SEM5000A & SSU5000A & SSM5000A Series Extend SIGLENT Solutions into complex RF Applications

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SIGLENT releases smart accessories that provide multiport and multi-device test solutions

In wireless communication and electronic industry, with the improvement of microwave integrated circuit technology and device performance requirements, the demand for reducing size, cost, weight and power consumption is pushing complex multiport devices to replace discrete components. This is especially true with differential RF devices now widely in use.

Rapidly growing mobile data traffic requires continuous further development of technologies and an increase in the share of the frequency spectrum for mobile communications. Components used in modern communication devices such as mobile phones and tablet PC front-end modules support more frequency bands and functions, such as WLAN, Bluetooth and GPS. An important element of 5G development is that the number of ports in the front-end module has increased rapidly, including filters, amplifiers and other components. The complexity of these FEM, including the high efficiency of test requirements and the stability of mass production, has become the key to efficient design.

When it is necessary to accurately characterize the performance parameters of microwave networks, vector network analyzers are used to measure the scattering parameter (S parameter) matrix of the network. New multiport and balancing devices often have more than the typical 2 or 4 ports on a network analyzer complicating characterization. Repeated tests, multiple connection points, and repeat calibrations slow test results and introduce additional errors. The measurement result is the common result of real multiport S parameters and errors. Designing test systems that combine RF switching, electronic calibration, and S parameter measurements improves test speed and accuracy. SIGLENT's multiport device test solutions combine increased speed, accuracy, and efficiency with cost effective test expansion options.

October 13th 2023, SIGLENT officially announces the release of SEM5000A series electronic calibration (ECal) modules, SSU5000A series mechanical switch and SSM5000A series switch matrix, which are designed and optimized for use with the SHA850A, SVA1000X and SNA5000A series vector network analyzers from SIGLENT. They offer a comprehensive, cost-effective total solution for simple to complex RF measurement tasks on multiport and multiple devices.

SSU5000A Series Mechanical Switch

In order to meet the multiport test requirements of microwave and millimeter wave systems, SIGLENT has introduced SSU5000A series mechanical switches with frequency range up to 50 GHz. The SSU5000A has compact design, excellent RF characteristics, low insertion loss, great impedance matching and fast switching time. It contains 1-4 independent single-pole double-throw mechanical switches with SMA or 2.4 mm connectors, or 1-2 single-pole six-throw mechanical switches.

For example, the SSU5264A is divided into four groups A-D. Each group is an independent SPDT and contains three connectors. The middle (common) connector will be linked to left or right connector. Green indicates whether the left connector (green 1) or the right connector (green 2) is connected.

Alternately, the SSU5266A is divided into two groups A and B. Each group is an independent SP6T and contains seven connectors. The middle connector of the SP6T switch can be configured to connect to one of the six surrounding connectors. Green indicates which of the surrounding connectors is connected.

Built into an easy-to-use USB connected enclosure, switches can be configured programmatically using VISA and SCPI or free, standalone software. For small switch systems that require high frequency and good signal fidelity, the SSU5000A mechanical switch systems combine capability and value in a small package.

SEM5000A Series Electronic Calibration (ECal) Modules

SEM5000A series electronic calibrators include 5002A / 5012A / 5022A / 5032A / 5004A / 5014A / 5024A / 5034A, covering the frequency bands of 9kHz to 4.5GHz / 9kHz to 9GHz / 100kHz to 13.5GHz / 100kHz to 26.5GHz, with USB interface for communication and power. They are suitable for calibration and error correction of SHA850A series, SVA1000X series and SNA5000A series vector network analyzers from SIGLENT. The SEM5000A series are simple, fast, efficient, accurate, and widely applicable. Modules have SMA or 3.5 mm connections with custom configurations also available.

Traditional mechanical calibration methods require the operator to connect and disconnect the instrument to be measured several times using calibration devices. This not only increases the calibration time, but also the frequency of operation and the probability of human error. SEM5000A series electronic calibration modules make calibration in one step and provide great convenience for multiport and manufacturing tests, which significantly reduces the number of connections made during the calibration process, making the process much simpler and more efficient. As the number of connections decreases, the probability of operator error is reduced, as is the probability of connector wear and tear, which in turn reduces maintenance and instrumentation costs.

First, the ECal module is connected to the vector network analyzer with the provided USB cable and then the analyzer controls and powers the module. The analyzer will automatically identify the calibration model, frequency range, and connector type. Connect RF cabling to the device ports using the included torque wrench to insure accuracy and protect your investment.

SSM5000A Series Switch Matrix

RF test systems increase quickly in complexity. When requirements go beyond the mechanical switch systems, an RF matrix switch system can often address this added complexity. To fill this need, SIGLENT is also introducing a powerful RF matrix test solution suitable for different frequencies and port requirements. The SSM5000A series switch matrix can expand the number of test ports of network analyzer, signal source, spectrum analyzer and other equipment. With up to 4 input ports and up to 24 output ports, supporting USB, LAN, and Direct Control communication modes, these switch matrix systems simplify device connections as well as system topology with added flexibility. The Direct Control interface on the switch matrix also makes it possible to further automate multiport calibration for maximum efficiency. These RF switch systems can be used with any brand RF test equipment ideal for mixed system designs. Built into a standard 19” rack chassis, these systems are ideal for multiport test environments from basic antennas to complete 5G component modules.

Use with a vector network analyzer such as the SNA5000A series to characterize large RF networks in a complete multiport test system. With 2 or 4 input ports to match the VNA, sequentially capture the S-parameters across up to 24 output ports by saving and restoring calibration setups. With a multitude of switch system configurations available quickly design a custom test system built for your devices at an incredible value versus competitive packaged solutions. The SSM5000A series switch matrix can be connected to the analyzer via USB, LAN or direct control interface. Once a matrix is connected, the analyzer automatically detects the matrix type and allocates the ports. Users can use it as a complete multiport vector network. The software is already in the vector network firmware.

The switch matrix is also designed for use with a signal source and spectrum analyzer. Test transmission and reflection parameters with simplicity across up to 24 ports in a single switch chassis. Calibrate only path loss and simplify measurements while reducing the required number of test stands. The SSM5000A switch system can handle up to 20 dBm input power for a wide variety of applicable RF devices.

The SSM5000A series switch matrix system extends RF applications to additional multiport device and module requirements. SIGLENT brings speed, efficiency, and value to RF systems with the powerful combination of RF source, measure, vector analysis, calibration, and now RF switching.

SIGLENT provides a total solution backed by proven reliability and our standard 3 years warranty plus pre-sale and post-sale support. Coupled with compact design, excellent RF characteristics and low insertion loss, the SEM5000A/ SSU5000A/ SSM5000A is a complete solution that makes a great addition to any RF engineer's workbench or test system.

SIGLENT offers a wide range of models and configurations for your RF test needs. Select by ports, switch configuration, connectors, or frequency range. Further device details can be found on the SIGLENT website.

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