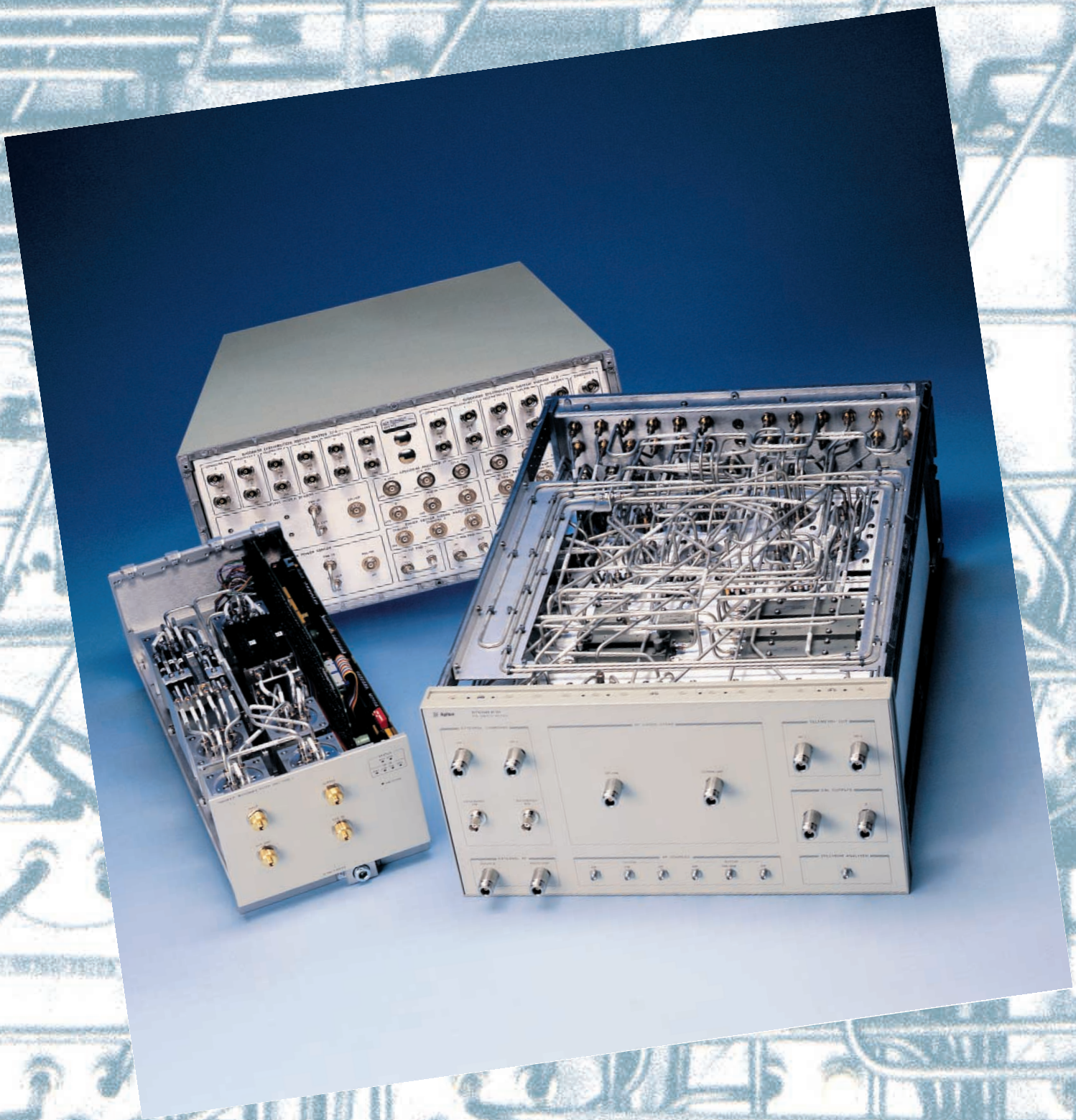
Why buy a Switch Matrix from Agilent Technologies?



Agilent Technologies

Innovating the HP Way

Minimize Risk…Enhance Performance

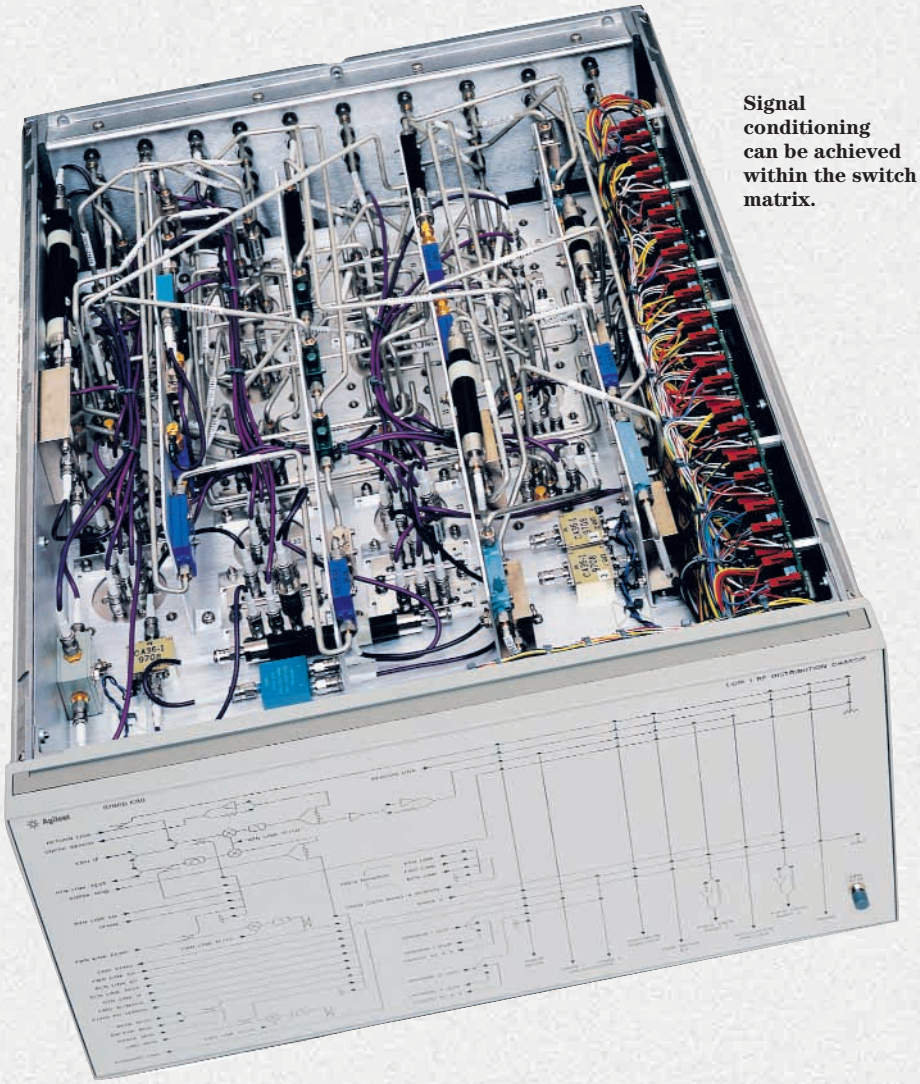
A switch matrix provides automatic routing of signals between test equipment and the device under test (DUT) in a microwave ATE system. The switch matrix decreases total measurement time, since multiple measurements are made automatically, with a minimum number of manual connections to the DUT. Also, devices such as couplers, attenuators, amplifiers, and filters can be easily included in the matrix to provide signal conditioning.

An optimized design ensures measurement integrity

If the switch matrix is not optimized for your application, it can negatively affect the performance of your system by degrading signal quality significantly. Important parameters to consider when designing a switch matrix are:

- **Repeatability:** Repeatability cannot be calibrated out with test software. It will directly impact measurement integrity.
- **Standing Wave Ratio (SWR):** High SWR significantly reduces system performance.
- **Insertion Loss:** Insertion loss is important since power at high frequencies is expensive.
- **Isolation:** Low isolation degrades measurements, especially when low- and high-level signals are routed at the same time.

As frequency increases, these performance parameters become even more significant. To ensure measurement integrity, you need a high performance switch matrix in your system.



Signal conditioning can be achieved within the switch matrix.

This Agilent satellite payload test system includes a switch matrix to route stimulus and response signals to 20 uplink and 20 downlink ports.

Minimize risk

In today's highly competitive business world, you are faced with tough management decisions:

• Resource management
If you need a switch matrix quickly and your resources are limited, or you need to concentrate your valuable engineering resources on core competencies, choose Agilent Technologies to design and manufacture a custom switch matrix for you. Agilent builds hundreds of custom switch matrices each year. Use our expertise and experience.

• Cost management
In a competitive marketplace, it is important to predict the cost of your system accurately. When designing a one-of-a-kind system, there may be unpredictable and hidden costs. With more than a decade of experience in providing custom switch matrices, Agilent can reduce your cost risk by quoting a firm price.

• Support management
The cost of documentation and support are often overlooked when total system cost is estimated. Effective system troubleshooting depends on complete, accurate documentation.

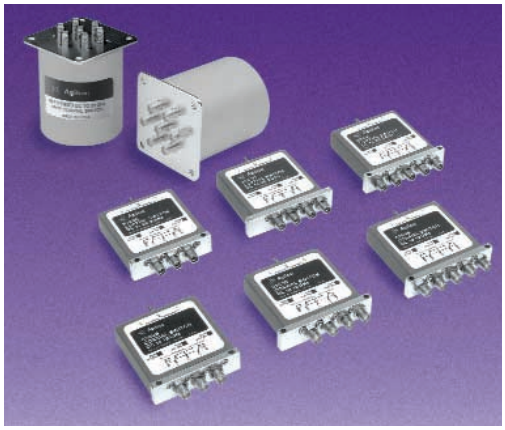
Agilent provides full documentation for your switch matrix, including an RF schematic, logic table, part locator diagram, wiring diagram, front and rear panel layouts, data sheets, replaceable parts list, and test data.

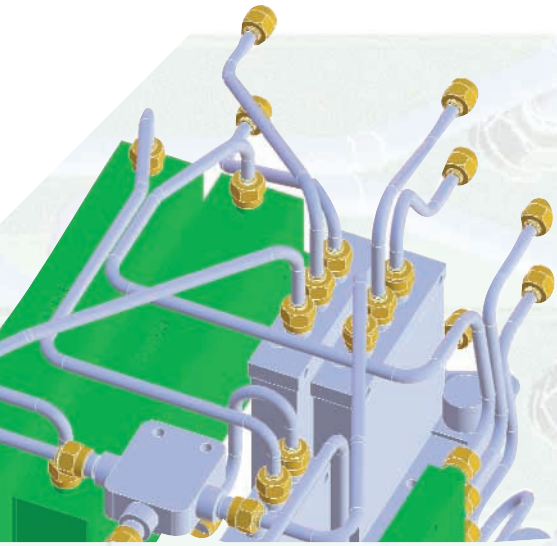
Serviceability is an important element of our designs. The Agilent coaxial switches and other components used in our matrices are off-the-shelf units found in the Agilent RF & Microwave Test Accessories (MTA) Catalog. When ordered through MTA QuickShip, they have a guaranteed delivery of five days or less.

Every customized switch matrix has a standard one year, return-to-Agilent warranty. We can also provide a tailored support scheme to meet your specific needs.

• Schedule management
We know that delays in your development or manufacturing processes can critically affect your success. If you can't afford late delivery of the system, let Agilent reduce the risk by providing the switch matrix. Through our mature manufacturing process and our experience, we can meet your schedule.

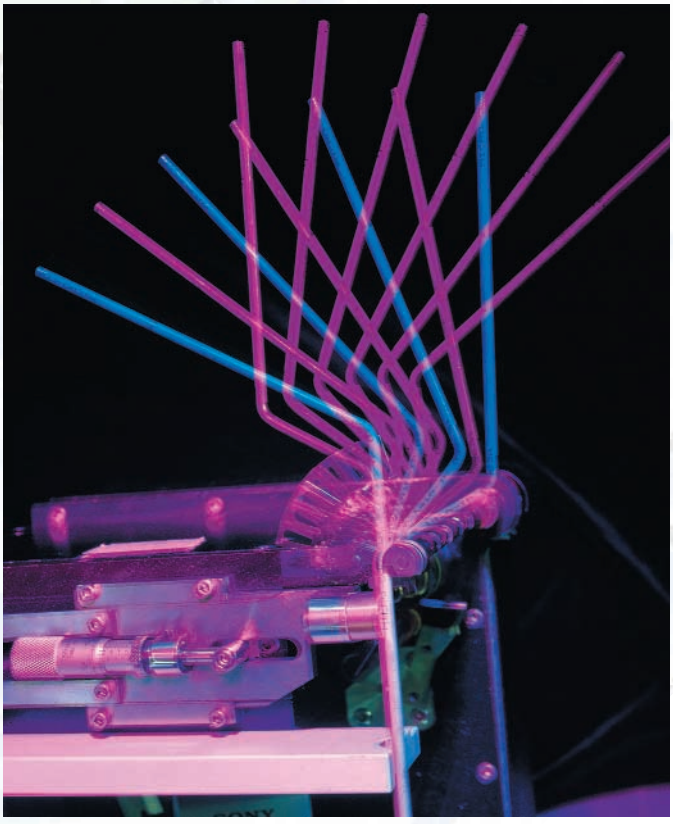
Agilent's high quality switches provide the best building blocks for your matrix—and our semi-rigid cables transfer the optimum performance of these switches to your DUT.





Semi-rigid cable design using integrated CAD tools

Semi-rigid cable automatic bending process



What makes us unique?

The keys to Agilent's exceptional switch matrix performance are our unmatched design experience, our no-compromise manufacturing processes for switches and semi-rigid cables, and our well-established methods for matrix assembly and testing.

Our coaxial switches provide performance and reliability
The performance of a switch matrix is determined chiefly by the performance of its components, particularly the coaxial switches. Agilent's switches have the best performance in the industry, with typical isolation of more than 90 db and SWR less than 1.2:1. Insertion loss repeatability is 0.03 db, resulting in higher measurement confidence.

Agilent's multiport switch performance is guaranteed over a life of 5 million cycles, ensuring higher uptime for test system platforms.

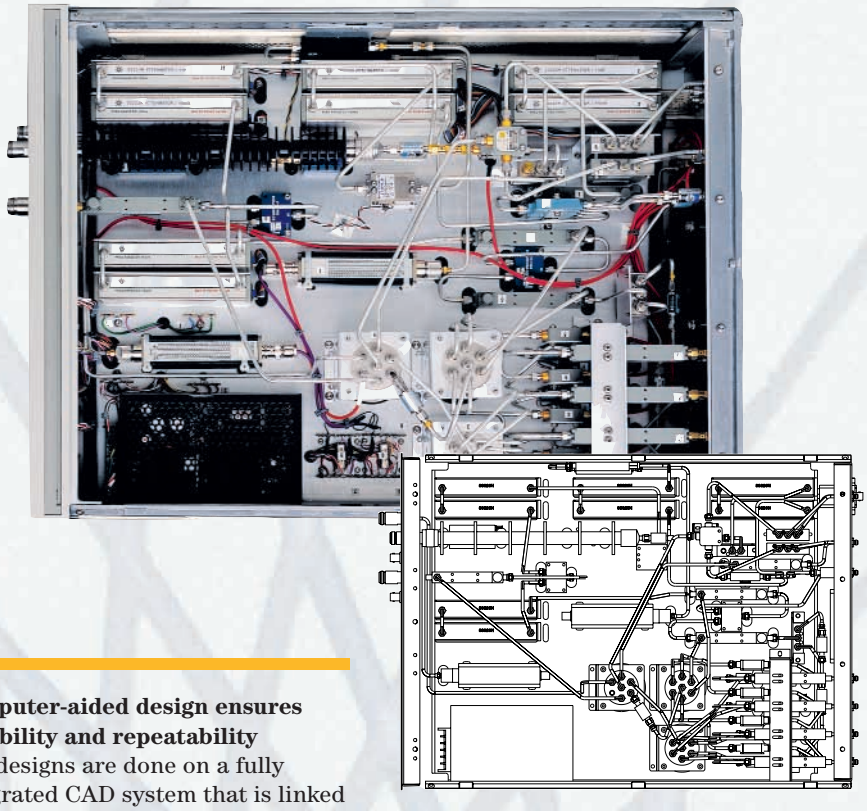
The outstanding performance of our switches is the result of excellent design and rigid manufac-turing tolerances. Every switch is tested for all specifications using Agilent 8510 series network analyzers.

Semi-rigid cable without equal
The same Agilent manufacturing operation that produces high-quality, semi-rigid coaxial cables for our RF and microwave instruments also makes the cables used in our custom switch matrices. This 14 step cable manufacturing process was origi-nally created to provide cables that would meet the strict performance requirements of the 8510 series vector network analyzers. The results were so consistently outstand-ing that we now make all of the semi-rigid cables used in Agilent test equipment—more than 30,000 cables each month.

Agilent's high-quality cables transfer the optimum performance of Agilent switches to your DUT.

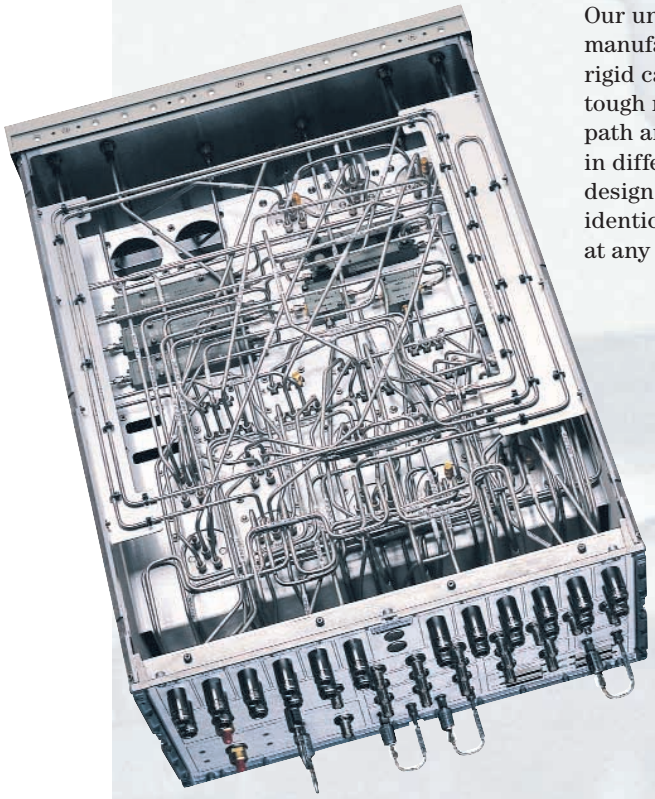
A standard process for a custom solution

We use Agilent's standard commercial manufacturing process for your custom switch matrix, except for one important difference: *you are involved in the design phase*. The process starts when you contact Agilent. Your sales representative works with you to fully understand your specific electrical and mechanical requirements. Once the requirements are understood and documented, we will provide you with a detailed proposal including an RF block diagram, specification, price, and delivery. When needed, we may list cost or performance improvement suggestions. After you approve the basic design and price, our engineering team will design the optimum switch matrix for your application. When the design is completed, you will have an opportunity to approve it before manufacturing begins.

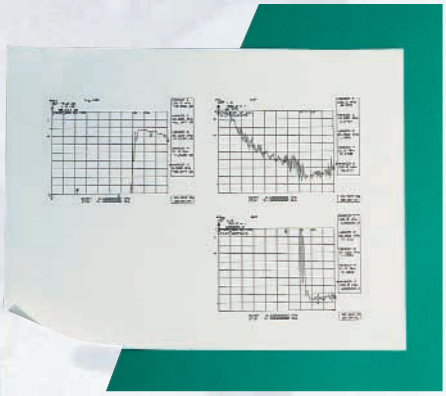


Computer-aided design ensures reliability and repeatability
Our designs are done on a fully integrated CAD system that is linked to our semi-rigid cable shop and our matrix assembly area. In our cable shop, the cable design files are downloaded to an automatic cable bending machine. This device shapes cables with a repeatable precision that is impossible to achieve by hand. Our unmatched ability to design and manufacture high-performance semi-rigid cables allows us to satisfy tough requirements such as equal path and equal phase for signals in different path. We archive all design files so that we can build an identical (or modified) unit for you at any time.

Fully tested
After your matrix is built, we will measure the S-parameters of every signal path with an Agilent 8510 network analyzer to make sure that your specifications are met. The test data is included in the documentation you receive with the matrix.



Fully assembled custom switch matrix



Sample of S-parameters final test data

Switch matrix platforms

Agilent's custom switch matrices are available in three platforms:

VXI
Agilent builds custom switch matrices in the VXI platform. A standard 4x4 VXI switch matrix module, the E6490A-K01, is also available. This is a C-size, 3-slot VXI module. The matrix is a full-access, blocking type, operating up to 26.5 GHz, with four input and four output channel ports, plus expansion port connections (all SMA connectors). Multiple modules can be interconnected to provide increased switching capability in four-channel increments.

Rack-and-stack
The Agilent 8760 series matrices are rackmount boxes with size, weight, connector type, and location designed to your specifications.

Modular Measurement System (MMS)
Agilent can provide a custom modular switch matrix for MMS-based ATE systems. We also have off-the-shelf MMS switch matrices that are suitable for many applications. The Agilent 70612A/C and 70613A/C are 2-slot modular matrices available in several frequency ranges up to 26.5 GHz. More information about these modules can be found in the Modular Measurement System catalog (p/n 5965-2818E).

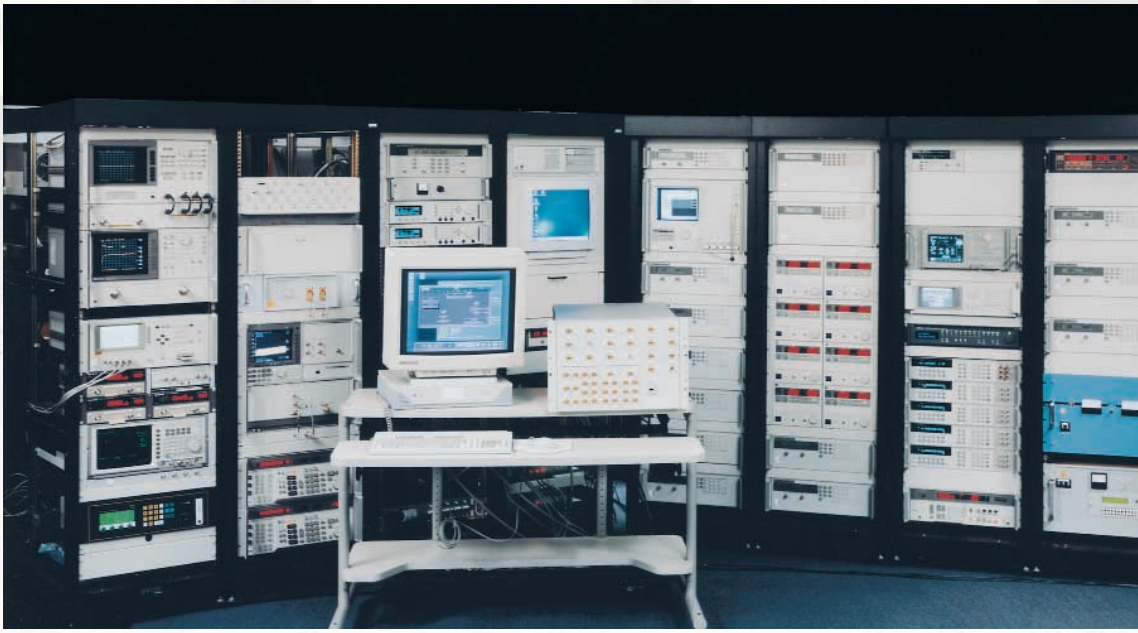
System integration capability

Agilent also offers a range of system integration services. We provide hardware integration of the switch matrix, test equipment, fixtures, racks, and cables. Agilent has integrated many microwave ATE subsystems, for applications as diverse as satellite payload testing, the U.S. Navy's CASS program, high-power amplifier testing, the B2 avionics test bay, and satellite communications simulation.

Photo courtesy of U.S. Navy and Lockheed Martin

Call us today

If a switch matrix is one of your test engineering challenges, why not call Agilent? We can reduce your cost, delivery, and quality risks by providing a high-performance, competitively priced switch matrix that is tailored exactly to your needs. We will take the time to truly understand your requirements, define a solution for them, and deliver a switch matrix that will match your needs. This will free your internal resources to focus on overall system design, ensuring product quality, and meeting your business objectives. Our mission is to apply our knowledge and expertise gained through experience to help you meet your business goals. For more details, contact your Agilent sales representative today.



B2 avionics test bay subsystem

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