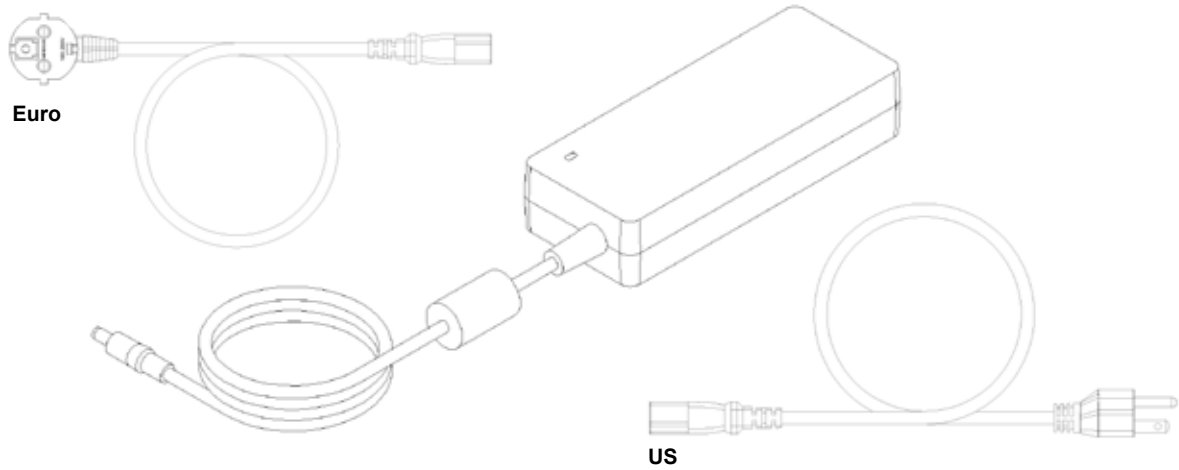


WARNING Only the provided power supply should be used with Eon-ID™. Not doing so will damage product and void warranty. Make sure power supply has a 24 VDC.

Accessories

Eon-ID™ ships with the following accessories:

Power Supply and cable. Input 100-200 VAC, 50/60Hz, 2 A. Output 24V, 3.75 A, 90W Max.



External Oscillator. Amplifies crystal drive signal.



Getting Started

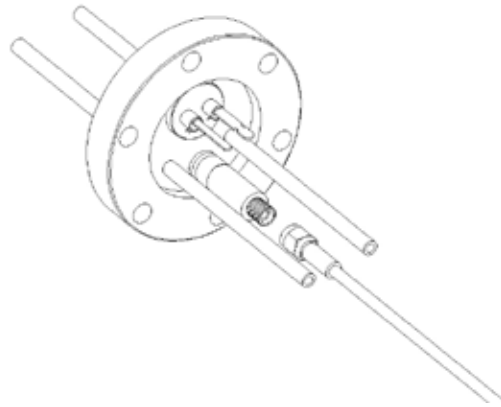
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Eon-ID™ System Assembly

The following guide will describe in detail how to integrate the Eon-ID™ controller into a basic QCM configuration. The QCM depicted below is the Colnatec Phoenix™ sensor head featuring temperature control technology. If using an alternative QCM, skip the step highlighted in red. (See Appendix A for connection map of a fully assembled Eon-ID™ system).

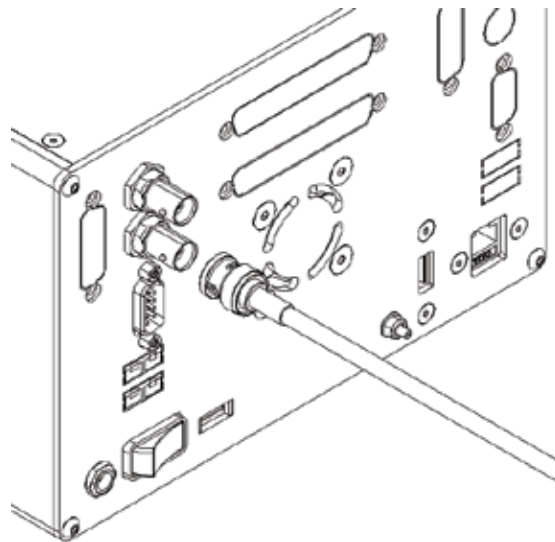
1. Connect 6" SMA-to-BNC Coaxial Cable to Sensor

Spin cable in place using cable shaft until resistance is felt. (Twisting cable shaft past point of resistance may damage cable). Roll fingertip over connector to tighten.



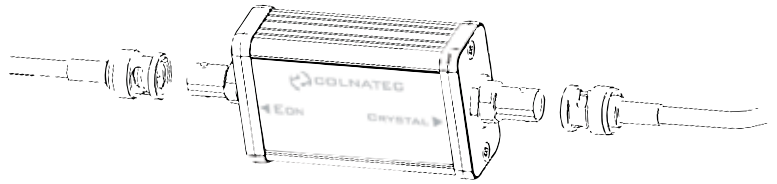
2. Connect 10' BNC Coaxial Cable to Eon-ID™

Slide coaxial connector onto BNC.



3. Unite Sensor and Eon-ID™ with Oscillator

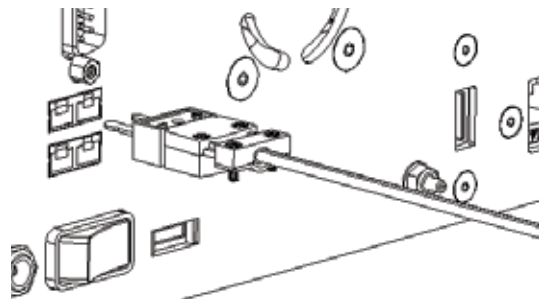
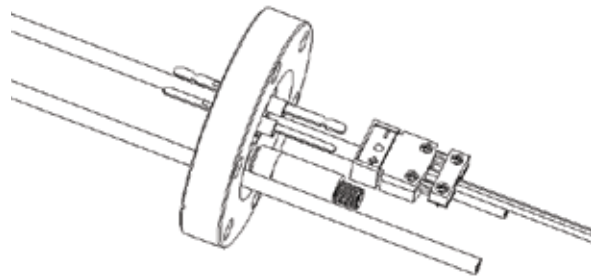
Attach Eon-ID™ BNC cable to connector marked “Eon”. Then, attach sensor BNC cable to oscillator connector marked Crystal (or “XTAL”).



4. Connect TC to Eon-ID™ and Sensor (skip this step if using a sensor not manufactured by Colnatec™)

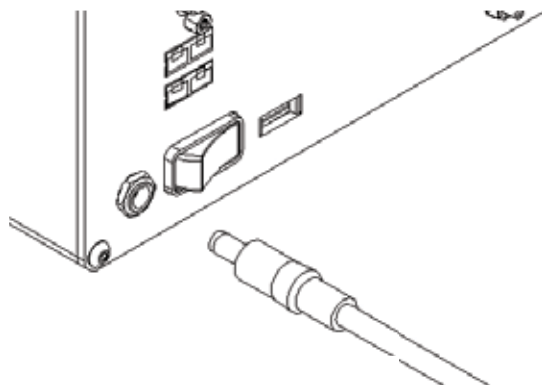
Plug thermocouple connector on sensor into female end of thermocouple extension cable.

Plug the male end of thermocouple extension cable into thermocouple connector on back panel of the Eon-ID™.



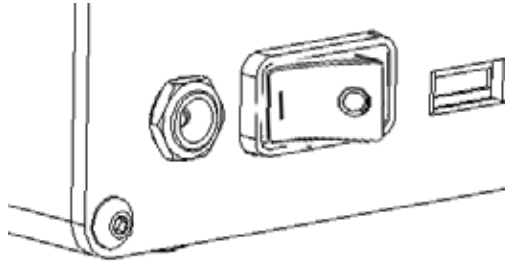
5. Connect Power to Eon-ID™

Plug Eon-ID™ power adapter into AC outlet. Then plug DC connector into the Eon-ID™.



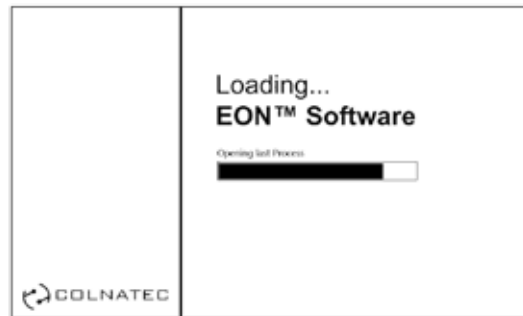
6. Powering on Eon-ID™

Flip the master power switch on the back of Eon-ID™ to power on unit.



7. Launching Software

Once powered up, Eon-ID™ automatically launches Eon™ software.



Using Virtual Keyboards

Eon-ID™ is pre-loaded with Eon-ID™ software designed specifically for touchscreen interactivity. In instances where a physical keyboard would normally be required, virtual alpha and numeric keyboards can be accessed. To use the virtual keyboards, touch and hold text input field until the text entry window appears.



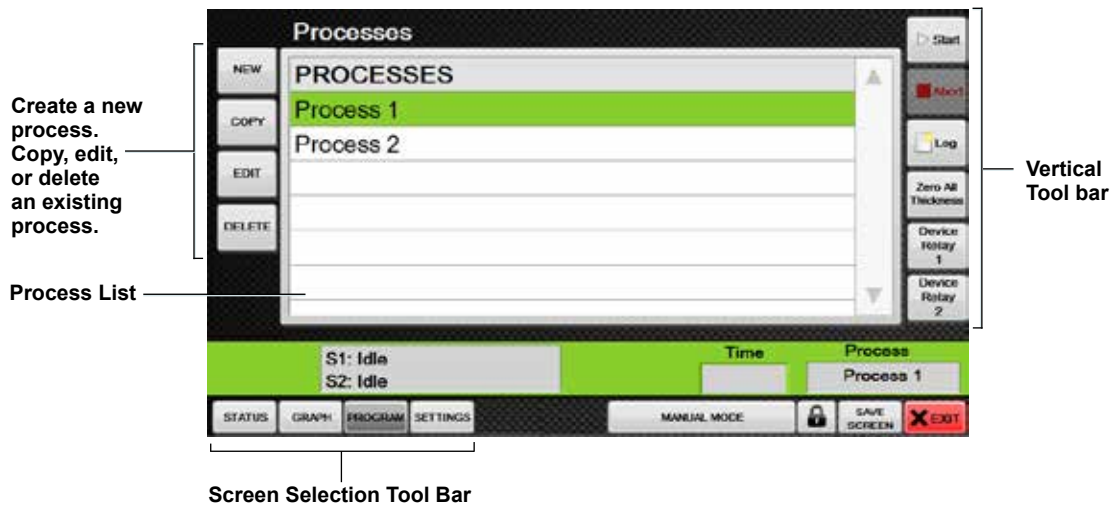
Type in text as usual. To use special characters in the alpha keyboard, select the Shift button (turns green while active). To return to the regular keyboard, deselect the Shift button.

Program Control

3

Program Control Screen

Select <PROGRAM> in the Screen Selection Tool Bar to access the Program Control screen. With this section, user will be able to create a new process, and copy, edit, or delete an existing process, as well as add or remove layers and layer properties.



Process List

Create a new process, and copy, edit or delete an existing process. The list contains all of the available processes.



Note: Process selector will automatically change to the process selected in the Process List when a process is not running.



To enter text, touch and hold the text field until virtual keyboard appears.

Creating a New Process. Selecting <NEW> brings up the New Process Screen. Enter a name in the text field and select either sequential or co-dep. When <OK>, is pressed, the process will appear on the Process List.



Editing a Process. On the Process Screen, select an existing process in the Process List and press <EDIT>.



Deleting a Process. Pressing <DELETE> will permanently delete a process.

Process Layers

Accessing the Layers of a Process. To add a layer or access the existing layer(s) of a process, touch and hold a process name. This will open the Layer List Screen (shown below).



To enter text, touch and hold the text field until virtual keyboard appears.

Adding a Layer to a Process. Press <NEW>. This will take the user to the New Layer Screen. (See [“New/Edit Layer Screen” on page 16](#)).

Copying a Layer. Pressing <COPY> produces a copy of the layer on the Layers List.

	LAYER NAME	RATE [A/s]	THICK [KÅ]
	Layer 1 Name	1.000000	1.000000
	Layer 1 Name	1.000000	1.000000
	Layer 1 Name	1.000000	1.000000
	Layer 2 Name	0.000000	0.000000

Editing a Layer. Select a layer on the Layers List, then press <EDIT>. Use the Layer Edit Screen to edit the properties of a layer. (See [“New/Edit Layer Screen” on page 16](#)).

Removing a Layer. Select a layer, then press <DELETE>. This removes the layer from the Layers List. (Note: Once a layer is removed, it can always be retrieved using the Use Stored Layer feature. For more on this, see [“Use Stored Layer” on page 16](#) for more details).

New/Edit Layer Screen

Enter the layer name using the alphanumeric keypad, and the rate and thickness using the numeric keypad. Select <USE STORED LAYER> to access an archive of saved layers.




Use Stored Layer. On the New Layer Screen select <USE STORED LAYER> to use a previously saved layer. The properties of the stored layers are predefined, but rate and thickness will still need to be entered.



Select the previously saved layer and press <OK> to use it in the current process.

Press <DELETE> to delete the layer. The Delete Layer Screen warns that the layer will be permanently deleted.



When  is selected, the layer will be deleted permanently and universally from any process containing it as well as from the device itself.

Selecting a Source / Selecting a Sensor. On the layer Properties Screen, the Sensor selection keys determine which of the two sensor inputs will be used to control the source power supply signal. The Source selection keys determines which of the two source power supply signal outputs will be used to control the power supply of the deposition control source based on the input of the selected Sensor. (For more information about the source power supply signal, see [“Source Power” on page 121](#)).

Select one of four configurations:

- Sensor 1 → Source 1
- Sensor 1 → Source 2
- Sensor 2 → Source 1
- Sensor 2 → Source 2



Selecting a Material. On the Layer Properties screen, touch and hold the Material Name, Density, or Z-Factor fields to open the Materials List screen.

On the Material List Screen, select the applicable material. The correct density and Z-Factor is automatically set.



If the material being applied in your process is unlisted, then press <ADD> to add a custom material.



To enter text, touch and hold the text field until virtual keyboard appears.


Adding a Material. On the Materials List Screen, press <ADD> to add a new material. The Add a Material Screen will open.



Give the new material a name and adjust the Density and Z-Factor according to your preference. Select <OK> to create the new material.

Deleting a Material. On the Materials List Screen select the material to be deleted and press <DELETE>, taking the user to the Delete Material Screen.



Press  to permanently delete the material.

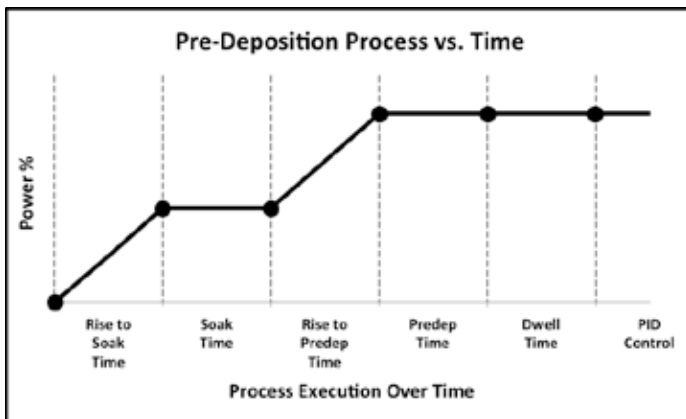


To enter text, touch and hold the text field until virtual keyboard appears.

Layer Properties (Defined)

The following is a list of settings that defines the parameters of the deposition. All settings must be set correctly for the software to function properly.

- **Materials**
The material being applied during the deposition process.
 - **Density**
The density of the selected material being applied.
 - **Z-Factor**
Acoustic impedance factor which is used to compensate for dense materials and is predefined based on the selected material.
 - **Tooling [%]**
The geometric relationship between the substrate and the positioning of the sensor. This property is used to correct error in thickness due to the relative location of the sensor head and source vs the substrate and source. (See [“Tooling Factor Calculation Method 1” on page 61](#); and [“Tooling Factor Calculation Method 2” on page 62](#)).
 - **Max Power [%]**
Specifies the maximum voltage output allowed on the source control signal based on a percentage of its total voltage of 5v. For example, because the maximum voltage of the source control signal is 5v, setting a maximum power of 50% would apply a source control signal output of 2.5v to the source power supply.
 - **Proportional**
The proportional coefficient that controls the material deposition rate during the PID phase.
 - **Integral**
The integral time constant that controls the material deposition rate during PID phase.
 - **Derivative**
The derivative time constant that controls the material deposition rate during the PID phase.
 - **Source**
For selecting the Source Power Supply Signal that will be used to control the Deposition Control Source. The Eon-ID features two Source Power Supply Signal outputs accessed via the I/O port. These are classified as Source 1 and Source 2. (See [“DB9 I/O Pin Diagram” on page 120](#); and [“Source Power” on page 121](#)).
- Sensor**
Determines which of the two sensors will be used to control the Source



Predeposition Process vs. Time

Power Supply Signal for the current layer.

- **Rise to Soak Time**
The time specifying how long it takes Eon-ID™ to raise source power from 0% to desired soak power
- **Soak Time**
Once the soak power is reached, this is the time specifying how long Eon-ID™ sits at soak power before continuing to “Rise to Predeposit”.
- **Soak Power**
The power percentage that the source will achieve during soak process.
- **Rise to Predeposit**
The time specifying how long it takes Eon to change the current source power to the power percentage set for Predeposit.
- **Predeposit Time**
The time specifying how long Eon-ID™ will maintain the set “Predeposit Power” before moving into dwell.
- **Predeposit Power**
The power percentage that the source will achieve during the Predeposit process.
- **Dwell Time**
The time specified that follows the completion of the predeposition process before activation of the PID. This setting is generally used when a shutter is employed. Dwell Time provides the time required for deposition material to reach the sensor and substrate after the shutter opens and before the PID activates. When the shutter opens after predeposit time is reached, the deposition material is still en route to the substrate and the sensor. If this Dwell Time “delay” is disregarded, the PID will activate immediately when the shutter opens. In response, the device will miscalculate the level of power that the source power supply should be

generating, causing the source power supply to ramp up power output to the deposition source controller; hence, causing the source deposition controller to dramatically over-shoot the desired deposition rate. If no shutter is used and no dwell time required, a value of 0 can be inserted, initiating the PID immediately after predeposit is reached.

- **End of Layer Action**
 - Continue Selection: Continue with the next layer immediately when the layer is finished.
 - Wait for Start Press: The unit will wait for the user to press the Start button again, before continuing to the next layer.
- **Rate Abort Deviation**

Initiates the abort process automatically if the rate deviates from the set point at the percentage specified.
- **Abort Delay**

Specifies the amount of time that the unit should wait before aborting the process from the time the rate initially became out of tolerance. If the rate comes back into range, then the abort timer is reset.
- **Rate Warning Deviation**

Triggers a warning message if the rate deviates from the set point at the percentage specified.
- **Rate Warning Delay**

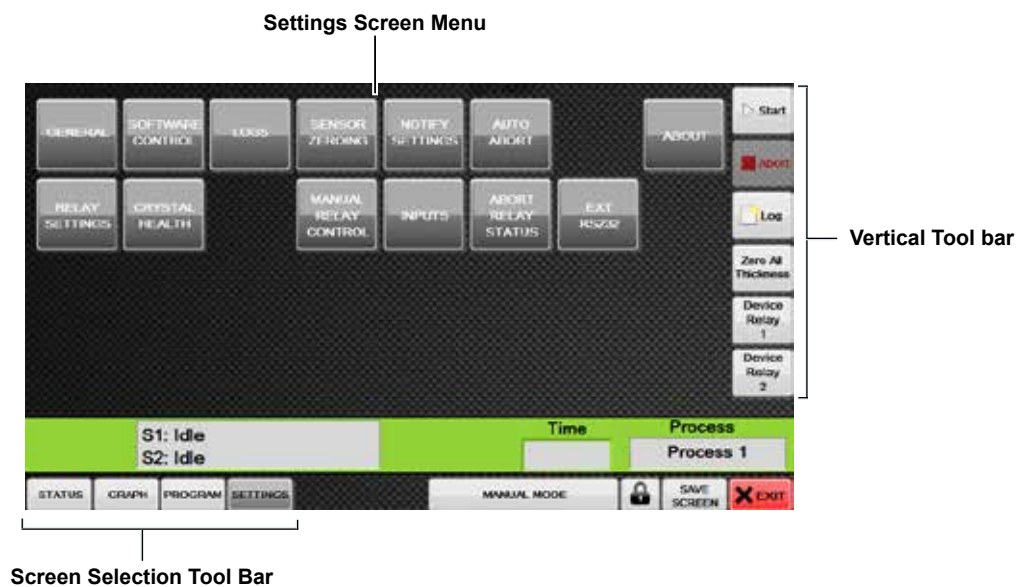
Specifies the amount of time that the unit should wait before warning the user that the rate is out of range. This time is started from the time the rate initially became out of tolerance. If the rate comes back into range, then the warning timer is reset.

Settings

4

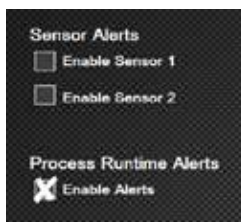
Settings Screen

Press <SETTINGS> on the Screen Selection tool bar to access the Settings Screen. Use the Settings Screen menu to select the settings of various software operations.



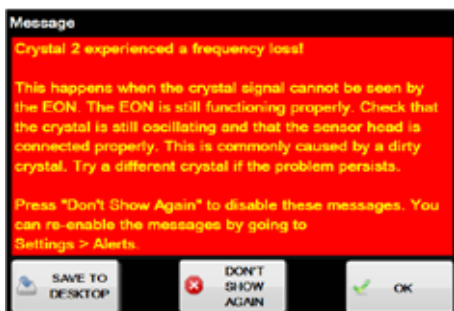
Notify Settings

The Notify Settings menu provides the option of enabling or disabling sensor and process runtime alerts.



Process Runtime Alerts. These alerts notify the user about possible issues they might encounter when running a process, such as a rate, thickness set to 0, or missing density or Z-Factor values. The software will check for these settings while a process is running. This is useful when a user is modifying the settings of a process during a deposition run.

Sensor Alerts . This alert notifies the user if the crystal signal drifts above or below 6-5Mhz, indicating the crystal sensor has experienced a frequency loss.



When the sensor alert is triggered, the message suggests possible causes that might help resolve the issue. Although it is recommended that the sensor alerts generally remain enabled, the user can tap <DON'T SHOW AGAIN> to disable the alert. (Alerts can be re-enabled by going to the main Settings screen > Notify Settings and rechecking the boxes under Sensor Alerts).



Note: The device is capable of reading a frequency between 6-5Mhz. Although they technically fall within 6-5Mhz range, **5Mhz crystals are incompatible with this system** due to the occurrence of frequency drift. Use 6Mhz crystals only.

Log Screen

The Log Screen features various tools for managing, retrieving, and saving log files.



Log Folder. With this option, individualized log folders can be created (log files are typically saved to the following location: "...\\Public Documents\\Colnatec\\LOGS"). For example, if the name "Folder1" was entered, the file path to any newly created logs would be "...\\Public Documents\\Colnatec\\LOGS\\Folder1".

Prepend Log Name. Using this option, a specialized name can be added to the beginning of logs recorded by the device.

Append Log Name. With this feature the user can add a specialized name to the end of the log recorded by the device.




Note: If a log recording is already underway, the logging must be restarted for the new name to take effect.

Note: Naming restrictions built into Microsoft Windows will prevent log recording if the following characters are used: [* / > " : |]. Eon-ID™ software raises a prompt to warn the user that the name is invalid. **Log files and folders** with restricted characters in the names will not save. For more information about this, see “Naming Files, Paths, and Namespaces” (<https://msdn.microsoft.com/en-us/library/windows/desktop/aa365247>)


Data Logged Selection. By selecting items from the list of data categories, the user can specify the type of data that is saved to the generated log file. Tap <Select> to select or unselect an item.


General Settings Screen

Period Control. The Period Control tuner  is used to adjust data collection frequency in increments of 0.1 seconds. The period range is 100 ms to 1 second to 0.1 seconds to 1 second.

Note: Values below 100ms may not be stable depending on the type of hardware being used.

For precision adjustment, moving the slider  produces an indicator showing the current value.

Changing the measurement magnitude  only affects the Status screen. Log files will still be recording in kilo-angstroms.

Restore Defaults. Tapping  restores default settings for the unit.

Sensor Zeroing

With the **Sensor Zeroing** panel, the user can select when to zero Sensor 1 or Sensor 2. Settings for each sensor are identical.



- **Before Log.** Pressing Log button zeros the sensor.
- **Start Pressed.** Pressing Start button zeros the sensor.
- **Before Layer.** Starting a new layer zeros the sensor.
- **Before PID.** Starting PID zeros the sensor.



NOTE: Failing to zero a sensor before each layer or PID can produce flawed data. Selecting Before Layer or Before PID will ensure timely zeroing.

Relay Control

Allows the user to change the settings for each individual relay on the unit and specify their settings. **Note:** The output for the Relay Board relays is located on the DB37 relay connector on the back of the unit (see [“Exterior Features” on page 7](#); and [“DB37 Relay Board” on page 119](#)); while the output for Device Relay 1 and Device Relay 2 is located on the DB9 I/O port, also on the back of the unit (see [“Exterior Features” on page 7](#); and [“DB9 I/O Pin Diagram” on page 120](#)).



NOTE: All relays are rated for 2A @ 30VDC/250VAC.

Actual Reported Relay Status. These indicators display the current status of the relays reported by the relay board hardware. These values are reported directly by the relay board hardware.



Relay State. This control allows the user to select which of the two states the relay should be in when the event occurs.

→ **LATCH.** When <LATCH> is engaged, a continuity is formed between the relay outputs on the specific I/O port to which the relay is connected. This setting will take effect immediately and the relay state will change as soon as the condition is true.

→ **UNLATCH.** When <UNLATCH> is engaged, no continuity is formed between the relay outputs on the specific I/O port to which the relay is connected. This setting will take effect immediately and the relay state will change as soon as the condition is true.

Relay. Use <RELAY> control to select which relay to use for the specified function.

When. Use <WHEN> to specify when the relay should be activated. The relay will be set to the specified state when the event selected in the WHEN control activates.

Select from the following <WHEN> events:

→ **Never.** Relay will never change its state automatically.

→ **Crystal Needs to Be Changed.** When crystal health drops below the percentage specified by the “Crystal HP Replace %” alert in the Crystal Health section on the Settings Screen.

→ **The Process Is Running.** While a process is running, the relay will be set to the specified state. When the process is no longer running, the relay returns to its opposite state.

→ **A Layer Is Running.** Will be in the selected state only when a layer is currently running. This is different from “The Process Is Running” WHEN event because the relay will return to its original state in-between layer runs.

→ **Rising to Soak.** The relay will change its state while the layer is in the “Rise to Soak” step during the predeposition process. When leaving the “Rise to Soak” step, the relay will return to the opposite state. The source that relay should monitor during the Predeposition process will need to be specified.

- **Soaking.** The relay will change its state while the layer is in the “Soak” step during the predeposition process. When leaving the “Soak” step, the relay will return to the opposite state.*
- **Rising to Predeposit.** The relay will change its state while the layer is in the “Rise to Predeposit” step during the predeposition process. When leaving the “Rise to Predeposit” step, the relay will return to the opposite state.*
- **Predepositing.** The relay will change its state while the layer is in the “Deposit” step during the predeposition process. When leaving the “Predepositing” step, the relay will return to the opposite state.*
- **Depositing.** The relay will change its state while the layer is in the “Deposit” step during the predeposition process. When leaving the “Depositing / PID” step, the relay will return to the opposite state.*
- **Rate is Ramping.** The relay will be set to the desired state when the current rate is equal to or greater than the set rate of the specified sensor.
- **Process Completed Successfully.** The relay will change its state only if the process has completed successfully. The relay will be reset on the next process run.
- **Abort is Pressed.** The relay will be set to the specified state when the abort button is pressed and will return to its previous state when a new process starts.
- **Process Auto Aborted.** The relay will be set to the specified state when the process is automatically aborted due to specified settings and will return to its previous state when a new process starts.
- **Last Layer Running.** The layer will be set to the specified state while the last layer of the process is running, returning to previous state when the layer is completed.
- **The Crystal Fails During Process.** If the crystal signal is lost while a layer is being run, the relay will activate and remain active until a new layer is run.
- **Max Power Reached.** The relay will activate if the max power specified in the layer’s settings is reached. The relay will return to its previous state when the power is no longer at max power.
- **Any Abort Occurs.** The relay is activated if any abort occurs; this includes both manual or automatic aborts. The relay will return to its previous state when a new process starts.

* The source that relay should monitor during the Predeposition process will need to be specified.

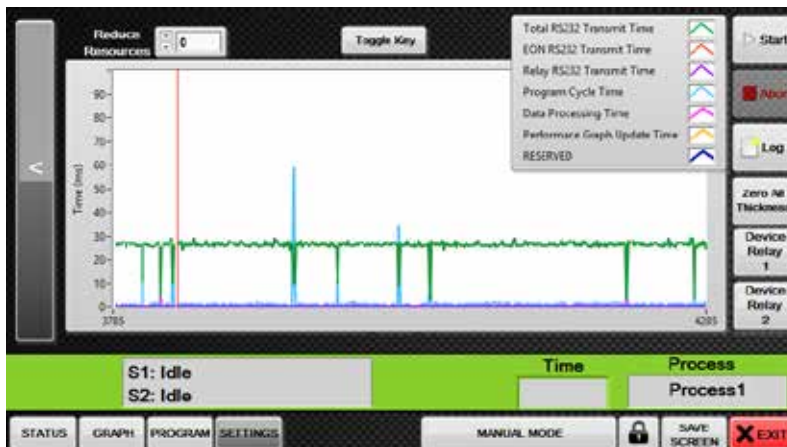
Auto Abort on Max Power

The Auto Abort on Max Power feature provides the user with the option of aborting a process if the Max Power percentage specified in the layer's properties is reached and sustained for a period that exceeds the time set in the Abort Delay Time control. On the Settings menu, select <AUTO ABORT> to access the Auto Abort on Max Power feature.



Software Monitor Screen

The Software Monitor screen is a troubleshooting tool that allows the user identify issues with missing data points.



The Eon™ software must be able to execute its code faster than 100 ms to keep up with the readings of the Eon-ID™. If the Eon™ software execution time exceeds 100ms - or higher than the specified period in the eon software - the Eon™ software will not be able to take readings fast enough from the hardware, and as a result data points will be missed when logging data.

The graph represents the execution time of the Eon™ software in milliseconds. The graph data should not exceed 100ms or the maximum period set in the software; otherwise, data points will be missed. This graph is useful to determine if external programs or internal hardware are causing data points to be missed due to slow software performance.

The graph should also be used when applying the “Reduce Resources” control, which is a process that involves intentionally slowing down the software in order to reduce the demand on internal hardware. **Note:** The “Reduce Resources” control should only be adjusted if the Eon-ID™ is having issues running the Eon™ software.


Reduce Resources Control. This control allows the user to reduce the speed at which the program runs. This is useful if the software is using excess hardware resources to run. Tap on the Reduce Resources entry control and enter a new value.



This Reduce Resources control should only be used when hardware performance is an issue. The data on the graph should not exceed a value of 100; otherwise, data points can be lost. The optimum setting of the Reduce Resources control is 0. A setting of 0 allows the software to perform at maximum speed.



Note: Increasing the Reduce Resources control setting can cause the software to take longer than 100ms to execute. If this happens, the software may miss readings.

Toggle Key. Tap  to toggle the display of the color key on the Software Monitor screen.

About

The About window contains useful information regarding your Colnatec products such as device type, software, and firmware versions . This information may be required when requesting assistance with your system.



The About window also contains several useful Colnatec web links as well as access to support documentation. Tap <HELP FILES> to open up a window containing Colnatec user manuals and quick start guides for handy reference.

Input Control

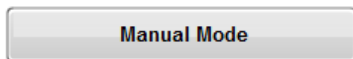
(See appendix, [“Input Control” on page 64](#)).

Manual Mode

5

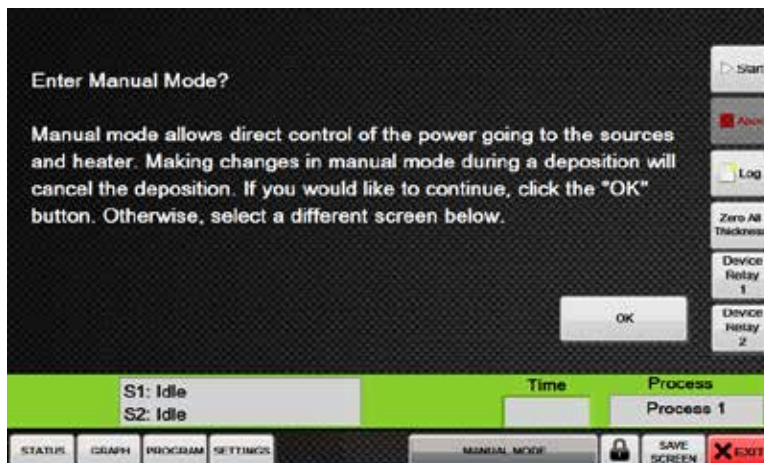
Manual Control

Manual Mode is an alternative operating environment in which the user can exercise manual control over the sources (Source 1 and 2). To access manual mode, simply tap



from any screen.

The following screen will be displayed:

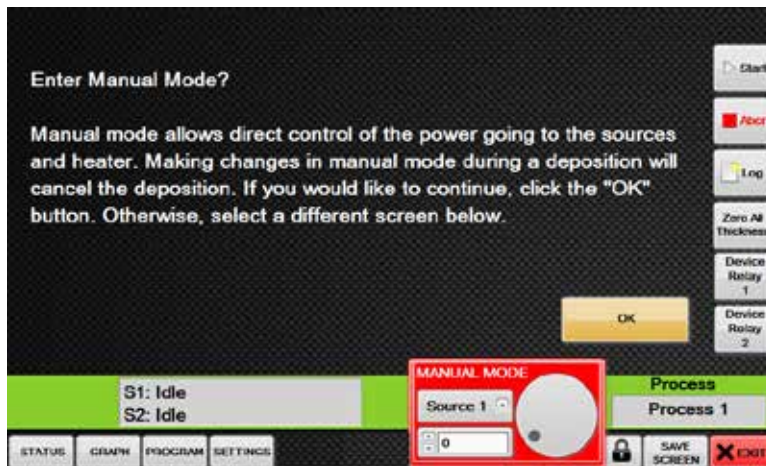


Make note that entering Manual Mode and making changes during a deposition will cancel the deposition. Tap <OK> to enter Mode Manual or select a different screen from the Screen Selectoon tool bar.



Note: In order for the program to update the source power, the user must enter a new value and then press in an area other than the Source Power indicator or press enter.

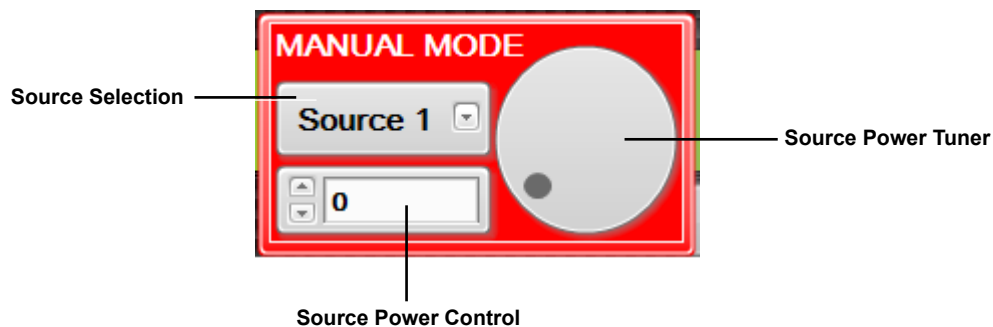
When the red-colored Manual Mode Panel is displayed, the software is in Manual Mode.



Adjusting Source

Using the following steps, the Source Power Supply Signal 1 & 2 can be manually adjusted by the user through the Manual Mode operating environment:

1. Tap the Source Selection drop down menu to select the source that needs to be manually controlled.




2. Touching and holding Source Power Control opens a numerical keypad.



Enter the appropriate value and tap <Accept>.

3. Use the Source Power Tuner to make quick, on-the-fly power adjustments.

Exiting Manual Mode

Press  to exit Manual Mode and return to the standard operating environment.



NOTE: Pressing the Abort button returns both sources to 0 power.

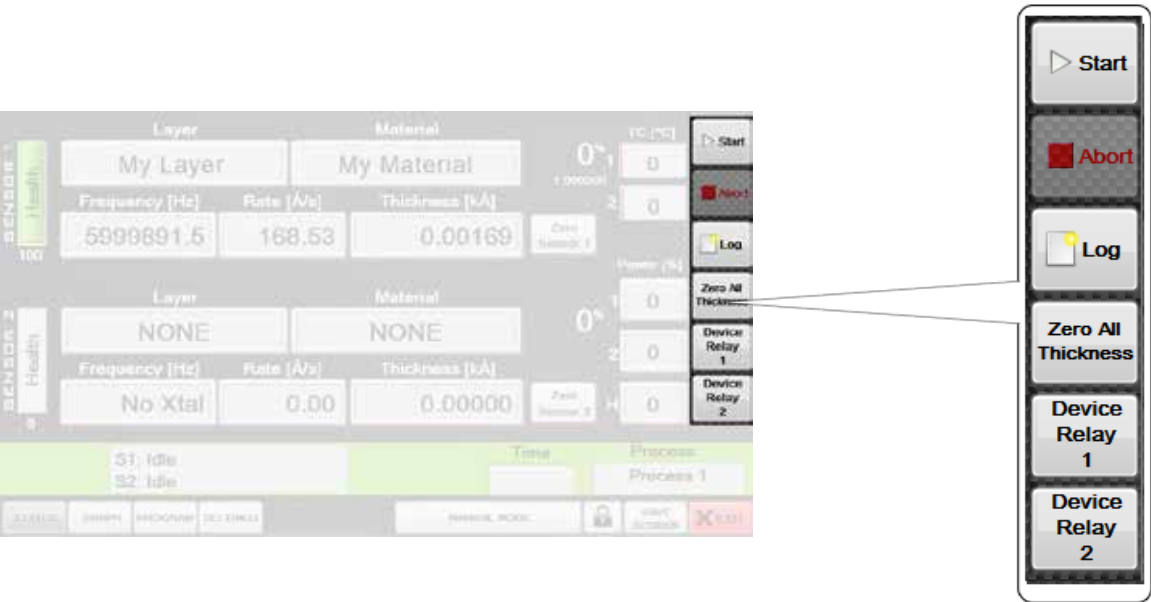
NOTE: When the user manually adjusts the value of the source power output, the source will no longer be controlled by the PID, regardless of the current process. If a source is adjusted during a deposition, the Eon-ID™ will no longer control the source controlling the PID or the predeposition processes, as the user has taken full control over the source.

Vertical Tool Bar

6

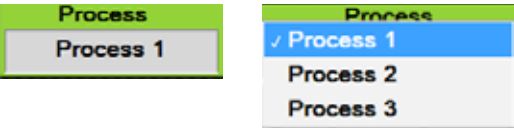
Using the Vertical Tool Bar


Like the Screen Selection tool bar, the vertical tool bar is always available. Use the vertical tool bar to start a process, abort a process, record a log, zero the sensors, and activate the relays.




Starting a Deposition

A deposition process can be started from any screen. Tap the Process Selector and select the process to be run.




Press  to begin the selected process.


Aborting a Process

A process can be aborted from any screen. Pressing  ends an active process. Abort is also used to exit Manual Mode.

Resume or Restart an Aborted Process


A process can be resumed or restarted from any screen. Press . If the last process was aborted, a screen will appear offering the option to restart the process, start from the beginning, or start from a specific layer (for more information, see [“Resuming Processes” on page 38](#)).

Logging Eon-ID™ Status

Eon-ID™ status can be logged to a monitor log from any screen. Selecting  saves a monitor log to the monitor log save folder (“Public/Colnatec/ LOGS”).


When a process is started, <Log> will automatically self-enable, logging all data while the process is running. Once the process has completed or is aborted, the Log button will return to an “unpressed” state, as the button was not originally pressed. If the Log button had already been pressed before a process is started, then the device will continue to log to the same file; and because the Log button had already been pressed, the Log button will remain in a pressed state even after the process ends.

Zeroing the Sensors


The sensors can be zeroed from any screen. Pressing  zeros Sensor 1 and Sensor 2 at once.

Activating Device Relays

Device Relay 1  and Device Relay 2  permit manual control of the relays controlled via the I/O port on the back panel of the Eon-ID™. **Note:** The device relays are the primary relays controlled via the DB9 Connector referred to as “I/O” (see [“Exterior Features” on page 7](#); and [“DB9 I/O Pin Diagram” on page 120](#)). Additional relays controlled via the Relay Board connector (also on the back panel of the Eon-ID™), utilize a different control system (see [“Relay Control” on page 26](#)).

 **Note:** During a process in which relay activity is automated, the relays will appear to enable or disable themselves based on updates and changes in the process status.

Exiting Eon-ID™ Software


Eon-ID™ software can be exited from any screen. Simply press , and when prompted press <OK>.

Resuming Processes

7

Resuming Processes Screen

This feature allows the user to resume previously aborted process.

Press  to access the Resuming Processes screen.



To resume an aborted process, select <RESUME ABORTED>, <START FROM THE BEGINNING>, or <START FROM SPECIFIC LAYER>.

Resume Aborted. Selecting <RESUME ABORTED> brings up the Resume Aborted screen.

The screenshot shows a software interface for resuming an aborted process. It features several input fields and buttons. At the top, 'Process Name' is set to 'Process 1'. Below this, 'Layer Name' is 'trs' and 'Material Name' is 'Tungsten'. A text box for 'Abort Reason' contains the message: 'User manually aborted the process by pressing the "Abort" button.' A row of four buttons shows 'Process Status' as 'Aborted (Manual)', 'Layer #' as '0', 'Rate Setpoint' as '1', and 'Last Rate' as '0'. Below these are three more input fields: 'Thickness Setpoint' (value 1), 'Last Thickness' (value 0), and 'Remaining' (value 1). At the bottom are two large buttons: 'CANCEL' and 'START'.

The Resume Aborted screen displays a list of properties showing the last run process, as follows:

- **Process Name.**
- **Layer Name.**
- **Material Name.**
- **Process Status.** Indicates whether the aborted process was aborted manually or automatically by the software.
- **Abort Reason.** A description explaining why the process was aborted.
- **Layer#.** This will be the layer that the process resumes. (If the process was edited and layers reordered, the program will resume the last remaining layer regardless of if the process layer order has changed; it will then increment to the next layer based on the new order).
- **Rate Setpoint.**
- **Last Rate.**
- **Thickness Setpoint.**
- **Last Thickness.**
- **Remaining.** The difference between layer setpoint and last thickness recorded.

If all of the settings are accepted, then press <START> to finish the last run layer.

The Resume Aborted feature applies the previous layer's settings regardless of any changes made to the process after the process was aborted and before the process is re-started. The process will start at the last thickness read and layer - subtracting the difference of what was applied from the desired thickness - and run the remaining thickness for that layer. This ensures that the last layer run is completed regardless of any changes made to the process. Once the previous layer is completed, the program will apply the updated process information. This means that if process was aborted on layer 2, and only partially completed, the program will use the same settings for layer 2 that were in use when the process was aborted; then it will load whichever layer is in position 3, regardless of whether the process has been modified.

Start from the Beginning. If this option is selected the process will start at the beginning of the currently selected process, regardless of where it left off. Selecting <START FROM THE BEGINNING> essentially starts the process as if it had never been aborted.

Start from Specific Layer. This is used when the user wants to start from a specific layer in a process.

1. Select the layer to start from:

LAYER NAME	RATE [A/s]	THICK [KA]
trs	1.000000	1.000000

2. Use this rate and thickness for the selected layer:

RATE [A/s] THICKNESS [KA]

0 0

CANCEL START

The Start from Specific Layer feature is particularly useful if the process has been edited by the user after the it was aborted, eliminating the need to create an entirely new process in order to run the remaining layers. The user can edit and then start the process at any specific point in the process cycle. This allows the user to resume the process at different points in the layer without having to create or modify layers to get the desired results when a process is stopped before completion.

To use the Start from Specific Layer feature, first select a layer from the layer list. Note that the rate and thickness of the layer is listed along with the layer name. Then enter the rate and thickness values manually into the Rate and Thickness controls. Press <START> to begin the process.

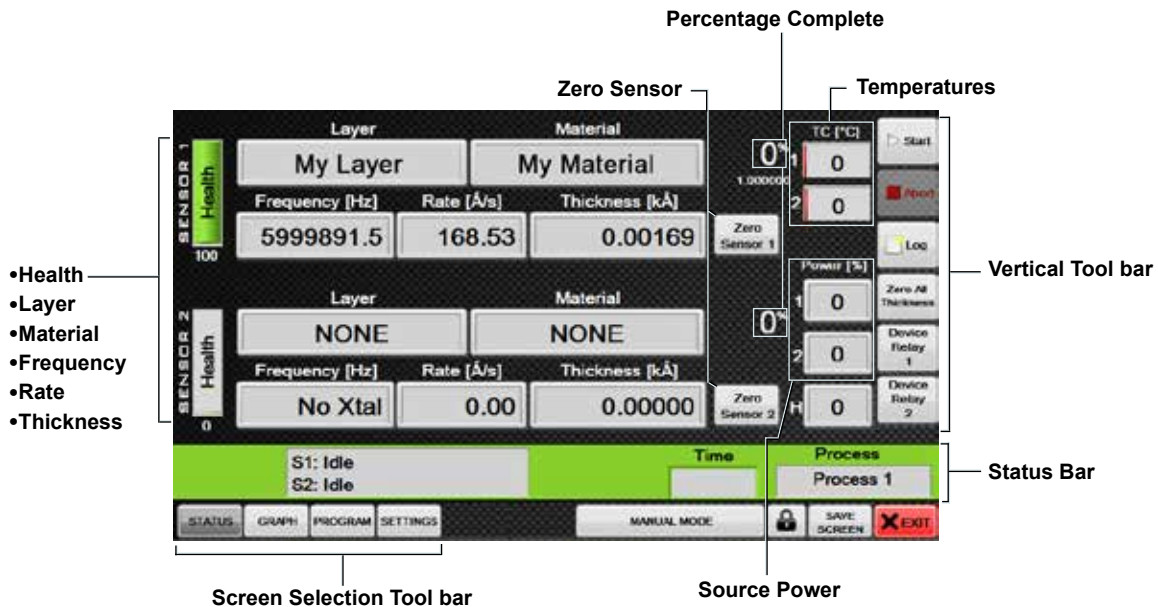
Status

8

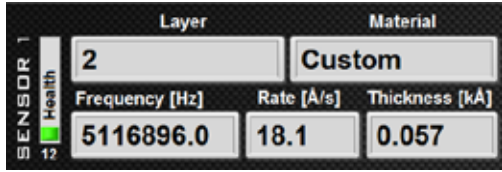
Status Screen

Navigate to the Status screen by selecting the Status button in the Screen Selection Tool Bar. The Status screen displays real-time information on the progress of the process.

Data for each sensor is represented - health, layer, frequency, material, rate, thickness, and percentage complete. Important information such as source power and temperature is also displayed.



Health, Layer, Material, Frequency, Rate, and Thickness



Health. Indicates crystal health.

Layer. The name of the layer being applied.

Material. When the sensor is being used during a deposition to apply material, the indicator will flash red, informing the user that the sensor is being used to control the selected source for the material being applied. During this process, the material being applied is also displayed.

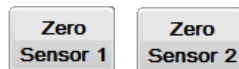
Frequency. Sensor frequency.

Rate. Rate of deposition.

Thickness. Thickness of deposition applied to sensor.

Zero Sensor

The Zero Sensor buttons



zero corresponding sensor thickness to zero.

Percentage Complete

The Percentage Complete indicators



corresponding sensor thickness to zero.

Source Power

The Source Power indicators display the current power being applied to Source 1 (S1 Power [%]), Source 2 (S2 Power [%]).



Temperatures

TC2. Auxiliary thermocouple connection.

Body Temp [°C]
0
TC 2 Temp [°C]
0

Manual Zeroing of Individual Sensors

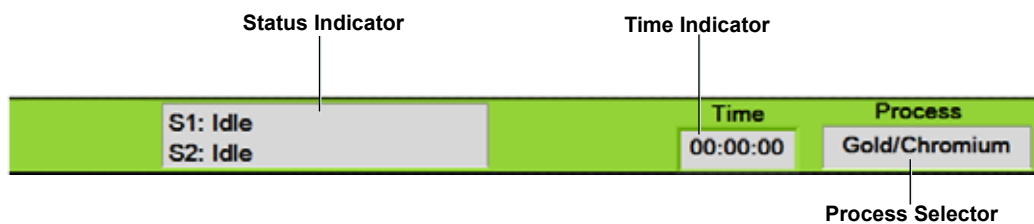
Press the Zero Sensor button that corresponds to the sensor to be zeroed.

Green Status Bar

9

Status Indicator, Time Indicator, and Process Selector

A fixed menu available from any screen, the Green Status bar serves a variety of display and control functions.



Status Indicator. Displays process Eon-ID™ is currently performing. Information updates in real-time as Eon-ID™ performs each task.

Time Indicator. Displays the run-time of the current active process. The Time Indicator also retains the run-time of the last completed or aborted process.

Process Selector. When a process is selected, the Status screen will display the first material to run on each sensor. If no materials are selected to be measured by one of the sensors, the sensor will display **NONE** in the Layer and Material displays.

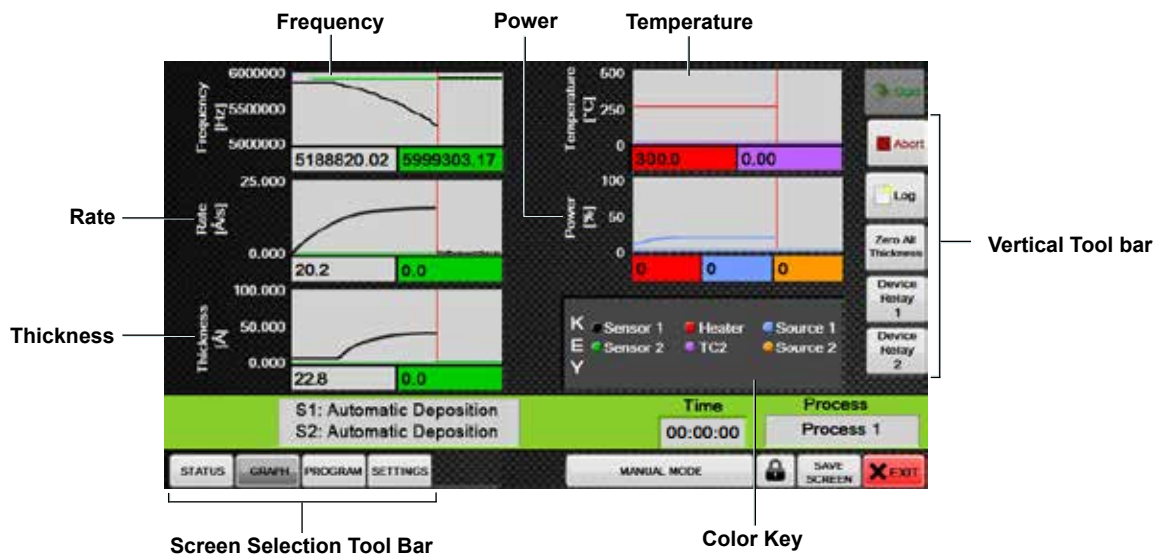


Graphs

10

Graph Screen

To view the Graphs screen, Press on Graphs in the Screen Selection tool bar. The Graphs screen features line graphs for frequency, temperature, rate, power, and thickness. Unlike real-time data, data in graph-form can provide the user with a comprehensive, historical perspective on a developing deposition process.



Adjusting Min/Max Range of Graphs

Touch a graph to access its range adjustment window. Press OK to return to the Graph screen.




Graphs

The graphs provide a visual representation of data gathered by Eon™. The following data is presented by the graphs:

- **Frequency**
Displays frequency over time in [Hz]
- **Rate**
Displays the rate of the material application over time in [Å/s].
- **Thickness**
Displays the thickness of material application over time in [kÅ].
- **Temperature**
Displays the temperature over time in [°C].
- **Power**
Displays the power of the sources and heater over time in percentages in [%].

Color Key

The Color Key  displays the color values representing the various devices being depicted on each graph.

Screen Lock


11

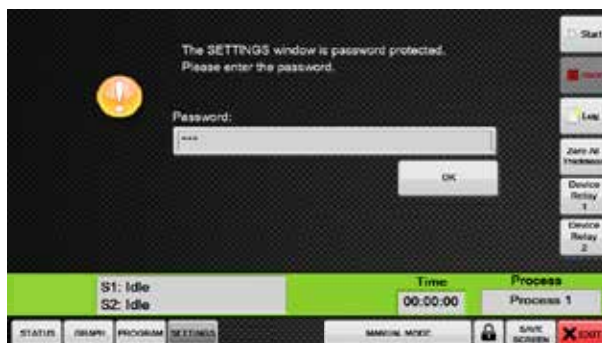
Password Protection

The Eon-ID™ screen lock enables the user to lock any screen that appears on the Screen Selection tool bar. Locking a screen helps ensure that the controls and settings on each screen remain secure and under password protection.



Screen Lock Button

To access the screen lock controls, select the Screen Lock button . If a password is already in place, the unlock screen appears.



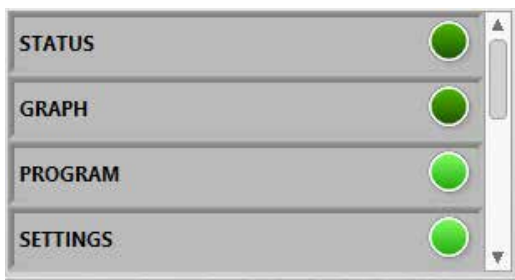
Entering the correct password will exit to the screen lock screen.

If a password is NOT already in place, the lock screen appears. Use these controls to lock and unlock screens and change the screen lock password.



Locking a Screen

On the screen lock screen, select the screen(s) to be locked. Selecting a screen highlights the green orb.



Note: Select “LOCK” from the list to ensure the screen lock is enabled for the password screen.

Press Update to engage screen lock protection.



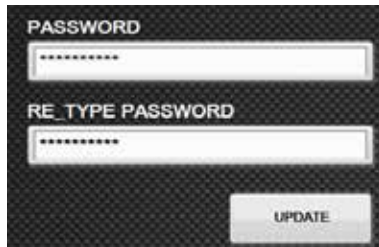
When Pressed on, the *protected* screen(s) will now require a password to access.



To enter text, touch and hold the text field until virtual keyboard appears.

Setting a New Password

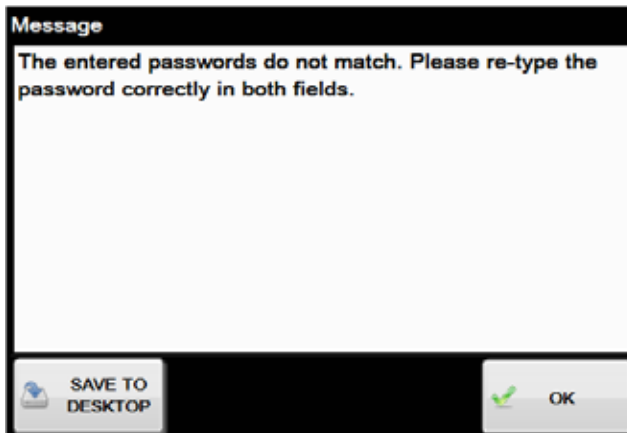
The user may keep an existing password or enter a new password using the password controls. In order for a new password to be accepted, the Password and Re-Type Password fields must contain the same password.




Press Update to save new password or Press away from the lock screen to keep the exiting password.

Forgotten Password & Resetting the Password

If the wrong password is entered, the following message prompt will appear:



Press OK to go back to the unlock screen. The Save to Desktop feature saves a screenshot of the prompt (in case troubleshooting is necessary).

To reset the screen lock password, Press on the Screen Lock button  and enter the following code into the password prompt: **45647kyswx94272fyshq**. When the screen lock screen appears, enter a new password into the password fields.



IMPORTANT Leaving password fields empty DOES NOT disable the screen lock. Attempting to access a locked screen will continue to produce a passport prompt. Leave field blank and tap <OK> to proceed to the screen lock menu. To disable the screen lock, deselect any locked screens.

Symptom	Cause	Solution
Frequency reads “No Crystal”, “-2”, or “-3”	<p>May include one or more of the following:</p> <ul style="list-style-type: none"> • Crystal is not properly seated • Crystal being used is outside of the frequency range of the system or malfunctioning • A bad connection exists between the crystal and the oscillator • Debris has built up around crystal inside crystal compartment • BNC between the sensor head oscillator is too long • Orientation of external oscillator is reversed 	<p>This error is an indication that the Eon-ID is not receiving a signal from the crystal of the sensor head. This issue is more likely a hardware than software issue.</p> <p>Please visit colnatec.com/support/faqs to view an extensive troubleshooting guide for this issue.</p>
Crystal warnings fail to appear	Sensor Alerts disabled	Go to Settings screen and enable Sensor Alert for sensor(s) in use
Layer completes immediately	Thickness is set to 0 in the layer	Enter a value other than 0 for the layer

Symptom	Cause	Solution
At program start, a “.7 firmware out of date \$@,!177” error appears, even though the firmware is current	Wrong COM port selected	NOTE: THIS ACTION RESTORES SETTINGS TO FACTORY DEFAULT. Close Eon™ software. Delete the Master.xml file in Public Documents / Colnatec. Open software and select new COM port.
“Could not connect to EON-ID after 3 seconds” message appears	Wrong COM port selected	NOTE: THIS ACTION RESTORES SETTINGS TO FACTORY DEFAULT. Close Eon™ software. Delete the Master.xml file in Public Documents / Colnatec. Open software and select new COM port.

Coating

Density	0.100 to 99.999 [g/cm ³]
Z-Factor	0.00 to 15.000
Rate Set-point	0.00 to 9999.99 [Å/s]
Thickness Set Point	0.00 to 9999.99 [KÅ]
Proportional Gain	0.00 to 9999.00 [s]
Integral Time	0.00 to 99.9 [s]
Derivative Time	0.0 to 99.9 [s]
Rise to Soak	0.10 to 9999.9 [s]
Soak Time	0.00 to 9999.99 [s]
Soak Power	0.00 to 100.00 [%]
Rise to Predeposit	0.00 to 999.99 [s]
Predeposit Time	0.00 to 9999.99 [s]
Predeposit Power	0.00 to 100.0 [%]
Dwell Time	0.0 to 9999.9 [s]

Communications

RS232	Baudrate: 115200 Data Bit: 8 Parity: None Stop Bit: 1 Flow Control: None
-------	--

Measurement

Frequency Resolution	0.001 [Hz] @ 6 [MHz] (1 sample per second)
Sample Rate	100 [Hz] to 10 [Hz]
Display Update Rate	10 [Hz] to 1 [Hz]
Sensor Crystal Frequency	6 [MHz]
Drives Crystals	6 [MHz], 1-200 Ω , any type
Filter	0-1
Alpha	0-1

Display

Film	Selected Material
Layer	Layer Being Deposited
Rate	Auto ranging -999 to 9999.9 Å
Thickness	Auto ranging -999 to 9999.9 Å
Frequency	-3.00 to 6,500,000 [Hz]
Run Time	Hh/mm/ss
Temperature	0 to 999.9 [°C]
Crystal Health	0.00 to 100 [%]
Screen	7" LCD-TFT display graphics; 800 x 480 VGA resolution; resistive touch

Inputs and Outputs

DB37	Relays 9 Relays 6 SPST (programmable) 2 SPDT (programmable) 1 SPST (abort only)
	Inputs 8 Inputs Passive Type Digital 5v
DB9	Relays 2 Relays 2 SPST (programmable)

Software

Number of Processes	100,000
Number of Layers	100,000
Manual Power Control	Yes
User Labeled Process (full touchscreen with alphanumeric entry)	Yes
User Labeled Films (full touchscreen with alphanumeric entry)	Yes
Shutter Delay	Yes
Software Control Loops	PID
Data Logging	Yes
User Language	English

Hardware

Sensor	2 BNC connections (4 optional)
Temperature	K-type TC (2, 4 optional)
Sources	0-5v DC source controls (2, 4 optional)
Relay Output Setup	Outputs can be triggered according to user-defined conditions
Sensor Head Input(s)	High resolution inputs, accurate up to .001 Hz (2)
Thermocouple Input(s)	K-type thermocouple inputs; accurate to +/-0.25°C (2)
Rackmount Dimension	Standard 19" 3U high rack; 1 or 2 Eon-IDs per slot
System Cooling	Exhaust Fan
Display with Graphics	Yes

Dimensions

10" L X 8.25" W X 5.25" H

Power Supply

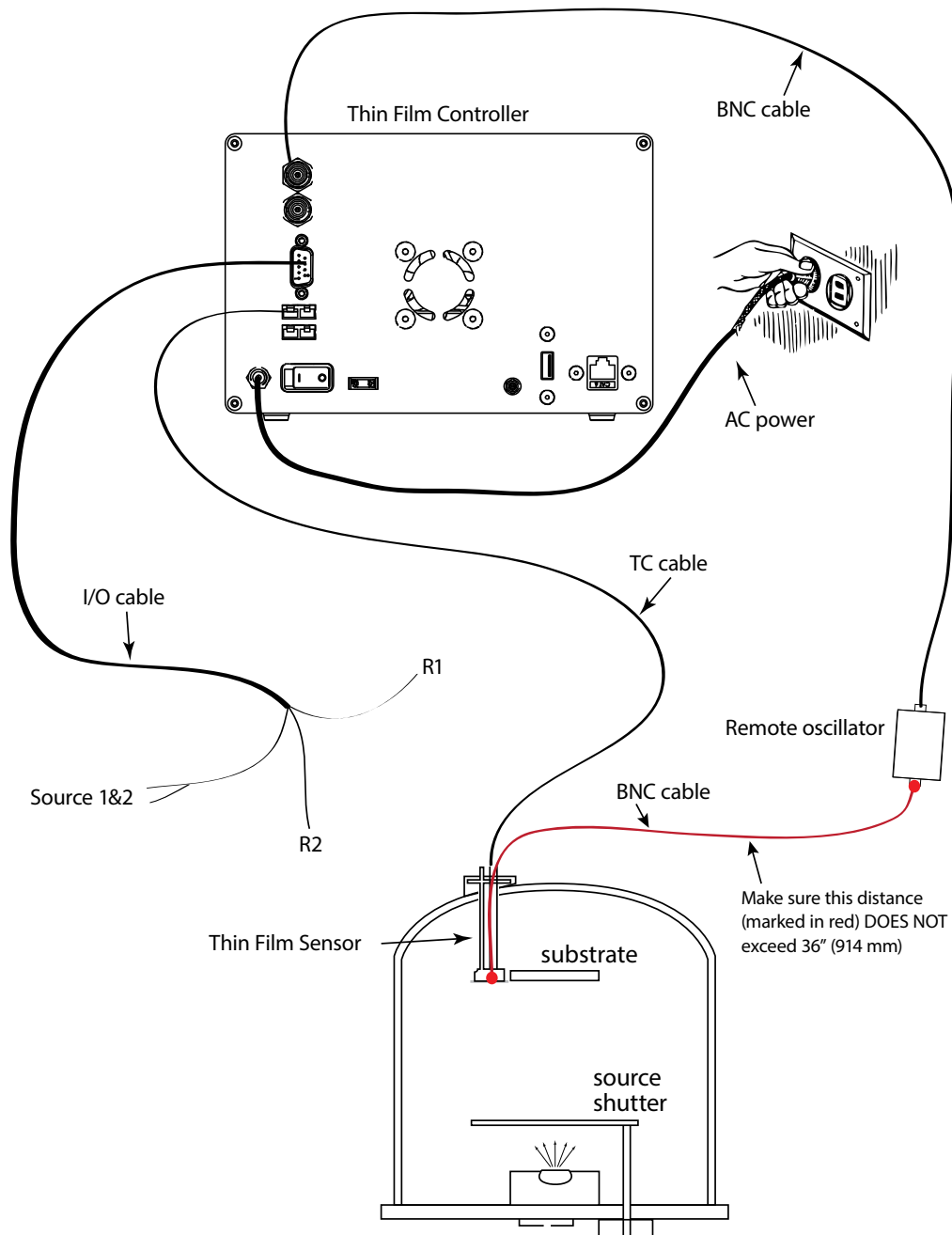
24 volt power (supplied); 100-240v @ 50/60 Hz

Eon-ID™ System

A Appendix

Eon-ID™ System Configuration

Rendering illustrates basic connections of Eon-ID™ system.



Safety, Handling, & Support

B Appendix



WARNING All electrical components are to be considered extremely dangerous if tampered with in any way. Colnatec is not liable for any injury resulting from product misuse, modification, or disassembly.



WARRANTY LABEL If the warranty label has been tampered with, “VOID” will appear where the warranty label was originally placed. If this is visible at the time of arrival, it is important that you contact Colnatec immediately after receiving the product.



EXAMINE YOUR NEW Eon-ID™ FOR ANY SIGNS OF PHYSICAL DAMAGE. ALSO, ENSURE THAT THE TAMPER-EVIDENT LABELS ARE INTACT

Before shipping, your Eon-ID™ was calibrated and tested by Colnatec to meet the highest quality standards. It is important that you take a few minutes to inspect the product to ensure that your equipment was not damaged or otherwise tampered with during transit.

About Eon-ID™

With the ability to sense deposition and temperature with high precision, the Eon-ID™ thin film controller is one of the newest advancements in Thin Film deposition controllers. The Eon-ID™ provides features that help improve measurement accuracy for better process control.

Software Updates

The Eon-ID™ interface software can be upgraded on site to provide software improvements. There will be notifications when these updates become available.

Inspection and Initial Setup

Examine Eon-ID™ for any signs of physical damage. Also, make sure that the tamper-evident labels are intact. In order to ensure safe, correct operation of your Eon-ID™, please follow the step-by-step instructions presented in the Eon-ID™ Quick Start guide included with your product.

Warranty

Eon-ID™ is warranted to the original purchaser to be free of any manufacturing-related defects for one year from the date of purchase. Colnatec reserves the right to repair or replace the unit after inspection.

Contact Colnatec Support

625 N. Gilbert Road, Suite 205

Gilbert, AZ 85234

(480) 634-1449

support@colnatec.com

colnatec.com

Tooling Factor Calculation Method 1

$$\text{Tooling \%} = \left(\frac{dc}{ds} \right) \cdot 100$$

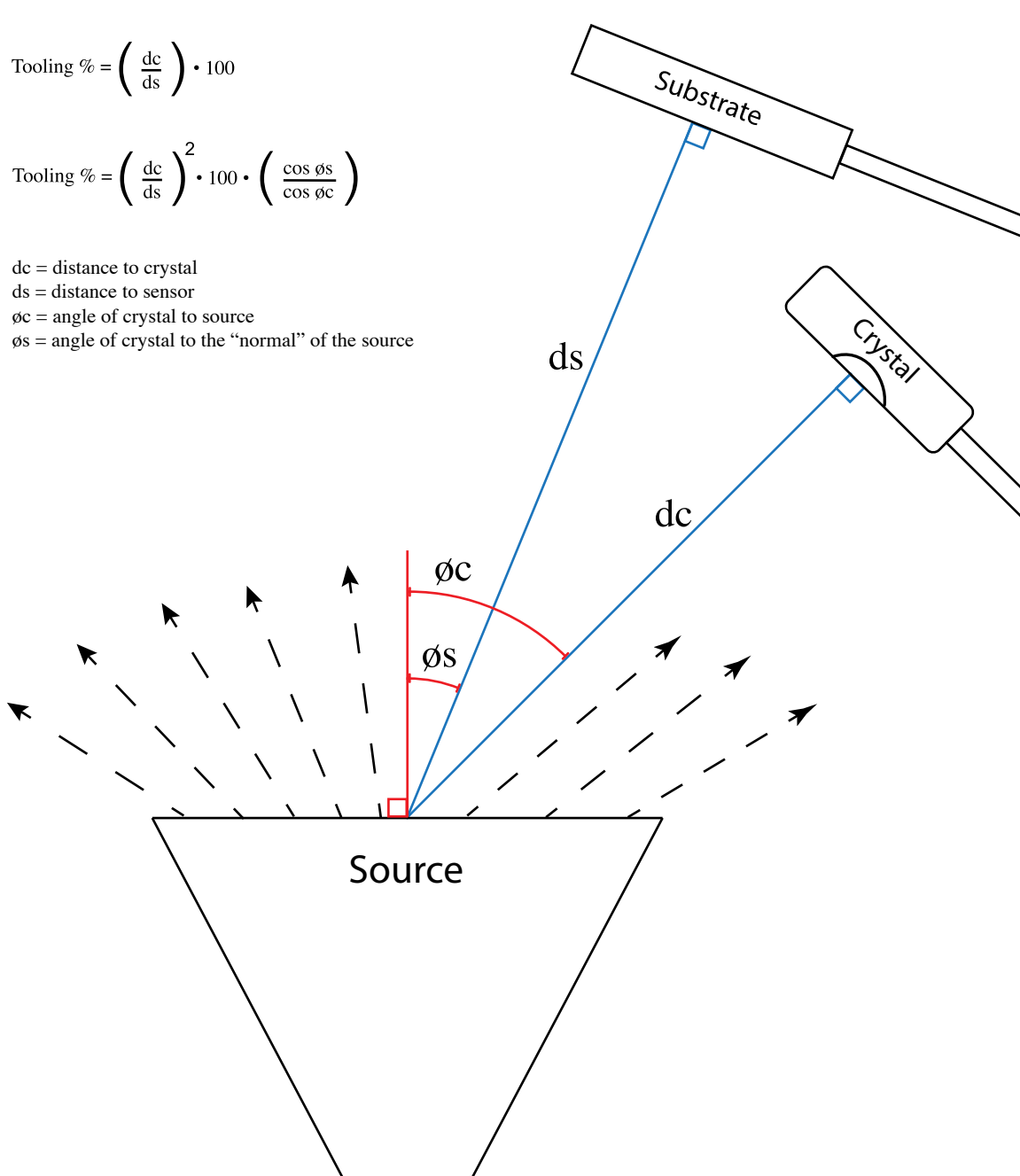
$$\text{Tooling \%} = \left(\frac{dc}{ds} \right)^2 \cdot 100 \cdot \left(\frac{\cos \phi_s}{\cos \phi_c} \right)$$

dc = distance to crystal

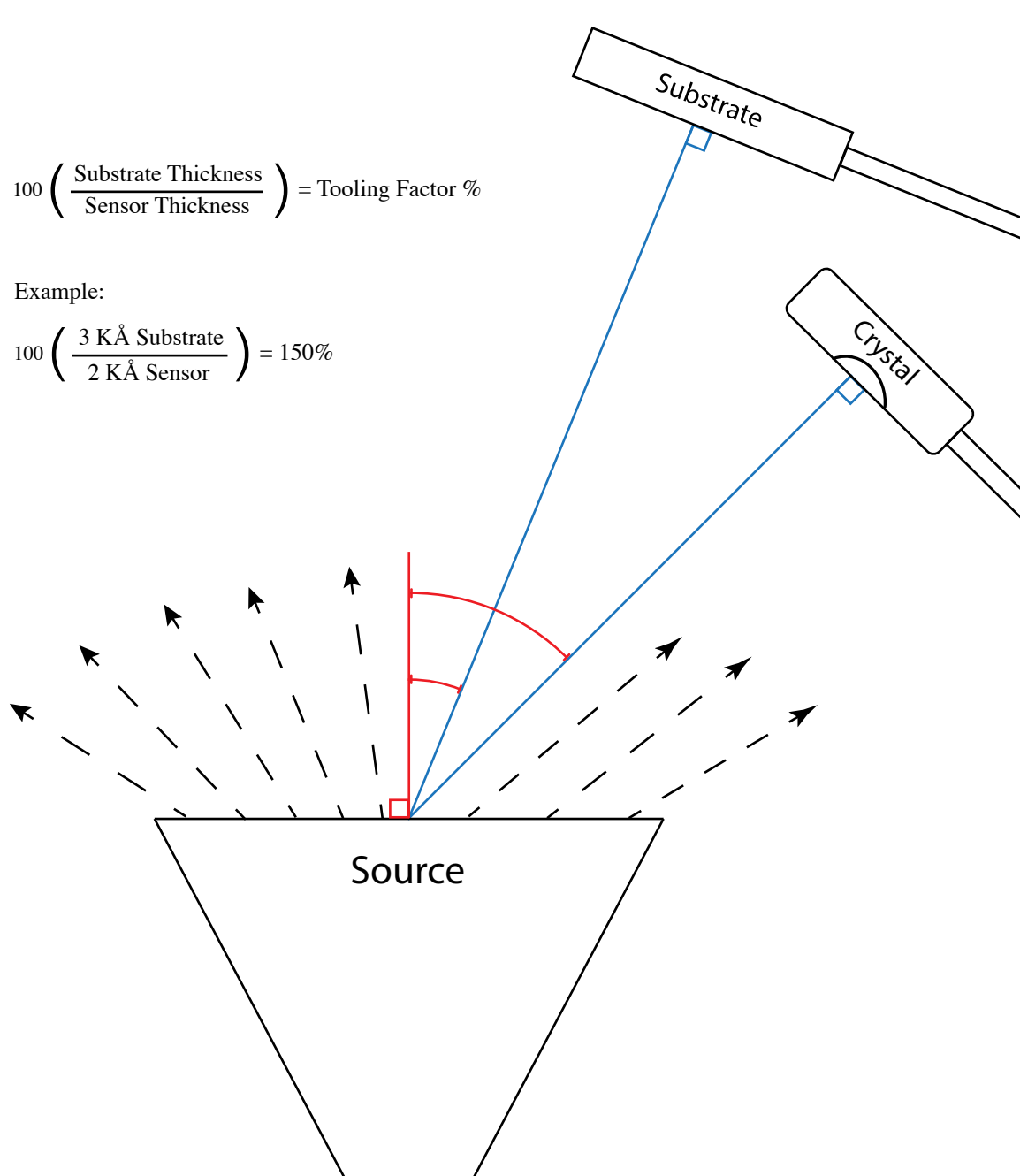
ds = distance to sensor

ϕ_c = angle of crystal to source

ϕ_s = angle of crystal to the “normal” of the source



Tooling Factor Calculation Method 2



Mass-to-Frequency Correlation Formula

Sauerbrey equation (modified)

$$T_F = \frac{N_{at} d_q}{\pi d_f F_c Z} \tan^{-1} \left(Z \tan \left(\frac{\pi (F_q - F_c)}{F_q} \right) \right)$$

Nat=Frequency Constant=166100 [Hz*cm]

dq=Density of Quartz=2.649 [gm/cm3]

df=Density of film [gm/cm3]

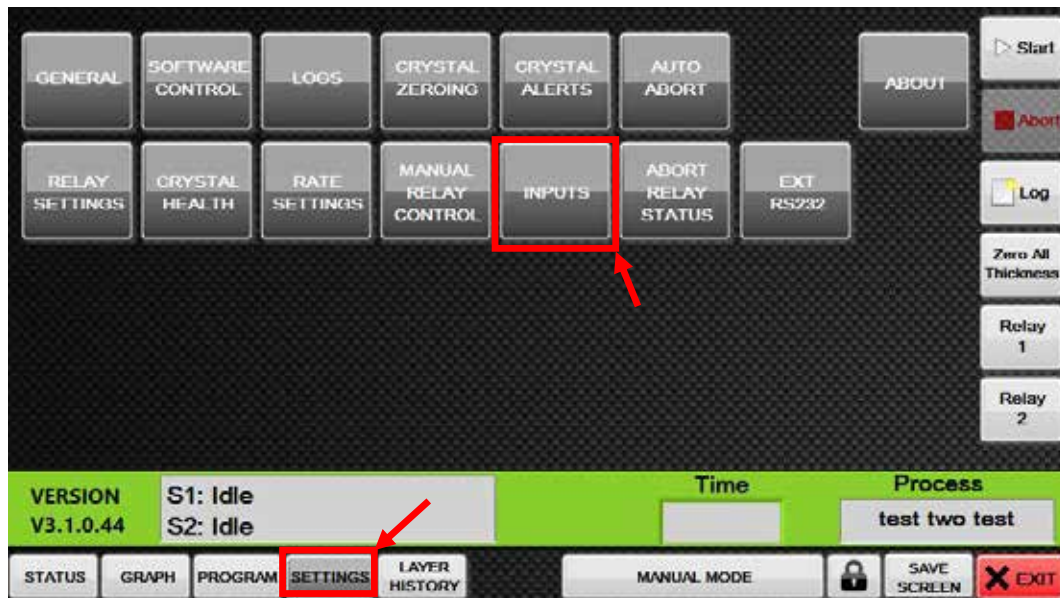
Fc=Coated Frequency [Hz]

Fq=Uncoated Frequency [Hz]

Z=Z ratio

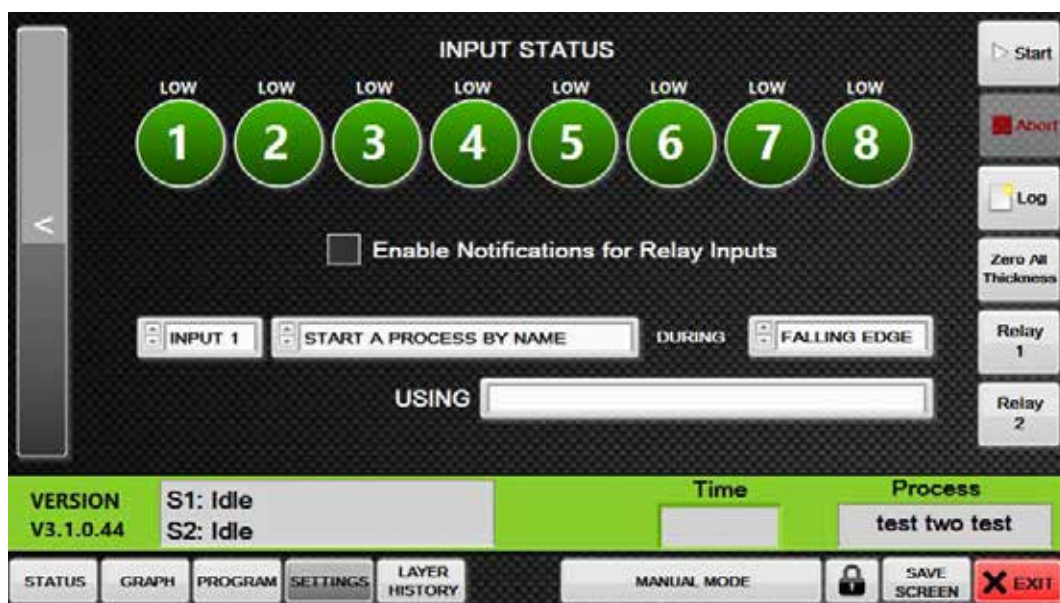
Input Control

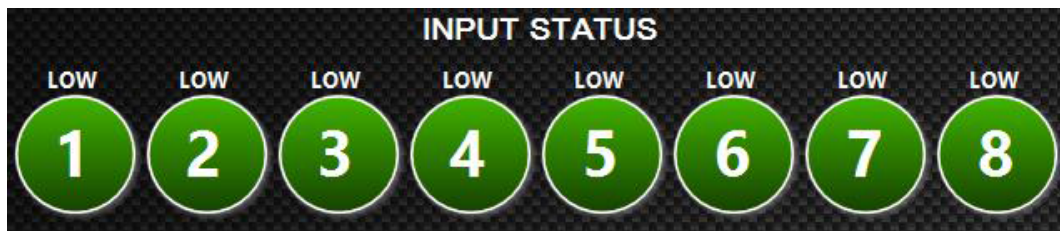
GETTING TO INPUT CONTROL SCREEN



1. First press the Settings button
2. Press the "Relay Settings" button in the settings screen

INPUT CONTROL





The input status bar shows the current status of the inputs. If the word “Low” is displayed, there is no continuity between the relay pins. If the indicator is bright and “High” appears over the indicator, there is continuity between the pins of that input.



The “Enable Notifications for Relay Inputs” option notifies the user when a specific operation could not be performed that was enabled by an input; e.g., if the “Activate Start Button” command is used but a process is already started. A notification will appear indicating that the input tried to start the process but that the process could not be started, as it is already activated.

This option enables / disables these notifications.



Use the controls on the “Input Settings” page to program an input.



This selector allows the user to select which input they would like to program. Selecting the input field will cause the other fields to update accordingly.



Selects what action should be performed when the input changes state.

Start a process by name – Starts a process by the specified name. This command requires that the name of the process be entered into the string box that will appear.

Activate abort button – Activates the abort button as if the user had pressed the abort button manually.

Zero thickness – Zeroes the thickness of the specified sensor. An option will appear to select the desired sensor.

Decrease manual power mode – Reduces the power output to the specified source by the amount specified. A numeric box will appear allowing user to specify the percent power to apply when the event occurs.

Increase manual power mode – Increases the power output to the specified source by the amount specified. A numeric box will appear allowing user to specify the percent power to apply when the event occurs.

Activate start button – Activates the start button as if the user had pressed the button manually.

Flash an alert – Displays an alert on the unit. This option will show a string box that allows the user to type in a message that will be displayed on the screen when the specified event occurs.

Step into next layer – Placeholder for future implementation.

Do nothing – Does not perform any action. This is used when no state change is requested.

NOTE: Some of these actions require additional information such as a sensor, number, or string. When one of these options are selected, the following controls will appear:

SENSOR	NUMBER	STRING
<input type="text" value="PROCESS SENSOR"/>	<input type="text" value="0"/>	<input type="text"/>

<input type="text" value="FALLING EDGE"/>

Specifies what edge (state transition) the operation should be performed on.

Falling Edge- A falling edge is when the input goes from a HIGH state to a LOW state. (The input is latched, then unlatched)

Rising Edge – When the input goes from a LOW state to a HIGH state (the input is unlatched, then latched)

Low State - The action will be continually performed while the state of the input is LOW (unlatched)

High State – The action will be continually performed while the state of the input is HIGH (latched)

Any Edge – The action will be performed when the state of the input goes from LOW to HIGH (unlatched to latched) or from HIGH to LOW (latched to unlatched).

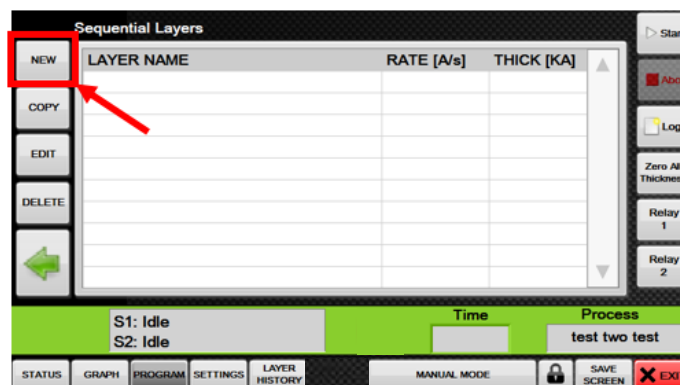
Quick Setup



1. Press the program button on the bottom of the screen



2. Press the “New” button to create a new process



9. Repeat steps 6-8 to add additional layers

Sequential Layers

LAYER NAME	RATE [A/s]	THICK [KA]
My_Layer1	1.000000	3.000000
My_Layer2	2.000000	4.000000
My_Layer3	3.000000	5.000000

S1: Idle Time Process
S2: Idle My_Process

STATUS GRAPH PROGRAM SETTINGS LAYER HISTORY MANUAL MODE LOCK SAVE SCREEN EXIT

10. Click and drag layers to re-arrange their order

Sequential Layers

LAYER NAME	RATE [A/s]	THICK [KA]
My_Layer2	2.000000	4.000000
My_Layer3	3.000000	5.000000
My_Layer1	1.000000	3.000000

S1: Idle Time Process
S2: Idle My_Process

STATUS GRAPH PROGRAM SETTINGS LAYER HISTORY MANUAL MODE LOCK SAVE SCREEN EXIT

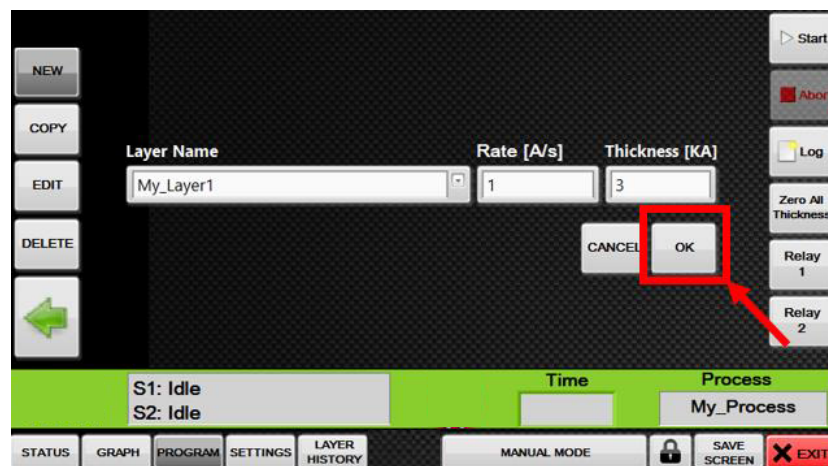
6. Press the “New” button to create a new layer



7. Enter a name, rate, and thickness for the new Layer



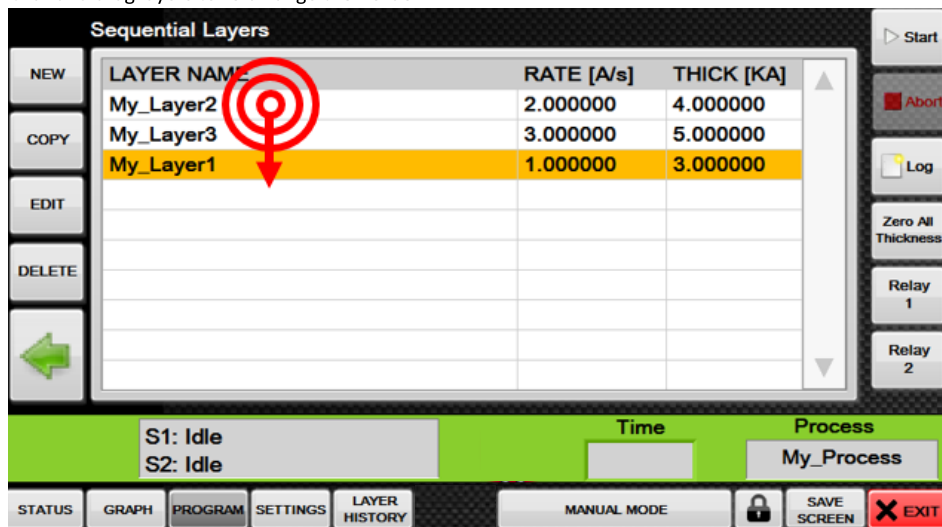
8. Press the “OK” button to create the new layer.
(Note layers with the exact same name will share properties)



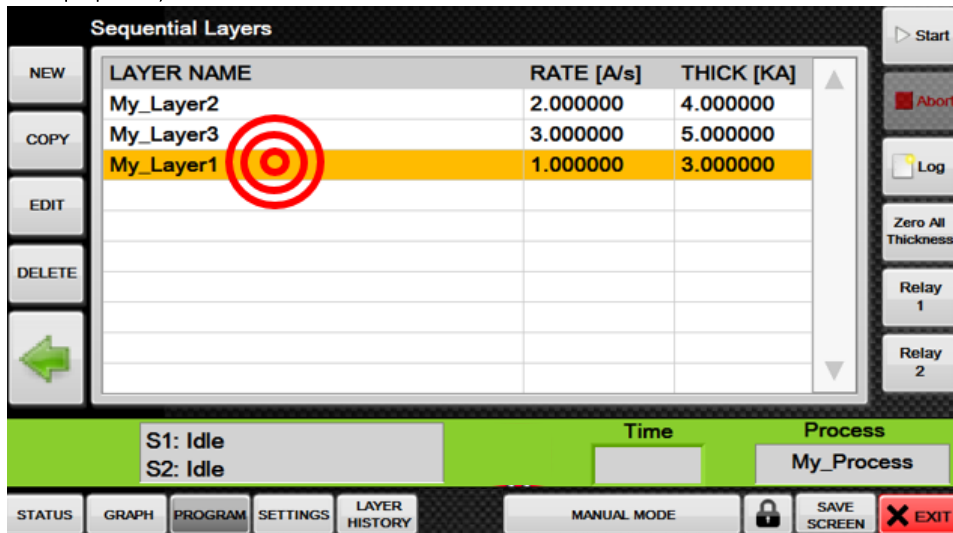
9. Repeat steps 6-8 to add additional layers



10. Click and drag layers to re-arrange their order



- Hold your finger down on the layer to edit its properties. (Layers with the same exact name will share properties)



- Set the desired properties for the layer



13. (Optional) You can specify a custom material name, Z-factor, and Density by entering the values directly, OR you can use the “Material Wizard” which has a selection of Pre-defined materials in the software’s memory

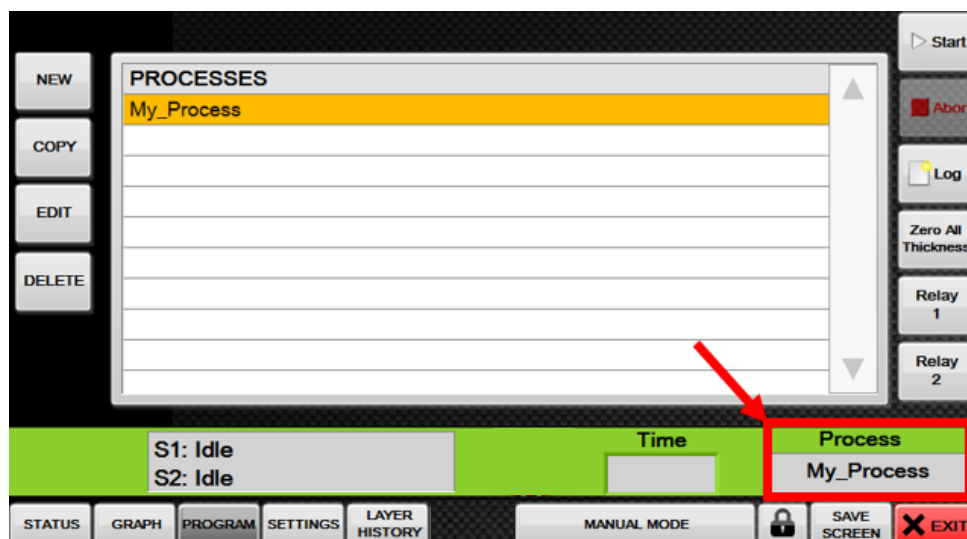
The screenshot shows the main software interface. At the top, there are input fields for Sensor (1, 2), Source (1, 2), Material Name (My_Material), Z-Factor (2.1), P (3.4), Tooling (1), I (1.1), Density [g/cm³] (32.1), and D (0). Below these are fields for Rate Warning Deviation (0) and Rate Abort Deviation (3). A section for End Of Layer Action includes a 'Continue' button. A table of parameters is shown: Rise to Predeposit [s] (4), Predeposit [s] (3), Predeposit Power [%] (2), Rise to Soak [s] (6), Soak Time [s] (16), Soak Power [%] (9), and Shutter Delay (2). At the bottom, there are buttons for Pre-Deposition Wizard, Sensor Setup Wizard, and Material Wizard (highlighted with a red box and an arrow). The status bar at the bottom shows S1: Idle, S2: Idle, Time, Process, and My_Process. The bottom navigation bar includes STATUS, GRAPH, PROGRAM, SETTINGS, LAYER HISTORY, MANUAL MODE, SAVE SCREEN, and EXIT.

14. (Optional) Select the material and press “OK” and the software will automatically fill in the material name, Z-factor, and Density based on your selection.

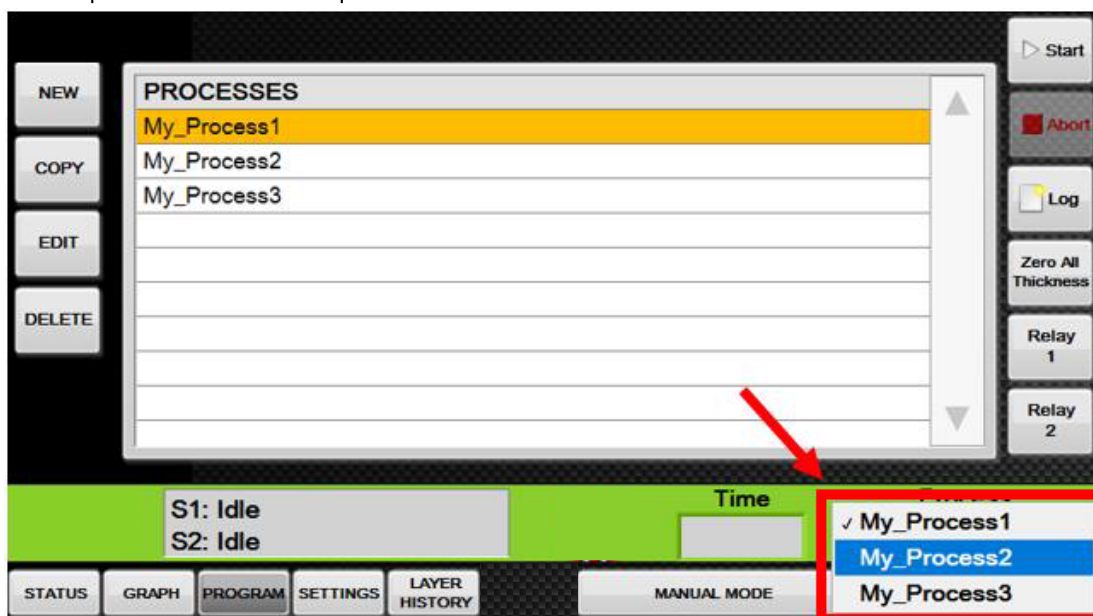
The screenshot shows the Material Wizard dialog box. It has a title bar that says "SELECT DESIRED MATERIAL FROM THE LIST THEN PRESS 'OK'". Inside, there is a table with three columns: Material, Density, and Z-Factor. The table lists several materials, with "Indium Antimonide" highlighted in yellow. Below the table are "OK" and "CANCEL" buttons. The "OK" button is highlighted with a red box and an arrow pointing to it. The background shows the same software interface as the previous screenshot, with the status bar and bottom navigation bar visible.

Material	Density	Z-Factor
Indium	7.3	0.841
Indium Antimonide	5.76	0.769
Iridium	22.4	0.129
Iron	7.86	0.349
Lanthanum	6.17	0.92
Lead	11.3	1.13
Lead Sulfide	7.5	0.566
Lithium	0.53	5.9
Lithium Fluoride	2.64	0.774

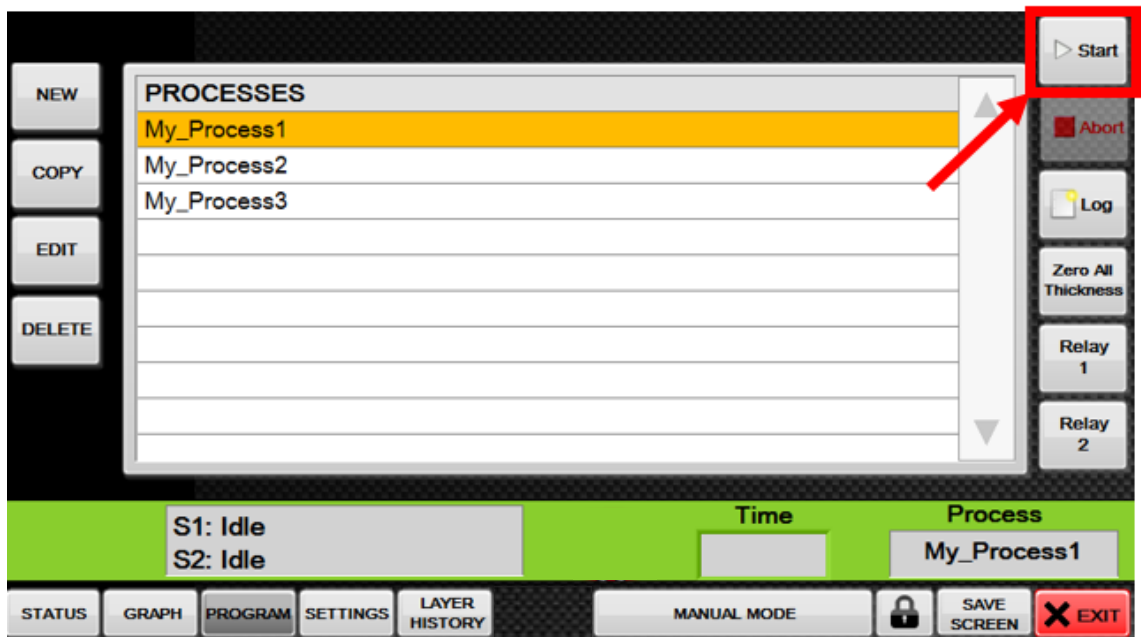
15. You should now see your newly created process selected in the Process selector. Any time a process is selected in the “Program” screen, the process selector will automatically update to that process. If a process is deleted, then the process selector will go to the first process available in the list of processes. If there are no processes available, it will be blank. i.e. all processes have been deleted.



16. If the desired process is not currently selected, simply click the process selector and choose the desired process from the list of processes.



17. Press “Start” to run the selected process.

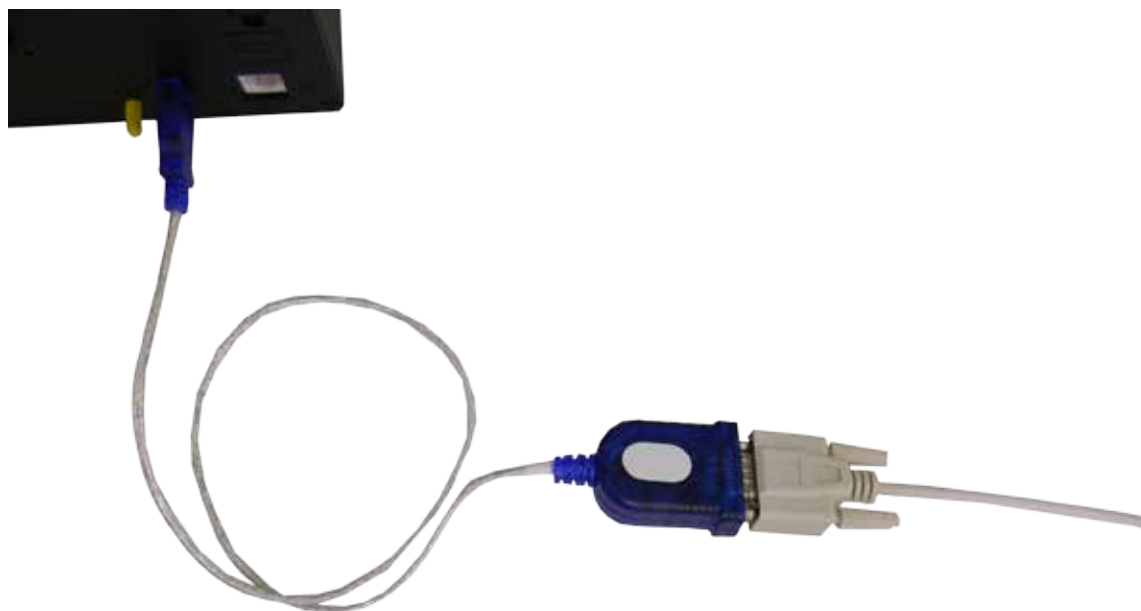


Setting Up RS232

1. Plug the accompanying RS-232 adapter into the USB port on back panel.



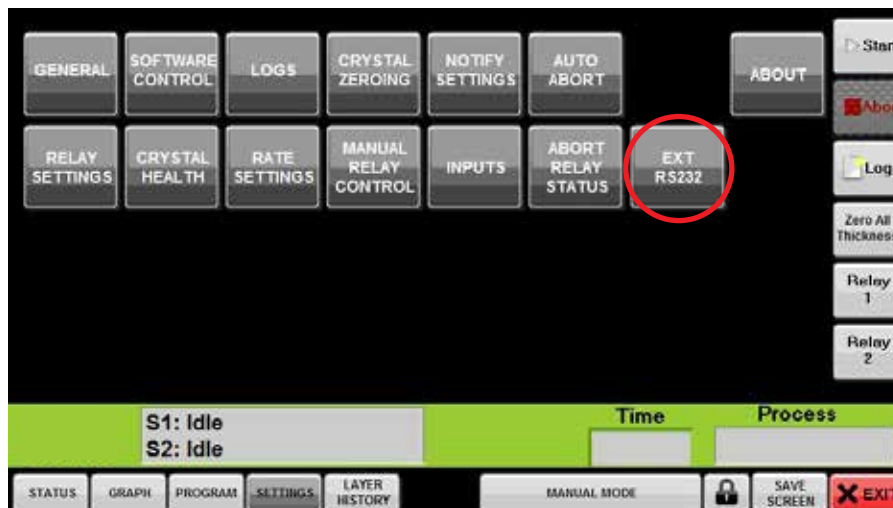
2. Connect the RS232 adapter to your external RS232 device.



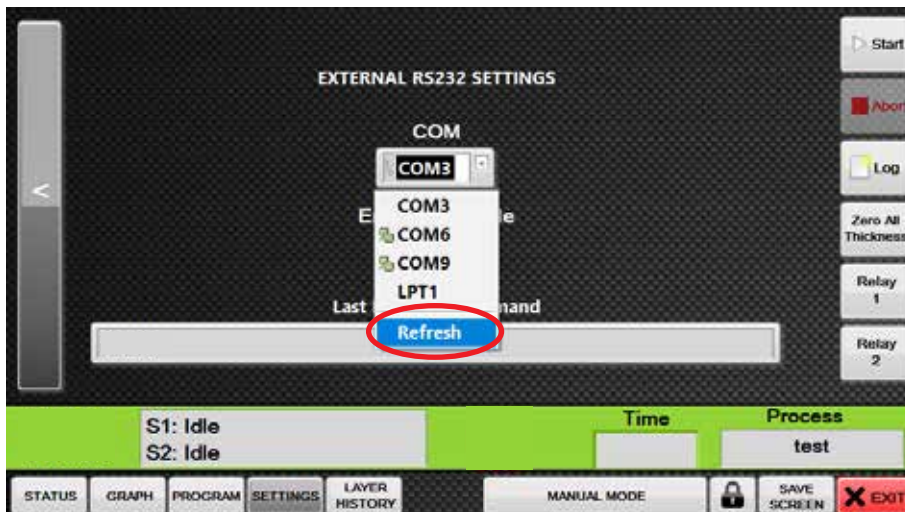
3. If the Eon-ID™ hasn't already been powered on, press the power button now. On completion of the startup routine, Eon™ software will open to the main Status Screen. Press on the Settings button to enter the Settings menu.



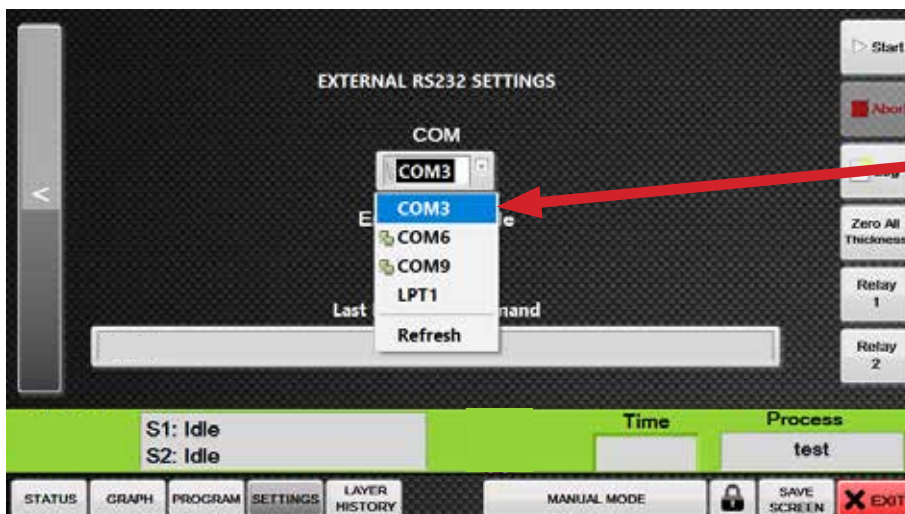
4. On the Settings screen, select the EXT RS232 button.



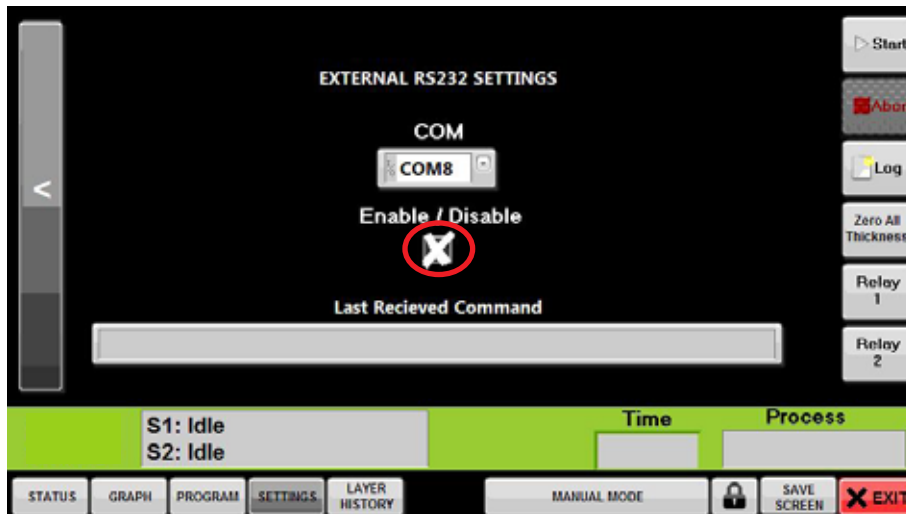
5. On the RS232 port selection screen, Press on the dropdown menu and select “Refresh” to reload the list.



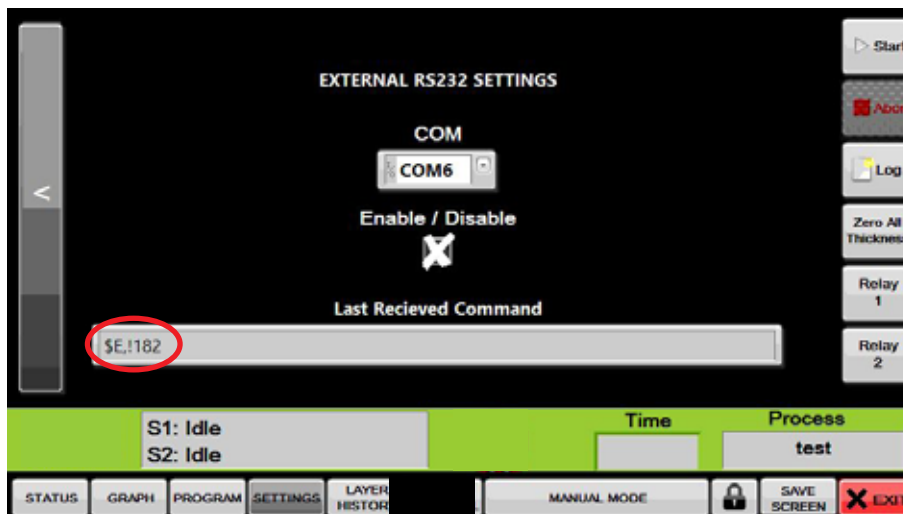
6. Select the “open” COM port, which is the COM port that DOES NOT contain a yellow icon beside it. This open COM port will be assigned to the external RS232 device.



7. To enable the RS232, Press the Enable / Disable box below the Com port selection menu. When the white X is displayed, RS232 communication is active.



8. The External RS232 Settings screen features a field that displays the command last received from the external RS232 device. This information is useful for troubleshooting purposes.



RS232 Commands

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Serial Setup

The table below shows the configuration for the RS-232 port. It is recommended that the included USB to serial cable is used.

Table 1- Communication Setup

Terminal ID	VT100 With Local Echo
Coding (Receive)	UTF-8
New Line Receive	CR+LF
New Line Transmit	CR+LF
Baud Rate	115200
Data Bit	8
Parity	None
Stop bit	1
Flow Control	NONE

Message Structure

Commands transmitted follow a basic structure. See the table below.

Table 2- Message Structure

	Initiator	Command	Command Parameters	Additional separator	Command terminator	Checksum	Transmission Terminators
Example	\$	C	0,2.74,1.8,.75	,	!	868	CR+LF

Important Notes

1. Between the command (e.g. "C") and the first command parameter (e.g. "0") there is no separator.
2. Between every command parameter there is a separator (i.e. ",")
3. Before the command terminator (i.e. "!") there is always an additional separator (i.e. ",")
4. The checksum is an integer sum of the all of the values including the command terminator (i.e. "!")
5. The checksum is transmitted as individual characters (e.g. "868" is transmitted as char 8,

Command Parameters

The parameters of each command will be different depending on each command. See the table below for a basic structure of the command parameters.

Table 3- Command Parameters Structure

	Sensor (if applicable)	Separator	Value	Separator	Value	Separator	Value
Example	0	,	2.74	,	1.8	,	.75

Checksum

A checksum is used in order to validate the data transmitted between devices. The checksum is the sum of the characters before the checksum. An “!” indicates that transmission has ended and the next value is the checksum. While the checksum is summed to be an integer, it is still treated as a character when transmitted.

Example Checksum

Assuming all of the ASCII values in the message sum to an integer 868, the checksum would be transmitted as each individual character. See the table below.

Table 4- Checksum Conversion

	Digit 1	Digit 2	Digit 3
ASCII	8	6	8
DEC	56	54	56

C Command Example:

This example will show how to send the parameters of the C command to Eon-ID.

Table 5- C Command Parameters

Parameter	Value
Sensor	0 (zero indexed, 0=sensor 1, 1=sensor 2)
Density [g/cm ³]	2.74
Z-Factor	1.8
Tooling [%]	75

These parameters will result in the following string.

\$C0,2.74,1.8,.75

This string includes the command and all of its parameters but it does not include any of the final termination values.

First, the string must be concatenated with the additional separator and the command terminator. This results in the following string.

\$C0,2.74,1.8,.75,!

This is now the final string that must be check-summed before it is transmitted. The table below shows the ASCII representation as DECIMAL values.

Table 6: Checksum Calculation

Initiator	CMD	Sensor	SEP.	2.74 Density				SEP.	1.8Z-Ratio			SEP.	75% Tooling Factor			SEP.	TERM	CHKSM
\$	C	0	,	2	.	7	4	,	1	.	8	,	.	7	5	,	!	NA
36	67	48	44	50	46	55	52	44	49	46	56	44	46	55	53	44	33	868

After creating the checksum, the string now is concatenated with the checksum. The resulting string is:

\$C0,2.74,1.8,75,!868

The final step is to concatenate the string with the transmission terminators (i.e. CR+LF). There is no example of this string since carriage return and line feed have no ASCII representations.

The string can now be transmitted. The following table shows the transmit buffer array to be transmitted.

Table 7- Transmit Buffer Array

INDEX	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
ASCII	\$	C	0	,	2	.	7	4	,	1	.	8	,	.	7	5	,	!	8	6	8	CR	LF
DEC	36	67	48	44	50	46	55	52	44	49	46	56	44	46	55	53	44	33	56	54	56	13	10

Application Notes:

Note 1:

The corresponding values for the sources inside of the code are 0 & 1. This table identifies the values used inside of the code to the corresponding sensor label on the case of the Eon-ID and Eon-ID-LT.

Table 8: Source # Reference

Code Source #	Eon-ID Sensor Label	Eon-ID-LT Sensor Label
0	1	2
1	2	1

Note 2:

Commas are not shown in the tables. Please refer to the “Command Parameters” and “Message Structure”.

Note 3:

“Legacy commands” are still available but it is highly recommended that their replacement commands be used.

\$@ Command Structure:

The @ Command returns the identity of the device and also the current firmware version. Eon-ID will return a 1-4 after the '@' character to identify the device type. The firmware version of Eon-ID will then be displayed afterwards.

To Eon-ID Syntax:

\$@

Table 9: Example Command to Eon-ID

	\$	@
Units	NA	NA
Range	NA	NA
Example	\$	@
Comment	NA	NA

From Eon-ID Syntax:

\$@[1-4], [Version Number]

Table 10: Example Command from Eon-ID

	\$	@	Eon-ID Type C	FW Version Number	SW Version Number
Units	NA	NA	NA	NA	NA
Range	NA	NA	1-4	NA	NA
Example	\$	C	1	2.0.2	3.1.0.58
Comment	NA	NA	NA	Firmware Version	Software Version

Table 11: Device Type

	1	2	3	4
Device	Eon-ID Controller	Eon-ID Monitor	Eon-ID-LT Controller	Eon-ID-LT Controller

\$A “Abort” Command Structure:

The **A** Command engages the Abort button.

To Eon-ID Syntax:

\$A

Table 12: Example Command to Eon-ID

	\$	A
Units	NA	NA
Range	NA	NA
Example	\$	A
Comment	NA	NA

From Eon-ID Syntax:

\$A

Table 13: Example Command from Eon-ID

	\$	A
Units	NA	NA
Range	NA	NA
Example	\$	A
Comment	NA	NA

\$AL “All Layers” Command Structure:

The **AL** command returns a list of all available layers on the system. If no layers are found on the device, the device will respond with an error code 9, indicating that no layers were found.

To Eon-ID Syntax:

\$AL

Table 14: Example Command to Eon-ID

	\$	AL
Units	NA	NA
Range	NA	NA
Example	\$	AL
Comment	NA	NA

From Eon-ID Syntax:

\$AL,[Layer 0],...,[Layer n]

Table 15: Example Command to Eon-ID

	\$	AL	[Layer 0-n]
Units	NA	NA	NA
Range	NA	NA	NA
Example	\$	AL	Layer 1
Comment	NA	NA	NA

\$AP “All Processes” Command Structure:

The **AP** command returns a list of all available processes on the system. If no processes are found on the unit, the device will respond with error code 10, indicating no processes are found on the unit.

To Eon-ID Syntax:

\$AP

Table 16: Example Command to Eon-ID

	\$	AP
Units	NA	NA
Range	NA	NA
Example	\$	AP
Comment	NA	NA

From Eon-ID Syntax:

\$AP,[Process 0],...,[Process n]

Table 17: Example Command to Eon-ID

	\$	AP	[Process 0-n]
Units	NA	NA	NA
Range	NA	NA	NA
Example	\$	AP	Process 1
Comment	NA	NA	NA

\$CP “Continue Process” Command Structure:

If a process was aborted, the **CP** command calculates the remaining thickness of the layer and resumes the process if it was previously aborted. If the selected process was not aborted, then the error code 7 will be returned to notify the user that the process could not be continued, as the process was not aborted previously.

To Eon-ID Syntax:

\$CP

Table 18: Example Command from Eon-ID

	\$	CP
Units	NA	NA
Range	NA	NA
Example	\$	CP
Comment	NA	NA

From Eon-ID Syntax:

\$CP

Table 19: Example Command from Eon-ID

	\$	CP
Units	NA	NA
Range	NA	NA
Example	\$	CP
Comment	NA	NA

\$DL “Delete Layer” Command Structure:

The **DL** command deletes the specified layer from the system and all processes. If the layer could not be found, the unit will respond with an error code of 3, indicating that the layer could not be found.

Warning: The DL command removes the layer universally from all processes that contain the layer in their layer list.

To Eon-ID Syntax:

\$DL,[Layer Name]

Table 20: Example Command from Eon-ID

	\$	DL	Layer Name
Units	NA	NA	NA
Range	NA	NA	NA
Example	\$	DL	Aluminum
Comment	NA	NA	Found using \$AL

From Eon-ID Syntax:

\$DL

Table 21: Example Command from Eon-ID

	\$	DL
Units	NA	NA
Range	NA	NA
Example	\$	DL
Comment	NA	NA

\$DP “Delete Process” Command Structure:

The **DP** command deletes a specified process from memory. If the specified process could not be found, then the device responds with error code 12, indicating that the process could not be found.

To Eon-ID Syntax:

\$DP,[Process Name]

Table 22: Example Command from Eon-ID

	\$	DP	Process Name
Units	NA	NA	NA
Range	NA	NA	NA
Example	\$	DP	Aluminum 1
Comment	NA	NA	NA

From Eon-ID Syntax:

\$DP

Table 23: Example Command from Eon-ID

	\$	DP
Units	NA	NA
Range	NA	NA
Example	\$	DP
Comment	NA	NA

\$DS “Device Status” Command Structure:

The **DS** command returns the current process status of the Eon-ID. Returns the current process status of the device. This returns the same “Process Status” found in the “\$E” command.

To Eon-ID Syntax:

\$DS

Table 22: Example Command from Eon-ID

	\$	DS
Units	NA	NA
Range	NA	NA
Example	\$	PS
Comment	NA	NA

From Eon-ID Syntax:

\$DS

Table 23: Example Command from Eon-ID

	\$	DS	Status #
Units	NA	NA	NA
Range	NA	NA	0-3
Example	\$	PS	2
Comment	NA	NA	NA

Notes:

Status # - The numeric value returned represents the current status of the process on the device. Below is a list of the statuses possible:

Active Process #	
Number	Meaning
0	Manually Aborted
1	Automatically Aborted
2	Process Complete
3	Running

Manually Aborted – This status occurs when the user forced the process to abort. Either by pressing the abort button on the unit, or by sending the abort command through RS232.

Automatically Aborted – This status occurs when the software aborted the process itself. This occurs when the user has specified a condition when the process should be aborted. For example, if the user specifies that the unit should abort if max power is reached, then the device will automatically abort the process and set the process status to “Automatically Aborted”.

\$DS “Device Status” Command Structure:

Process Complete – There is currently no process running, and the last process was not aborted at any point.

Running – A process is currently running on the device.

\$E “Get Data” Command Structure:

The **E** command returns the latest values read from the internal sensor board. Returns “\$E,*,[checksum]”, if there is no new data to report. (See Note Below).

To Eon-ID Syntax:

\$E

Table 24: Example Command to Eon-ID

	\$	E
Units	NA	NA
Range	NA	NA
Example	\$	E
Comment	NA	NA

From Eon-ID Syntax:

\$E,[Device Status],[Crystal 0 Frequency],[Crystal 1 Frequency],[Material Application Rate 0],[Material Application Rate 1],[Sensor 0 Thickness],[Sensor 1 Thickness],[Thermocouple 0 Temp],[Thermocouple 1 Temp],[RTD 0 Temperature],[RTD 1 Temperature],[Source 0 Power (%)], [Source 1 Power (%)], [Heater Power (%)], [Relay 0 Status],[Relay 1 Status],[Active Process 0],[Active Process 1],[Active Process 2],[Process Status 0],[Process Status 1],[Max Power Flag 0],[Max Power Flag 1],[Max Power Flag 2],[PID Sensor , Select Source 0],[PID Sensor Select Source 1]

Table 25: Example Command to Eon-ID

	\$	E	Device Status	Crystal 0 Frequency	Crystal 1 Frequency
Units	NA	NA	NA	Hz	Hz
Range	NA	NA	0-5	-2-6100000	-2-6100000
Example	\$	E	3	5999999.999	5999999.999
Comment	NA	NA	NA	NA	NA

	Material Application Rate 0	Material Application Rate 1	Sensor 0 Thickness	Sensor 1 Thickness	Thermocouple 0 Temp
Units	Å/s	Å/s	kÅ	kÅ	Celsius
Range	0-999.9	0-999.9	0-9999.99	0-9999.99	0-999.9
Example	556.3	556.3	34.675	34.675	125.5
Comment	NA	NA	NA	NA	NA

\$E “Get Data Command Structure:

	Thermocouple 1 Temp	RTD 0 Temperature	RTD 1 Temperature	Source 0 Power (%)	Source 1 Power (%)
Units	Celsius	Celsius	Celsius	Decimal	Decimal
Range	0-999.9	0-999.9	0-999.9	0-1	0-1
Example	125.5	125.5	125.5	0.523	0.523
Comment	NA	NA	NA	0-5V	0-5V

	Heater Power (%)	Relay 0 Status	Relay 1 Status	Active Process 0	Active Process 1
Units	Decimal	NA	NA	NA	NA
Range	0-1	0-1	0-1	0-1	0-1
Example	0.523	1	1	1	1
Comment	NA	1=ON/0=OFF	1=ON/0=OFF	1=ON/0=OFF	See Below

	Heater Process	Source Status 0	Source Status 1	Heater Status	Max Power Flag 0	Max Power Flag 1
Units	NA	NA	NA	NA	NA	NA
Range	0-1	(-1)-5	(-1)-5	(-1)-8	0-1	0-1
Example	1	3	3	3	1	1
Comment	See Below	See Below	See Below	See Below	1=ON/0=OFF	1=ON/0=OFF

	Max Power Flag 2	PID Sensor	Select Source 0	PID Sensor Select Source
Units	NA	NA	NA	NA
Range	0-1	0-1	0-1	0-1
Example	1	1	1	1
Comment	1=ON/0=OFF	See Below	See Below	See Below

\$E “Get Data Command Structure:

Notes:

Active Process # – Set as 1 if the corresponding source is currently in PID mode otherwise it is set as 0.

Active Process #	
Number	Meaning
0	PID MODE OFF
1	PID MODE ON

Process Status # – This value represents the current process being executed in pre-deposition mode. When in the deposition process, the Process Status will output a 5 for a fraction of a second and then return to 0. At this point, if auto PID mode is set, Process Status will read 0, however, Active Process will change to a value of 1, indicating that PID mode has taken over.

Active Process #	
Number	Meaning
-1	OFF
0	Rise To Soak
1	Soak
2	Rise To Predeposit
3	Predeposit
4	Delay
5	Depositing
6	PID (Heater Only)
7	Cooling (Heater Only)
8	Cleaning (Heater Only)

PID Sensor Select Source# - This flag identifies which sensor will be used to control the PID mode for the specified source.

[PID Setup 0] displays which sensor will control source 0 (0 = Sensor 0, 1 = Sensor 1)

[PID Setup 1] displays which sensor will control source 1 (0 = Sensor 0, 1 = Sensor 1)

Device Status - The numeric value returned represents the current status of the process on the device. Below is a list of the statuses possible:

Active Process #	
Number	Meaning
0	Manually Aborted
1	Automatically Aborted
2	Process Complete
3	Running

Manually Aborted – This status occurs when the user forced the process to abort. Either by pressing the abort button on the unit, or by sending the abort command through RS232.

Automatically Aborted – This status occurs when the software aborted the process itself. This occurs when the user has specified a condition when the process should be aborted. For example, if the user specifies that the unit should abort if max power is reached, then the device will automatically abort the process and set the process status to “Automatically Aborted”.

Process Complete – There is currently no process running, and the last process was not aborted at any point.

Running – A process is currently running on the device.

“\$E,*,[Checksum]” Return - The “\$E,*,[Checksum]” occurs when the external device that is polling the EON device before new data is available. For example, if the EON device’s period is set to 1 second, and the external device is polling the EON device every 100ms, then the external device would receive several “\$E,*,[Checksum]” responses from the EON unit until the EON unit updates every one second. It will then transmit the new data once it updates, then return to sending “\$E,*,[Checksum]” until the EON device has another update. This process prevents the external device from reading the same data multiple times, and makes it easier for the external device to capture only new data and not repeated values. This can also occur if the EON device rejects updated data due to corruption/a failed checksum. In this case, the EON device will not update the data, and instead will poll the device again repeatedly to attempt retrieving the data correctly. In this case it can also cause a return of “\$E,*,[Checksum]” as the EON device is in the process of retrieving the data again.

\$GL “Get Layer” Command Structure:

The GL commands gets the layer properties for the specified layer. The list of layers can be retrieved by using the \$AL command.

To Eon-ID Syntax:

\$GL,[Layer Name]

Table 26: Example Command to Eon-ID

	\$	GL
Units	NA	NA
Range	NA	NA
Example	\$	GP
Comment	NA	NA

From Eon-ID Syntax:

\$GL,[Name],[Material Name],[Density],[Z-Factor],[Tooling],[P],[I],[D],[Source],[Sensor],[Max Power],[End Of Layer Action],[Rise to Soak],[Soak Time],[Soak Power %],[Rise to Predeposit],[Predeposit],[Predeposit Power],[Delay],[Rate Warning],[Rate Warning Delay],[Rate Abort],[Rate Abort Delay]

Table 27: Example Command to Eon-ID

	\$	GL	Name	Material Name	Density
Units	NA	NA	NA	NA	gm/cc
Range	NA	NA	NA	NA	0.100-99.999
Example	\$	E	Initial Coat	Aluminum	58.568
Comment	NA	NA	NA	NA	NA

	Z-Factor	Tooling	P	I	D
Units	NA	Percent	NA	NA	NA
Range	0.100-15.000	10.0 999.999	0-9999	0-99.9	0-0.99
Example	2.325	5.253	2.7	1.08	5.2
Comment	NA	NA	NA	NA	NA

	Source	Sensor	Max Power	End of Layer Action	Rise to Soak
Units	NA	NA	Percent	NA	Seconds
Range	1-2	1-2	0-100	C,W	0.1-9999.9
Example	1	1	52	C	52.3
Comment	NA	NA	NA	C = Continue W = Wait	NA

\$GL “Get Layer” Command Structure:

	Soak Time	Soak Power (%)	Rise to Predeposit	Predeposit	Predeposit Power
Units	Seconds	Percent	Seconds	Seconds	Percent
Range	0-9999.9	0-100	0.1-9999.9	0-9999.9	0-100
Example	52.3	0.25	52.3	52.3	0.25
Comment	NA	NA	NA	NA	NA

	Delay	Rate Warning	Rate Warning Delay	Rate Abort	Rate Abort Delay
Units	Seconds	Percent	Seconds	Seconds	Percent
Range	0-999.9	0-999.9	0.1-9999.9	0-9999.9	0-100
Example	11	10	52.3	52.3	0.25
Comment	NA	NA	NA	NA	NA

\$GP “Get Process” Command Structure:

The **GP** command gets the currently selected process to run on the Eon-ID. This command will return with error code 13 if the process selector is blank, indicating that no process is selected.

To Eon-ID Syntax:

\$GP

Table 28: Example Command to Eon-ID

	\$	GP
Units	NA	NA
Range	NA	NA
Example	\$	GP
Comment	NA	NA

From Eon-ID Syntax:

\$GP

Table 29: Example Command to Eon-ID

	\$	GP	Process Name
Units	NA	NA	NA
Range	NA	NA	NA
Example	\$	GP	Aluminum 1
Comment	NA	NA	NA

\$HA “Heater Activate” Command Structure:

The **HA** activates the heater with the specified settings.

To Eon-ID Syntax:

\$HA,[P],[I],[D],[Setpoint],[Max Power],[Mode],[Clean Time]

Table 30: Example Command from Eon-ID

	\$	HA	P	I	D
Units	NA	NA	NA	NA	NA
Range	NA	NA	0-9999	0-99.9	0-0.99
Example	\$	HA	2.7	1.08	5.2
Comment	NA	NA	NA	NA	NA

	Setpoint	Max Power	Mode	Clean Time
Units	Celsius	Percent	NA	Seconds
Range	0-500.00	0.00-100.00	C,R	0-9999.99
Example	200.01	34.5	R	60.5
Comment	NA	NA	C = Clean R= Remain	NA

From Eon-ID Syntax:

\$HA

Table 31: Example Command from Eon-ID

	\$	HA
Units	NA	NA
Range	NA	NA
Example	\$	HA
Comment	NA	NA

\$HA “Heater Activate” Command Structure:

Notes:

Remain - Remain mode means that the heater will remain on until manually told to shut off. When Remain mode is specified, the “Clean Time” argument is not used. However, a place value must still be entered. i.e. A value of 0.

Clean - In clean mode, the heater will heat up to the specified temperature. Once the temperature is reached the heater will remain on for the specified amount of time designated by “Clean Time”. The heater will then shut-off after the time specified has elapsed. Once the setpoint temperature is reached, the “Clean Time” timer will start. Once the timer is started, the temperature does not have an effect on the timer.

For example, if the setpoint of 100 degrees is reached, the timer will start. If the temperature then drops down to 50 degrees while the timer is running it will have no effect on the timer. The timer will not reset. It will turn off the heater after the specified lapsed time. This is to prevent infinite loops, where the timer is constantly being reset due to temperature fluctuation.

Max Power – Used to limit the maximum power that is being applied to the heater. This can be used to prevent rapid overshoots.

\$HO “Heater Off” Command Structure:

The **HO** shuts the heater off.

To Eon-ID Syntax:

\$HO

Table 32: Example Command from Eon-ID

	\$	HO
Units	NA	NA
Range	NA	NA
Example	\$	HO
Comment	NA	NA

From Eon-ID Syntax:

\$HO

Table 33: Example Command from Eon-ID

	\$	HO
Units	NA	NA
Range	NA	NA
Example	\$	HO
Comment	NA	NA

\$IL “Insert Layer” Command Structure

The **IL** command inserts/adds a layer to the specified process. Use the **\$AL** command to get a list of all available layers on the unit that can be used. Use the **\$AP** to get a list of all the processes available for use.

To Eon-ID Syntax:

\$IL,[Overwrite],[Process Name],[Layer Index],[Layer Name],[Rate],[Thickness]

Table 34: Example Command to Eon-ID

	\$	IL	Overwrite	Process Name	Layer Index	Layer Name
Units	NA	NA	NA	NA	NA	NA
Range	NA	NA	Y,N	NA	0-n	NA
Example	\$	IL	Y	Aluminum 1	9	Aluminum
Comment	NA	NA	NA	NA	NA	NA

	Rate	Thickness
Units	A/s	NA
Range	0-999.9	NA
Example	0	IL
Comment	NA	NA

From Eon-ID Syntax:

\$IL

Table 35: Example Command to Eon-ID

	\$	IL
Units	NA	NA
Range	NA	NA
Example	\$	IL
Comment	NA	NA

Notes:

Insert vs Overwrite – When “N” is sent for overwrite, the index will be ignored, and the layer will be added to the end of the processes layers list. When “Y” is used, the layer at the specified location will be overwritten, and replaced with the specified layer info. When using the “Overwrite” functionality, if the index specified is out of range for the number of layers that the process has, then error 15 will occur specifying that the index specified is out of range of the total number of layers.

Index is zero based – Note that the index is zero based. This means that the first layer inside of the process will have an index of 0. If the process has a total of 5 layers in its list, then the index of the last layer will be 4, not 5, since the first layer starts at 0.

\$LP “Layer Properties” Command Structure:

The **LP** command sets the properties for a specified layer. This command will return with a response of “\$*, *,16, Wrong Number Of Arguments” if an incorrect number of arguments are used.

To Eon-ID Syntax:

\$LP,[Name],[Material Name],[Density],[Z-Factor],[Tooling],[P],[I],[D],[Source],[Sensor],[Max Power],[End Of Layer Action],[Rise to Soak],[Soak Time],[Soak Power %],[Rise to Predeposit],[Predeposit],[Predeposit Power],[Delay],[Rate Warning],[Rate Warning Delay],[Rate Abort],[Rate Abort Delay]

Table 36: Example Command to Eon-ID

	\$	LP	Name	Material Name	Density
Units	NA	NA	NA	NA	gm/cc
Range	NA	NA	NA	NA	0.100-99.999
Example	\$	E	Initial Coat	Aluminum	58.568
Comment	NA	NA	NA	NA	NA

	Z-Factor	Tooling	P	I	D	Source	Sensor
Units	NA	Percent	NA	NA	NA	NA	NA
Range	0.100-15.000	10.0 999.999	0-9999	0-99.9	0-0.99	1-2	1-2
Example	2.325	5.253	2.7	1.08	5.2	1	1
Comment	NA	NA	NA	NA	NA	NA	NA

	Max Power	End of Layer Action	Rise to Soak	Soak Time	Soak Power (%)
Units	Percent	NA	Seconds	Seconds	Percent
Range	0-100	C,W	0.1-9999.9	0-9999.9	0-100
Example	52	C	52.3	52.3	0.25
Comment	NA	C = Continue W = Wait	NA	NA	NA

	Rise to Predeposit	Predeposit	Predeposit Power	Delay	Rate Warning
Units	Seconds	Seconds	Percent	Seconds	Percent
Range	0.1-9999.9	0-9999.9	0-100	0-999.9	0-999.9
Example	52.3	52.3	0.25	11	10
Comment	NA	NA	NA	NA	NA

	Rate Warning Delay	Rate Abort	Rate Abort Delay
Units	Seconds	Seconds	Percent
Range	0.1-9999.9	0-9999.9	0-100
Example	52.3	52.3	0.25
Comment	NA	NA	NA

From Eon-ID Syntax:

\$LP

Table 37: Example Command to Eon-ID

	\$	LP
Units	NA	NA
Range	NA	NA
Example	\$	LP
Comment	NA	NA

Notes:

Adding a Layer – To create a new layer, simply use a layer name that is not already in use.

Updating a Layer – To update a layer, simply use a layer name that already exists. The layer properties will be updated with the specified properties. You can obtain a list of the currently saved layers using the \$AL command.

\$NL “Next Layer” Command Structure:

The **NL** command advances to the next layer if the deposition is paused between layers. Will return an error code of 6 if a process is not currently running.

To Eon-ID Syntax:

\$NL

Table 38: Example Command from Eon-ID

	\$	NL
Units	NA	NA
Range	NA	NA
Example	\$	NL
Comment	NA	NA

From Eon-ID Syntax:

\$NL

Table 39: Example Command from Eon-ID

	\$	NL
Units	NA	NA
Range	NA	NA
Example	\$	NL
Comment	NA	NA

Notes:

Caution – This command forces the EON-ID to go to the next layer in the list. This command should be used when the process has already been started and the current layer is finished, but waiting for the next layer to be executed. Currently the software will allow you to move to the next layer while in the middle of the deposition. Future implementation will notify the user that a layer is currently running, however, as of now v3.1.0.60, the software will allow you to force the process to the next layer while the current process is running.

Detecting when a layer is completed and waiting for next layer – Currently the \$E data will allow you to identify when a layer is complete but waiting for the next layer. If the Active Process # = 0 (PID is not running), Process Status # = -1 (Not in Pre-Deposition Mode), and

\$P “Set Period” Command Structure:

The **P** command sets the period used by the Eon-ID. Error code 8 is returned when the period is out of range.

To Eon-ID Syntax:

\$P,[Seconds]

Table 40: Example Command from Eon-ID

	\$	P	Period in Seconds
Units	NA	NA	Seconds
Range	NA	NA	0.1-1.0
Example	\$	P	0.5
Comment	NA	NA	NA

From Eon-ID Syntax:

\$P

Table 41: Example Command from Eon-ID

	\$	P
Units	NA	NA
Range	NA	NA
Example	\$	P
Comment	NA	NA

\$PL “Process Layers” Command Structure:

The **PL** command returns a list of all of layers for the selected process.

To Eon-ID Syntax:

\$PL,[Process Name]

Table 42: Example Command from Eon-ID

	\$	PL	Process Name
Units	NA	NA	NA
Range	NA	NA	NA
Example	\$	PL	Process1
Comment	NA	NA	NA

From Eon-ID Syntax:

\$PL,[Layer 1 Name],[Layer 1 Rate],[Layer 1 Thickness],...,[Layer n Name],[Layer n Rate],[Layer n Thickness]

Table 43: Example Command from Eon-ID

	\$	PL	[Layers 0-n]
Units	NA	NA	NA
Range	NA	NA	NA
Example	\$	PL	First_AL_Layer
Comment	NA	NA	NA

Notes:

Return Format – The command will return each layer in order that is assigned to that process. Each layer will be returned with 3 arguments. The first argument will be the name. The second will be the rate setpoint. The third will be the thickness setpoint. This pattern repeats until all layers are sent. The takeaway here is that every layer in the layers list will return 3 arguments, then the next argument will be the name of the next layer.

Return Order vs. Run Order – The layers are returned in the order they are found in the layers list. This means that the first layer in the list, would be the first layer to run when the process starts. The second layer returned will be the second layer to run in the process, etc.

\$PP “Process Properties” Command Structure:

The **PP** command creates or modifies a process. To create a process, simply use a process name that is not currently used. To modify a process, simply specify the name of the processes you wish to change. The process name cannot be empty.

To Eon-ID Syntax:

\$PP,[Process Name],[Mode]

Table 44: Example Command from Eon-ID

	\$	PP	Process Name	Mode
Units	NA	NA	NA	NA
Range	NA	NA	NA	S,C
Example	\$	PS	Aluminum	S
Comment	NA	NA	NA	S - Sequential C - Co-dep

From Eon-ID Syntax:

\$PP

Table 45: Example Command from Eon-ID

	\$	PP
Units	NA	NA
Range	NA	NA
Example	\$	PS
Comment	NA	NA

Notes:

Adding a layer – To create a new process, simply use a name that is not already in use. The new process will be created and added to the system

Modifying a Layer – As of V3.1.0.60 only the process type can be modified, and the process name cannot be edited. Future revisions of the software will allow this feature.

\$RL “Remove Layer” Command Structure:

The **RL** command removes a layer from a process at the specified index. If the process does not have a layer at the specified index, then error 15 will occur indicating that there was no layer to remove.

To Eon-ID Syntax:

\$RL

Table 46: Example Command from Eon-ID

	\$	RL	Process	Layer Index
Units	NA	NA	NA	NA
Range	NA	NA	NA	0-n
Example	\$	RL	Initial AL	3
Comment	NA	NA	NA	NA

From Eon-ID Syntax:

\$RL

Table 47: Example Command from Eon-ID

	\$	RL
Units	NA	NA
Range	NA	NA
Example	\$	RL
Comment	NA	NA

Note:

Difference between removing a layer and deleting a layer – Removing a layer simply removes it from the process’s list of layers. It does not remove it from the device. The layer and its properties can still be found on the device. “Delete Layer” completely deletes the layer from the machine and removes it from all processes.

\$RP “Run Process” Command Structure:

The **RP** command runs the currently-selected process.

To Eon-ID Syntax:

\$RP

Table 48: Example Command from Eon-ID

	\$	RP
Units	NA	NA
Range	NA	NA
Example	\$	RP
Comment	NA	NA

From Eon-ID Syntax:

\$RP

Table 49: Example Command from Eon-ID

	\$	RP
Units	NA	NA
Range	NA	NA
Example	\$	RP
Comment	NA	NA

\$SP “Set Process” Command Structure:

The **SP** command sets the selected process to run.

To Eon-ID Syntax:

\$SP

Table 50: Example Command from Eon-ID

	\$	SP
Units	NA	NA
Range	NA	NA
Example	\$	SP
Comment	NA	NA

From Eon-ID Syntax:

\$SP

Table 51: Example Command from Eon-ID

	\$	SP	Process Name
Units	NA	NA	NA
Range	NA	NA	NA
Example	\$	SP	Aluminum 1
Comment	NA	NA	NA

\$\$\$ “Set Source” Command Structure:

The **SS** command sets the specified source to the specified percentage of total power. This command is used to manually control the source. Using this command will pull the source out of PID control during deposition runs.

To Eon-ID Syntax:

\$\$\$,[Source #],[Power]

Table 52: Example Command to Eon-ID

	\$	SS	Source	Percent
Units	NA	NA	NA	Percent
Range	NA	NA	0-1	0-100
Example	\$	SS	1	75
Comment	NA	NA	NA	NA

From Eon-ID Syntax:

\$\$\$

Table 53: Example Command to Eon-ID

	\$	SS
Units	NA	NA
Range	NA	NA
Example	\$	SS
Comment	NA	NA

Note:

Source Number – See the chart to control the specific sources:

Active Process #	
Number	Meaning
0	Source 1
1	Source 2
2	Heater

Freezing a source’s power – While a source is running under PID control you can read its current power from the \$E command, then use this command to set its power. This will effectively “freeze” the sources power at a specific point. This may be desirable when tuning the system.

\$ZS “Zero Sensor” Command Structure:

The **ZS** command zeroes the specified sensor.

To Eon-ID Syntax:

\$ZS,[Sensor]

Table 54: Example Command from Eon-ID

	\$	ZS	Sensor
Units	NA	NA	NA
Range	NA	NA	0-1,A
Example	\$	ZS	A
Comment	NA	NA	NA

From Eon-ID Syntax:

\$ZS

Table 55: Example Command from Eon-ID

	\$	ZS
Units	NA	NA
Range	NA	NA
Example	\$	ZS
Comment	NA	NA

Notes:

Sensor – Below is a list specifying which sensors will be zeroed using the specified commands:

Active Process #	
Number	Meaning
1	Sensor 1
2	Sensor 2
A	All (Sensor 1 & Sensor 2)

\$* “Error Response” Command Structure:

The * command is returned when an error occurs from sending a command.

To Eon-ID Syntax:

\$*

Table 56: Example Command from Eon-ID

	\$	*
Units	NA	NA
Range	NA	NA
Example	\$	*
Comment	NA	NA

From Eon-ID Syntax:

\$*

Table 57: Example Command from Eon-ID

	\$	*	Command	Error #	Message
Units	NA	NA	NA	NA	NA
Range	NA	NA	AA-ZZ	1-11	NA
Example	\$	*	IL	2	Unknown Error
Comment	NA	NA	NA	NA	NA

\$* “Error Response” Command Structure:

Error response codes are as follows:

Active Process #	
Number	Meaning
1	Eon-ID received command, but it was not processed correctly
2	Unknown Command
3	General Error
4	Unknown Value Entered
5	Process Already Running
6	Process Not Running
7	Process Was Not Aborted
8	Value Out Of Range
9	No Processes Found On Unit
10	No Layers Found On Unit
11	Name Cannot Be Empty
12	Process Not Found
13	No Process Selected
14	Layer Not Found
15	Index Out Of Range
16	Wrong Number Of Arguments
17	Bad Checksum Sent
18	Command Char Not Found
19	Index Cannot Be Empty

Notes:

Command Char Not Found – This error occurs when the ‘\$’ is missing at the beginning of the command. Check to make sure that the command you are sending is not being cut off. Also, ensure that the command is not being sent too fast from the external device, causing corrupt data to be received.

Wrong Number Of Arguments – When a command requires input arguments, the device will check to ensure that the number of arguments sent to the device, matches the correct number of arguments the command requires. It has more or less, this error will be returned to notify that the correct number of arguments has not been sent.

Index out of range – This occurs when the specified index used for the command is out of range for the command. For example, if you have a process that has 5 layers, and you specify an index of 10, this error will be returned indicating that the index is out of range of the total number of layers. Also, indexes are 0 based. Meaning the first element in the list starts with the number 0, not the number 1. So if you have 5 items in a list, the last index of that list would be 4, not 5.

\$* “Error Response” Command Structure:

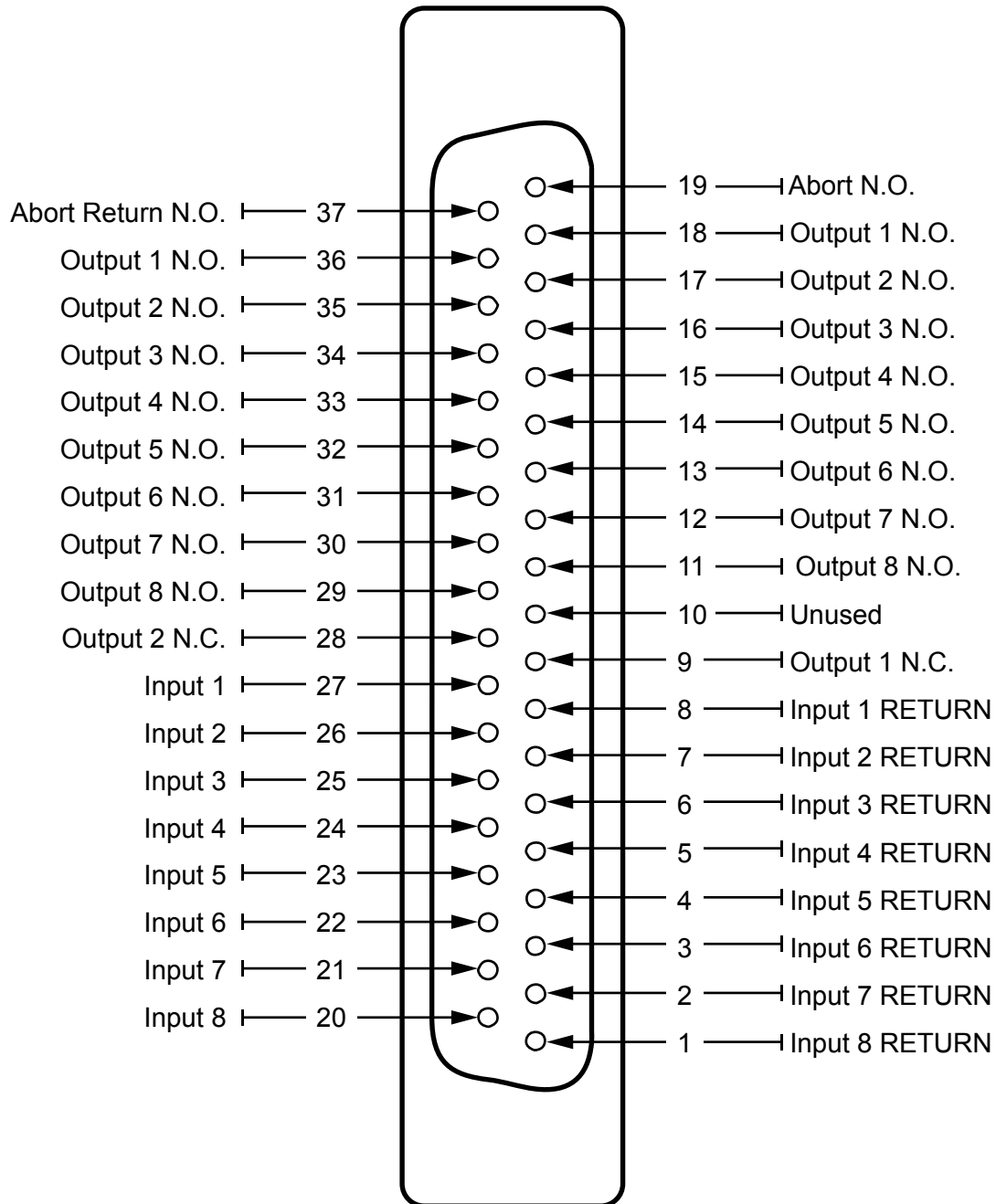
Unknown Command – The command that was sent could not be found in the list of commands that the unit was programmed for. This occurs when the characters directly after the command initiator (the ‘\$’) does not match any known commands.

Process Already Running – This occurs when the specified command can only be used while a process is not currently running, but the command was sent while the command was running.

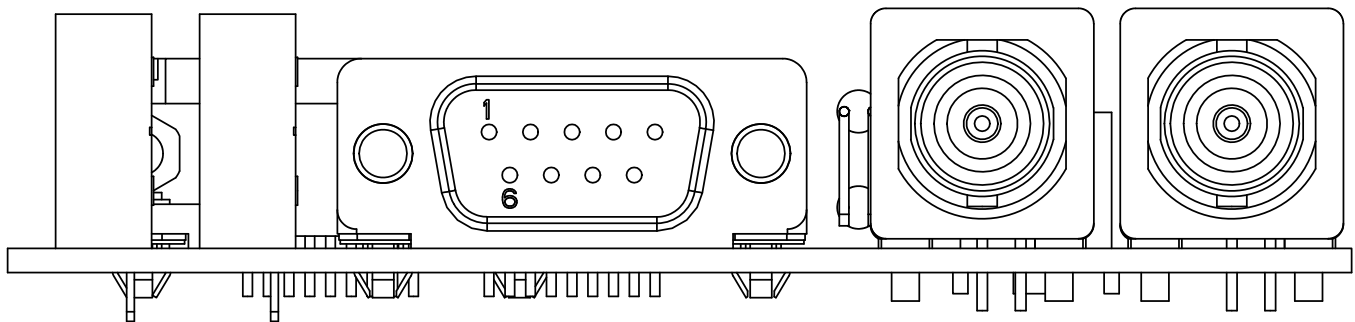
Process Not Running – This occurs when the specified command requires the process to be running, but there is currently no running process on the device, so the command could not be completed

\$*,*,[error num],[message] Returned – When an error occurs, where the command name cannot be identified, or could be corrupt (Such as a checksum failure, or the initial command char not being found) an ‘*’ will be used in place of the command name, however, an error number and message will still be returned identifying the issue that the device ran into, even though it does not specify the command.

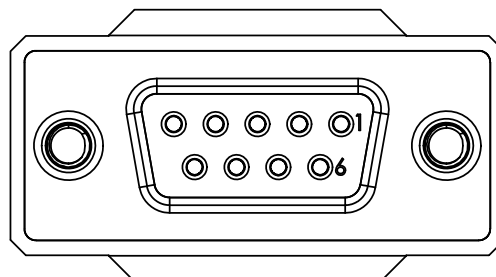
DB37 Relay Board Pin Diagram (Female)



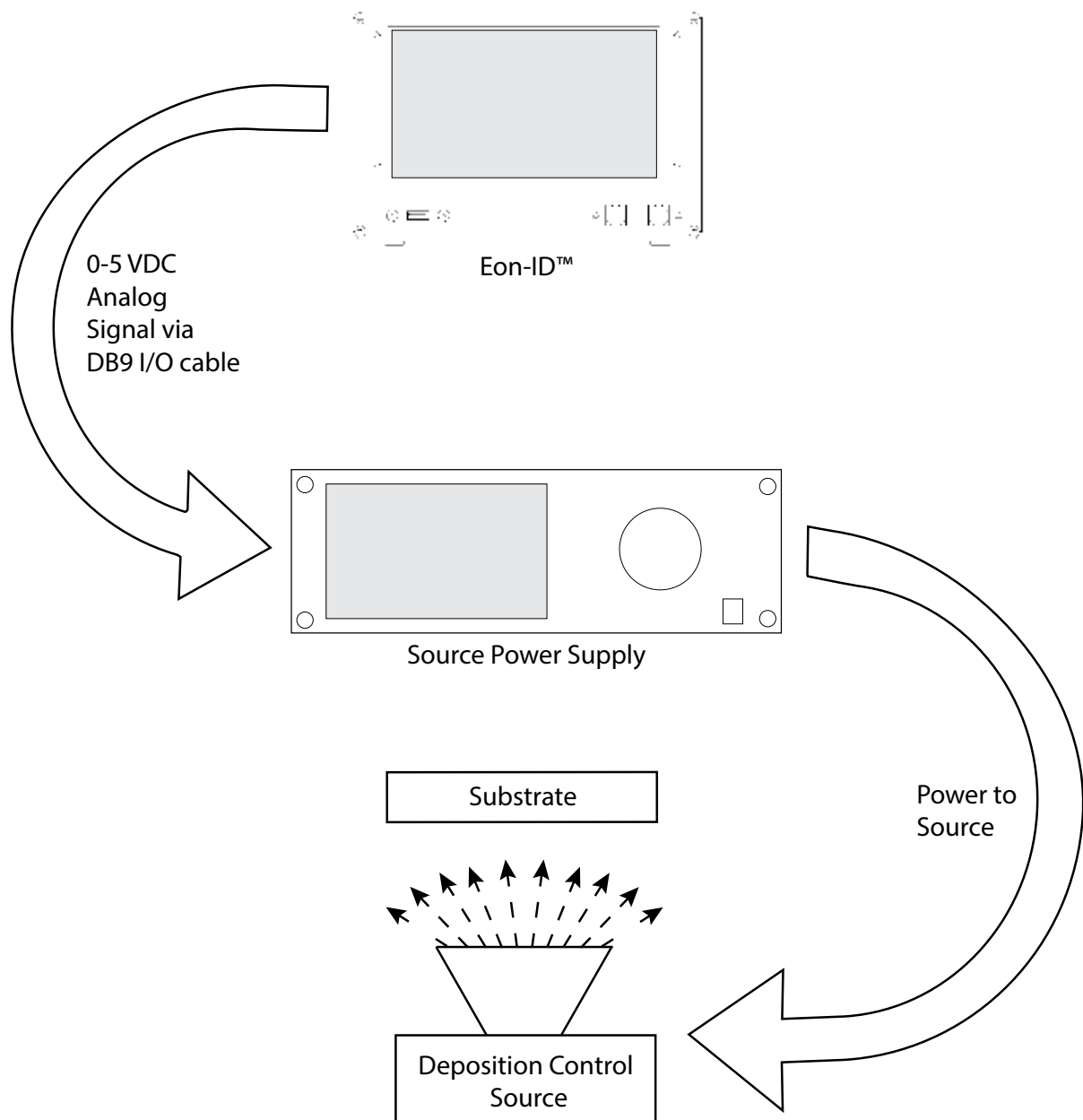
DB9 I/O Pin Diagram



PIN#	Description
1	Relay 2 Out (N.O.)
2	Relay 1 Out (N.O.)
3	24 vdc for Mirage use only
4	0-5 vdc Source 2 Control
5	0-5 vdc Source 1 Control
6	Relay 2 Return (N.O.)
7	Relay 1 Return (N.O.)
8	Ground Signal
9	Ground Signal



Source Power Supply Signal



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