# AE TECHRON DSR 400 Series Dropout Surge Ripple Simulator and AC/DC Voltage Source Instruction Manual



**DSR 400 Series**
**Dropout, Surge, Ripple Simulator**
**and AC/DC Voltage Source**
**Operation Manual**

Contents



# DSR 400 Series Dropout Surge Ripple Simulator and AC/DC Voltage Source

**Three-Year, No-Fault Warranty**

**SUMMARY OF WARRANTY**

AE TECHRON INC., of Elkhart, Indiana (Warrantor) warrants to you, the ORIGINAL COMMERCIAL PURCHASER and ANY SUBSEQUENT OWNER of each NEW AE TECHRON INC. product, for a period of three (3) years from the date of purchase, by the original purchaser (warranty period) that the product is free of defects in materials and workmanship and will meet or exceed all advertised specifications for such a product. We further warrant the new AE Techron product regardless of the reason for failure, except as excluded in the Warranty.

**ITEMS EXCLUDED FROM WARRANTY**

This AE Techron Warranty is in effect only for failure of a new AE Techron product which occurred within the Warranty Period. It does not cover any product which has been damaged because of any intentional misuse, or loss which is covered under any of your
insurance contracts. 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 any defect, regardless of the reason for failure (except as excluded), by repair or replacement, at our sole discretion. 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 or one of our authorized service centers of your need for warranty service, you will receive 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 and return the product to you within three weeks of the date of receipt of the defective product, or will make available to you a product of equal or better performance on temporary loan until your product can be repaired or replaced and returned to you. 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. This statement of warranty supersedes any others contained in this manual for AE Techron products.

AE TECHRON INC.
Customer Service Department
2507 Warren St. Elkhart, IN, 46516, U.S.A.
574-295-9495
www.aetechron.com

Figure 1.2 – Left to right: DSR400-80 and DSR400-160

## About the DSR 400 Series Test Systems

Congratulations on your purchase of an AE Techron DSR 400 Series test system, designed for use in EMC testing as a dropout, surge, ripple simulator and AC/DC voltage source. DSR 400 Series test systems provide complete, single-box solutions for mmunity testing. Each DSR 400 system includes a simple-to-use yet powerful standards waveform generator, an industry-standard arbitrary waveform generator, plus an industry-leading power supply technology. They come with an extensive library of tests for many automotive and aviation standards.

Both models of the DSR 400 Series are 4-quadrant, allowing them to source and sink current. The DSR 400 Series has power in reserve; each model provides continuous DC power as rated, and is able to provide 5X 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.

### 1.1 Disclaimer

Although AE Techron has made substantial effort to ensure the accuracy of the Standards' test files that are included with the DSR 400 series test system, 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.

## System Setup

### 2.1 Safety First

Throughout these instructions, special emphasis is placed on good safety practices. The following graphics are

used to highlight certain topics that require extra precaution.

**DANGER**

**DANGER** represents the most severe hazard alert. Extreme bodily harm or death will occur if these guidelines are not followed. Note the explanation of the hazard and instruction for avoiding it.

**WARNING**

**WARNING** alerts you to hazards that could result in severe injury or death.
Note the explanation of the hazard and the instructions for avoiding it.

**CAUTION**

**CAUTION** indicates hazards that could result in potential injury or equipment or property damage. Once again, note the explanation of the hazard and theinstructions for avoiding it.

### 2.2 Unpacking and Installing

Your system will be delivered to the ship-to address enclosed in a wooden crate and transported on a special, shock-absorbing pallet. With the addition of packaging, the DSR 400-80 test system can weigh more than 300 pounds (130 kg) and the DSR 400-160 test system can weigh more than 400 pounds (180 kg). To avoid serious injury and/ or product damage, use a heavy-duty lift or other suitable equipment to unpack and move the product to its place of installation.

**WARNING**

Use caution when using a forklift to move this system. Crushing bodily injury can result if care is not taken during uncrating and installation.
To uncrate the product, remove the crate's top, front, and back. Remove the accessories located on the crate's shelf, then remove the shelf and packing material. Use a fork lift or other suitable equipment to glide the system from the crate and off the pallet. Forklift provisions are provided in the base of the system to facilitate this removal procedure (see Figure **2.1).**

Figure 2.1 – Provisions in Unit's Base for Forklifts

**CAUTION**

Use caution when inserting the forklift tynes into the unit's lifting base. Do not drag the tynes heavily against the bottom of the unit when entering or exiting the base. Keep the tynes level at all times while handling the unit.

The system has been tested and inspected for damage before leaving the factory. Carefully unpack and inspect the product for damage. Please note any damage for future reference and notify the shipping company immediately if damage is found. Also, please save the shipping crate and pallet as evidence of damage and/or for returning the product for repair.

### 2.3 Check Contents

In addition to the DSR 400 system, your shipment should include the following:

1. LCD monitor
2. Monitor power cord
3. HDMI-to-DVI monitor cable
4. USB mouse
5. USB keyboard
6. Male pin-plug connectors (2)
7. Ethernet cable
8. Mouse pad
9. Quick Start Guide
10. DSR 400 Series Operation Manual on USB drive

⚠ **CAUTION**
DO NOT use the system's wheels to transport the system over long distances.
The system's wheels should be used only for moving the system over a short distance to position it in its permanent location.

**2.4 DSR 400 System Location**
DSR 400 Series test systems are mounted on wheels to allow rolling on a flat, smooth surface. The system's wheels should be used only for mov-ing the system over a short distance to position the unit in its permanent location. DO NOT use the system's wheels to move the system over long distances. To avoid possible tipping, always push the system from the front and avoid rough or pitted surfaces.
Locate your system near a three-phase power source. Allow enough clearance at the front and back to allow adequate airflow and hot air dis-charge through the system's rear. See Figure 2.2 for clearance recommendations.
All of the wheels on the system are equipped with a leveling pad that can be used to adjust the height of each wheel (see Figure 2.3). This level-ing mechanism will also act to lock each wheel in place and prevent unintentional movement of the unit.
Two covers have been provided to insert into fork lifting openings at the front of the system once it has been set in its final location.

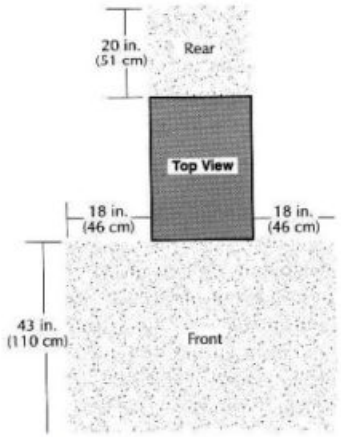

Figure 2.2 – Clearance Recommendations for System Placement

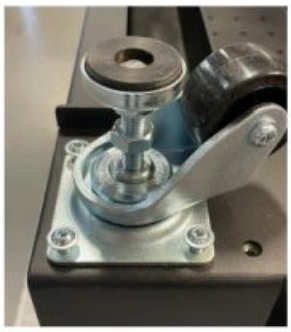
Figure 2.3 – Leveling pads on System's Wheels

**2.5 Connecting the Signal Source**

Your DSR 400 system includes two integrated and pre-programmed signal generators: An AE Techron 3110A Standards Waveform Generator and a Siglent SDG2042X Function/Arbitrary Waveform Generator.

Optionally, a Keysight 33511B Function/Arbitrary Waveform Generator can be substituted for the Siglent unit.

The 3110A Standards Waveform Generator includes an extensive library of tests for many automotive, aviation, and industry standards.* It provides a powerful yet simple-to-use interface to help streamline the testing process. 3110A test files (.swg) are easy to link, build from scratch, or customize using time-saving controls like trig-gers and loops with changing variables. Plus, the 3110A's intuitive, drag-and-drop interface makes it easy to modify existing tests or build new tests.

The 3110A can produce standard signals and waveforms with or without a DC offset. Frequency, amplitude and DC offset can be fixed or swept, and sinewave sweeps can be linear, logarithmic or exponential. It can create dropouts and surges and can also produce ripple waveforms of up to 50 kHz.

In addition to the main 3110A signal source, a sec-ondary waveform generator (Siglent SDG2042X or optionally Keysight 33511B) has been included with the DSR 400 system. This generator has been added to produce the complex harmonic waveform required for several tests in MIL STD 704 (see section 3.2.2 of the standard for additional details).

**2.5.1 Connect the AE Techron 3110A**

**Connect Peripheral Equipment**

Complete the following steps to connect the 3110A cables and accessories provided to the DSR 400 Series' SWG Peripheral Connections panel located

*Some Standards' tests included in the 3110A Library may require voltages above the maximum voltage available in your DSR 400 Series system. To run those tests, connect the 3110A to a different amplifier or amplifier system that can generate the required voltage.

on the back of they system. Refer to Figure 2.4 for component locations.

1. Plug the USB keyboard into the USB port labeled KEYBOARD.
2. Plug the USB mouse into the port labeled MOUSE.
3. Plug the HDMI to DVI cable into the HDMI port labeled MONITOR and then connect the cable to the DVI port on the monitor.
4. Plug the monitor power cord into a 120V power source.

5. **OPTIONAL:**

A. To connect the DSR system to be ac-cessed and controlled through a network: Plug the Ethernet cable to the Ethernet port labeled NETWORK, and then plug the Ethernet cable into a router, switch or hub on the network.

B. Use the USB port labeled FLASH DRIVE for software updates or to move test files to and from the 3110A system.

Note on Network Control of the 3110A: After network control of the 3110A has been implement-ed, the monitor, keyboard and mouse can be dis-connected from the 3110A and the system can be operated remotely. See the topic “Remote Opera-tion” in the 3110A Help files for more information.

**Connect the Signal Input**

Use a standard unbalanced BNC cable to connect from the front-panel Signal Output connector on the AE Techron 3110A to the Aux Input connector

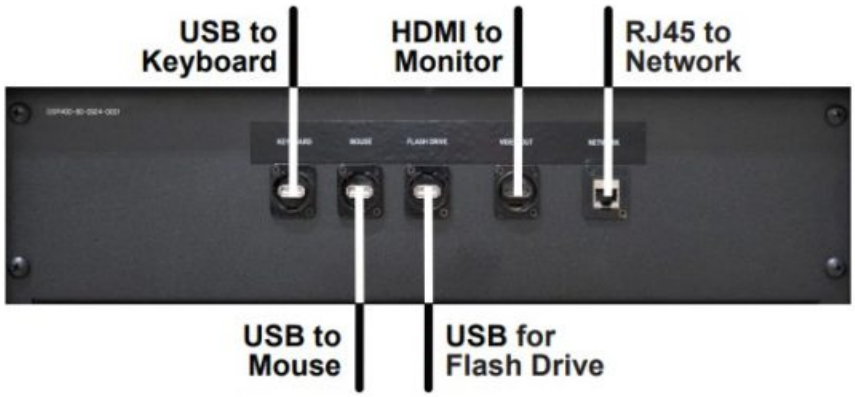


Figure 2.4 – Connecting the 3110A Accessories

on the front panel of the DSR 400 system. See Figure 2.5.

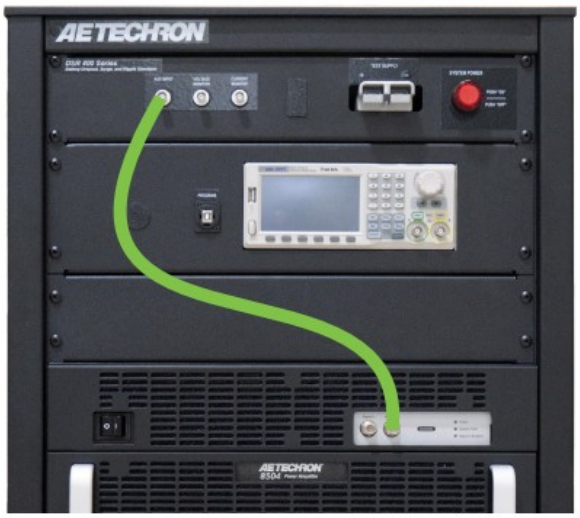


Figure 2.5 – Connecting for Signal Input from the AE Techron 3110A

**2.5.2 Connect the Siglent SDG2042X**

If connected, disconnect any BNC cables already connected to the Aux Input connector on the front panel of the DSR 400 system from the 3110A or another signal generation device. Use that cable or another standard unbalanced BNC cable to connect from one of the front-panel Signal Output connectors on the SDG2042X to the Aux Input connector on the front panel of the DSR 400 system. See Figure 2.6.


Figure 2.6 – Connecting for Signal Input
from the Siglent SDG2042X

**2.5.3 Connect a Stand-alone Signal Generator**

If connected, disconnect any BNC cables already connected to the Aux Input connector on the front panel of the DSR 400 system from the 3110A , the SDG2042X, or another signal generation device.

Use that cable or another standard unbalanced BNC cable to connect from a signal output connector on the stand-alone signal generation device to the Aux Input connector on the front panel of the DSR 400 system. See Figure 2.7.

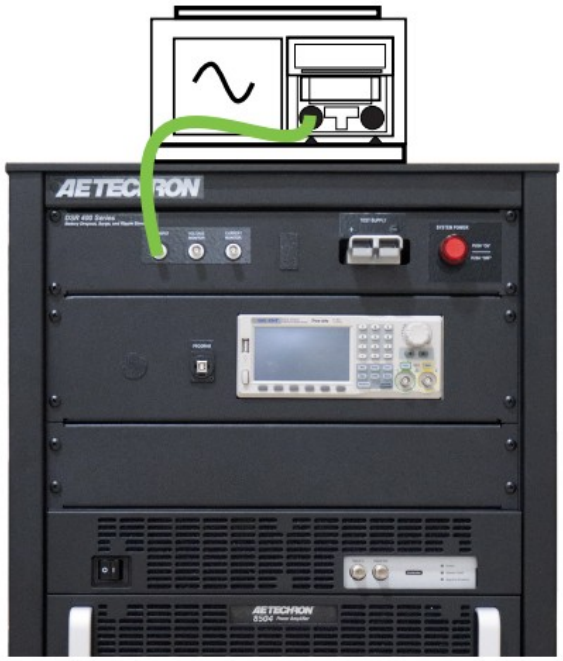

Figure 2.7 – Connecting for Signal Input
from a Stand-alone Signal Generator

**Connect the Test Supply**

**⚠ WARNING**
**ELECTRIC SHOCK HAZARD.**

Output potentials can be lethal. Make connections only with AC Power unplugged or switched off at the source and the system's AC power switch in the OFF position.

Make sure the DSR 400 system is turned off and AC power is disconnected. Using wiring appropri-ate for your application, connect from the DSR system's positive and negative test supply connec-tors to the device under test.

See Figure 2.8.


Figure 2.8 – Test Supply Connections
(DSR 400 System Output)

**2.6 Connect the Power Source**

**WARNING**
**ELECTRIC SHOCK HAZARD**. Power supply wiring should only be performed by a qualified, licensed electrician.

Complete the following steps to connect the cabinet to a 208V (or optional 400V) three-phase power source:

1. Wear safety goggles.
2. Disconnect your AC power source
3. Open the access door on the back of the cabinet and locate the power block, which can be found at the bottom of the cabinet, behind the fuse and AC inlet panel.
4. Route the AC power input cable into the cabinet through the cable strain relief (located on the fuse and AC inlet panel). See Figure 2.9.

Figure 2.9 – Routing the AC power input cable

5. Locate the power distribution block at the bot-tom of the cabinet. Open the distribution block cover and connect the AC power line to the AC input terminals as shown (see Figure 2.10)
6. If connecting to an AC power cord, verify con-nector wiring for phases, neutral and safety ground. Verify that proper phase, neutral and safety ground connections have been made at the AC mains breaker.

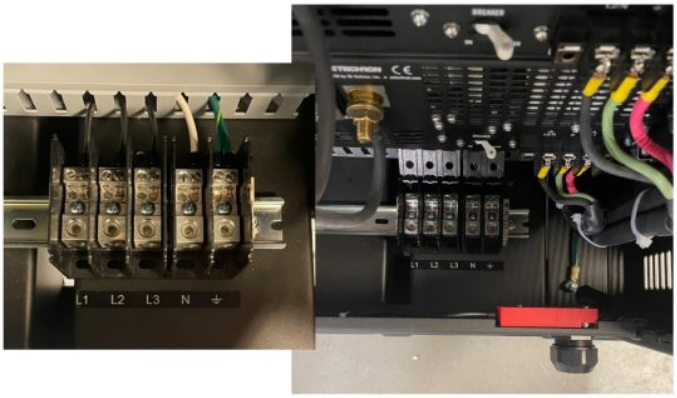


Figure 2.10 – Wiring the AC distribution block

**2.7 Startup Procedure**

Complete the following steps to power up the DSR system with the 3110A as a signal source..

1. Use the monitor's power switch (last button on the right) to turn on the monitor.
2. Check the power/breaker switch on the 3110A and the Standby/Run switch on all amplifier modules. Make sure all units are switched ON. See Figure 2.11.


Figure 2.11 – Standby/Run Switch for DSR 400 System Modules

3. Depress the SYSTEM POWER switch to turn the DSR system ON.
4. Wait for the 3110A interface to load (loading will take up to 30 seconds). Press the Help button to access this manual from within the program.
5. Run the System Calibration test to determine the proper settings for your system. See the "Calibration" section in the 3110A Help files for more information.

**2.8 Shutdown Procedure**

**IMPORTANT:** Any powered amplifiers that are connected to the 3110A must first be disabled before shutting down the 3110A or the DSR 400 System. Failure to follow the proper shutdown procedure can result in damage to the amplifiers or any connected load/DUT.

Complete the following to safely shut down a 3110A/amplifier combination or DSR 400 System:

1. Make sure any amplifiers or amplifier mod-ules connected to the DSR 400 system are disabled. For DSR 400-80 models, press the Standby/Run switch on the front panel of the amplifier module to place the module in Standby mode (see Figure 2.11). For DSR 400-160 models, press the Standby/Run switch on either amplifier module to place both units in Standby mode. For non-AE Techron amplifiers, consult the product instructions to determine the best method for disabling those units.
2. After all amplifiers/amplifier modules have been disabled, turn the system OFF by press-ing the System Power button.

**NOTE:** If the AE Techron 3110A is not connected to any amplifiers, it can be safely shut down by simply pressing the front-panel power switch.

## Operation

**IMPORTANT:** Before operating the DSR 400 system using the 3110A for signal input, the 3110A System Calibration Procedures should be performed to verify the correct System Gain and DC Offset settings for your system. See the topic “System Calibration” in the 3110A Help files for more information.

**System Overview**

Your DSR 400 system provides two integrated signal generation devices and one or two ampli-fier modules to reproduce and amplify the output signal. The location of each module is specified in Figure 3.1.

**3.1 System Controls and Connectors**

System level controls are located on the Input/Output/Power panel installed at the top front of the system cabinet. Refer to Figure 3.2 for component locations.

**System Signal Input:** An unbalanced BNC con-nector is used to provide the input signal to the system.

**Current Monitor:** An unbalanced BNC connector is provided for current monitoring. 1V-20A

**Voltage Monitor:** An unbalanced BNC connector is provided for voltage monitoring. 1V=20V

**Test Supply (System Output):** A pair of high-cur-rent Anderson connectors are provided to supply the test signal to the DUT. Mating connectors are provided.

**System Power:** An illuminated power/emergency stop switch is provided which controls the power supply to the system and all system components. Press once to power the system on. Press again to power off the system.

**3.2 Signal Generation Components**

**3.2.1 AE Techron 3110A Operation**

The AE Techron 3110A Standards Waveform Gen-erator provides an intuitive interface for waveform sequence creation and generation.

The accessories required for operation of the 3110A are connected using the Accessores panel

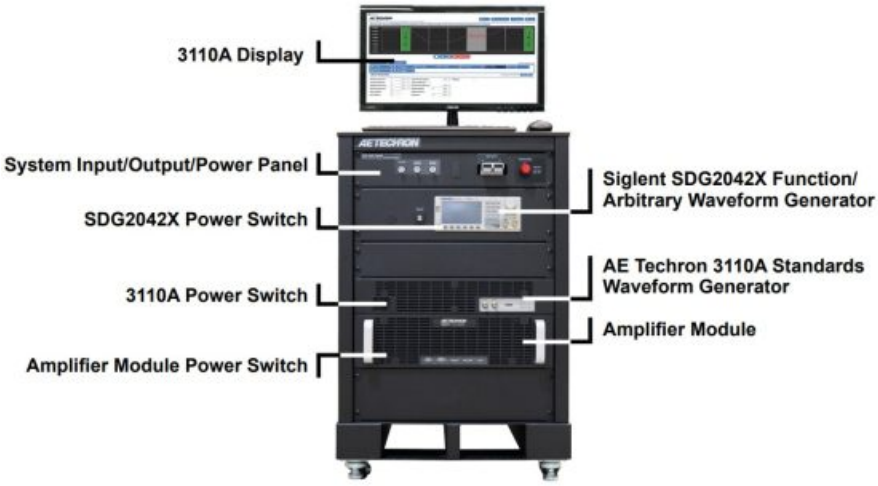


Figure 3.1 – DSR 400 System Components and Component Power Switches

located at the top rear of the cabinet. Refer to Figure 3.3 for connector locations.

To select a pre-programmed test from the Standard’s Library, simply use the Files button to open the files window and select the test file. Refer to Figure 3.4 for on-screen controls’ locations.

Custom test files can be created by adding wave-forms and controls to the test sequence display.

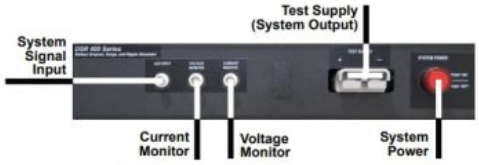


Figure 3.2 – DSR 400 System System Controls and Connectors on the System Input/Output/Power F


Figure 3.3 – Back-panel Accessory Connectors

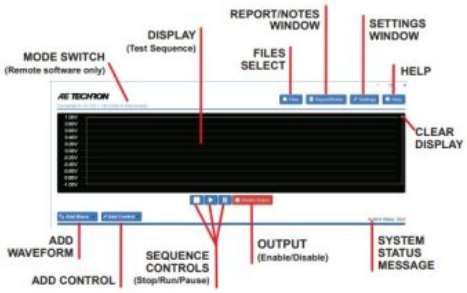


Figure 3.4 – AE Techron 3110A On-screen Controls

For help in getting up and running quickly on the 3110A, please see the “3110A Tutorials” section in the 3110A Help files.
Please also refer to the 3110A Help files for gen-eral operation and troubleshooting information, The Help files are available by selecting the Help button from the 3110A main window. They are also provided in pdf format on the USB drive shipped with your DSR 400 system, or on the AE Techron website at aetechron.com.

**3.2.2 Siglent SDG2042X Operation**

The Siglent SDG2042X is a dual-channel function/arbitrary waveform generator that is capable of producing a variety of high fidelity and low jit-ter signals. In addtion to the standard functional signals available, the Siglent SDG2042X has been prerogrammed with the following MIL STD 704 waveforms:

- SAC107-400 Hz devices
- SVF107-360-800 Hz devices (4 frequency tests)
- SXF107-60 Hz devices

To select one of the pre-programmed MIL STD 704 waveforms from the device’s memory, complete the following steps:

1. Press the Store Recall button on the unit’s front panel”
2. Turn the Scroll & Select knob to locate the desired waveform.
3. When the desired waveform is highlighted, press the Scroll & Select knob to load the se-lected waveform.
4. Finally, press the Output Enable button to activate the waveform.

Refer to Figure 3.5 for control locations.

For additional instructions, please refer to the SDG2000X User Manual and other reference materials available from the Siglent website at **https://siglentna.com**.

**3.3 Amplifier Module Operation**

Your DSR 400 system contains one or two ampli-fier modules to provide the high-current output required for many Standards’ tests. If your system contains two amplifier modules, those modules have been configured as a parallel multi-amp system, increasing the system’s output current capabilities.

In multi-amp configurations, the individual amplifier modules are interlocked together, with one Master amplifier controlling the operation of all of the am-plifier modules in the system. With the exception of the breaker/power switches, a control operated on one amplifier module will perform that action on all of the amplifier modules in the system.
The following sections describe the controls and indicators found on the DSR 400 Series amplifier modules.

**3.3.1 Front-Panel Controls and Indicators**

This section provides an overview of Front-Panel controls found on the DSR 400 amplifier modules.
Refer fo Figure 3.6 for component locations.


Figure 3.5 – Siglent SDG2042X Display and Controls

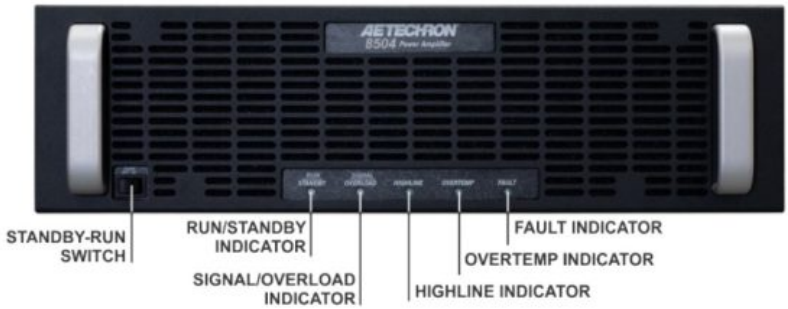


Figure 3.6– Amplifier Module Front-Panel Controls and Indicators

**Standby-Run Switch**

The Standby-Run switch controls the power to the amplifier module's high-voltage transformers. Switch to the Run position (right) to energize the module. Switch to the Standby position (left) to remove power from the high-voltage transformers and place the module in Standby mode.

**Run/Standby Indicator**

**Run mode:** The indicator will be lit solid green. The amplifier module's high-voltage transformers are energized and the unit will amplify the input signal.

**Standby mode:** The indicator will be lit solid am-ber. The amplifier module will be placed in Standby when one of the following conditions occurs:

1. High/Low Line error
2. Overtemp condition
3. Fault condition
4. The user sets the front-panel Standby-Run switch to the Standby (left) position.

Note that when one amplifier module in the DSR 400 system is placed in Standby mode, all mod-ules in the system will be placed in Stand by mode. In Standby mode, the amplifier module's low-voltage transformer is energized but the high-voltage transformers are not.
To release the DSR 400 system from Standby mode:

1. **High/Low Line error:** Clear the over- or un-der-voltage condition. The system will resume operation when the input voltage is brought within the operating range of the amplifier.
2. **Overtemp condition:** Remove the input signal from the system and leave the all amplifier modules with the Standby-Run switch in the Run position and with the fans operating to cool the system. When the internal

tempera-ture of all amplifier modules in the system drops to less than 100°C, the system will resume operation.

3. **Fault condition:** On the module displaying the fault condition, turn the front-panel Standby-Run switch to Standby and then back to Run to reset the amplifier module and return the sys-tem to operation. If the fault condition recurrs or does not clear, the amplifier module may require servicing. See the Troubleshooting section for more information.
4. **Standby-Run switch pressed:** When the sys-tem is operating (Run mode), setting the front-panel Standby-Run switch on any amplifier module to the Standby position (left) will place the system in Standby mode. Set the switch to Run (right) to release the system from Standby and return the system to Run mode.

**Signal/Overload Indicator**

**Signal Presence:** When an input signal is pre-sented at a lever greater than 0.5V, the Signal/Overload indicator will light solid green.

**Overload (clipping):** The indicator will flash amber intermittently. When the indicator flashes amber, this indicates that the output of the system could not follow the input signal due to voltage or current limits. The amber Overload indicator will begin flashing when distortion is greater than 0.1%.

**High/Low Line Indicator**

This amber indicator will illuminate, and the system will be placed in Standby if the detected AC mains voltage is outside of the operable range of the system (±10%). This can occur if the amplifier's back-panel breaker is not in the on position (left), or if the AC supply into the amplifier is higher or lower than the operable range.

To remove the amplifier from Standby, the AC mains must be brought to within the optimal range.

Once the fault condition has been cleared, the am-plifier will return automatically to Run mode. If the High/Low Line indicator does not turn off or if the amplifier does not return from Standby, the ampli-fier may require servicing. See the Troubleshoot-ing section for more information.

**Overtemp Indicator**

The amplifier monitors the temperature inside the high-voltage transformers and in the output stage heat sinks. The amber Overtemp indicator will light and the amplifier will be placed in Standby mode when the temperature sensors detect a condition that would damage the amplifier. If the Overtemp pulse is extremely short, as in the case of defec-tive wiring or switches, this indicator may be lit too briefly to observe.

To remove the amplifier from Standby and return it to normal operation after an Overtemp fault has occurred, make sure the Standby-Run switch is in the Run position and the amplifier fans are running, and then remove the input signal from the amplifier. Allow the fans to run until the ampli-fier automatically returns to Run mode. See the Troubleshooting section for information on iden-tifying and correcting the cause of an Overtemp fault condition.

**Fault Indicator**

The red Fault indicator will light and the amplifier will be placed in Standby under two conditions:

1. High frequency oscillation is causing high shoot-through current.
2. An output transistor has shorted, causing the output fault condition.

Cycle the front-panel Standby-Run switch (Stand-by, then Run) to reset the amplifier. If the fault condition recurrs or does not clear, the amplifier may require servicing. See the Troubleshooting section for more information.

**3.4 Changing the System Gain**

Most of the test sequences available in the 3110A Standard's Library can be run using the DSR 400 system's default gain level, but tests having a maximum voltage of less than 30V may require a change to the system's gain setting. This is con-trolled via eight DIP switches located on the back panel of the amplifier module. (For model DSR 400-160, use the Master amplifier module's DIP swiches to adjust the system gain.) See Figure 3.7 for DIP switch location.

The purpose of changing this setting is to DE-CREASE the overall system gain from the typical setting of 40 to a setting of 10. Lowering the sys-tem gain allows you to achieve maximum system signal-to-noise performance.

To change the DSR 400's system gain from 40 to 10, move the amplifier module's back-panel DIP switches SW#9 and SW#10 to the OFF (DOWN) position.

In general, if you are experiencing noise during testing, changing the gain setting is recommended.

**3.4.1 System Calibration**

When the gain setting of the DSR 400 system is changed, the 3110A's System Gain setting must be recalibrated. This allows the 3110A to adjust its output levels to deliver the required levels at the system output.

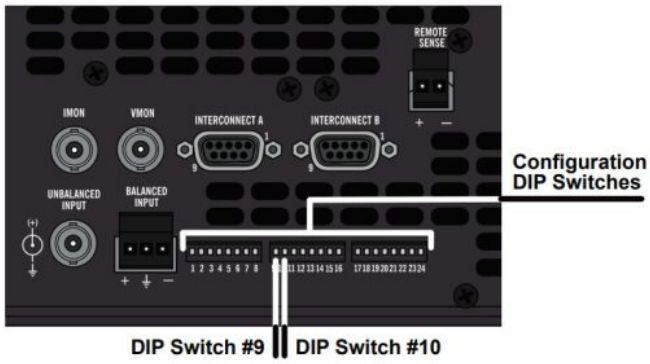


Figure 3.7– Location of Amplifier Module DIP Switches for System Gain Change

To adjust the 3110A's System Gain setting com-plete the following steps:

1. Press the Settings button from the 3110's main window, and then select the System Calibration tab.
2. If desired, adjust the 3110A Output Voltage from the default setting of 1 Vp.
3. Connect an oscilloscope to the DUT (load at the system output).
4. Press the Run Calibration Test button to run the Calibration Test.
5. When the System Calibration testing is com-pleted, press the Save button to save the new System Gain setting and return to the 3110A's main menu.

### 3.5 System Safety Controls

Your DSR 400 system provides several controls to help protect the system and the user from elec-trical faults or unsafe operation. These controls include the following:

**Power/Emergency Stop:** This illuminated switch is located on the system's front near the top of the cabinet. When in the OFF position, the system's high-power circuits are disabled. Press once to power the system on; press again to power the system off.

**System Circuit Breaker:** This switch is located on the system's rear near the bottom of the cabinet (see Figure 3.8). When in the OFF position, all power to the system is disabled. To turn the Sys-tem Circuit Breaker off, move the sxwitch to the DOWN position.

**Cabinet Door Safety Switch:** This magnetic switch is located on the system's rear door. When the rear door to the system's cabinet is opened, the system's high-power circuits are disabled. Close the door to return power to the system.

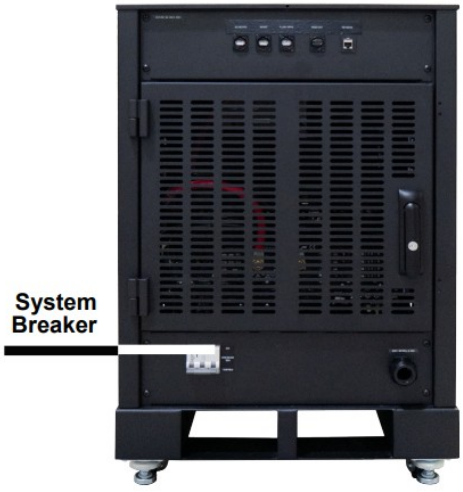


Figure 3.8– Location of the DSR 400 System's Circuit Breaker

## Maintenance

Simple maintenance can be performed by the user to help keep the equipment operational. The following routine maintenance is designed to prevent problems before they occur. See the “Troubleshooting” section for recommendations for restoring the equipment to operation after an error condition has occurred.
Preventative maintenance is recommended after the first 250 hours of operation, and every three months or 250 hours thereafter. If the equipment environment is dirty or dusty, preventative mainte-nance should be performed more frequently.
The procedures outlined in this section are direct-ed towards an experienced electronics technician; it assumes that the technician has knowledge of typical electronics safety and maintenance proce-dures.

⚠ **CAUTION**
Before you begin, make sure your unit is disconnected from the power source, with power switch in the OFF position

**4.1 Clean Filters and Grills on Amplifier Modules**

**Tools Required**

The recommended equipment and supplies needed to perform the functions required for this task are described below.

- Vacuum cleaner
- Damp cloth (use water only or a mild soap diluted in water)

To ensure adequate cooling and maximum effi-ciency of the internal cooling fans, the amplifier’s front and rear grills should be cleaned periodically. To clean the amplifier grills and filter, complete the following steps:

1. Turn completely down (counter-clockwise) all level controls and turn the amplifier OFF. Dis-connect the amplifier from its power source.
2. Using a vacuum cleaner, vacuum the front ven-tilation grill and the back ventilation exit grill.
3. Remove the front grill by pulling the grill firmly away from the amplifier.
4. Remove the filter and vacuum. You can also clean the filter using mild soap and water.
   **IMPORTANT:** Make sure the filter is completely dry before reinstalling in the amplifier.
5. Using a damp cloth, clean the front and rear ventilation grills. Dry with a clean cloth or al-low to air dry.
   IMPORTANT: Grills should be completely dry before plugging in or restarting amplifier.
6. Reinstall the filter and replace the amplifier front grill.

⚠ **CAUTION**
The front grill is held on by strong mag-nets. When replacing the front grill, hold the grill by its side edges and be sure to keep fingers clear of the grill back. Pinching injuries can occur if the grill is replaced improperly.

**4.2 Clean Cabinet Interior**

**Tools Required**

The recommended equipment and supplies needed to perform the functions required for this task are described below.
Vacuum cleaner

1. Using a vacuum cleaner, remove any dust that has accumulated within the cabinet interior.
2. Close the cabinet rear door and restart the test system. Check for any problems such as inop-erative fans that might cause overheating.

## Troubleshooting

If the DSR system 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.

**PROBLEM:** The system has no signal output.
A: Check to make sure signal input is being gener-ated using the 3110A Standards Waveform Gen-erator or a stand-alone signal generator.
To see if signal is being generated by the 3110A, access the 3110A SWG software, and check to make sure that output is enabled for the test se-quence and that the “Segment Enabled” option is selected for all wave segments.
If using the Siglent SDG2042X, first, check to make sure that the 3110A’s power switch is in the OFF position. Next, check the BNC cable connect-ing from the SDG2042X’s Signal Output connector to the AUX INPUT connector on the front panel of the DSR 400 system. Make sure the connections at both ends are secure.


Figure 5.1– Location of the System’s Circuit Breaker

**PROBLEM:** Cabinet does not power on; no LEDS are lit on the 3110A or any of the amplifier mod-ules.
A: Check that the AC mains are connected to the cabinet and the AC mains is switched on. Next, check that the DSR 400’s rear cabinet door is closed. Also check that the system’s rear circuit breaker is in the ON (UP) position (see Figure 5.1). Finally, check to make sure the system’s front Power/Emergency Stop switch is in the ON posi-tion.
**PROBLEM:** 3110A unit does not power on.
A: Check the front-panel power switch on the 3110A to make sure the unit is in the ON position (see Figure 5.2).
**PROBLEM:** Experiencing noise during testing.
A: Lower the system gain to improve the system’s signal-to-noise performance by following the in-structions provided under the topic “Changing the System Gain” in the Operations section of this manual..
**PROBLEM:** The SWG Windows Remote software will not load or will not connect remotely to the 3110A; instead, an error message indicates a “ver-sion mismatch.”
A: The 3110A software and the Windows Remote software versions must match for successful in-teraction between the two modules. See the topic “Updating the 3110A” in the 3110A Help files for information about how to install new versions of these modules.


Figure 5.2 – 3110A’s Power Switch Location

**PROBLEM:** On one or more of the amplifier mod-ules, no LEDs are lit and/or fans are inoperative.
A: Check the breaker/power switches on all ampli-fier modules to make sure they are in the on posi-tion. See Figure 5.3.
**DSR 400 Amplifier Module**


Figure 5.3 – Amplifier Module's Standby/Run Switch Location

**PROBLEM:** One or more of the amplifier modules is displaying the Overvoltage Warning message/LED.
A: The amplifier modules will protect themselves from AC mains voltage that is 10% above the 230V rated operating voltage. If this condition occurs, reduce the AC mains voltage to the proper level. When the line voltage condition is corrected, the amplifier modules will automatically reset, and the system will return to Run mode.
If one or more amplifier modules do not automati-cally reset, the amplifier's three internal trans-formers may need to be rewired. See the Factory Service information at the end of this section.
**PROBLEM:** One or more of the amplifier modules is displaying the Overtemp Warning message/LED.
A: One or more amplifier modules may overheat due to one or both of the following conditions: Excessive power requirements and/or inadequate air flow.
An amplifier module will overheat if the required power exceeds the system's capabilities. High duty cycles and low-impedance loads are ewpecially prone to cause overheating. To see if excess power requirements are causing overheating, check the following:

1. Check the "Specifications" information pro-vided on the product's datasheet to verify that your application's requirements fall within the capabilities of this system.
2. Check for faulty output connectors and/or load.
3. Check for undesired DC offset at the output and on the input signal.

If one or more amplifier modules chronically overheats with suitable power and load conditions, then the cabinet or amplifier may net be receiving adequate airflow. Check the following to determine the cause of inadequate airflow:

1. Check air filters for excess dirt and dust. Per-form the steps outlines in the "Maintenance" section to clean the amplifier filters and cabi-net.
2. Visually inspect fans to assure correct opera-tion while the system is on. Any inoperative, visibly slow, or reverse-spinning fans should be replaced. Please see the Factory Service information at the end of this section.

An OverTemp condition places the unit in Standby mode. If the OverTemp pulse is extremely short, as in the case of defective wiring or switches, the OverTemp pulse may be too brief to observe.
Resetting After Overtemp: To reset the amplifier module after an OverTemp has occurred, make sure fans are running. Remove the input signal from the system by turning OFF the 3110A and/or the Siglent SDG2042X and allow the fans to run until the module has cooled sufficiently and the system automatically returns to Run mode.
**NOTE:** Typically, overheating that occurs in the amplifier module's outputs due to inadequate air-flow or very low impedance loads will clear within 5 minutes. Overheating in the amplifier module's transformers due to excessive power requirements will take from 5 to 15 minutes to clear. Timing the cool-down period for the amplifier module may help to determine the cause of the overheating.

**PROBLEM:** One or more of the amplifier mod-ules is displaying the Output Device Fault Warning message/LED.
A: The amplifier modules contain protection cir-cuitry that disables the module if an output stage is behaving abnormally. This usually indicates an output transistor has shorted.
**CAUTION**
Shut off the signal source before reset-ting the system. Try resetting the Fault condition only once. If the Fault condi tion on any amplifier module does not clear after one reset, STOP. Contact AE Techron Support for further assistance. Repeated resetting can damage the amplifier module.
To clear the Fault condition, follow these steps:

1. Turn off the signal source.
2. Turn off the system AC mains.
3. Turn AC mains power back on. If the Fault LED doesn't illuminate again, turn the signal source on.
4. If the Fault LED is still illuminated and the Fault condition doesn't clear, return the amplifier module for Factory Service. Please see the Factory Service information at the end of this section.

**5.1 Factory Service:**

If the troubleshooting procedures are unsuccess-ful, the DSR system 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 cus-tom fees, duties, and/or taxes). Please review the "Warranty." for more information.

All service units must be given Return Authori-zation Tickets by AE Techron, Inc. before being returned. Return Authorization Tickets 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 nomi-nal fee.

Please send all service units to the following ad-dress and be sure to include your Return Authori-zation Ticket Number on the box.

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

96-8007765 09-17-2024
Information subject to change
574.295.9495 | www.aetechron.com
2507 Warren Street, Elkhart, IN 46516

## Documents / Resources

| | |
|---|---|
|  | AE TECHRON DSR 400 Series Dropout Surge Ripple Simulator and AC/DC Voltage Source [pdf] Instruction Manual<br>DSR 400 Series Dropout Surge Ripple Simulator and ACDC Voltage Source, DSR 400 Series, Dropout Surge Ripple Simulator and ACDC Voltage Source, Ripple Simulator and ACDC Voltage Source, and ACDC Voltage Source, ACDC Voltage Source, Voltage Source, Source |

## References

- Home - AE Techron
- Home - AE Techron
- User Manual