About the DSR 100-15 Dropout, Surge, Ripple Simulator and AC/DC Voltage Source

Congratulations on your purchase of a DSR 100-15 AE Techron dropout, surge, ripple simulator and AC/DC voltage source. The DSR 100-15 provides a complete, single-box solution for immunity testing. It includes a simple-to-use yet powerful standards waveform generator matched with an industry leading power supply technology and comes with an extensive library of tests for many automotive and aviation standards.

The DSR 100-15 is 4-quadrant, allowing it to source and sink current. The DSR 100-15 has power in reserve; it provides continuous DC power as rated, and is able to provide 4X rated power for in-rush testing up to 200 mS, as is required in DO 160 Section 16.

The AE Techron brand is known throughout the world for its robust precision amplifiers and test systems as well as its product service and support.

Disclaimer

Although AE Techron has made substantial effort to ensure the accuracy of the Standards' test files (SWG files), which are included with the DSR 100-15, no warranty, expressed or implied, is made regarding accuracy, adequacy, completeness, legality, reliability or usefulness of the information provided. It is the responsibility of the user to ensure the accuracy and applicability of these test files for their intended purposes.

Getting Started

DSR 100-15 Setup

The following steps explain how to connect the DSR 100-15 using the cables and accessories provided.

Check Front-Panel Controls

A. Check to make sure that the AC power/breaker switch for both the Controller and the amplifier module are in the ON (|) position.
B. Make sure the Gain control is turned to the 100 (cal) position (fully clockwise).

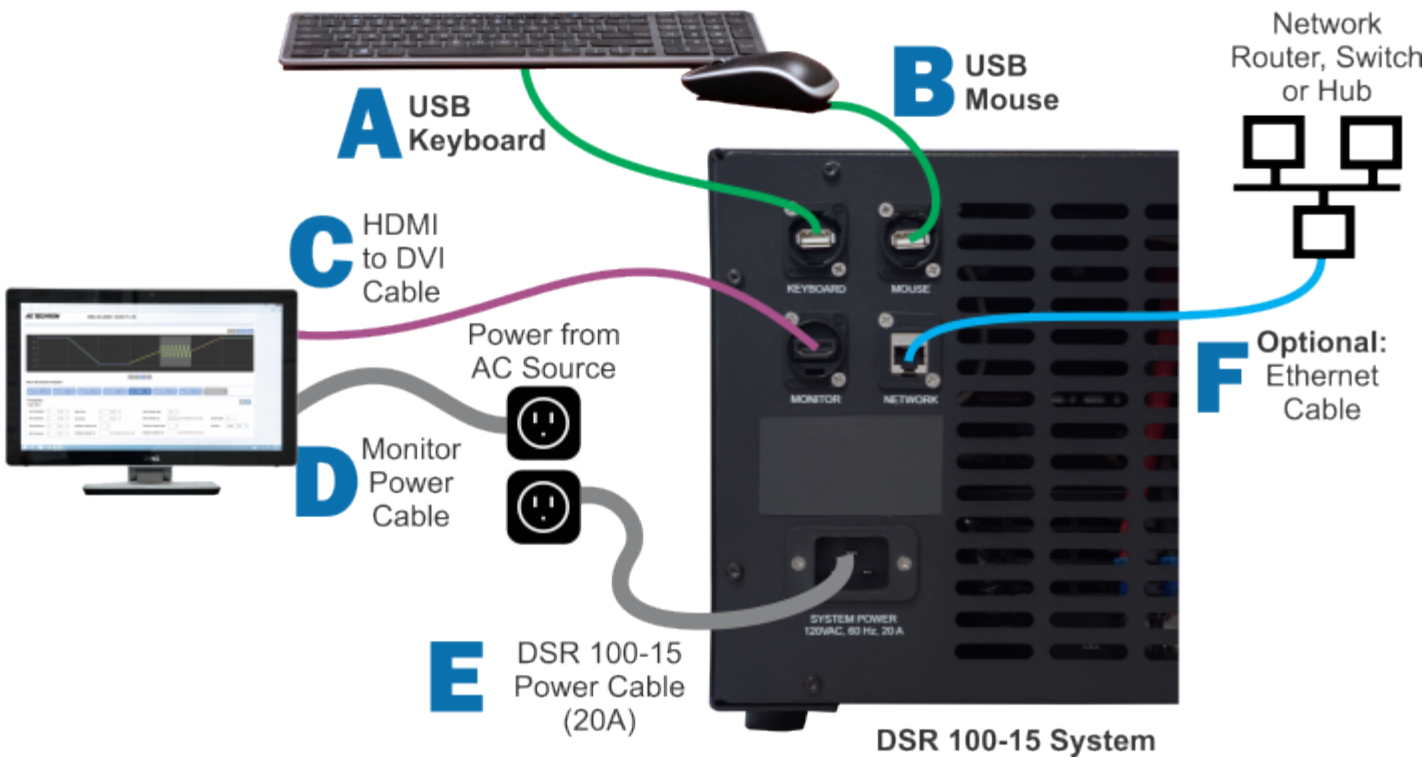
Connect Test Supply:

Make sure the DSR 100-15 system is turned off and AC power is disconnected. Using the supplied pin-plug connectors and wiring appropriate for your application, connect fromt he DSR 100-15 front-panel positive and negative test supply connectors to the device under test.

Back-Panel Connections:

A. Plug the USB keyboard into the USB port labeled KEYBOARD on the DSR 100-15 back panel.
B. Plug the USB mouse into the USB port labeled MOUSE on the DSR 100-15 back panel.
C. Plug the HDMI to DVI cable into the HDMI port labeled MONITOR on the DSR 100-15 back panel, and then connect the cable to the DVI port on the monitor.
D. Plug the monitor power cord into the monitor, and then connect the cord to a power source.
E. Plug the DSR 100-15 power cord into the power connector located on the DSR 100-15 back panel, and then connect the cord to a 20A power source.

F. OPTIONAL: To connect the DSR 100-15 to be accessed and controlled through a network: Plug the Ethernet cable to the Ethernet port on the DSR 100-15 back panel labeled NETWORK, and then plug the Ethernet cable into a router, switch or hub on the network. See the topic "DSR 100-15 via Network" for more information.



Startup Procedure

Complete the following steps to power up a DSR 100-15 system:

A. Use the monitor's power switch (last button on the right) to turn on the monitor.

B. Depress the DSR 100-15 SYSTEM POWER switch to turn the DSR 100-15 ON.

C. Wait for the DSR 100-15 interface to load (loading will take up to 30 seconds). See additional topics in this Help system for "System Calibration" and "Basic Operation."

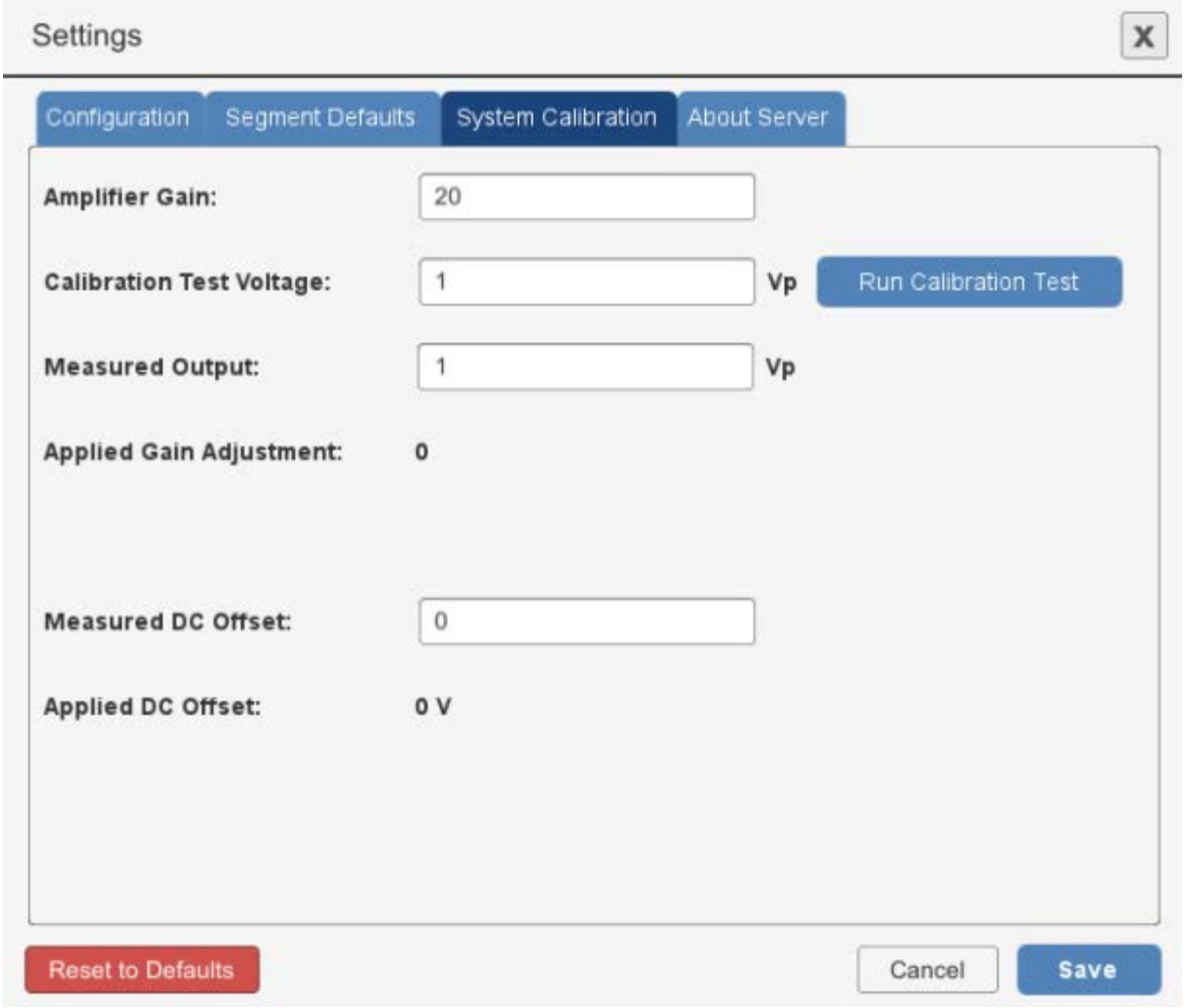
System Calibration

IMPORTANT: Before operating the DSR 100-15, the Calibration Test should be run to determine the correct system settings for the DSR 100-15.

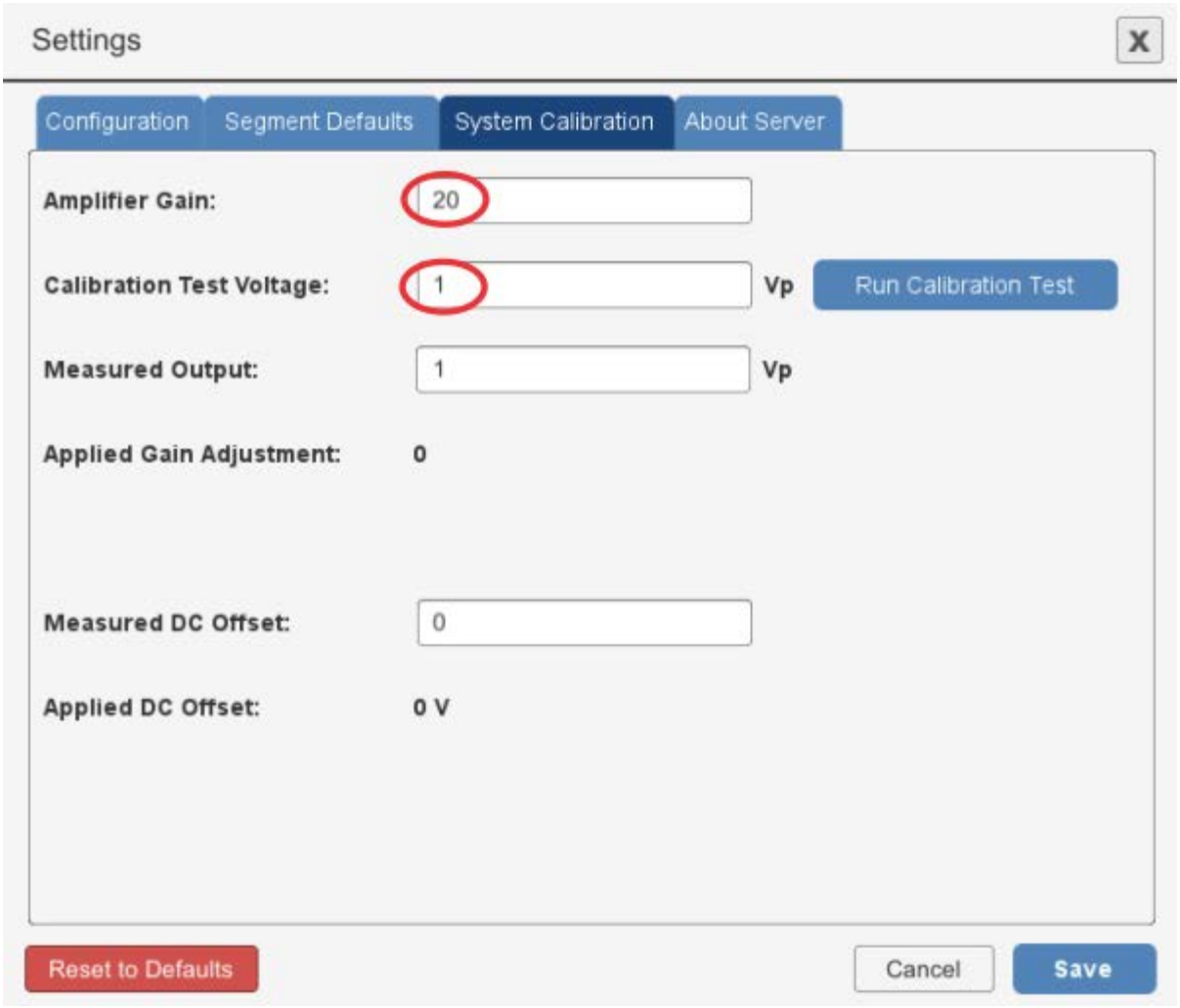
The DSR 100-15's default System Gain setting is 20, and the default DC Offset setting is 0, but these settings should be verified and adjusted, if needed, to reflect the measured gain of your DSR 100-15 system at the Test Supply outputs. If you are measuring the output of the DSR 100-15 without amplification (from the Controller's front-panel BNC signal output), a System Gain of 1 can be used for DSR 100-15 calibration (for an expected output of 10Vp/20Vpp).

Complete the following steps to run the calibration test and adjust the DSR 100-15's System Gain and DC Offset settings:

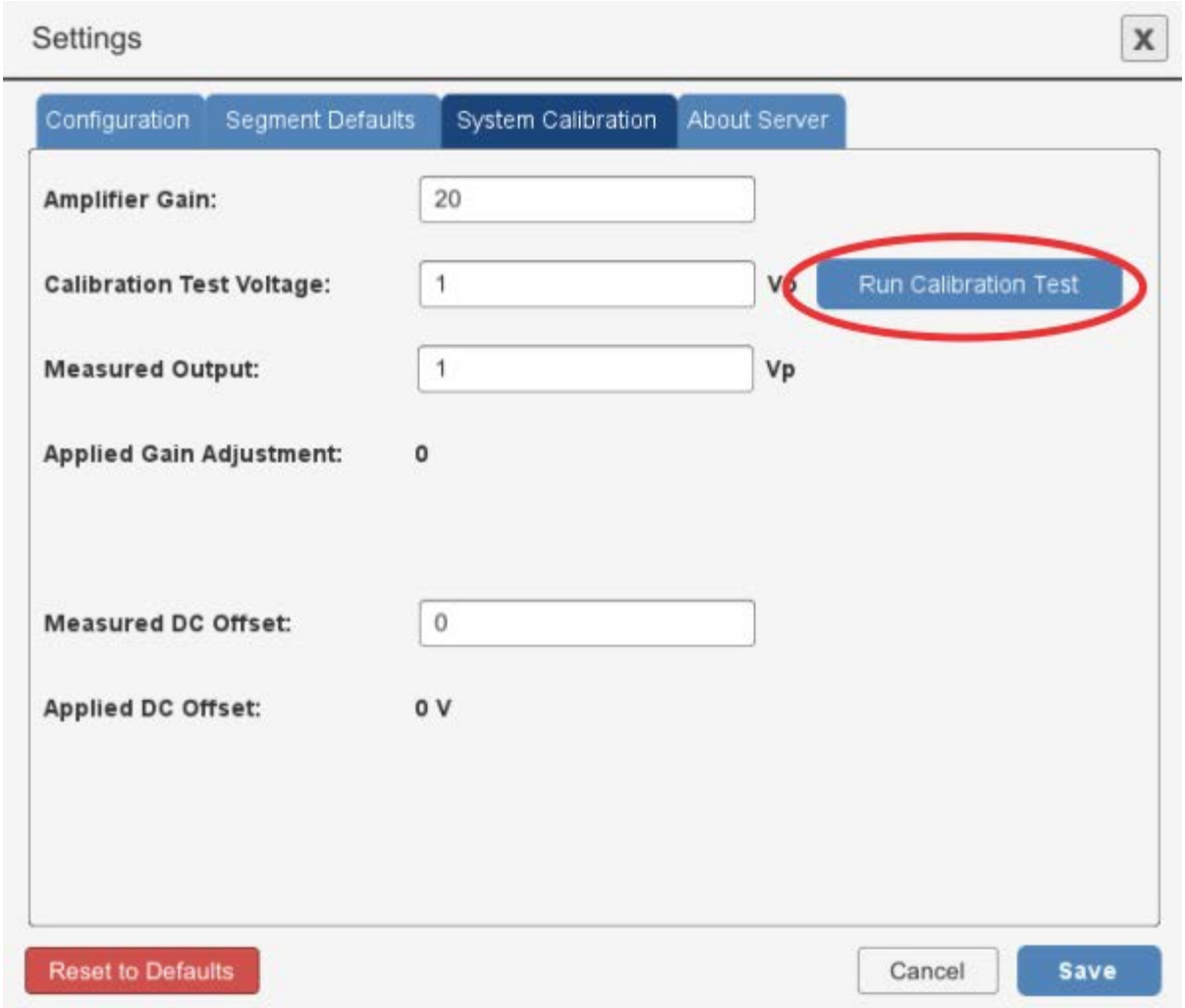
1. Select the Settings button and then open the System Calibration tab.



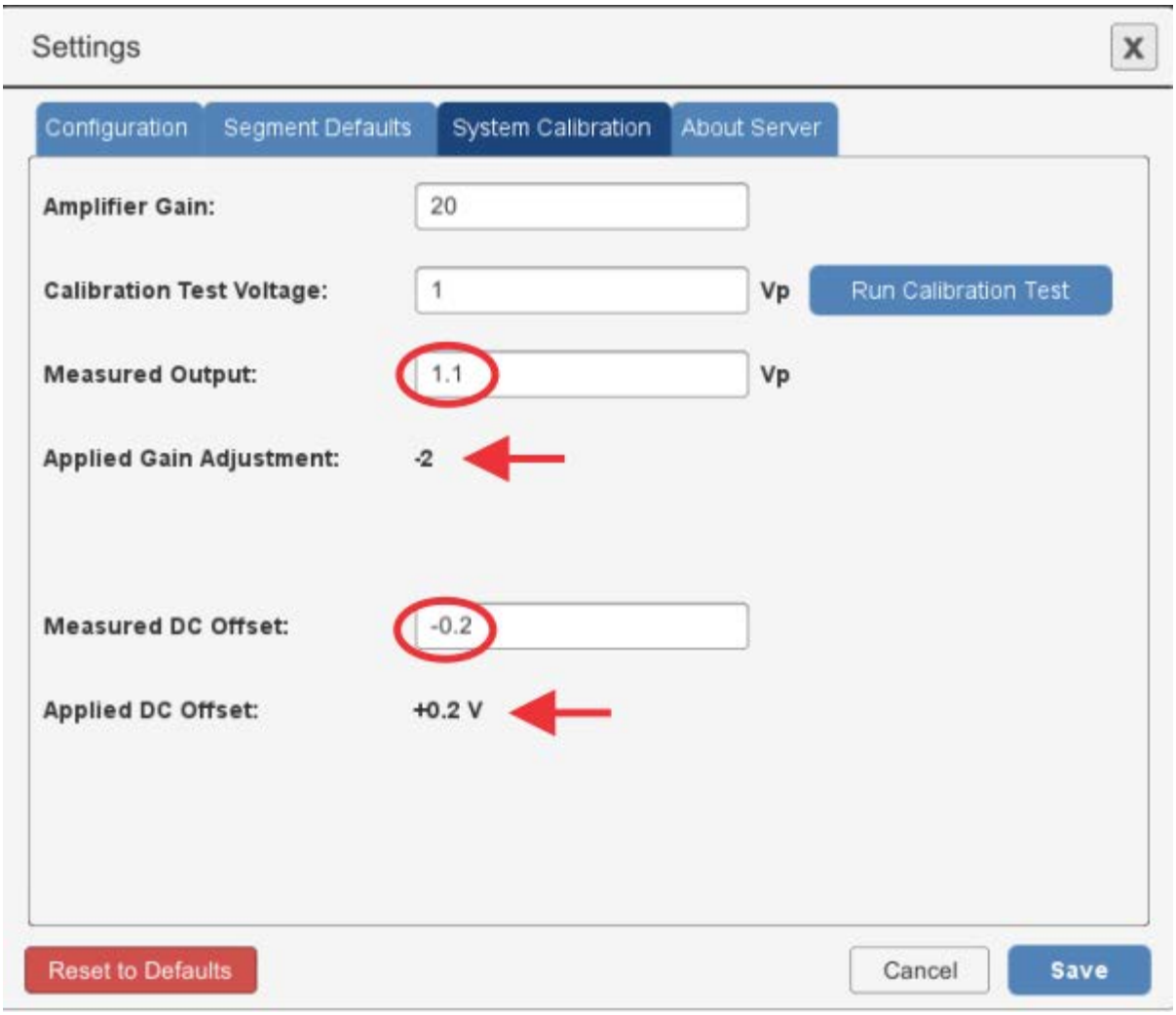
2. Make sure an estimated gain is entered in the Amplifier Gain input box. A default gain of 20 will be pre-entered in this box.
3. Adjust the Calibration Test Voltage, if desired. A default test signal of 1 Vp will be pre-entered in this box. Note: the default DC offset is 0 and cannot be changed.



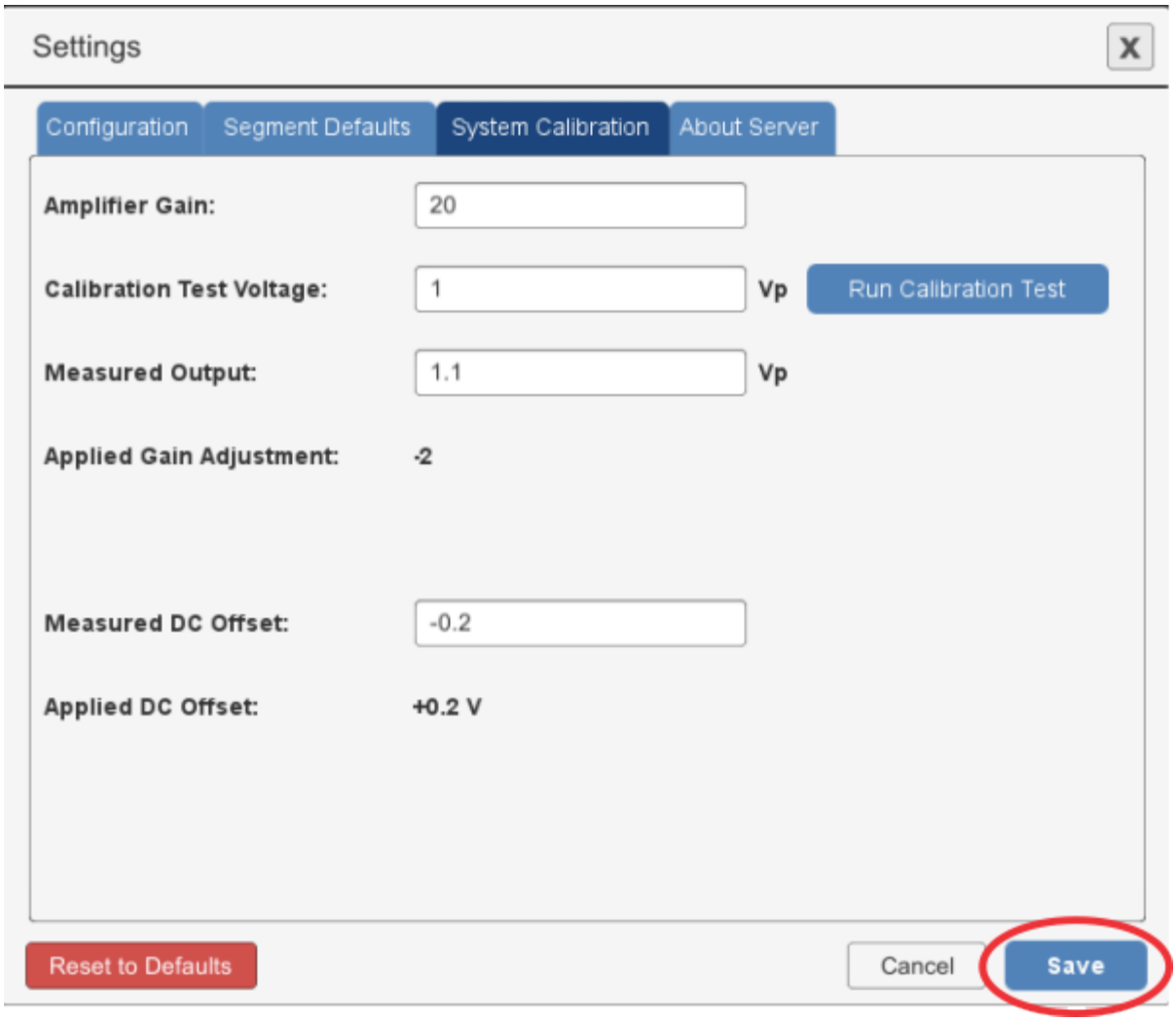
4. Connect an oscilloscope to the DUT (load at the Test Supply output).
5. Press the Run Calibration Test button to begin the Calibration Test. The DSR 100-15 will generate a 1 kHz sine wave signal at the test voltage entered in the Calibration Test Voltage box.



6. Note the output voltage and any DC offset shown on the oscilloscope. Enter these results in the Measured Output and Measured DC Offset boxes on the System Calibration tab. The DSR 100-15 Controller will automatically calculated the required Gain and DC Offset adjustments and display them on the Applied Gain Ajustment and Applied DC Offset lines on the System Calibration tab.



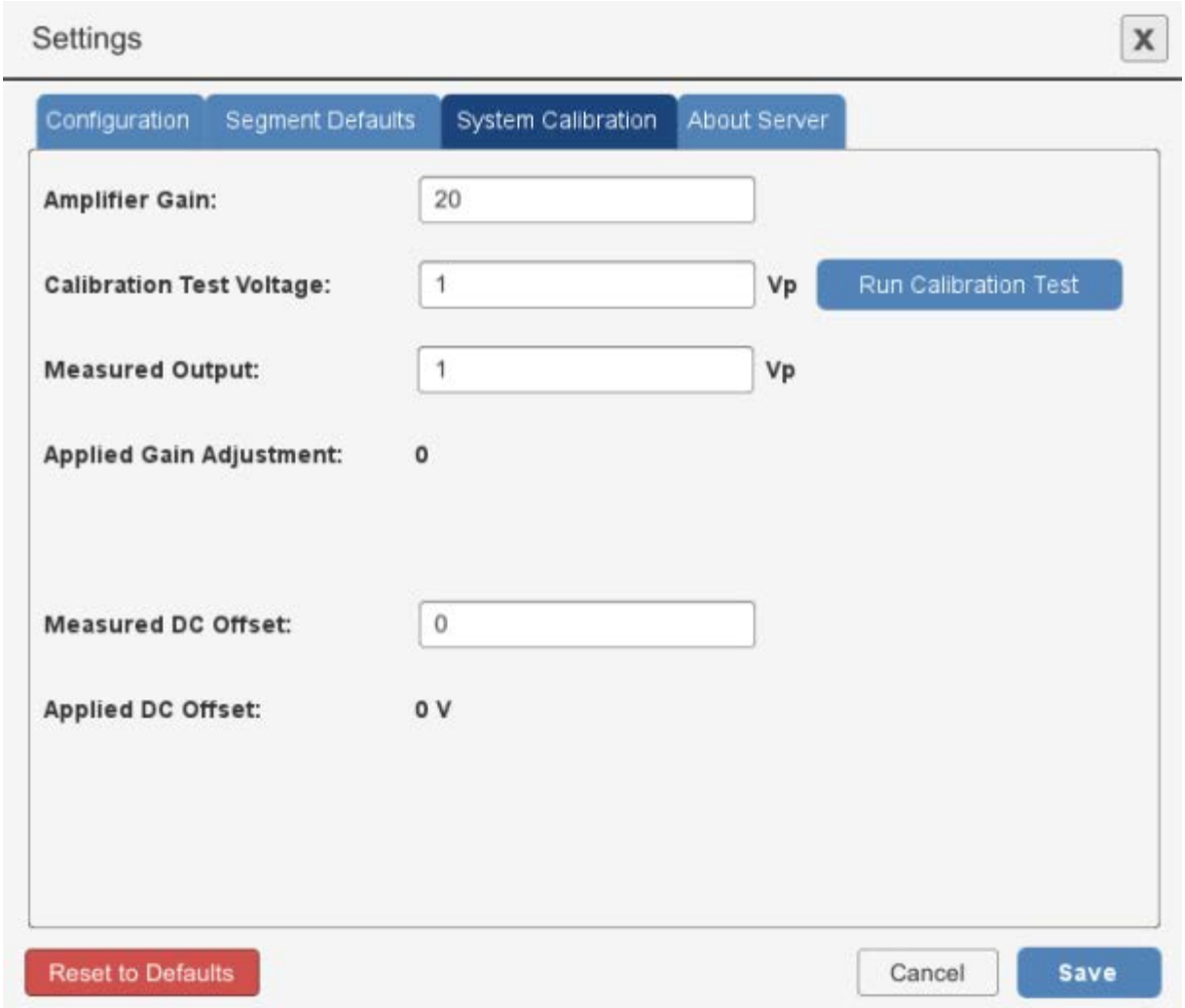
7. Press the Save button to save the resulting calibration numbers and close the Settings window.


Settings
X
Configuration
Segment Defaults
System Calibration
About Server
Amplifier Gain:
20
Calibration Test Voltage:
1
Vp
Run Calibration Test
Measured Output:
1.1
Vp
Applied Gain Adjustment:
-2
Measured DC Offset:
-0.2
Applied DC Offset:
+0.2 V
Reset to Defaults
Cancel
Save

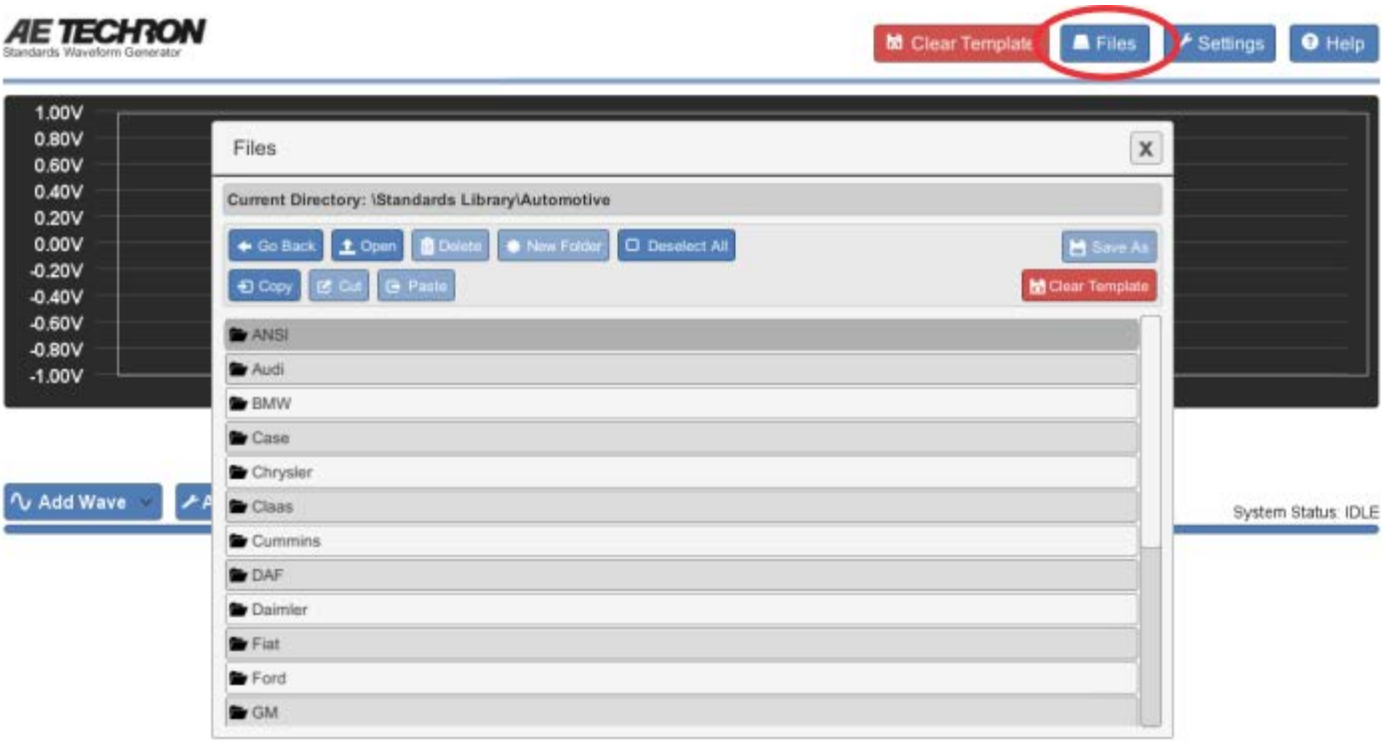
Basic Operation

IMPORTANT: Before operating the DSR 100-15 system, the System Calibration Procedures should be performed to determine the correct System Gain and DC Offset settings for the DSR 100-15. See the *"System Calibration"* topic for more information.

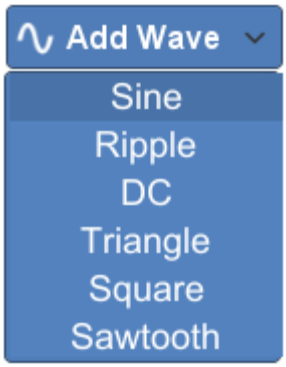
1. Select the Settings button and then open the System Calibration tab to set the DSR 100-15 system gain. The default setting for a DSR 100-15 system is 20, but this should be calibrated to match your actual system gain. If measuring DSR 100-15 Controller output directly (without amplification), the system gain can be set to 1 for a 10Vp/20Vpp output.



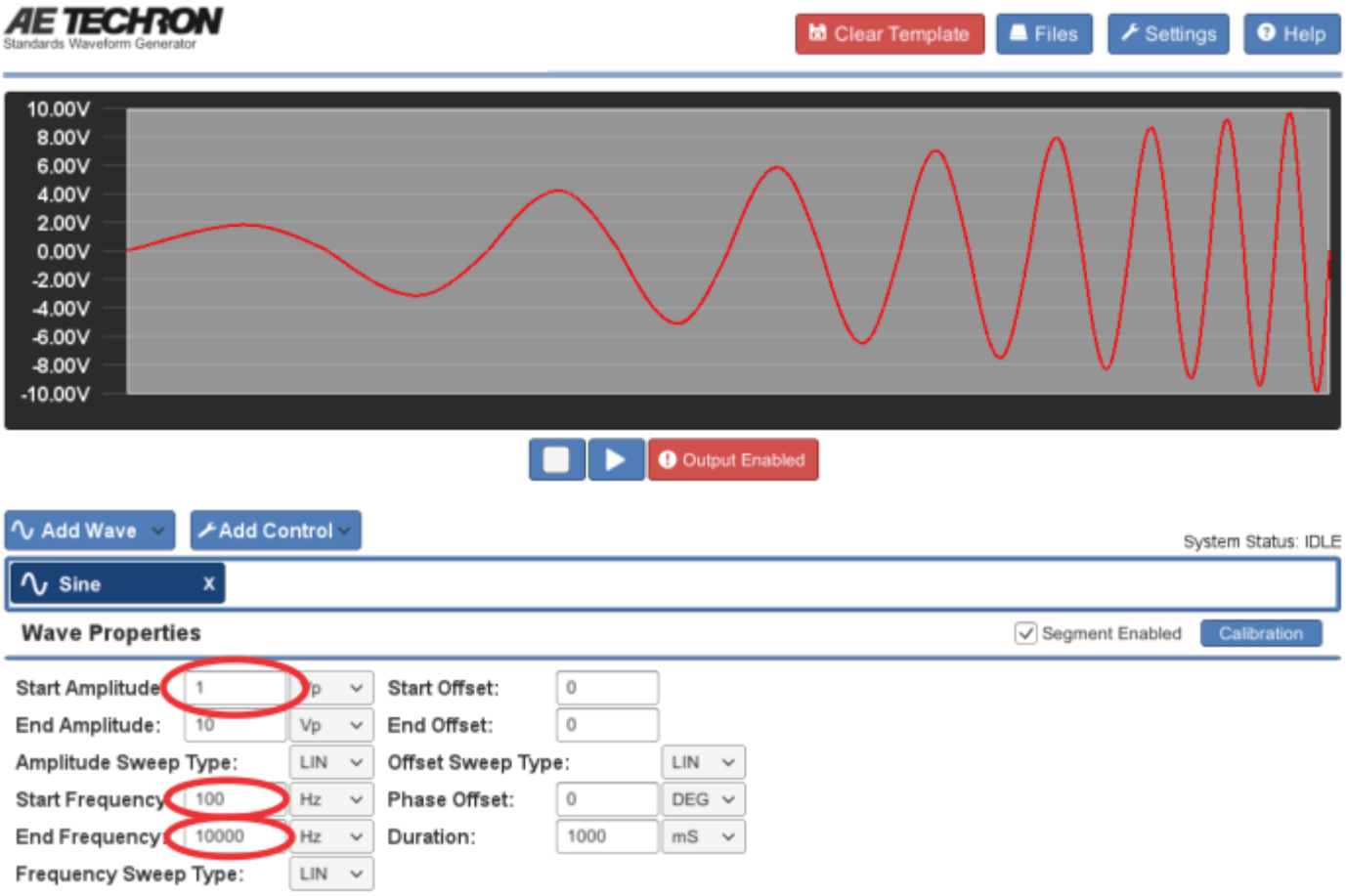
2. Use the Files button to load a test from the Standards library.



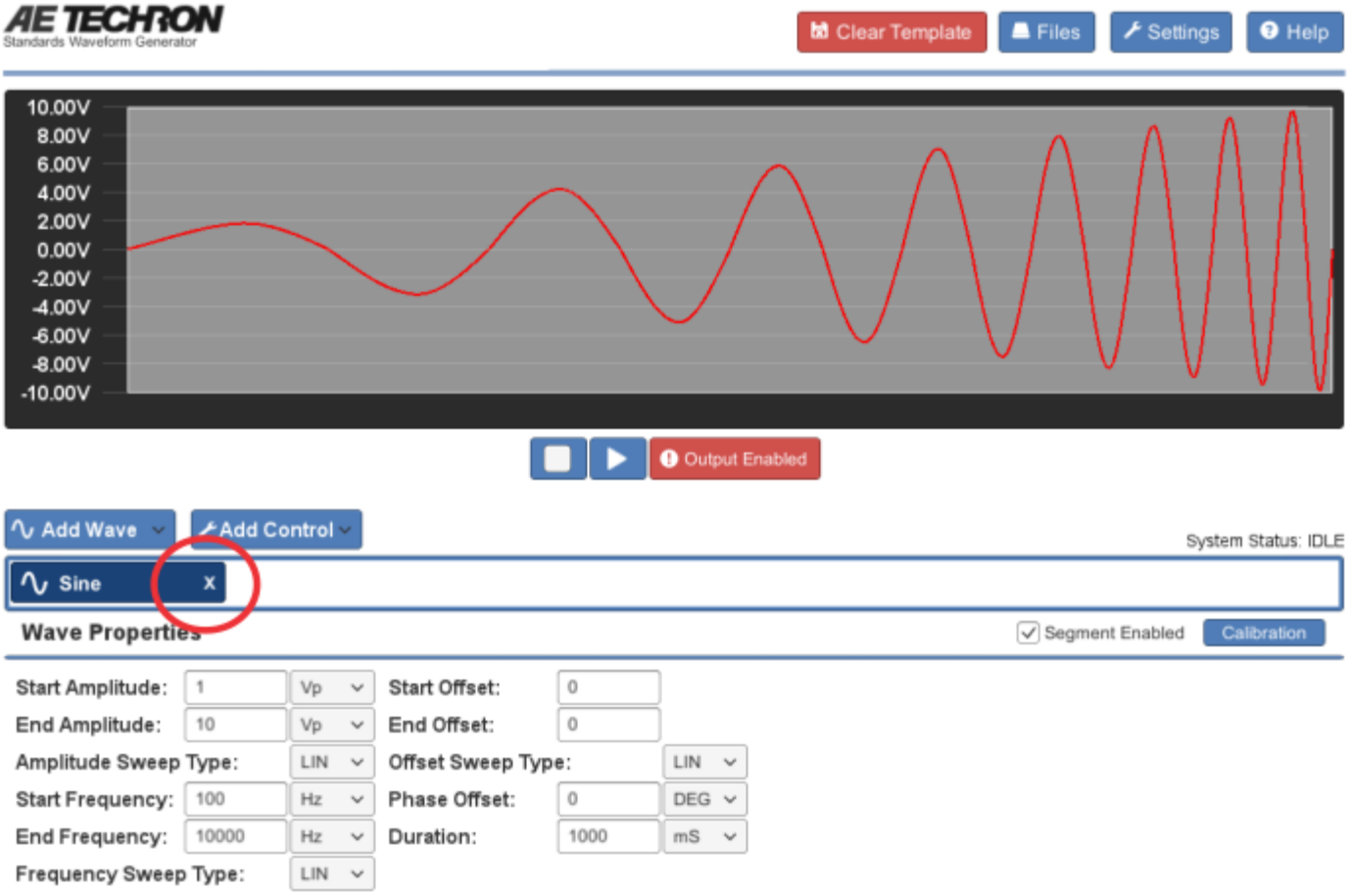
3. Use the Add Wave and Add Control buttons to select a waveform or control to add to the active test window.



4. Select the tab for a waveform or control to open the Properties dialog. Edit the properties to create complex waveforms and waveform sequences.



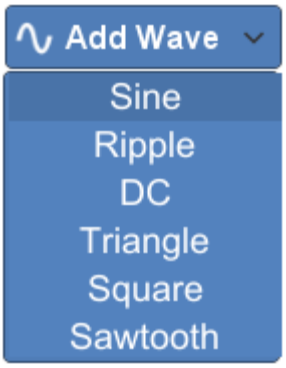
5. Segments can be dragged to change their order. To remove a segment from the test, press the X on the segment's tab.



6. When your test sequence is complete, press the Arrow button to begin generating signal output from the amplifier.

Adding Waveforms

The Add Wave button opens a drop down menu listing the types of waveforms that can be added to the active window. You can choose Sine, Ripple, DC, Triangle, Square or Sawtooth waveforms.



When you choose a waveform from the Add Wave drop-down menu, the default waveform of that type is added to the active window. Click on the tab or the waveform in the display to open the Properties form containing the available property settings for that waveform. See the individual entries in this Help system for more information about the settings available for each waveform type.

As you add or adjust settings for the waveform in the Properties tab, the visual depiction in the active test window will adjust to reflect the approximate signal being described by the waveform properties. Note that time sequences are NOT to scale.

To add additional waveforms to the active test, select additional waveforms from the drop-down menu. New waveforms will be added sequentially and will appear to the right of the selected control or waveform in the active window.

Position Waveforms: To reposition a waveform within the test sequence, click on the waveform to highlight and then click and drag the waveform to the desired position in the sequence.

Enable/Disable Segment: Each waveform segment can be set to Enabled (Segment Enabled checkbox checked) or Disabled (unchecked). When enabled, the waveform will be played as part of the test sequence. When unchecked, the waveform will be skipped during the running of the test segment. This can be useful when building or troubleshooting test sequences to skip over long or previously verified segments.

Segment Calibration: Each waveform segment can be individually calibrated using the segment calibration procedure. This can allow minor adjustments in system gain to be performed for a single segment.

To perform segment level calibration, complete the following:

1. Locate the segment to be calibrated and press the blue Calibration button located to the right of the waveform properties. The Segment Calibration window will open.

2. Connect an oscilloscope to the DUT (load at the amplifier output).
3. Press the Run Calibration Test button to begin the Calibration Test. The DSR 100-15 will continuously generate a waveform with the amplitude and frequency defined in the wave properties.
4. Note the output voltage shown on the oscilloscope. If the output does not match the test voltage, enter the amount required to adjust the output to match the test voltage in the Wave Gain input box. For example, if the oscilloscope reading is 1.1 Vp, enter -0.1 in the Wave Gain input box. Rerun the Calibration Test to verify the calibration, and then press the Close button to save your adjustment and close the Segment Calibration dialog.

NOTE: The calibration test can only produce voltage levels within the voltage limits of the system. If levels above system limits are entered in the Wave Gain input box, the calibration test levels will remain at the highest level capable.

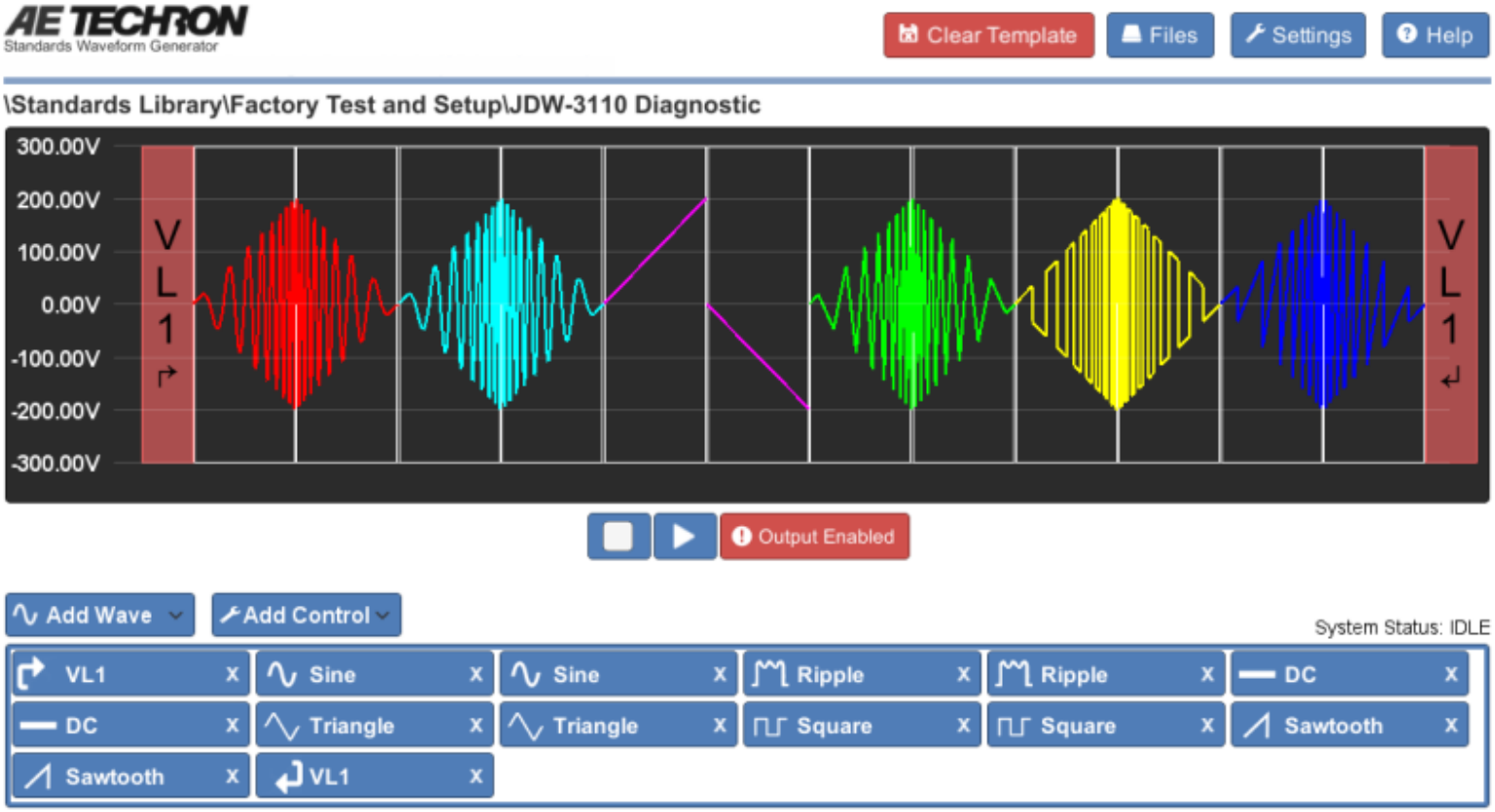
Adding Controls

The Add Control button opens a drop down menu listing the types of controls that can be added to the active window. You can choose Trigger, Fixed Loop, Variable Loop, Template, or GPIO Output.

When you choose a control from the Add Control drop-down menu, an icon representing that control type is added to the active window, and a form containing the available settings for that control opens below the active test display. See the individual entries in this Help system for more information about the settings available for each control type.

To add additional controls to the active test, select additional controls from the drop-down menu. New controls will be added sequentially and will appear to the right of the selected waveform or control in the active window. To reposition a control within the test sequence, click on the control to highlight and then click and drag the control to the desired position in the sequence.

Running a Test



One or more waveforms and/or controls that have been added to the active test window can be run using the controls located below the active window.

RUN: When the Run button  is pressed, the active test sequence will be sent to the DSR 100-15, and the system will begin generating signal starting at the beginning of the test sequence (the waveform or control farthest to the left). The System Status reporting message will change from 'Idle' to '1 of X,' with X being the total combined number of waveforms and controls in the test.

An individual segment may be highlighted in the active test window during playback. This occurs when the DSR 100-15 system is currently generating the highlighted segment and the segment is equal to or greater than one second in duration. Segments shorter than one second are too short to register as being highlighted.

STOP: When the Stop button  is pressed, the DSR 100-15 will stop signal generation, and the test will reset to the start of the first waveform. The system will report its status as 'Idle.' The system will also report its status as Idle at all times that the DSR 100-15 is operating normally but a test is not active .

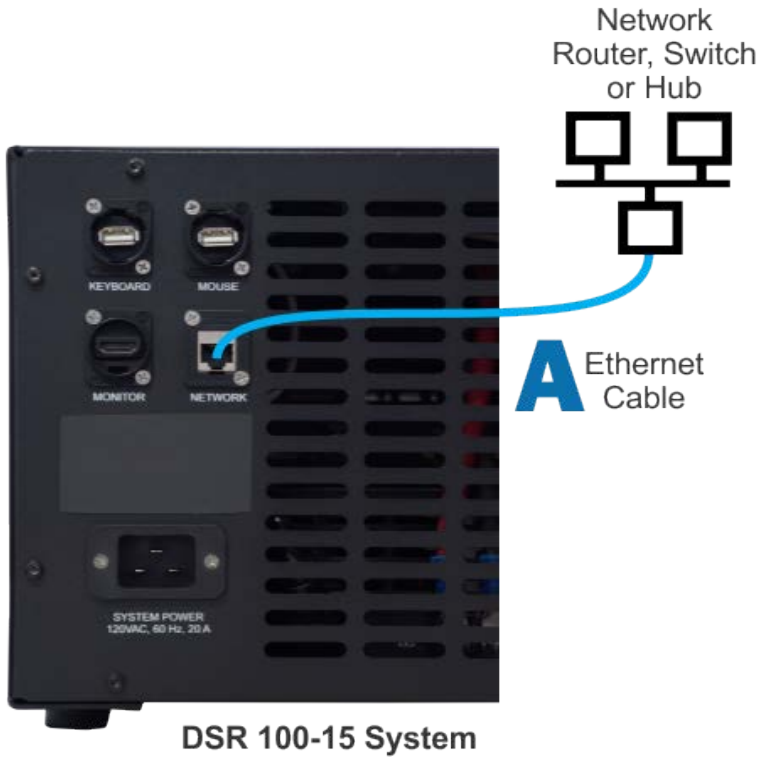
OUTPUT ENABLED/DISABLED: When the Output Enabled button  is displayed, the signal defined by the active test sequence will be generated by the DSR 100-15. When pressed, the Output Enabled button will toggle to the Output Disabled display  , and the test sequence can be run without generating output signal. This can be

useful for testing a sequence before generating output.

Controlling the DSR 100-15 Through a Network

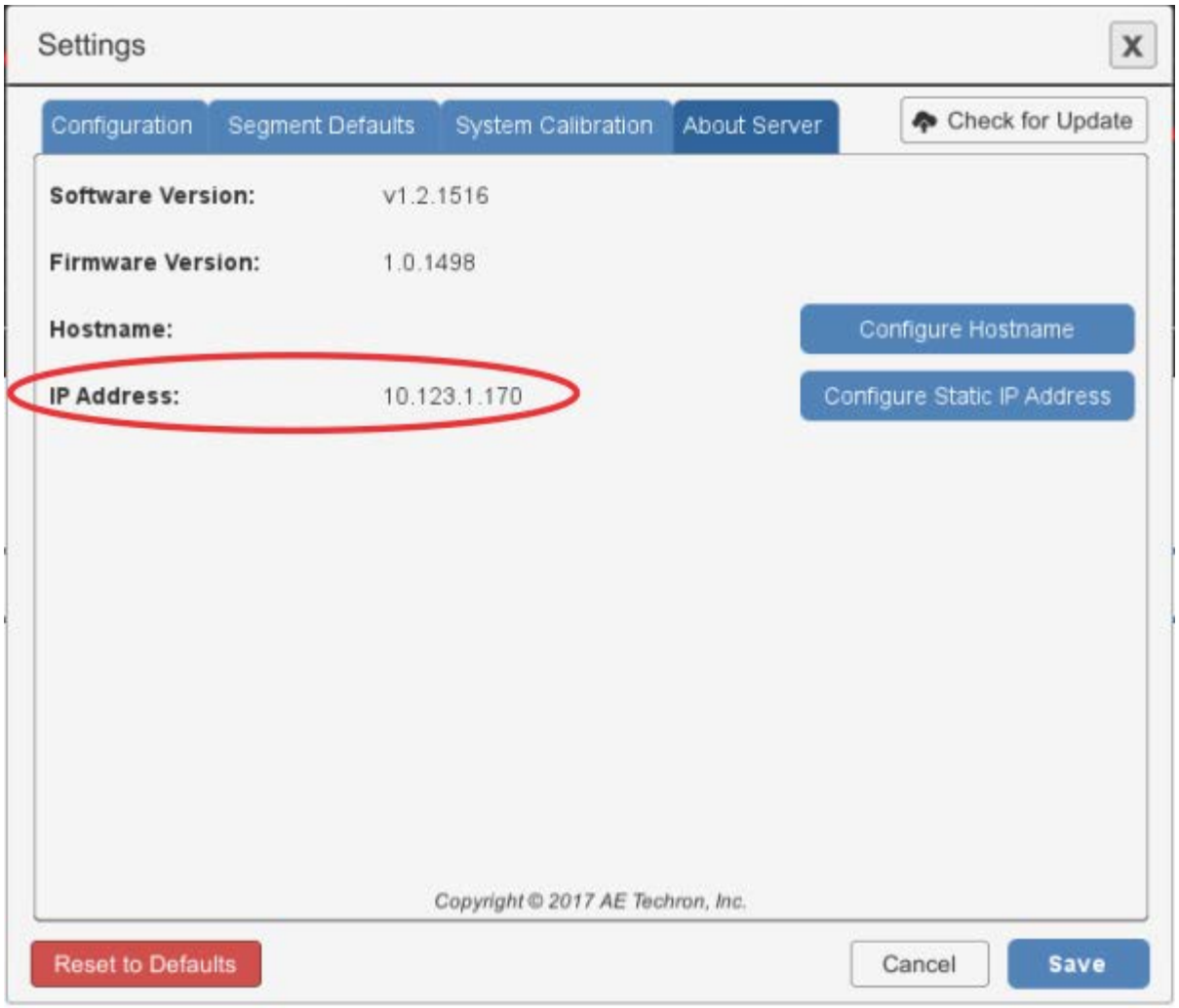
To access and control the DSR 100-15 through your local network, complete the steps below:

A. Connect the DSR 100-15 to the keyboard, monitor, mouse and amplifier as directed for a free-standing workstation setup (see the topic *"Getting Started"*), but also connect the Ethernet cable between the DSR 100-15r and your network hub, router or switch, as shown below:



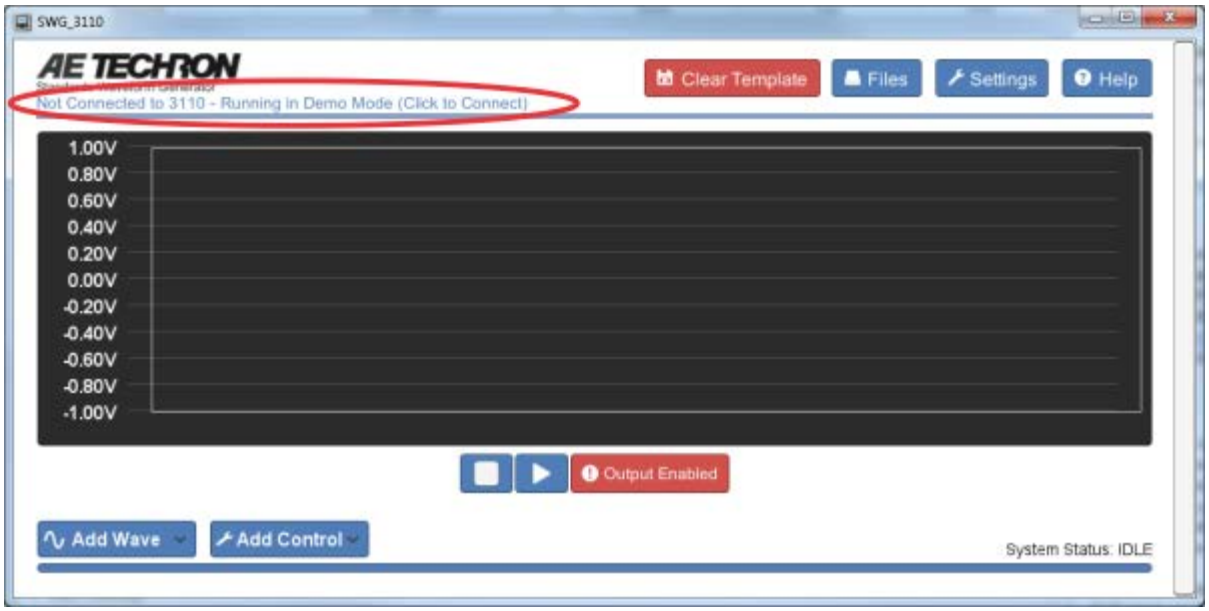
DSR 100-15 System

B. Power up the DSR 100-15 system, and wait for the Controller interface to load (this can take up to 30 seconds). Press the Settings button to open the Settings window, and then select the About Server tab. Write down the IP address shown in the IP Address section for later reference, and then press the Cancel button to close the Settings window. NOTE: If the Service Endpoint box is blank or contains the IP address 0.0.0.0, then the DSR 100-15 is not connected to your network. Check your Ethernet connection or contact your network administrator for assistance.



C. Insert the microSD card with USB adapter (included with the DSR 100-15) into an open USB port on the computer to be used for accessing the DSR 100-15 across the network. Open the USB drive and then locate and install and the SWG Setup.exe file.

D. When the program has loaded, the notice "Not Connected to DSR - Running in Demo Mode (Click to Connect)" will be displayed in the upper left of the window. Click the message to open the connection dialog, and then type the DSR 100-15's IP address you wrote down into the IP Address text box. Press OK to connect to the remote DSR 100-15. The DSR 100-15's interface will be displayed on your computer monitor, and the DSR 100-15 system can now be controlled remotely.



REMOVING I/O DEVICES: If the DSR 100-15 will only be operated remotely through your network, the I/O devices (monitor, mouse and keyboard) can be removed from the DSR 100-15 system. Leave the DSR 100-15 powered on for continued use through the network.

RECONNECTING TO THE DSR 100-15 REMOTELY: If the DSR 100-15 is disconnected from the network, it may be assigned a new IP address when the unit is reconnected to the network. To find the new IP, go to the DSR 100-15 system (reconnect monitor and mouse, if necessary), and then press the Settings button to open the Settings window. Select the About Server tab and review the IP address listing. Enter the new IP address in the IP Address text box on the remote computer.

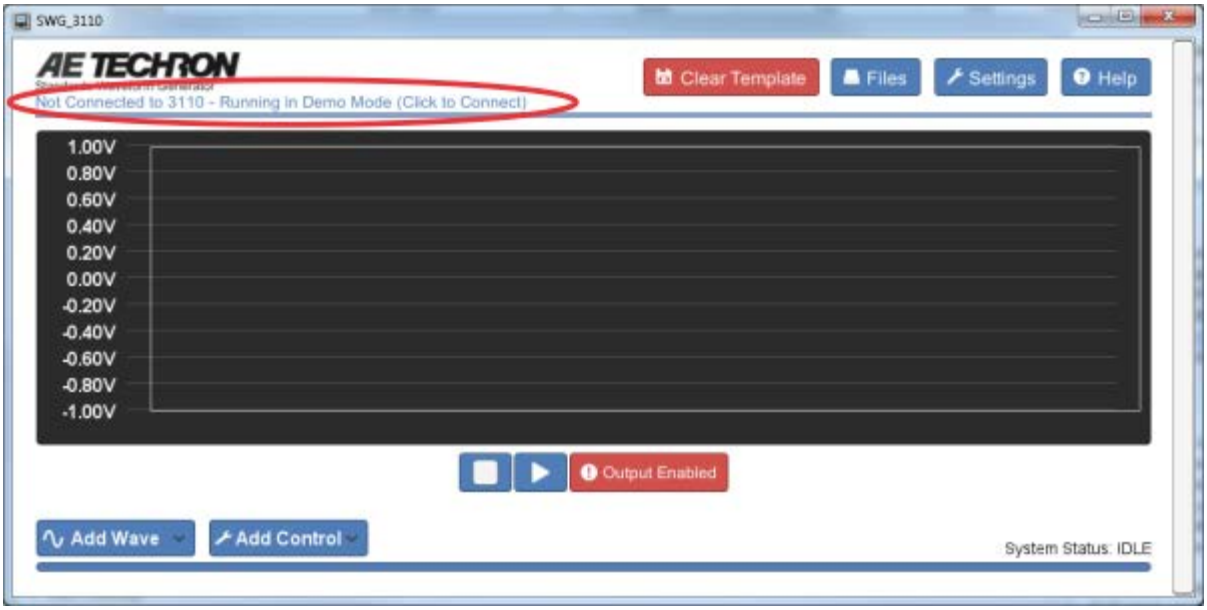
Working in Demo Mode

A Windows computer (WIN 7, 8 or 10) can be used to create .swg test files for later use by working in Demo Mode using the SWG Windows Remote Client software.

When working in Demo Mode, the Windows computer does not need to be in contact with the DSR 100-15 via network connection, so the DSR 100-15 can be used to run existing test routines while new routines are created elsewhere.

To prepare a computer to run in Demo Mode, install the SWG Windows Remote Client software (Setup.exe), which is provided on the microUSB card with USB adapter that was included with the DSR 100-15 system.

Once the program has installed and loaded, the notice "Not Connected to DSR 100-15 - Running in Demo Mode (Click to Connect)" will be displayed in the upper left of the window.



You can use the Add Wave and Add Control buttons to create a waveform sequence. In addition, you can load existing tests from the Standard's Library to use as a template or to edit and save as a new test file.

When the test sequence is complete, press the Files button to save the .swg file in the User Standards directory.

When working in Demo Mode, files saved to the User Standards directory will be saved on your local hard drive in your Documents directory in a sub-directory named "Demo SWG."

To transfer the files saved on your local drive to the DSr 100-15, use the provided micro SD card with USB adapter to copy the .swg files from your hard drive to the micro SD card.

Follow the steps detailed in the topic "Accessing the Memory Card Slot" to remove the DSR 100-15 back panel. Locate the microSD card slot, and then insert the micro SD card into the SD card slot on the back of the DSR 100-15 Controller. Be careful when installing the card to insert the card in a straight line directly into the card slot. If the card is inserted at an angle, it may miss the internal card slot and be inaccessible from your DSR 100-15 unit.

Start the DSR 100-15 and use the Files button to open the files manager, and then open the SD card. Copy the files located on the SD card, and then paste the files into the User Standards directory on the DSR 100-15.

NOTE: The files can be retreived from the SD card using the DSR 100-15 locally and can also be transferred using a remote computer connected to the DSR 100-15 via network. For more information, see the help topic *"DSR 100-15 via Network."*

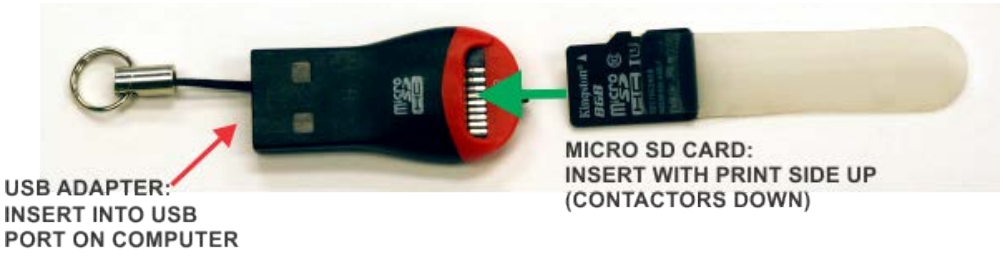
Updating the 3110

Updates for the DSR 100-15 Controller software (including additions to the Standards Library) and the SWG Windows Remote Client software are available on the AE Techron website (aetechron.com). NOTE: When updating the DSR 100-15 Controller software, all Windows computers used to access the DSR 100-15 remotely must also be updated with the corresponding version of the SWG Windows Remote Client software.

Updating the DSR 100-15 Controller

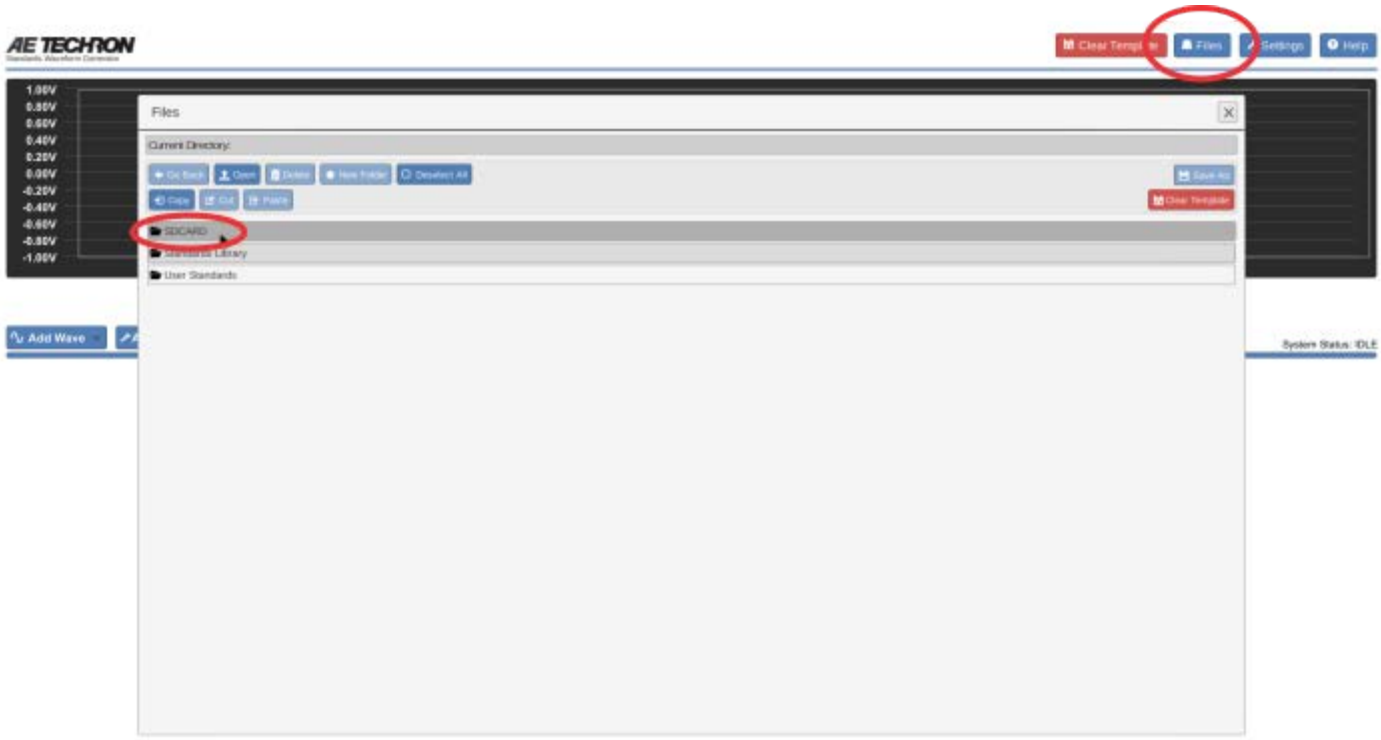
Complete the following steps to update the SWG software and load additional tests into the Standard's Library on the 3110 Controller:

1. From a computer with access to your network, go to the AE Techron website (aetechron.com) and check for DSr 100-15 updates. Locate the update package (Apk file) for updating the DSR 100-15 Controller (not the Windows remote client .exe file). Follow the instructions provided there for downloading the update file. Save the file on the microSD card with USB adapter that came with your DSR 100-15 unit.

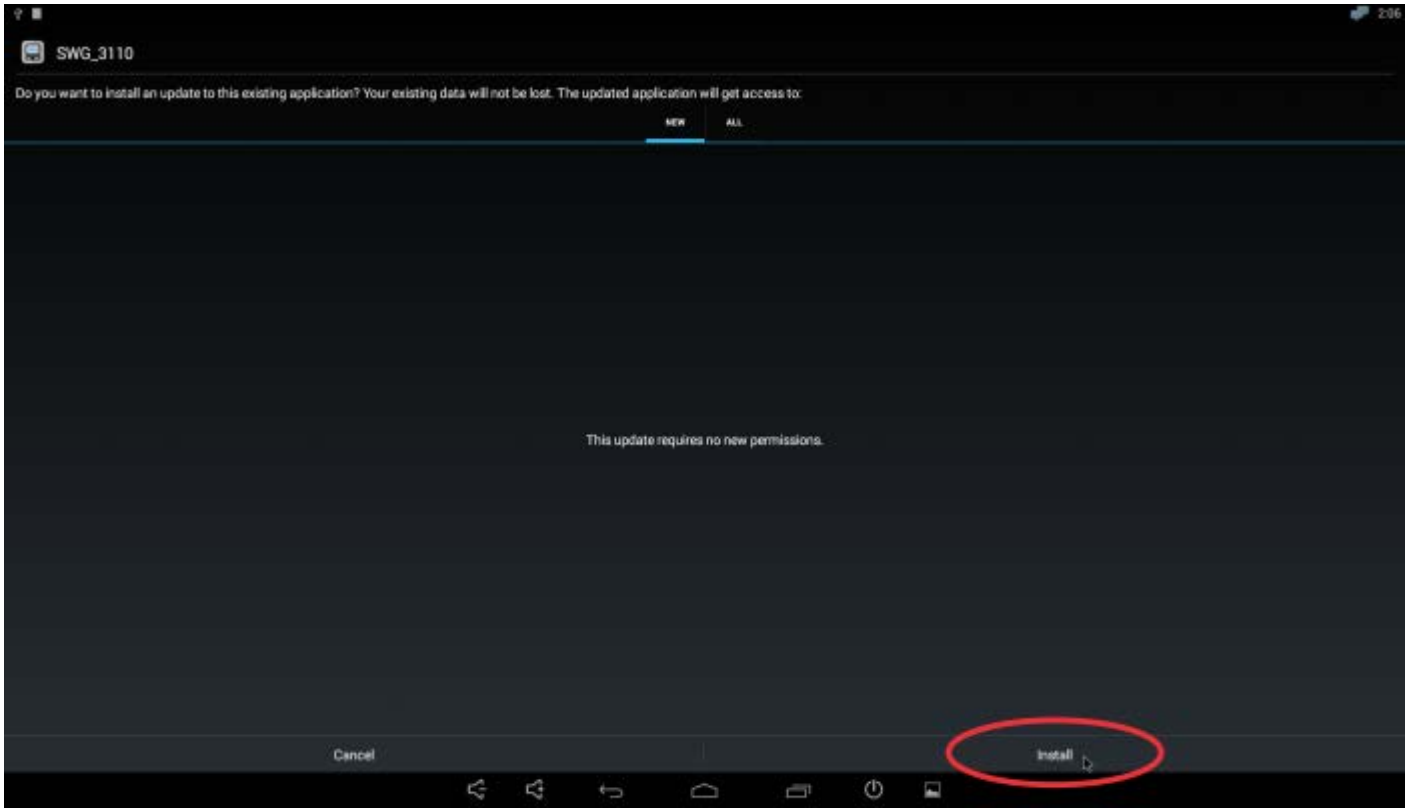


2. Remove the back panel of the DSR 100-15 and locate the microSD card slot labeled "Memory Card" located on the DSR 100-15 Controller's back panel. For more information, see the topic "Accessing the Memory Card Slot."

3. Remove the micro SD card from the USB adapter and insert the card into the Memory Card slot. Be careful when installing the card to insert the card with the printed side UP. The card must also be inserted in a straight line directly into the card slot. If the card is inserted at an angle, it may miss the internal card slot and be inaccessible from your DSR 100-15 unit.
4. Turn on the DSR 100-15 system and allow the software interface to load. Then locate and press the Files button to open the Files explorer. Open the SDCARD directory and then locate the update Apk file you saved. **NOTE: If the SDCARD directory won't open, the microSD card is not being recognized by the DSR 100-15 Controller. Check the insertion of the microSD card. It may not have been inserted properly or completely.**



5. Select and open the .apk file. You will be prompted to approve new permissions (if any). If no new permissions are required, select the INSTALL button at the bottom right of the screen to start the update process.



6. The message "App installed" will appear in the window when the update has been successfully performed. Select the "Done" button to close the dialog box and return to the normal DSR 100-15 interface.
7. Check the version information displayed on the About Server tab in the Settings window to confirm the update has

been successfully installed.

Updating the SWG Windows Remote Client Software

Complete the following steps to update the SWG Windows remote client software on a Windows computer (Windows 7, 8 and 10):

1. From a computer with access to your network, go to the AE Techron website (aetechron.com) and check for DSR 100-15 updates. Locate the update program (.exe file) for updating the Windows remote client (not the DSR 100-15 Controller Apk file). Follow the instructions provided there for downloading the update file. Save the file on your local computer or on a network drive that is accessible to the computer(s) being updated.
2. Locate and open the downloaded .exe file via Windows File Explorer. You will be prompted to approve the update process. Once approved, the update process will begin.
3. A dialog box will confirm the update has been successfully performed. Close the dialog and the DSR 100-15 Remote Client will automatically load.
4. Check the version information displayed on the About Server tab in the Settings window to confirm the update has been successfully installed.

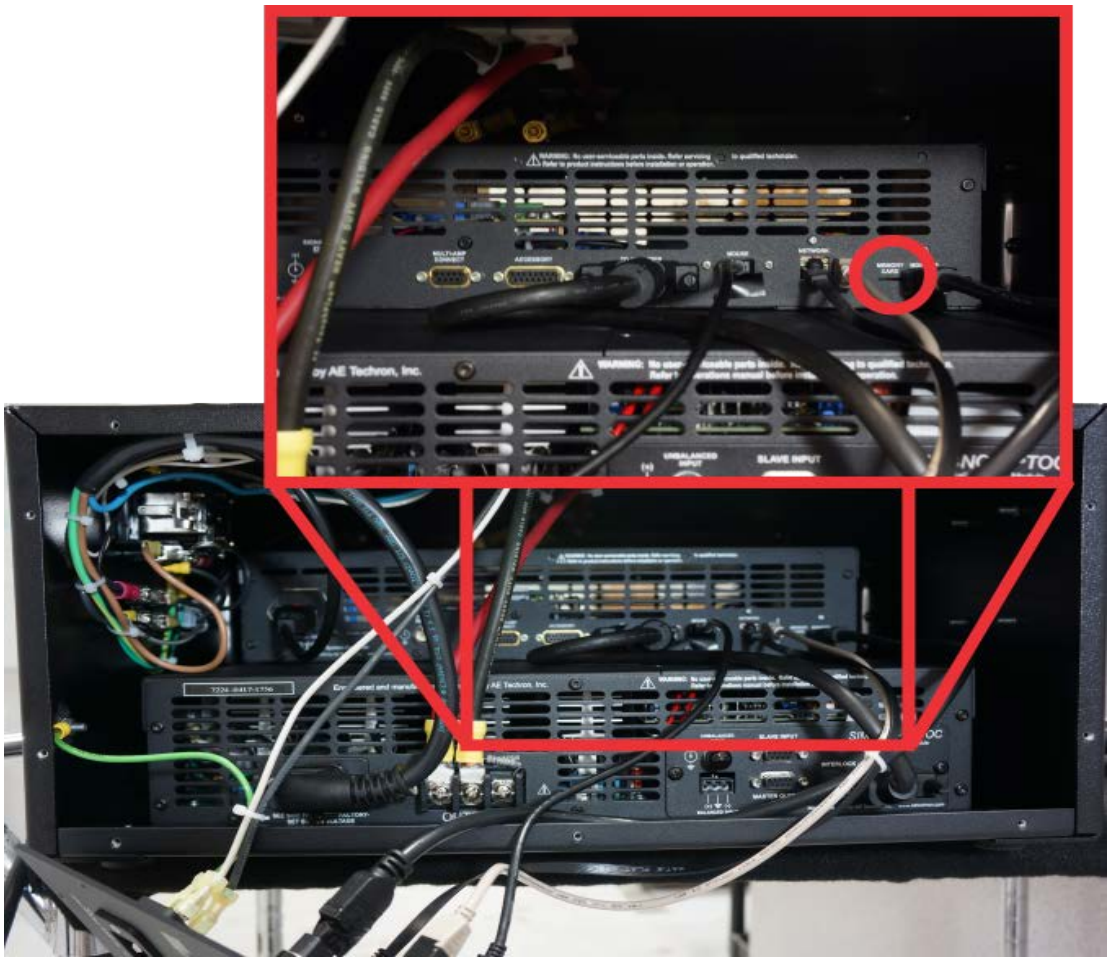
Accessing the Memory Card Slot

To access the Memory Card slot located on the Controller's back panel inside the DSR 100-15 unit, complete the steps below:

A. IMPORTANT: Disconnect the unit from AC power before beginning this procedure.

B. Using a T-15 Torx driver, remove the ten (10) hex-head screws from the unit's back panel, as shown. Being careful not to strain or unplug the attached cables, move the back panel aside to gain access to the unit's interior.

C. Locate the microSD card port labled "Memory Card," which is located near the right side of the DSR 100-15 Controller's back panel, as shown.



Shutdown Procedure

Depress the front-panel SYSTEM POWER switch (located near the upper right on the front panel) to turn the unit OFF.

Sine Wave Properties

A Sine Wave makes use of the DSR 100-15's arbitrary waveform generator to generate the desired waveform. Select the Sine button from the Add Waveform drop-down when you need to create an audio-frequency sinusoidal waveform (DC to 20 kHz).

Set the following properties to specify the characteristics of the sine wave to be produced at the amplifier output:

Amplitude: The Start Amplitude and End Amplitude properties determine the height of the sine wave from the zero-crossing point to the crest, measured in volts. Amplitude can be defined using the unit Volts peak (Vp), Volts peak-to-peak (Vpp) or Volts root-mean-square (Vrms). When the unit of measure is changed, the DSR 100-15 automatically converts the property's value to the new unit of measure. The units of measure used for Start Amplitude and End Amplitude do not need to be the same.

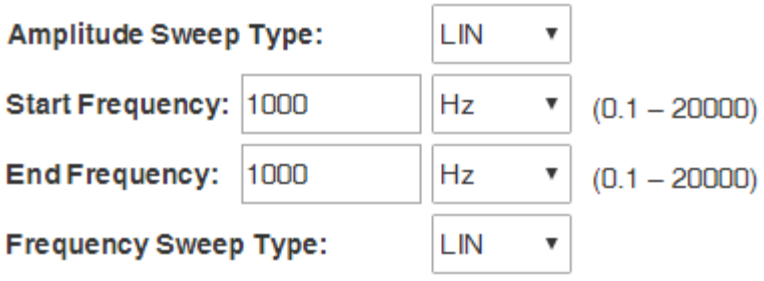
The values for both Start and End Amplitude can be positive or negative, and the allowable range for these values will be determined by the DSR 100-15 based on the System Calibration settings (for more information, see the topic *"System Calibration"*) The default allowable range is +/-200Vp (with system gain set to 20). When a value outside of the allowable range is entered, the input box will turn red and an error message will be displayed.

Amplitude Sweep Type: A Sweep can be Linear, Logarithmic or Exponential. Choose the desired sweep type from the drop-down.

Frequency: The Start Frequency and End Frequency properties determine the frequency of the sine wave in cycles per second (Hertz). Frequency can be defined using Hertz (Hz) or Kilohertz (kHz) as the unit of measure. When the unit of measure is changed, the DSR 100-15 automatically converts the property's value to the new unit of measure. The units of measure used for Start Frequency and End Frequency do not need to be the same.

The allowable range for Start and End Frequency is 0.1 Hz to 20 kHz. When a value outside of the allowable range is entered, the input box will turn red and an error message will be displayed.

Frequency Sweep Type: A Sweep can be Linear, Logarithmic or Exponential. Choose the desired sweep type from the drop-down.

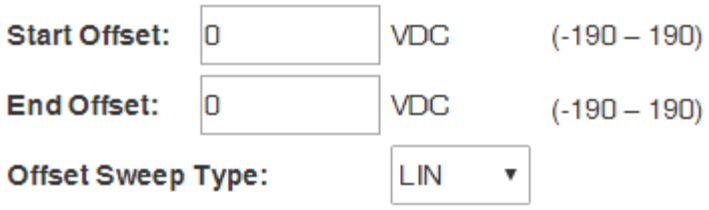


DC Offset: The Start Offset and End Offset properties supply a constant positive or negative DC voltage on the sine

wave. DC Offset is defined in Volts DC (VDC) as the unit of measure.

The allowable range for Start and End Offset is +/-200 VDC (with system gain set to 20). When a value outside of the allowable range is entered, the input box will turn red and an error message will be displayed.

Offset Sweep Type: A Sweep can be Linear, Logarithmic or Exponential. Choose the desired sweep type from the drop-down.



Phase Offset: The Phase Offset property determines the beginning offset of the waveform within the cycle. Phase Offset can be defined using degrees (deg) or radians (rad) as the unit of measure.

The allowable range for Phase Offset is 0 to 359 degrees. When a value outside of the allowable range is entered, only the value greater than complete (360 degree) cycles will be set as the offset amount.

Duration: The Duration property determines how long the waveform will be generated. Duration can be defined using the microsecond (us), millisecond (ms), second, (sec), minute (min) or hour (hour) as the unit of measure. When the unit of measure is changed, the DSR 100-15 automatically converts the property's value to the new unit of measure.

The maximum duration of a single segment is 1193 hours, and the minimum duration is 150 us. When the duration specified for the waveform has been completed, the DSR 100-15 will begin outputting the next waveform defined in the test. However, if a Trigger Control follows the just-completed waveform, and the Trigger Control's "Continue Prev. Wave" property is set to TRUE, the waveform before the Trigger Control will continue indefinitely, regardless of the duration time set in that waveform's properties.

If no additional waveform has been defined to follow the completed waveform, the system output will stop.

Ripple Wave Properties

A Ripple Wave makes use of the DSR 100-15's arbitrary waveform generator to generate the desired waveform. Select the Ripple button from the Add Waveform drop-down when you need to create a sinusoidal waveform with a frequency up to 300 kHz.

Set the following properties to specify the characteristics of the ripple wave to be produced at the amplifier output:

Amplitude: The Start Amplitude and End Amplitude properties determine the height of the ripple wave from the zero-crossing point to the crest, measured in volts. Amplitude can be defined using the unit Volts peak (Vp), Volts peak-to-peak (Vpp) or Volts root-mean-square (Vrms). When the unit of measure is changed, the DSr 100-15 automatically converts the property's value to the new unit of measure. The units of measure used for Start Amplitude and End Amplitude do not need to be the same.

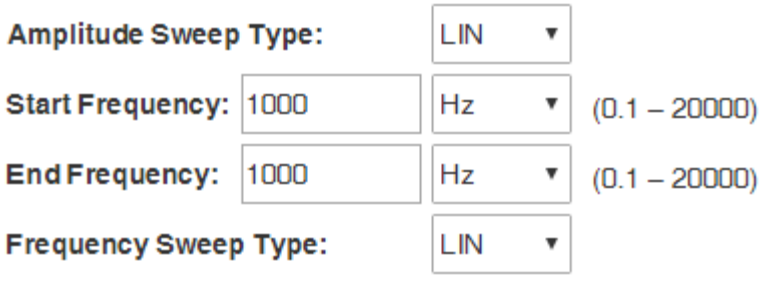
The values for both Start and End Amplitude can be positive or negative, and the allowable range for these values will be determined by the DSR 100-15 based on the System Calibration settings (for more information, see the topic *"System Calibration"*). The default allowable range is +/-200Vp (with system gain set to 20). When a value outside of the allowable range is entered, the input box will turn red and an error message will be displayed.

Amplitude Sweep Type: A Sweep can be Linear, Logarithmic or Exponential. Choose the desired sweep type from the drop-down.

Frequency: The Start Frequency and End Frequency properties determine the frequency of the ripple wave in cycles per second (Hertz). Frequency can be defined using Hertz (Hz) or Kilohertz (kHz) as the unit of measure. When the unit of measure is changed, the DSR 100-15 automatically converts the property's value to the new unit of measure. The units of measure used for Start Frequency and End Frequency do not need to be the same.

The allowable range for Start and End Frequency is 0.1 Hz to 300 kHz. When a value outside of the allowable range is entered, the input box will turn red and an error message will be displayed.

Frequency Sweep Type: A Sweep can be Linear, Logarithmic or Exponential. Choose the desired sweep type from the drop-down.

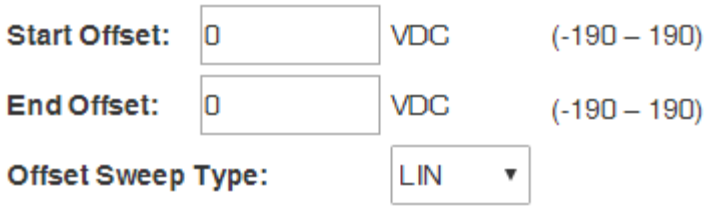


DC Offset: The Start Offset and End Offset properties supply a constant positive or negative DC voltage on the ripple

wave. DC Offset is defined in Volts DC (VDC) as the unit of measure.

The allowable range for Start and End Offset is +/-200 VDC (with system gain set to 20). When a value outside of the allowable range is entered, the input box will turn red and an error message will be displayed.

Offset Sweep Type: A Sweep can be Linear, Logarithmic or Exponential. Choose the desired sweep type from the drop-down.



Phase Offset: The Phase Offset property determines the beginning offset of the waveform within the cycle. Phase Offset can be defined using degrees (deg) or radians (rad) as the unit of measure.

The allowable range for Phase Offset is 0 to 359 degrees. When a value outside of the allowable range is entered, only the value greater than complete (360 degree) cycles will be set as the offset amount.

Duration: The Duration property determines how long the waveform will be generated. Duration can be defined using the microsecond (us), millisecond (ms), second, (sec), minute (min) or hour (hour) as the unit of measure. When the unit of measure is changed, the DSR 100-15 automatically converts the property's value to the new unit of measure.

The maximum duration of a single segment is 1193 hours, and the minimum duration is 150 us. When the duration specified for the waveform has been completed, the DSR 100-15 will begin outputting the next waveform defined in the test. However, if a Trigger Control follows the just-completed waveform, and the Trigger Control's "Continue Prev. Wave" property is set to TRUE, the waveform before the Trigger Control will continue indefinitely, regardless of the duration time set in that waveform's properties.

If no additional waveform has been defined to follow the completed waveform, the system output will stop.

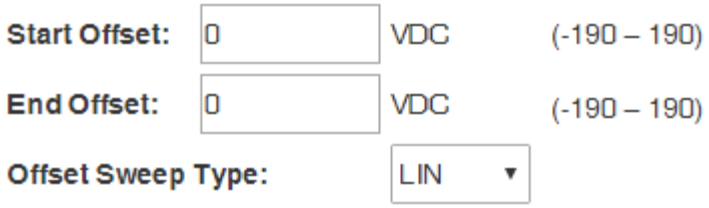
DC Signal Properties

Select the DC button from the Add Wave drop-down when you need to create a positive or negative DC output. Set the following properties to specify the characteristics of the DC output to be produced at the DSR 100-15's output:

DC Offset: The Start Offset and End Offset properties supply a constant positive or negative DC voltage. DC Offset is defined in Volts DC (VDC) as the unit of measure.

The allowable range for Start and End Offset is +/-200 VDC (with system gain set to 20). When a value outside of the allowable range is entered, the input box will turn red and an error message will be displayed.

Offset Sweep Type: A Sweep can be Linear, Logarithmic or Exponential. Choose the desired sweep type from the drop-down.



Duration: The Duration property determines how long the waveform will be generated. Duration can be defined using the microsecond (us), millisecond (ms), second, (sec), minute (min) or hour (hour) as the unit of measure. When the unit of measure is changed, the DSR 100-15's Controller automatically converts the property's value to the new unit of measure.

The maximum duration of a single segment is 1193 hours, and the minimum duration is 150 us. When the duration specified for the waveform has been completed, the DSR 100-15 will begin outputting the next waveform defined in the test. However, if a Trigger Control follows the just-completed waveform, and the Trigger Control's "Continue Prev. Wave" property is set to TRUE, the waveform before the Trigger Control will continue indefinitely, regardless of the duration time set in that waveform's properties.

If no additional waveform has been defined to follow the completed waveform, the system output will stop.

Triangle Wave Properties

A Triangle Wave makes use of the DSR 100-15's arbitrary waveform generator to generate the desired waveform. Select the Triangle button from the Add Waveform drop-down when you need to create an audio-frequency sinusoidal waveform (DC to 20 kHz).

Set the following properties to specify the characteristics of the triangle wave to be produced at the amplifier output:

Amplitude: The Start Amplitude and End Amplitude properties determine the height of the triangle wave from the zero-crossing point to the peak value, measured in volts. Amplitude can be defined using the unit Volts peak (Vp), Volts peak-to-peak (Vpp) or Volts root-mean-square (Vrms). When the unit of measure is changed, the DSR 100-15 automatically converts the property's value to the new unit of measure. The units of measure used for Start Amplitude and End Amplitude do not need to be the same.

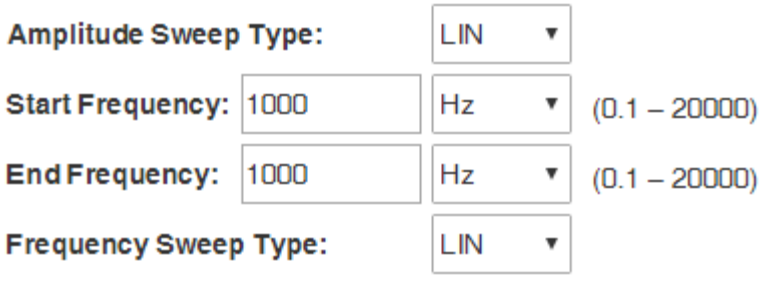
The values for both Start and End Amplitude can be positive or negative, and the allowable range for these values will be determined by the DSR 100-15 based on the System Calibration settings (for more information, see the topic *"System Calibration"*). The default allowable range is +/-200Vp (with system gain set to 20). When a value outside of the allowable range is entered, the input box will turn red and an error message will be displayed.

Amplitude Sweep Type: A Sweep can be Linear, Logarithmic or Exponential. Choose the desired sweep type from the drop-down.

Frequency: The Start Frequency and End Frequency properties determine the frequency of the triangle wave in cycles per second (Hertz). Frequency can be defined using Hertz (Hz) or Kilohertz (kHz) as the unit of measure. When the unit of measure is changed, the DSR 100-15 automatically converts the property's value to the new unit of measure. The units of measure used for Start Frequency and End Frequency do not need to be the same.

The allowable range for Start and End Frequency is 0.1 Hz to 20 kHz. When a value outside of the allowable range is entered, the input box will turn red and an error message will be displayed.

Frequency Sweep Type: A Sweep can be Linear, Logarithmic or Exponential. Choose the desired sweep type from the drop-down.

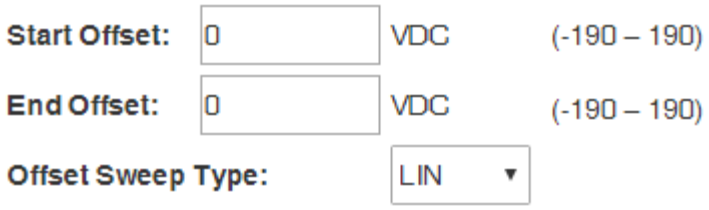


DC Offset: The Start Offset and End Offset properties supply a constant positive or negative DC voltage on the triangle

wave. DC Offset is defined in Volts DC (VDC) as the unit of measure.

The allowable range for Start and End Offset is +/-200 VDC (with system gain set to 20). When a value outside of the allowable range is entered, the input box will turn red and an error message will be displayed.

Offset Sweep Type: A Sweep can be Linear, Logarithmic or Exponential. Choose the desired sweep type from the drop-down.



Phase Offset: The Phase Offset property determines the beginning offset of the waveform within the cycle. Phase Offset can be defined using degrees (deg) or radians (rad) as the unit of measure.

The allowable range for Phase Offset is 0 to 359 degrees. When a value outside of the allowable range is entered, only the value greater than complete (360 degree) cycles will be set as the offset amount.

Duration: The Duration property determines how long the waveform will be generated. Duration can be defined using the microsecond (us), millisecond (ms), second, (sec), minute (min) or hour (hour) as the unit of measure. When the unit of measure is changed, the DSR 100-15 automatically converts the property's value to the new unit of measure.

The maximum duration of a single segment is 1193 hours, and the minimum duration is 150 us. When the duration specified for the waveform has been completed, the DSR 100-15 will begin outputting the next waveform defined in the test. However, if a Trigger Control follows the just-completed waveform, and the Trigger Control's "Continue Prev. Wave" property is set to TRUE, the waveform before the Trigger Control will continue indefinitely, regardless of the duration time set in that waveform's properties.

If no additional waveform has been defined to follow the completed waveform, the system output will stop.

Square Wave Properties

A Square Wave makes use of the DSR 100-15's arbitrary waveform generator to generate the desired waveform. Select the Square button from the Add Waveform drop-down when you need to create an audio-frequency sinusoidal waveform (DC to 20 kHz).

Set the following properties to specify the characteristics of the square wave to be produced at the amplifier output:

Amplitude: The Start Amplitude and End Amplitude properties determine the height of the square wave from the zero-crossing point to the maximum value, measured in volts. Amplitude can be defined using the unit Volts peak (Vp), Volts peak-to-peak (Vpp) or Volts root-mean-square (Vrms). When the unit of measure is changed, the DSr 100-15 automatically converts the property's value to the new unit of measure. The units of measure used for Start Amplitude and End Amplitude do not need to be the same.

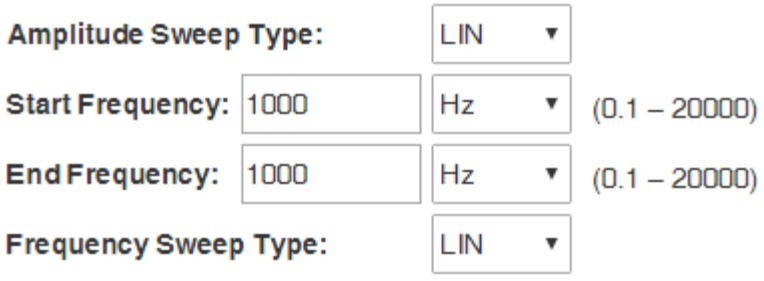
The values for both Start and End Amplitude can be positive or negative, and the allowable range for these values will be determined by the DSR 100-15 based on the System Calibration settings (for more information, see the topic *"System Calibration"*). The default allowable range is +/-200Vp (with system gain set to 20). When a value outside of the allowable range is entered, the input box will turn red and an error message will be displayed.

Amplitude Sweep Type: A Sweep can be Linear, Logarithmic or Exponential. Choose the desired sweep type from the drop-down.

Frequency: The Start Frequency and End Frequency properties determine the frequency of the square wave in cycles per second (Hertz). Frequency can be defined using Hertz (Hz) or Kilohertz (kHz) as the unit of measure. When the unit of measure is changed, the DSR 100-15 automatically converts the property's value to the new unit of measure. The units of measure used for Start Frequency and End Frequency do not need to be the same.

The allowable range for Start and End Frequency is 0.1 Hz to 20 kHz. When a value outside of the allowable range is entered, the input box will turn red and an error message will be displayed.

Frequency Sweep Type: A Sweep can be Linear, Logarithmic or Exponential. Choose the desired sweep type from the drop-down.

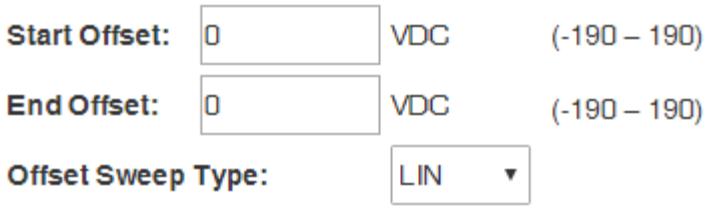


DC Offset: The Start Offset and End Offset properties supply a constant positive or negative DC voltage on the square

wave. DC Offset is defined in Volts DC (VDC) as the unit of measure.

The allowable range for Start and End Offset is +/-200 VDC (with system gain set to 20). When a value outside of the allowable range is entered, the input box will turn red and an error message will be displayed.

Offset Sweep Type: A Sweep can be Linear, Logarithmic or Exponential. Choose the desired sweep type from the drop-down.



Phase Offset: The Phase Offset property determines the beginning offset of the waveform within the cycle. Phase Offset can be defined using degrees (deg) or radians (rad) as the unit of measure.

The allowable range for Phase Offset is 0 to 359 degrees. When a value outside of the allowable range is entered, only the value greater than complete (360 degree) cycles will be set as the offset amount.

Duration: The Duration property determines how long the waveform will be generated. Duration can be defined using the microsecond (us), millisecond (ms), second, (sec), minute (min) or hour (hour) as the unit of measure. When the unit of measure is changed, the DSR 100-15 automatically converts the property's value to the new unit of measure.

The maximum duration of a single segment is 1193 hours, and the minimum duration is 150 us. When the duration specified for the waveform has been completed, the DSR 100-15 will begin outputting the next waveform defined in the test. However, if a Trigger Control follows the just-completed waveform, and the Trigger Control's "Continue Prev. Wave" property is set to TRUE, the waveform before the Trigger Control will continue indefinitely, regardless of the duration time set in that waveform's properties.

If no additional waveform has been defined to follow the completed waveform, the system output will stop.

Sawtooth Wave Properties

A Sawtooth Wave makes use of the DSR 100-15's arbitrary waveform generator to generate the desired waveform. Select the Sawtooth button from the Add Waveform drop-down when you need to create an audio-frequency sinusoidal waveform (DC to 20 kHz).

Set the following properties to specify the characteristics of the sawtooth wave to be produced at the amplifier output:

Amplitude: The Start Amplitude and End Amplitude properties determine the height of the sawtooth wave from the zero-crossing point to the peak value, measured in volts. Amplitude can be defined using the unit Volts peak (Vp), Volts peak-to-peak (Vpp) or Volts root-mean-square (Vrms). When the unit of measure is changed, the DSR 100-15 automatically converts the property's value to the new unit of measure. The units of measure used for Start Amplitude and End Amplitude do not need to be the same.

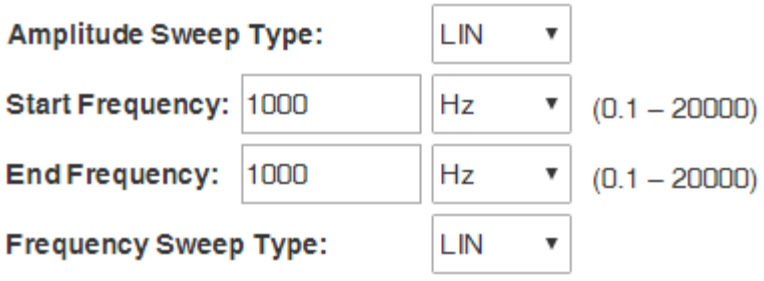
The values for both Start and End Amplitude can be positive or negative, and the allowable range for these values will be determined by the DSR 100-15 based on the System Calibration settings (for more information, see the topic *"System Calibration"*). The default allowable range is +/-200Vp (with system gain set to 20). When a value outside of the allowable range is entered, the input box will turn red and an error message will be displayed.

Amplitude Sweep Type: A Sweep can be Linear, Logarithmic or Exponential. Choose the desired sweep type from the drop-down.

Frequency: The Start Frequency and End Frequency properties determine the frequency of the sawtooth wave in cycles per second (Hertz). Frequency can be defined using Hertz (Hz) or Kilohertz (kHz) as the unit of measure. When the unit of measure is changed, the DSR 100-15 automatically converts the property's value to the new unit of measure. The units of measure used for Start Frequency and End Frequency do not need to be the same.

The allowable range for Start and End Frequency is 0.1 Hz to 20 kHz. When a value outside of the allowable range is entered, the input box will turn red and an error message will be displayed.

Frequency Sweep Type: A Sweep can be Linear, Logarithmic or Exponential. Choose the desired sweep type from the drop-down.

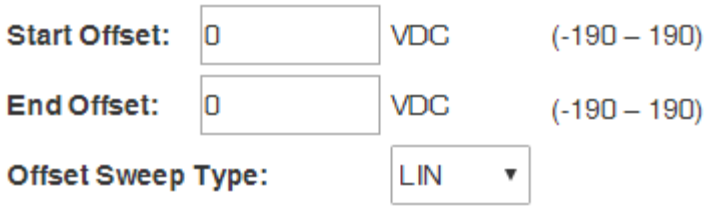


DC Offset: The Start Offset and End Offset properties supply a constant positive or negative DC voltage on the sawtooth

wave. DC Offset is defined in Volts DC (VDC) as the unit of measure.

The allowable range for Start and End Offset is +/-200 VDC (with system gain set to 20). When a value outside of the allowable range is entered, the input box will turn red and an error message will be displayed.

Offset Sweep Type: A Sweep can be Linear, Logarithmic or Exponential. Choose the desired sweep type from the drop-down.



Phase Offset: The Phase Offset property determines the beginning offset of the waveform within the cycle. Phase Offset can be defined using degrees (deg) or radians (rad) as the unit of measure.

The allowable range for Phase Offset is 0 to 359 degrees. When a value outside of the allowable range is entered, only the value greater than complete (360 degree) cycles will be set as the offset amount.

Duration: The Duration property determines how long the waveform will be generated. Duration can be defined using the microsecond (us), millisecond (ms), second, (sec), minute (min) or hour (hour) as the unit of measure. When the unit of measure is changed, the DSR 100-15 automatically converts the property's value to the new unit of measure.

The maximum duration of a single segment is 1193 hours, and the minimum duration is 150 us. When the duration specified for the waveform has been completed, the DSR 100-15 will begin outputting the next waveform defined in the test. However, if a Trigger Control follows the just-completed waveform, and the Trigger Control's "Continue Prev. Wave" property is set to TRUE, the waveform before the Trigger Control will continue indefinitely, regardless of the duration time set in that waveform's properties.

If no additional waveform has been defined to follow the completed waveform, the system output will stop.

Trigger Control Properties

The Trigger Control will cause a a running test to pause and wait for an input that will cause the trigger to "release."

To create a trigger within a test, select the Trigger option from the Add Control drop-down menu in the DSR 100-15's active window. A Trigger icon will be added to the active test sequence. Drag the trigger icon until it is positioned where you want the trigger to occur within the test sequence. Select the Trigger tab and change the Trigger properties as required.

Trigger Type

Two types of input can be used: user or gpio.

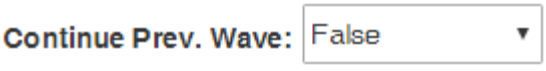
User Trigger: Select user trigger to enable a local action (eitiher pressing the Arrow (RUN) button in the DSR 100-15's active window or pressing the spacebar on the keyboard) to release the trigger.

GPIO Trigger: Select the GPIO Trigger option if you want an input signal received on one of the three GPIO ports to cause the trigger to be released. When GPIO Trigger is selected, three GPIO port controls are provided for selection. Choose a GPIO port that you have previously designated as a GPIO input during GPIO setup. See the help topic *"Settings* for more information.

After you have selected a GPIO monitor as "true," you will be prompted to choose the logic state (0 or 1) that will cause the trigger to be released.

Continue Prev. Waveform:

When the trigger is released, the DSR 100-15 will being generating the next waveform in the test sequence. While waiting for the trigger, the DSR 100-15 will continue to generate the waveform previous to the trigger control indefinitely until the trigger is released (default). To set the DSR 100-15 to not generate any signal between the end of the last waveform and the release of the trigger, set the Trigger's Continue Prev. Wave property to False.



Fixed Loop Control Properties

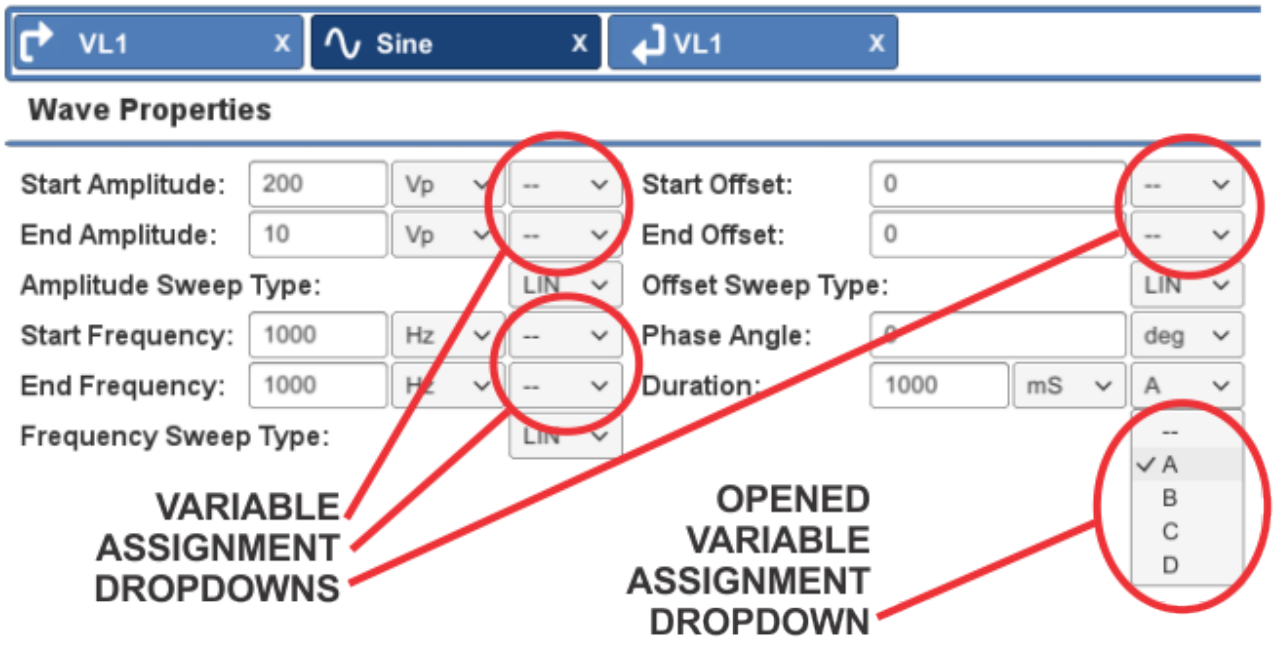
When one or more waveforms are positioned between the Fixed Loop Start control and Fixed Loop End control, those waveforms will be generated repeatedly. The number of times the waveforms will be repeated is determined by the Loop Count property found under the Fixed Loop Start tab.

To create a fixed loop within a test, select the Fixed Loop option from the Add Control drop-down menu in the DSR 100-15's active window. Two control icons, Fixed Loop Start and Fixed Loop End, will be added to the active test sequence. Drag the waveform(s) to be repeated so they are positioned between the Fixed Loop icons. Select the Fixed Loop Start tab and enter the desired number of loops in the Loop Count property.

Variable Loop Control Properties

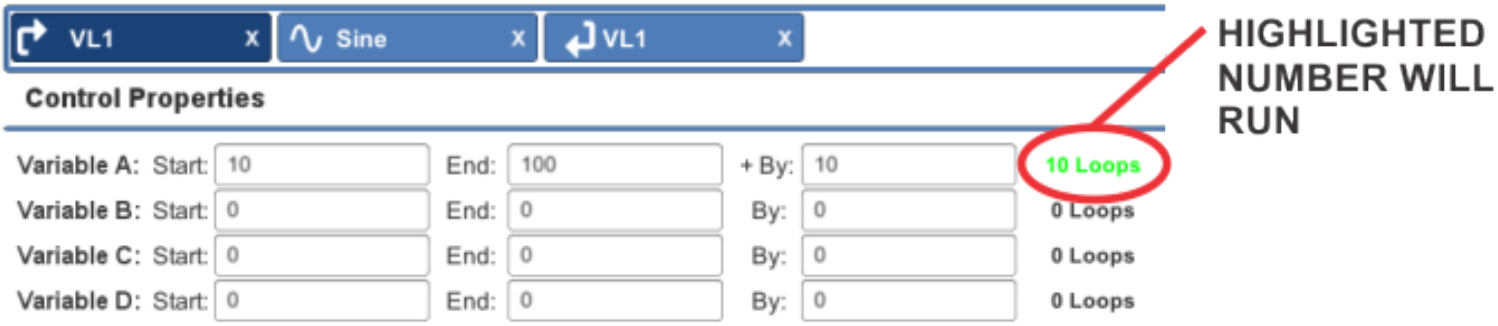
When one or more waveforms are positioned between the Variable Loop Start control and Variable Loop End control, those waveforms will be generated repeatedly with one or more changing variables. Up to four of the following properties can be set as variables within a single Variable Loop: Start Amplitude, End Amplitude, Start Frequency, End Frequency, Start Offset, End Offset, and Duration.

To create a variable loop within a test, select the Variable Loop option from the Add Control drop-down menu in the DSR 100-15's active window. Two control icons, Variable Loop Start and Variable Loop End, will be added to the active test sequence. Drag the waveform(s) to be looped so they are positioned between the Variable Loop icons. When a waveform is positioned between the two Variable Loop icons, the Properties tab for the waveform will be changed to provide additional drop-down lists to be used to assign variables within the Variable Loop.

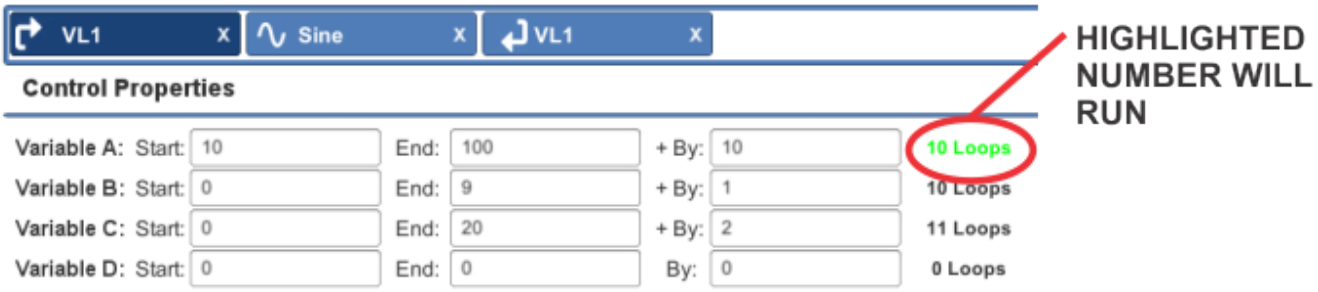


Find the waveform property to be varied within the loop, and then use the variable assignment drop-down to select a letter. After variable assignment, the input box for that property will be grayed to indicate its status as a variable. Check to make sure that the units being used for the property to be varied are the system default units (Vp for amplitude, Hz for frequency, VDC for offset, and ms for duration).

Next, open the Variable Loop Start tab and find the property controls for the variable letter you just assigned. In the Variable Start input box, enter the setting you want for that property at the beginning of the loop sequence (first loop). In the End input box, enter the setting you want for that property at the end of the loop sequence (last loop). Last, input the amount the variable should increase or decrease from one loop to the next. The DSR 100-15 will calculate and display the total number of loops that will result.



Adding Additional Variables: Up to four different waveform properties can be assigned as variables within a Variable Loop control. When the properties set for variables will result in a different number of loops to be generated, the DSR 100-15 will only generate the lesser number of loops. The actual number of loops to be generated will be highlighted on the Variable Loop Start tab.



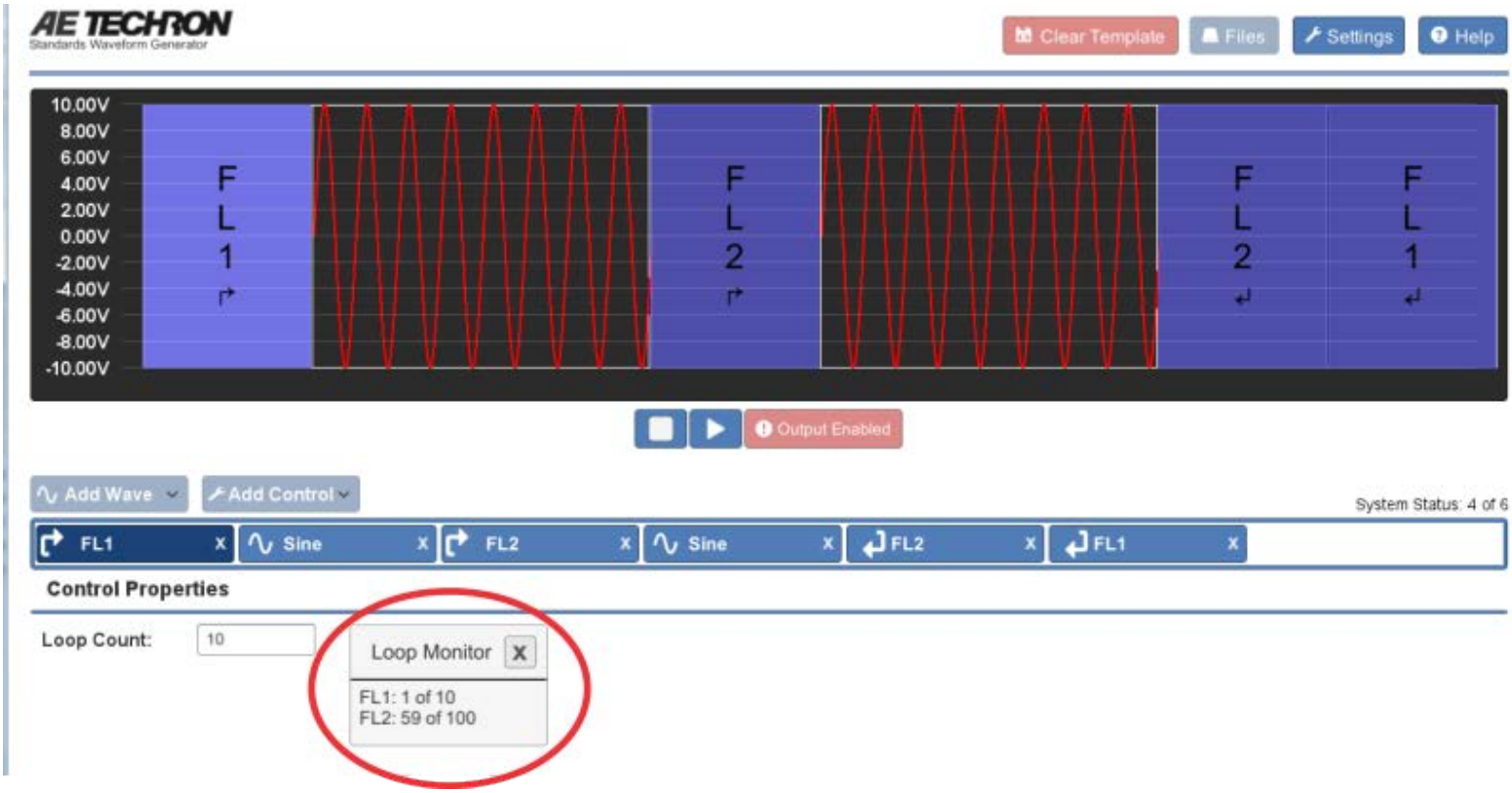
Once a variable has been created, it can be used on other waveforms contained within the Variable Loop, or on other properties within the same waveform, since the variables are independent of unit. For example, if variable A is defined as starting at 1000 and ending at 10,000 with an increment of 1000, this variable could be used to create a 10-loop repeat with starting frequencies from 1000 Hz to 10,000 Hz increasing in 1000 Hz increments, and variable A could also be used to create a 10-loop repeat with a duration increasing from 1000 ms on the first loop to 10,000 ms on the final loop.

Nested Controls: All Wave Controls (Trigger, Fixed Loop, Variable Loop, Template Playback, and GPIO Output) can be included within loop controls to become a part of the sequence. When a Variable Loop is included (nested) within another Variable Loop, a maximum of four different variables can be assigned between the two variable loops. Variables assigned in the outer loop are also available to the inner loop and can be reused. However, if the same variable letter is defined in both an outer and an inner Variable Loop, the variable assignment from the outer Variable Loop takes precedence and will be applied to all variables with the same letter assignment.

Loop Monitor

The Loop Monitor allows the user to track the status of the fixed and variable loops in any test sequence. To enable the Loop Monitor feature, complete the following steps:

1. Press the Settings button to open the Settings window and locate the Loop Monitor selection box on the Configuration tab. Check to box labeled "Show Loop Monitor Window During Playback." Press the SAVE button to save your selection.
2. Create or open the test to be monitored into the DSR 100-15's active window. Press the arrow button to start the test.
3. The Loop Monitor Window will appear in the DSR 100-15 active window and display the loops contained in the test sequence, displaying the number of completed loops out of the total loops required to complete the sequence.



Note that the Loop Monitor window can be dragged to another location on the screen, if desired.

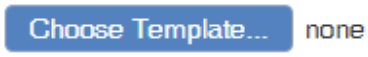
If the test sequence is stopped, the loop monitor count will also be stopped. If the test is restarted, the loop monitor count will be reset to the beginning of the count.

Use the X in the upper right of the Loop Monitor window to close the window. Note that this will also prevent the Loop Monitor window from opening for this or other tests until the Loop Monitor check box is selected again on the Configuration tab in the Settings window.

Template Control Properties

Use the Template Control when you want to link two or more pre-programmed tests from the Standards Library, or when you want to incorporate a pre-programmed test into a custom test routine you have created. Template controls can be inserted (nested) within Fixed and Variable Loop controls. Template controls inserted into a Variable Loop should first be reviewed by opening the test from the Standards Library. Make note of any variables that have already been assigned in the pre-programmed test to avoid assigning the same variable letter within the Variable Loop.

To load a Template using the Template control into a test, select the Template option from the Add Control drop-down menu in the DSR 100-15's active window. A Template icon will be added to the active test sequence. Select the Template tab and press the Choose Template... button to open the file selection dialog box. Locate the .swg file for the test desired, and then double-click on the file name to add it to the Template control. Or you can click on the file name to select the .swg file, and then press the Open button in the file selection dialog to add the test to the Template control.



When a test has been added to a Template control, the file name will appear in the Template properties tab. An Open button is available to allow the associated test to be loaded into the active window. Loading the test into the active window will clear any waveforms or controls currently in the active window. A confirmation dialog also provides the opportunity to save the current active window before opening the Template.

GPIO Output Control Properties

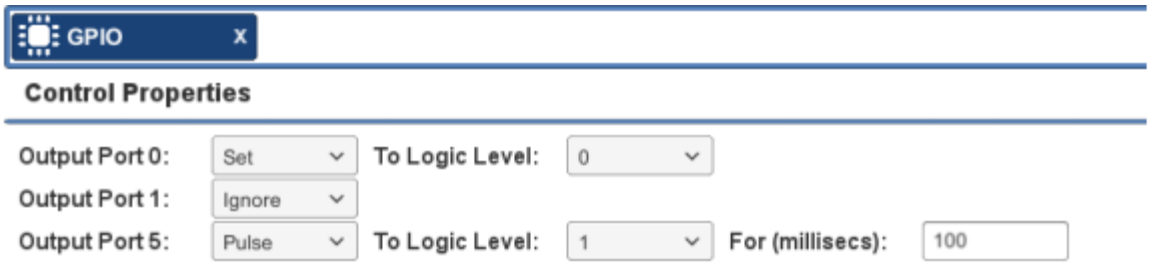
NOTE: The GPIO ports are located on the DSR 100-15 Controller's back-panel, which can be accessed by removing the DSR 100-15's back panel. See the topic "Accessing the GPIO Ports" for more information.

Use the GPIO Output Control to send a signal through the GPIO-enabled pins on the DSR 100-15 Controller's DB-15 and DB-9 connectors when the GPIO Output is played as part of a test sequence.

Before configuring the GPIO Output Control, first configure each GPIO port to function as an input or an output using the GPIO Setup controls on the Configuration tab located under Settings. See the help topic *"Settings"* for more information.

If a GPIO port has been configured as an input in the GPIO Setup controls, that port can be used as a GPIO Trigger only, so you must set that Output Port to **Ignore** (no signal) on the GPIO Output control properties. If one or more GPIO ports has been configured as an output in the GPIO Setup controls, you can configure the GPIO Output segment to send a signal on that port, or you can set the port to "ignore," if desired.

Each GPIO port configured as an output can be set to send a signal when the GPIO Output segment is played as part of a test sequence. The signal type can be configured as **Set** (a continuous signal of 0 or 1), or **Pulse** (a pulseed signal of 0 or 1 for a specified number of milliseconds).



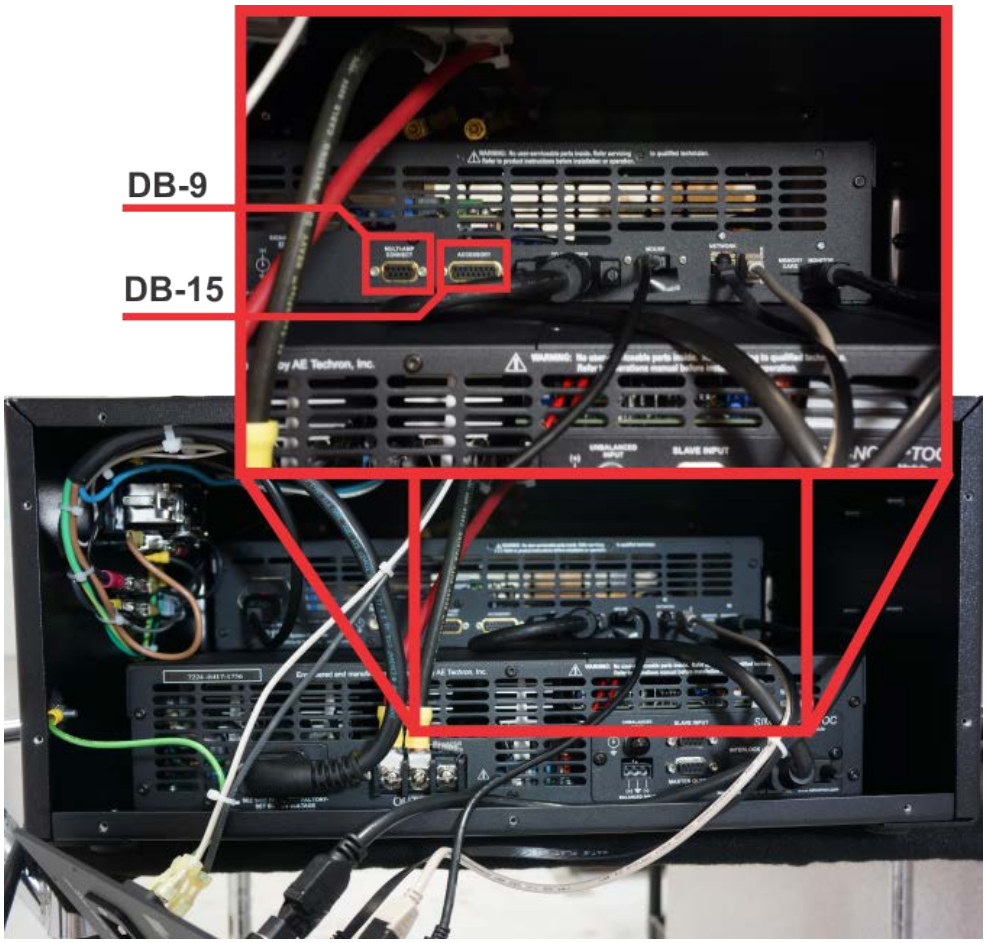
Accessing the GPIO Ports

To access the GPIO Ports located on the Controller's back panel inside the DSR 100-15 unit, complete the steps below:

A. IMPORTANT: Disconnect the unit from AC power before beginning this procedure.

B. Using a T-15 Torx driver, remove the ten (10) hex-head screws from the unit's back panel, as shown. Being careful not to strain or unplug the attached cables, move the back panel aside to gain access to the unit's interior.

C. Locate the DB-9 and DB-15 connectors, which are located left of center on the DSR 100-15 Controller's back panel, as shown.



Files

The Files button opens the Files window, which provides access to the DSR 100-15's internal file system, including the Standards library and the User Standards directory.

The **Standards library** contains the .swg (Standards Waveform Generator) files for a variety of EMC Standards' tests. The Standards' test files are separated into the main categories, Automotive and Aviation, and organized in sub-directories by Standard. The Standards library also contains a Factory Test and Setup directory, which contains test routines that may be required during factory or on-site troubleshooting. All files contained in the Standards library are Read-Only.

The **User Standards** directory is a write-able storage space to be used to store user-created custom tests and test variations. Files saved in the User Standards directory can be copied, altered and deleted. Subdirectories can be added to the User Standards directory.

To open a pre-programmed .swg file, open the Files window and double-click on the Standard's Library directory (or use the Open button), and then locate the test to be used. Double-click on the test name to load the file into the DSR 100-15's active window.

Once loaded, simply press the Arrow button to begin generating the required waveform sequence. You can also add or remove individual waveforms and controls from the test sequence, or make changes to the properties of a waveform or control, and then save the modified test in the User Standards directory for later use.

The following functions are available in the Files window:

Go Back: Press the Go Back button to display the files and/or folders one level higher in the file system hierarchy.

Open: Press the Open button to open the selected folder or file. When a folder is opened, the files and/or folders one level lower in the file system hierarchy will be shown in the Files window. When a file is selected, pressing the Open button will cause the file to be loaded into the DSR 100-15's active window. Double-clicking on a folder or file in the Files window will also function the same as pressing the Open button.

Delete: Press the Delete button to delete the selected folder(s) or file(s). Confirmation is required before the delete action is completed. Click on additional folder or file names to select multiple items for deletion. Click on a selected item again to clear that item from selection. To clear all selected items, use the Clear Selection button.

New Folder: Press the New Folder button to create a new folder in the User Standards directory. The new folder will be created at the level currently displayed in the Files window.

Deselect All: Press the Deselect All button to deselect all selected items. To deselect individual selected items, click again on the selected item.

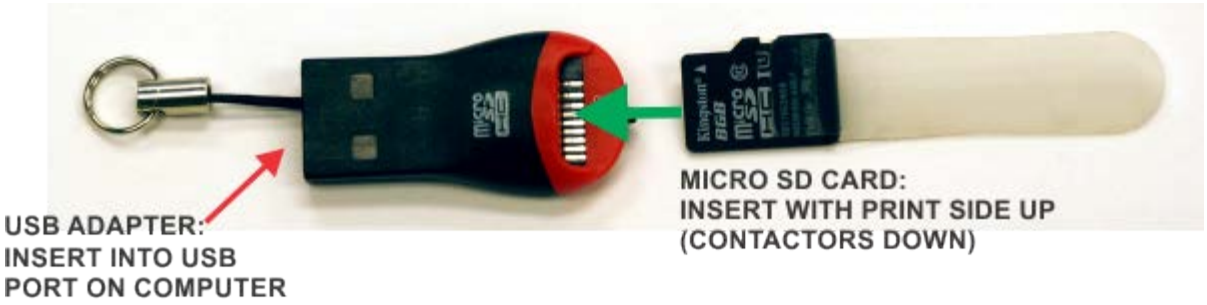
Save As: Press the Save As button to save the test sequence displayed in the active window as a Standards Waveform Generator (.swg) file. Navigate first to the location in the User Standards directory where you want to save the file. The file will be saved at the level currently displayed in the Files window.

Copy: Use the copy button to make a copy of an .swg file located in the DSR 100-15's internal storage. Click on an .swg file to select, and then press the Copy button to copy the file into the Controller's temporary memory.

Cut: Use the cut button to cut an .swg file located in the User Standards directory. Click on an .swg file to select, and then press the Cut button remove the file from its storage location in the User Standards directory and copy the file into the Controller's temporary memory. Note that .swg files located in the Standards library cannot be cut.

Paste: Press the paste button to paste .swg file from the Controller's temporary memory into the current location in the User Standards directory. Note that .swg files cannot be pasted into the Standards library.

SDCARD: The DSR 100-15 ships with a microSD card with extension tab (attached) and a USB adapter.



The microSD card contains the SWG Setup.exe file that is used to install the remote access SWG program on a Window's computer. For more information, see the topic *"DSR 100-15 via Network."*

The microSD card also can be used to create a backup of the .swg files stored in the DSR 100-15 and to move .swg files created on a Windows computer running in Demo Mode to the DSR 100-15 for use. See the topic *"Working in Demo Mode."*

In addition, the microSD card is used to update the DSR 100-15 Controller. See the topic *"Updating the DSR 100-15"* for more information.

The SDCARD directory will be visible at the top level of the Files window when working directly on the DSR 100-15 or when accessing the DSR 100-15 remotely. However, the SDCARD directory will not appear when working in Demo Mode.

The SDCARD directory can only be opened when the microSD card has been inserted into the card slot labeled "Memory Card" located on the Contoller's back panel, which can be accessed by removing the DSR 100-15's back panel. See the topic "Accessing the Memory Card Slot" for more information.

Clear Template: Press the New Template button to clear all waveform and control segments currently loaded in the active window. Confirmation is required before the active window will be cleared.

Settings

The Settings window contains four tabs that provide information and control settings for the DSR 100-15 Controller.

Configuration

The Configuration tab allows the control for the loop monitor window to be toggled on and off, and also provides the controls for GPIO setup.

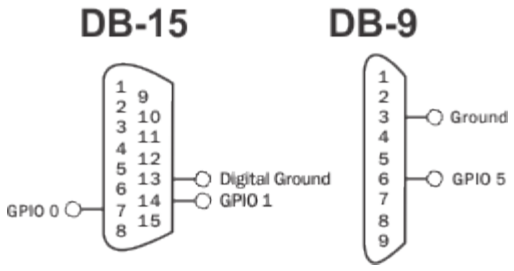
Loop Monitoring:

The Loop Monitoring checkbox turns the loop monitor window on or off. When the box is checked, the loop monitor window will be displayed during test playback. For more information about loop monitoring, see the topic *"Loop Monitoring."*

GPIO Setup:

The GPIO Setup checkboxes are used to configure the usage of the DSR 100-15 Controller's three dedicated GPIO ports. These ports located on the DSR 100-15 Controller's back panel DB-15 connector (using pins 7 and 14 referenced to ground on pin 13) and DB-9 connector using (pin 6 referenced to ground on pin 3). The DSR 100-15 Controller's back panel can be accessed by removing the DSR 100-15 back panel. See the topic "Accessing the GPIO Ports" for more information.

IMPORTANT: The GPIO pins are tied directly to the microprocessor and are not isolated. Take care not to exceed maximum ratings as permanent damage can occur. We highly recommend optical isolation (opto-coupler, solid state relay, etc.) be used on all GPIO pins before connecting to external equipment.



Each GPIO port can be configured as an Input or an Output.

GPIO Input: When a GPIO port is configured as an input, it can be used in a GPIO Trigger segment. When a GPIO Trigger segment is reached in a test sequence, the DSR 100-15 will pause and wait for the specified signal to be received on the designated GPIO port. When the signal is received, the test sequence will continue with the next segment following the trigger. NOTE: Only one GPIO port should be configured as an Input for use as a Trigger.

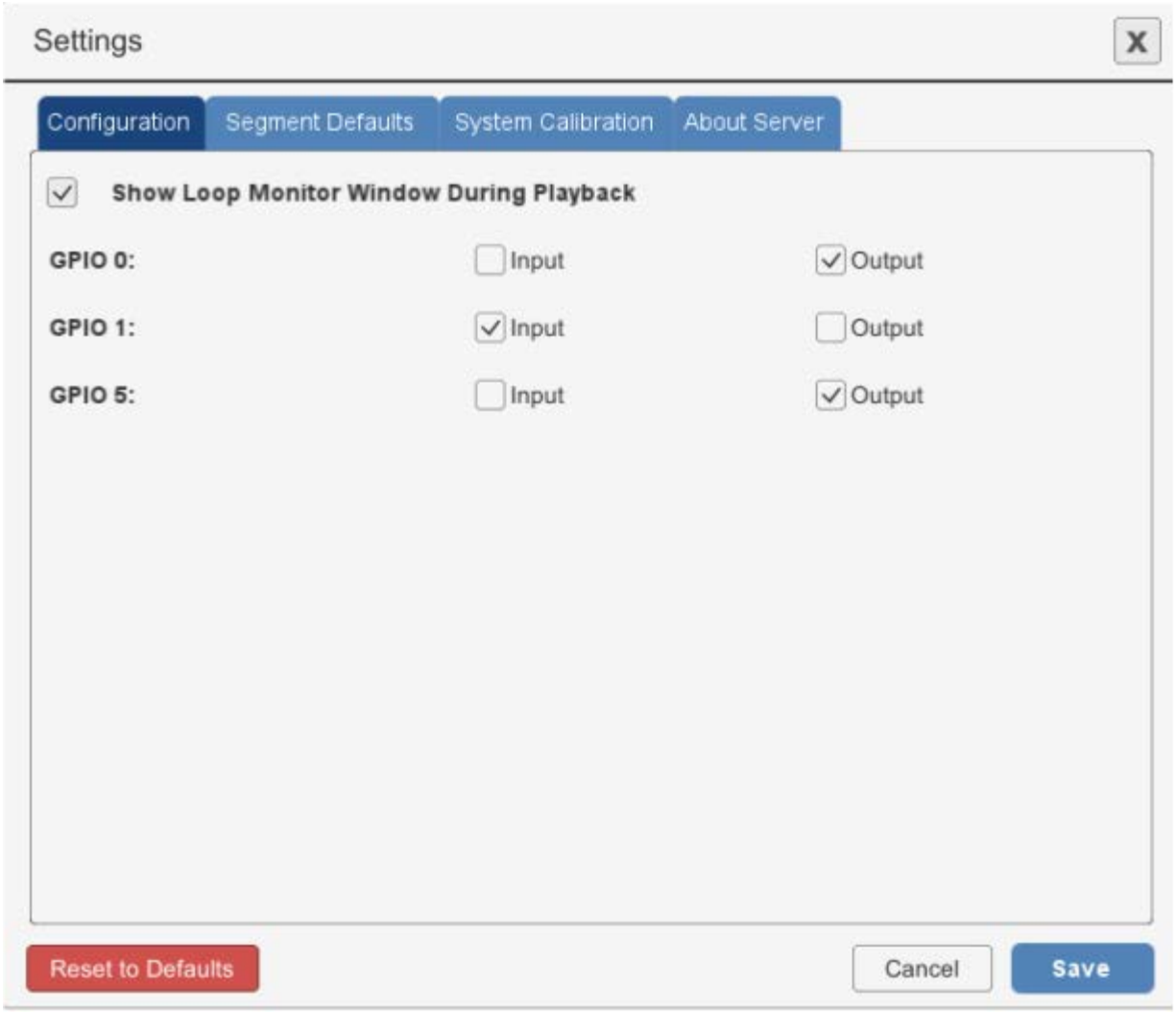
The electrical characteristics of a GPIO port when programmed as an input:
Voltage: Logic 0 = 0VDC; Logic 1 = 3.3VDC
Impedance: =>10 Mohm

GPIO Output: When a GPIO port is configured as an output, it can be used in a GPIO Output segment. When a GPIO Output segment is reached in a test sequence, the specified signal(s) will be sent through the GPIO port(s) designated in the GPIO Output segment. NOTE: Up to three GPIO ports can be configured as Outputs for use in one or more GPIO

Output segments.

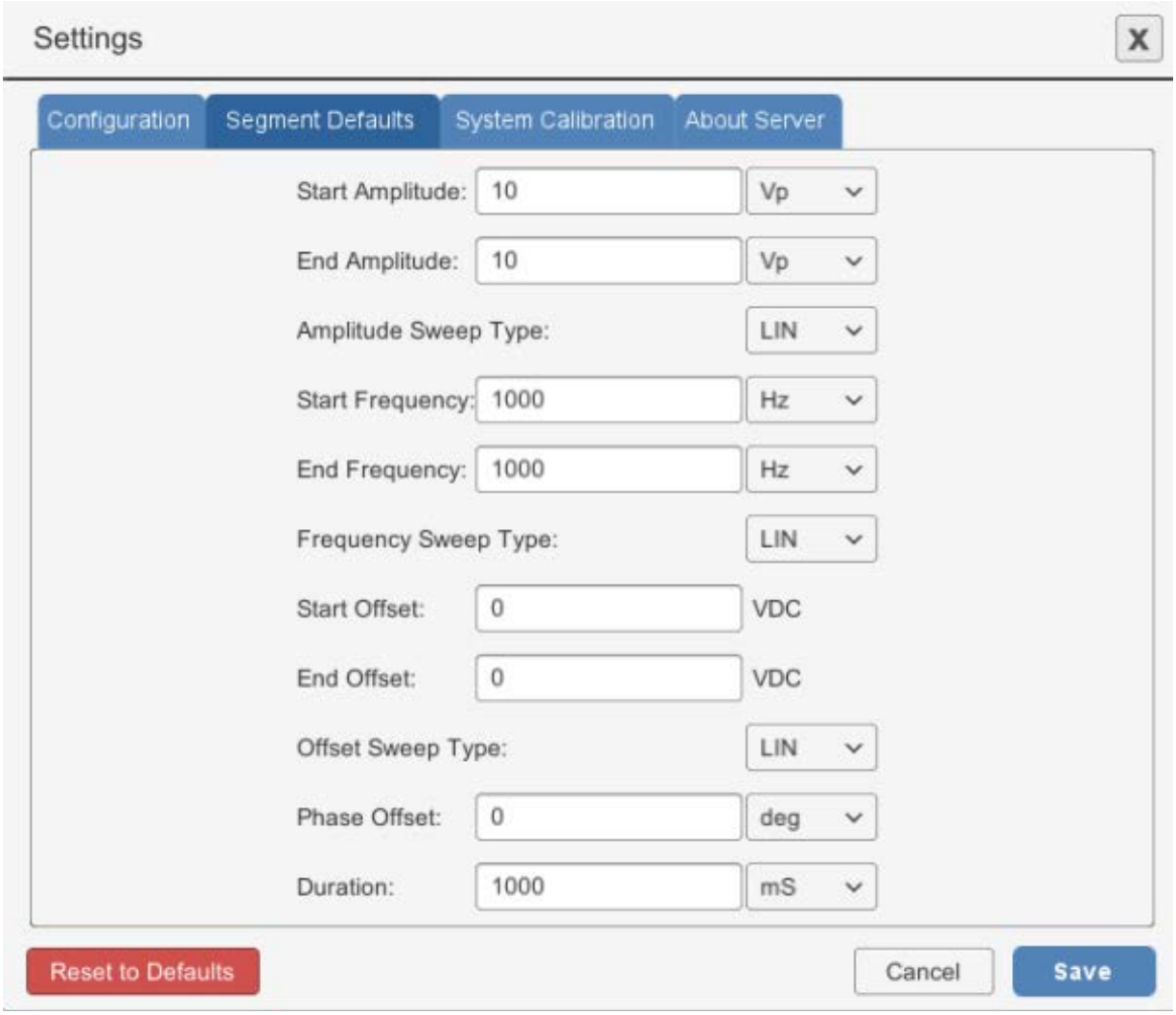
The electrical characteristics of a GPIO port when programmed as an output:
Voltage: Logic 0 = 0VDC; Logic 1 = 3.3VDC
Max Current Drive: >20 mA

After assigning the pins as required for your use or application, press the Save button to save the settings. and then use the corresponding pins to program a GPIO Trigger or GPIO Output segment. For more information about GPIO triggers and output segments, see the topics *"Trigger Control"* or *"GPIO Output Control."*



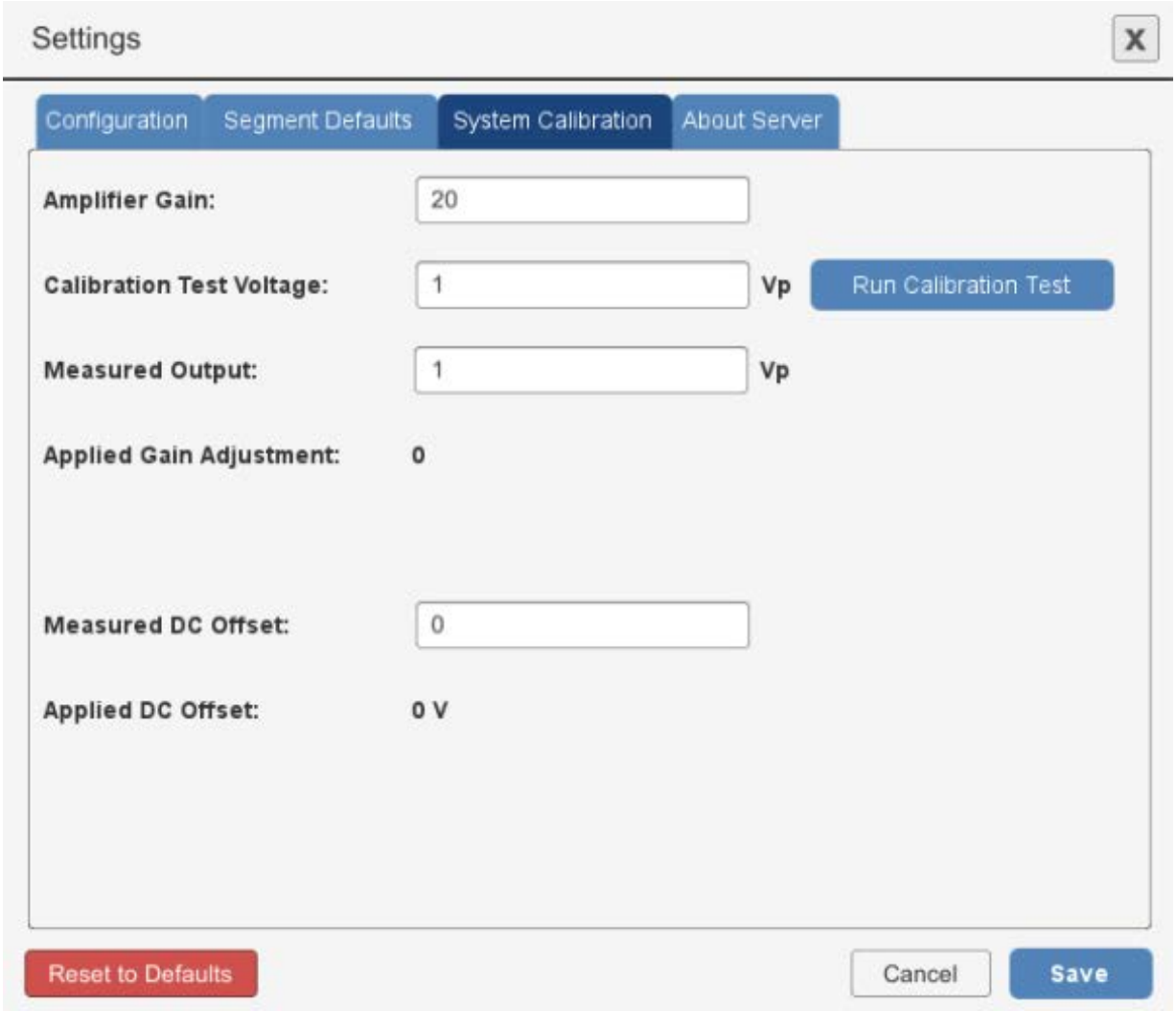
Segment Defaults

The Segment Defaults tab contains the default settings for SWG waveforms. When a new waveform is added into the active window, the initial waveform properties will be determined by these default settings. To change a default setting, select the input box for that setting, and then type the new setting into the text box or select the new value from the dropdown window. Select Save to save the new settings and close the Settings window. To return all Segment Default settings to the factory defaults, select the Reset to Defaults button.



System Calibration

The System Calibration tab holds information about the output generated by the DSR 100-15 system. Both system gain and system DC offset information are used by the DSR 100-15 to adjust its signal output to produce the expected signal at the Test Supply output. By default, the DSR 100-15 is set to a system gain at 20 and DC offset at 0, which are the typical settings for a DSR 100-15 system as configured from the factory. For accurate operation, the actual gain and offset of your system should be tested by running the Calibration Test. See the *"System Calibration"* topic in these Help files for more information.



About Server

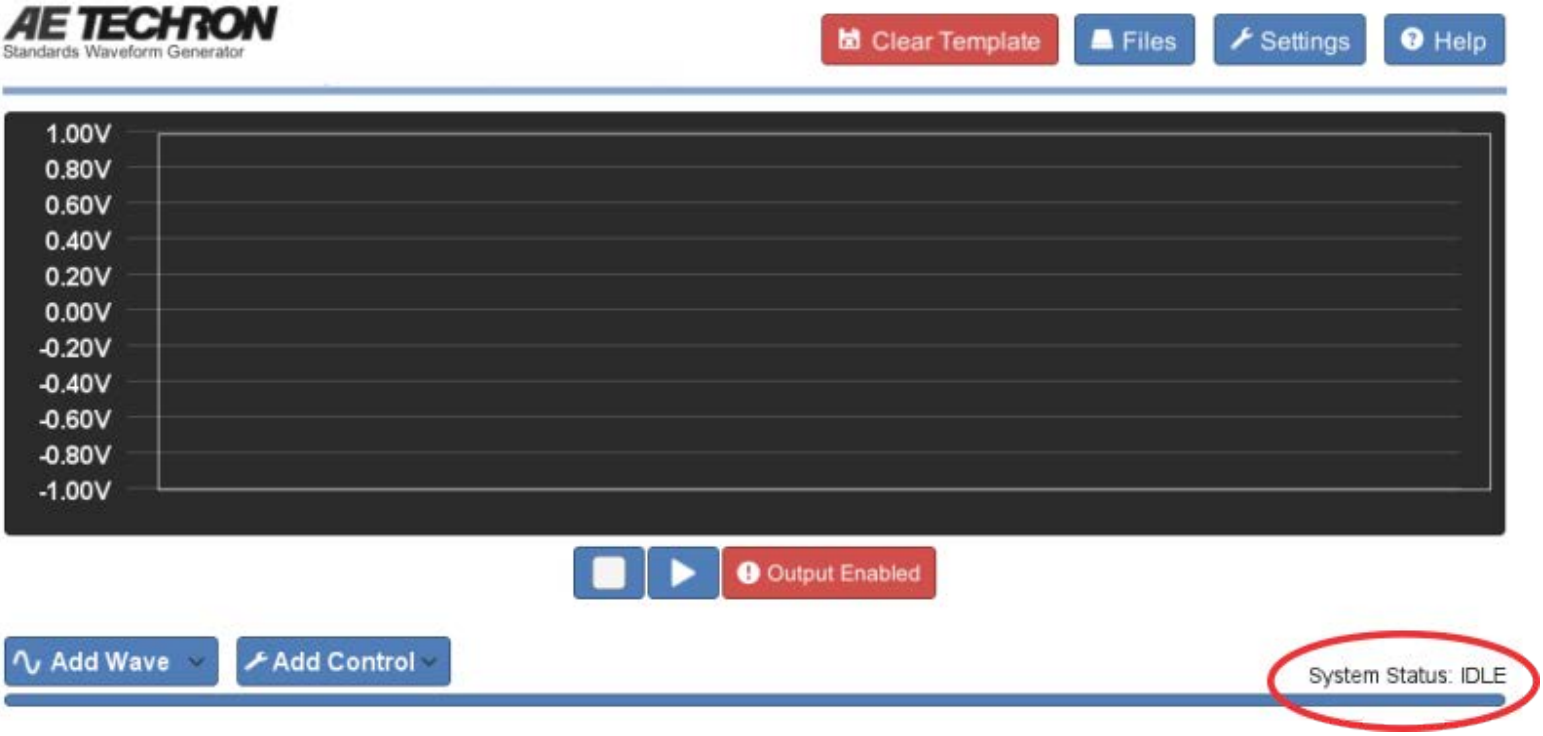
The About Server tab contains the DSR 100-15 version information for the Software and Firmware. It also displays the current IP address for the DSR 100-15 when it is connected to a network. This information is automatically displayed and is used for diagnostic purposes.

Help

The Help button opens this electronic Help system within the DSR 100-15 system. You can find additional helpful product information at the AE Techron website at www.aetechron.com.

System Status

System Status is reported as a system message located on the right side of the DSR 100-15's main window directly below the active test display. Under normal operation, the system will report its status as one of two states: Running or Idle.



Running: When the Arrow (RUN) button  is pressed, the test or wave sequence loaded in the active window will be sent to the DSR 100-15 system, and it will begin generating signal starting with the waveform or control farthest to the left in the active window. The DSR 100-15's System Status should display '1 OF X' where X is the total number of waveform segments and controls included in the test sequence.

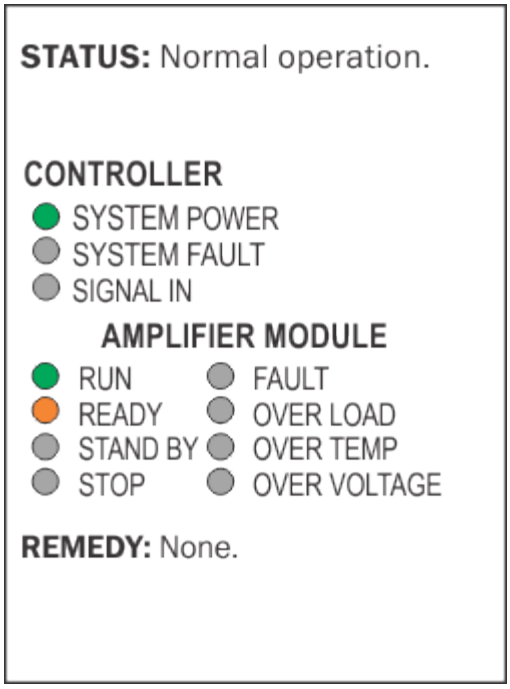
Idle: When the Stop button  is pressed, the DSR 100-15 will stop sending signal and the test will reset to the beginning of the first waveform or control. The DSR 100-15 will report its status as 'Idle.' The DSR 100-15 will also show its status as Idle at all times that a test is not actively running.

Troubleshooting

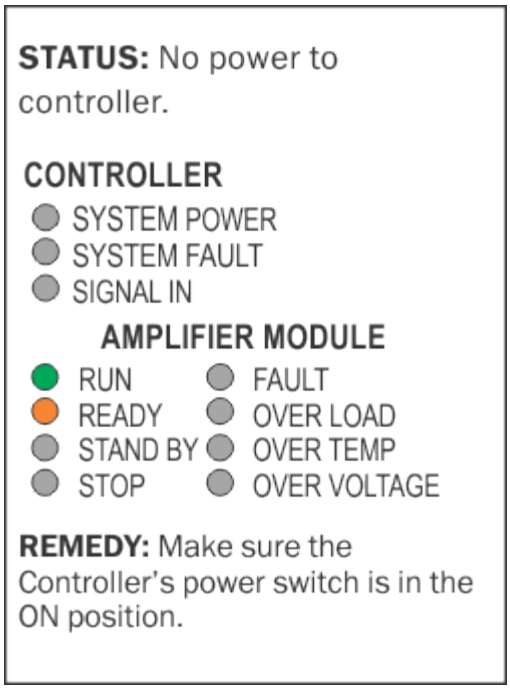
If the DSR 100-15 is not operating correctly, review the topics below for help with troubleshooting the problem. If the condition or error you are experiencing is not listed below, please contact AE Techron Technical Support at 574-295-9495 for additional help.

Displayed Messages / Indicators:

Use the front-panel indicators to resolve common problems with operation.
KEY: = LIT = NOT LIT = MAY BE LIT

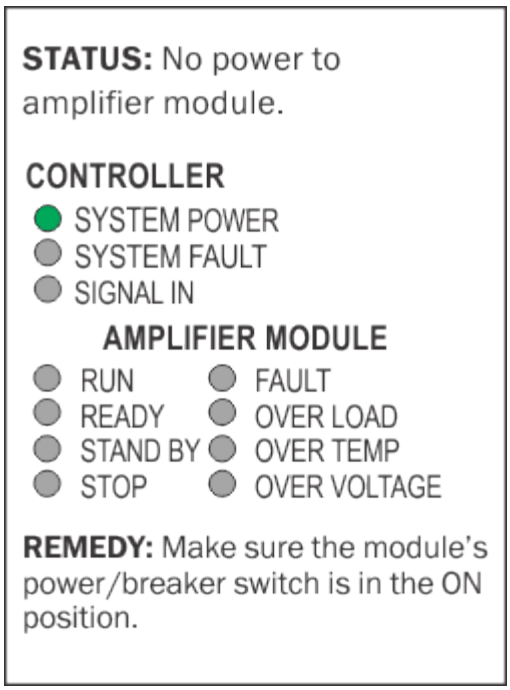


Detail: None.

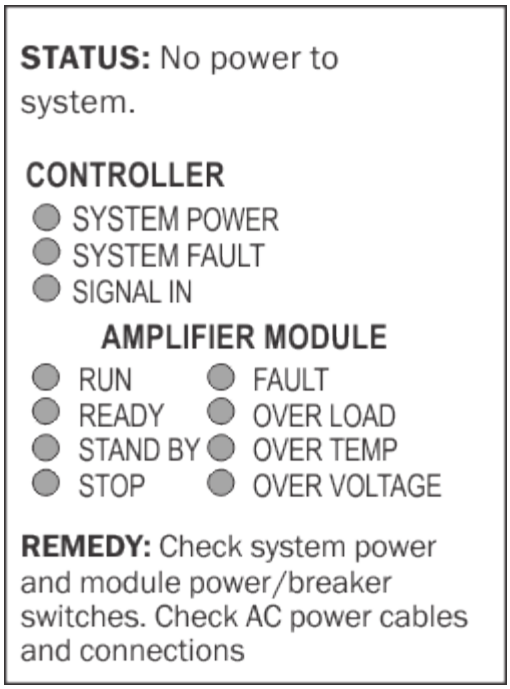


Detail: The front-panel power switch controls the power supply to the Controller. Make sure this switch in is the ON (|)

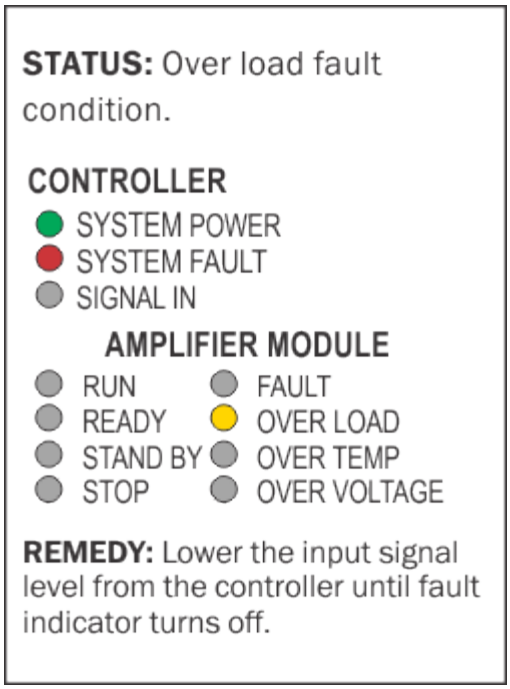
position.



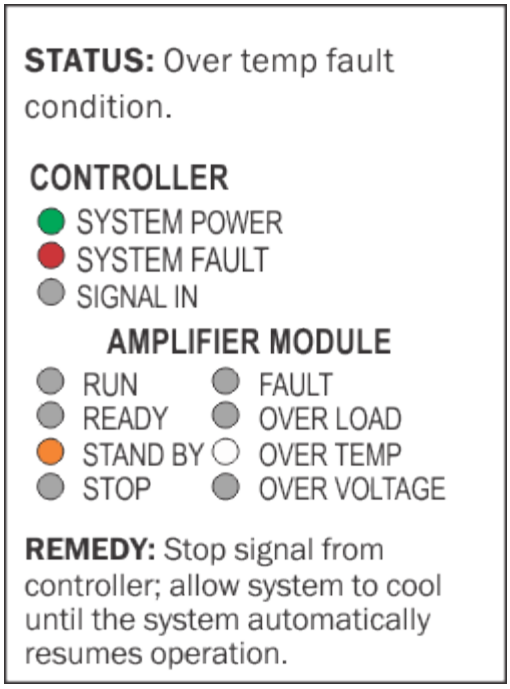
Detail: The front-panel power/breaker switch controls the power supply to the amplifier module. Make sure this switch in is the ON (|) position.



Detail: The red switch located on the upper right front-panel controls the power supply to the system. Make sure this switch is lit. Press once to light the switch and turn the power ON. Press again to turn the power OFF.



Detail:This indicates that the output of the amplifier module could not follow the input signal due to voltage or current limits. To remedy the Over Load fault, turn down the level of the input signal from the Controller until the Over Load indicator turns off.

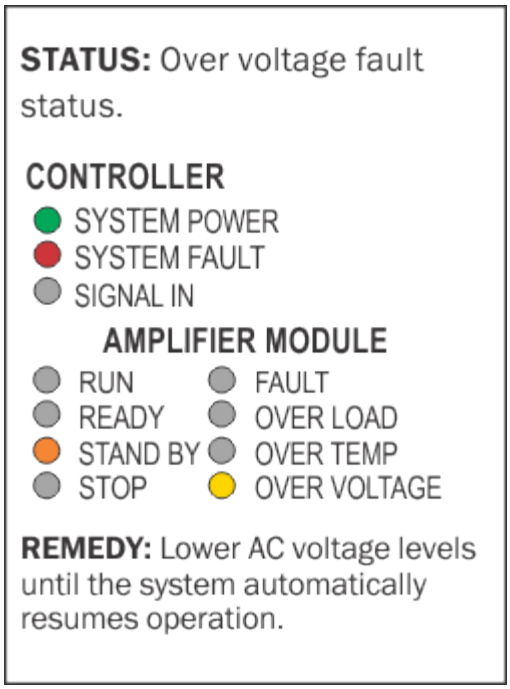


Detail:The DSR 100-15 monitors the temperature inside the highvoltage transformers, low-voltage transformer and in the output stage heat sinks of the system. The Over Temp indicator will light and the amplifier module will be placed in Standby mode when the temperature sensors detect a condition that would damage the system.

If the Over Temp pulse is extremely short, as in the case of defective wiring or switches, the Over Temp LED may be lit too briefly to observe.

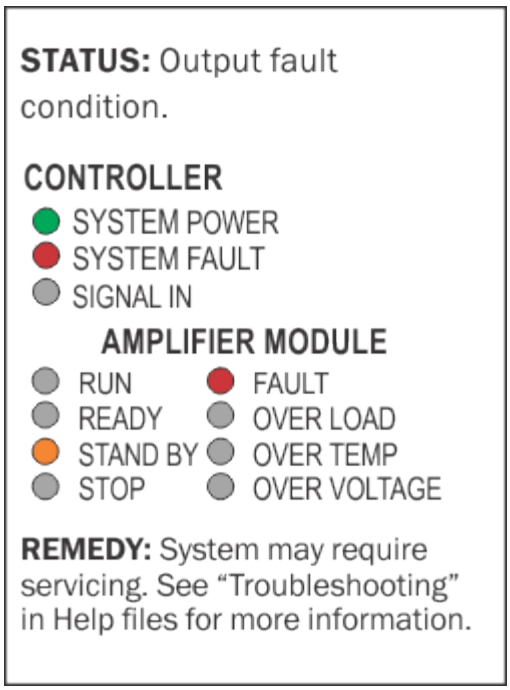
To reset after an Over Temp fault has occurred, make sure the fans are running, and then stop any input signal being sent by the Controller. Allow the fans to run for about 5 minutes until the system automatically returns the amplifier module to Run mode. To prevent this fault from recurring, see the “System Overheats” section below for information on

correcting the cause of an Over Temp fault condition.



Detail:This indicates that the AC mains voltage is more than +10% of nominal. The amplifier module will be forced to Standby when an Over Voltage condition occurs. When the Over Voltage condition is cleared, the amplifier module will automatically return to Run mode.

To clear an Over Voltage fault condition, the AC mains must be brought down to the nominal value. If the amplifiermodule does not return to Run mode when the Over Voltage condition has cleared, the DSR 100-15 system may require servicing.



Detail:This indicates that an Output Fault condition has occurred and the amplifier module has been placed in Standby mode. The Fault indicator will light under two conditions: 1) High-frequency oscillation is causing high shoot-through current; or 2) An output transistor has shorted, causing the output fault condition.

See the “Fault LED Lit” section below for more information on diagnosing and clearing this fault condition.

Other Problems / Symptoms:

PROBLEM: DSR 100-15 does not power on.
A: Check the connection to AC power, both at the AC source and at the back panel of the unit. Check the front-panel System Power switch to make sure the unit is powered on. Also check the Controller's power switch and the amplifier module's power/breaker switch to make sure they are in the ON (|) position.

The amplifier module's power/breaker switch also functions as a breaker. When tripped, the switch will move to the center position between OFF and ON. To reset, move the switch to the OFF position, and then move to the ON position.

PROBLEM: The SWG Windows Remote software will not load or will not connect remotely to the DSR 100-15; instead, an error message indicates a "version mismatch."
A: The DSR 100-15 software and the Windows Remote software versions must match for successful interaction between the two modules. See the topic *"Updating the DSR 100-15"* for information about how to install new versions of these modules.

PROBLEM: SDCARD directory won't open or can't be found.
A: The SDCARD directory will be visible at the top level of the Files window when working directly on the DSR 100-15 or when accessing the DSR 100-15 remotely. However, the SDCARD directory will not appear when working in Demo Mode.

The SDCARD directory can only be opened when the microSD card has been inserted into the card slot labeled "Memory Card" located on the DSr 100-15 Controller's back panel, which can only be accessed by removing the DSR 100-15 back panel. See the topic "Accessing the Memory Card Slot" for more information.

Be careful when installing the card. The card must be inserted with the printed side UP. The card also must be inserted in a straight line directly into the card slot. If the card is inserted at an angle, it may miss the internal card slot and be inaccessible from your DSR 100-15 unit. If the card is inserted, but the SDCARD directory still cannont be opened, check the card's installation. It may have missed the internal docking slot or it may not be completely inserted into the card slot.

PROBLEM: System overheats (Over Temp fault condition).
A: The DSR 100-15 might overheat for two reasons: 1) Excessive power requirements, or 2) Inadequate airflow.

Excessive power requirements: The DSR 100-15 will overheat if the required power exceeds the system’s capabilities. High duty cycles and low-impedance loads are especially prone to cause overheating. To see if excess power requirements are causing overheating, check the following:

1. The application’s power requirements fall within the specifications of the amplifier. See the "Specifications."topic.
2. Faulty output connections and load.
3. Undesired DC offset at the Output and Input signal.

If the amplifier chronically overheats with suitable power/load conditions, then the amplifier may not be receiving adequate airflow. To check for adequate airflow, refer to the following information: "Inadequate airflow."

Inadequate airflow: To see if inadequate airflow is causing overheating, check the following:

1. Check air filters. Over time they can become dirty and worn out. It is a good idea to clean the air filters periodically

with a mild detergent and water.

2. Visually inspect fans to assure correct operation while unit is On (I). Any inoperative, visibly slow, or reverse-spinning fan should be replaced. Please see the Factory Service information at the end of this topic.

PROBLEM: Fault LED Lit.

A: The DSR 100-15 contains protection circuitry that disables the amplifier module if an output stage is behaving abnormally. This usually indicates an output transistor has shorted. To clear the Fault condition, follow these steps:

1. Using the front-panel power switch, turn off the power to the Controller (0).
2. Turn off the main System Power switch.
3. Using the System Power switch, turn the DSR 100-15 back on. If the Fault LED doesn't illuminate again, turn the Controller on.
4. CAUTION: Try resetting this Fault condition only once. If the Fault condition does not clear after one reset, STOP. Repeated resetting can damage the amplifier module.
5. If the Fault LED is still illuminated and the Fault condition doesn't clear, return the amplifier for Factory Service. Please see the Factory Service information at the end of this topic.

Factory Service:

If the troubleshooting procedures are unsuccessful, the DSR 100-15 may need to be returned for Factory Service. All units under warranty will be serviced free of charge (customer is responsible for one-way shipping charges as well as any custom fees, duties, and/or taxes). Please review the "Warranty." for more information.

All service units must be given Return Authorization by AE Techron, Inc. before being returned. Return Authorizations can be requested on our website or by contacting our Customer Service Department.

Please take extra care when packaging your unit for repair. It should be returned in its original packaging or a suitable alternative. Replacement packaging materials can be purchased for a nominal fee.

Please send all service units to the following address and be sure to include your Return Authorization Number on the box.

AE Techron, Inc.
Attn: Service Department / RMA#
2507 Warren Street
Elkhart, IN 46516

3110 Calibration Guide

This section provides the guidelines for establishing the performance of key parameters for the DSR 100-15's Controller. It provides instructions for the measurement of the various output signals the Controller can provide. Although the output of the Controller can be adjusted via the gain settings, this feature is intended for use in calibrating the DSR 100-15 system and not for calibrating the output of the Controller alone. For instructions on the calibration of a DSR 100-15system, please see the Help topic *"System Calibration."*

For the calibration of the Controller, tolerances and ranges will be provided for a variety of measurements. The results of the measurements will be essentially a "Pass" or "Fail." Tests conducted according to these instructions should be considered "functional tests" that are intended to confirm the function of the settings of the Controller. Since fine adjustment of the test system can be accomplished via the DSR 100-15System Calibration, the calibration of the Contnrolelr will require only general instrumentation. The procedure should be carried out with the gain set at the anticipated gain to be used in testing. The default gain used in the assessment tables is 20.

Documentation

Standard SI units commonly found in electrical standard are used for checking the calibration of the Controller. The minimum requirements for calibration documentation are that the instruments used should be able to accurately measure the quantities in Table 1 within the tolerances provided. Instruments should bear evidence (via a label on the instrument or similar documentation) that the measuring instrument is calibrated. The table shown below is provided to record the performance of the Controller in key areas, and to facilitate interaction with the AE Techron when needed.

ANSI Z540 or ISO 17205 calibration with documentation is available as an option.

Required Instruments

Instruments required are an oscilloscope and a digital multimeter. All measurements should be made into high-impedance instruments. The measurements outlined here do not require a probe. Using BNC connectors to both instruments is advised. It is assumed that the oscilloscope probe attenuation is set at 1X.

Best performance will be attained if the measuring instruments are either isolated (battery powered) or grounded at the same point with the DSR 100-15.

Instruments requirements are suggested requirements. Virtually any calibrated high impedance DMM and oscilloscope will serve. Observe any temperature corrections or other temperature based requirements for the measuring instruments.

Oscilloscope:
Bandwidth: 50 MHz, minimum
Sample Rate: 1 GS/sec minimum
Automatic Measurements: Frequency, RMS, Peak-to-Peak
Input Impedance (DC): 10M ohm

DMM:
Frequency Range: ±(% of reading + # of counts)
50 Hz to 10 kHz: 0.3 + 20
10 to 20 kHz: 1 + 40

20 to 100 kHz: 2 + 150
Impedance: Up to 20 M ohm over available ranges

Connections

Test connections are made from the Controller's front panel Signal Out BNC connector to the test instrument.
Cables and connectors having minimal insertion loss over the bandwidth (DC to 300 kHz) are required.
Shut off the lower front-panel power/breaker switch to disable the amplifier module in the DSR 100-15 during this series of tests.
No other peripheral connections will affect these tests.
Use common ground or isolated instruments, if possible. Select an environment with minimal radiated noise.

Temperature and run time: Allow the DSR 100-15 Controller to run for 20 minutes in a quiescent state.

Settings and features not tested: Sweep functions, Control functions, Duration setting

Output Assessment

The assessment of a waveform consists of setting up the DSR 100-15's user interface with the values as indicated for each waveform type listed on the far left of Table 1. The duration may be set for several seconds, or more depending on the triggering selected. The test varies voltage and, for alternating waveforms, a range of frequencies is given for each voltage level.

Set up the test waveforms in the "User Defined Standards" Directory

Procedure for Phase Testing

A. Create a 0 VDC segment of short duration (no more than a few seconds)

B. Insert a trigger (True) after the 0 VDC segment

C. Insert a ripple waveform with the following settings:

D. Recommended Vp = 20 Vp (Start and End)

E. f = 1 kHz

F. Offset = 0 V

G. Sweep = LIN (ALL settings)

For testing each phase shift, enter the value of the phase for each test and start the waveform running. With the oscilloscope trigger function set to capture the initiation of the ripple function, touch the space bar and measure the time from the start of the (truncated ripple to the end of the first cycle. Repeat for each of the phase values shown in Table 1.

Assessment Table

Notes:

G = 20.0 for all waveforms
Use 0 VDC for offset setting for varying waveforms

Sweep Type = LIN for all tests

Where applicable, frequency values should be within 2% of values selected

For the Square waveform, slew rate should be within 3 V/ms for each test

Waveform	Start/End Offset (V)	Frequency (kHz)	Measured Frequency (kHz)	Low Limit (V)	Measured (V)	High Limit (V)
DC	0	NA	NA	0.0		0.0
100	NA	NA	4.9		5.1	
200	NA	NA	9.9		10.1	
Ripple	Start/End Amplitude, Vp	Frequency (kHz)	Measured Frequency (kHz)	Low Limit (Vp)	Measured (V)	High Limit (Vp)
100	1		4.8		5.3	
10		4.8		5.3		
100		4.8		5.3		
300		3.5		3.6		
200	1		9.5		10.5	
10		9.5		10.5		
20		9.5		10.5		
Sawtooth	Start/End Amplitude, Vp	Frequency (kHz)	Measured Frequency (kHz)	Low Limit (V)	Measured (V)	High Limit (V)
100	1		4.8		5.3	
10		4.8		5.3		
20		4.8		5.3		
200	1		9.5		10.5	
10		9.5		10.5		
20		9.5		10.5		
Phase*	Start/End Vp = 20 V, f = 1 kHz	Phase Offset (°)	Measured Frequency (kHz)	Low Time (msec)	Measured Time (msec)	High Time (msec)
90	NA	735		765		
180	NA	490		510		
270	NA	245		255		

Table 1

*See procedure above.

If you have any questions, please contact AE Techron Technical Support at 574-295-9495.

Specifications

Output Current: 0A to 15A continuous
Peak Current: 50A for 200 mS
Bandwidth (-3dB),
  Full Signal: DC to 200 kHz;
  Small Signal: 20Vp-p to 300 kHz
Output Range: –80V to +80V
Source Impedance: 3 mV + 2.2 µH
Operation: 4-quadrant, bi-polar operation
Output Rise Time: <3 µS
Cooling: Internal forced-air fans
Protection: Over/under voltage, over current, over temperature
Trigger: Automatic repeat, manual trigger
Input,
  Signal In: BNC connector
  LAN: Ethernet connector
Output,
  DUT Supply +/-: High-current connectors
  Signal Output: BNC connector
  LAN: Ethernet connector
Waveforms: Sine wave sweep, ripple (cranking), DC source, triangle wave, square wave, sawtooth wave
Control Functions: Trigger, fixed loop, variable loop, template playback
Operating Environment,
  Temperature: 10°C to 50°C (50°F to 122°F), Maximum Output Power de-rated above 30°C (86°F).)
  Humidity: 70% or less, non-condensing
  Atmospheric Pressure: 86 kPa (860 mbar) to 106 kPa (1,060 mbar)
Supply Voltage: Single-phase 100/120/230V ±10%
Dimensions (DxHxW): 25 x 9.5 x 20 in. (63.5 x 24.1 x 50.8 cm)
Weight: Approximately 70 lbs. (32 kg)

Limited One-Year Warranty

Summary of Warranty:
AE TECHRON INC. of Elkhart, Indiana (Warrantor) warrants to you, the ORIGINAL COMMERCIAL PURCHASER ONLY of each NEW AE TECHRON INC. product, for a period of one (1) year from the date of purchase, by the original purchaser (warranty period) that the product is free of defects in materials or workmanship and will meet or exceed all advertised specifications for such a product. This warranty does not extend to any subsequent purchaser or user, and automatically terminates upon your sale or other disposition of our product.

Items Excluded From Warranty:
We are not responsible for product failure caused by misuse, accident or neglect. This warranty does not extend to any product on which the serial number has been defaced, altered, or removed. It does not cover damage to loads or any other products or accessories resulting from AE TECHRON INC. product failure. It does not cover defects or damage caused by the use of unauthorized modifications, accessories, parts, or service.

What We Will Do:
We will remedy, at our sole discretion, any defect in materials or workmanship by repair, replacement, or refund. If a refund is elected, you must make the defective or malfunctioning component available to us free and clear of all liens or other encumbrances. The refund will be equal to the actual purchase price, not including interest, insurance, closing costs, and other finance charges less a reasonable depreciation on the product from the date of original purchase. Warranty work can only be performed at our authorized service centers or at our factory. Expenses in remedying the defect will be borne by AE TECHRON INC., including one-way surface freight shipping costs within the United States. (Purchaser must bear the expense of shipping the product between any foreign country and the port of entry in the United States and all taxes, duties, and other customs fees for such foreign shipments.)

How to Obtain Warranty Service:
When you notify us of your need for warranty service, we will give you an authorization to return the product for service. All components must be shipped in a factory pack or equivalent which, if needed, may be obtained from us for a nominal charge. We will take corrective actions within a reasonable time of the date of receipt of the defective product. If the repairs made by us are not satisfactory, notify us immediately.

Disclaimer of Consequential and Incidental Damages:
You are not entitled to recover from us any consequential or incidental damages resulting from any defect in our product. This includes any damage to another product or products resulting from such a defect.

Warranty Alterations:
No person has the authority to enlarge, amend, or modify this warranty. The warranty is not extended by the length of time for which you are deprived of the use of this product. Repairs and replacement parts provided under the terms of this warranty shall carry only the unexpired portion of this warranty.

Design Changes:
We reserve the right to change the design of any product from time to time without notice and with no obligation to make corresponding changes in products previously manufactured.

Legal Remedies of Purchaser:
There is no warranty that extends beyond the terms hereof. This written warranty is given in lieu of any oral or implied

warranties not contained herein. We disclaim all implied warranties, including, without limitation, any warranties of merchantability or fitness for a particular purpose. No action to enforce this Warranty shall be commenced later than ninety (90) days after expiration of the warranty period.

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