Solid-State Switch Matrix

SMX Series

Full Crossbar | Up to 30GHz | 20µs

KEY FEATURES

- Ultra-low insertion loss (~12dB at 30GHz)
- Ultra-high isolation (>90dB)
- Broadband and flat – up to 12/30GHz
- Full crossbar topology
- Switch path length matched
- Any combination of input/output ports dual path
- Oven stabilised for zero drift
- Benchtop or Rackmount for professional ATE

APPLICATIONS

- RF Automated Testing
- VNA Multiport Measurements
- Antenna Characterization
- 5G & Phased Arrays
- Cross-correlation
- RF Multiplexing
- Satellite Base Station

PRODUCT DESCRIPTION

EECL has extensive experience in the design and manufacture of high performance microwave switch matrices, with capability up to 44 GHz. Our solutions are engineered to deliver low loss, high isolation, and excellent repeatability, ensuring reliable performance in demanding environments. We provide fully bespoke designs tailored to project requirements, from compact configurations to large, highly complex routing systems. With inhouse RF simulation, precision mechanical engineering, and advanced test facilities, we control the entire development process to guarantee quality, scalability, and long-term dependability of every switch matrix we deliver.

To achieve best-in-class performance, our switch matrices incorporate several proprietary techniques and in-house capabilities that set us apart. We utilise custom microwave absorber integration and precision shielding gasket dispensing to minimise interference and achieve exceptionally compact designs without compromising performance. Each network is characterised using Time Domain Reflectometry (TDR), enabling us to guarantee consistency and repeatability in both phase and magnitude across every path. Thermal stability is ensured through integrated oven based temperature control, while our ultra-fast, fully reconfigurable firmware and control systems provide unmatched

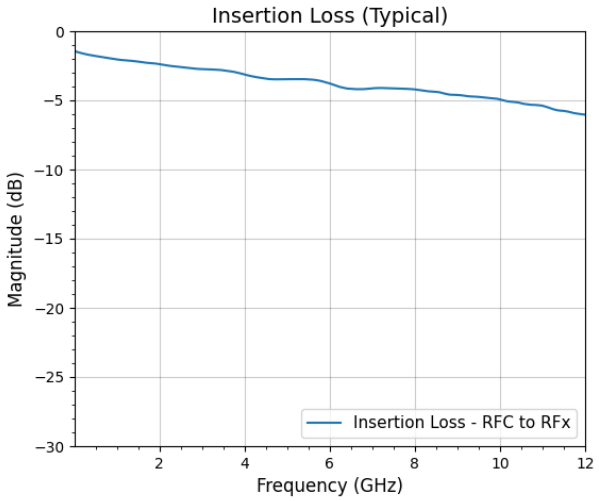
flexibility and responsiveness. These innovations allow us to deliver switch matrices that combine superior RF performance, reliability, and scalability in ways no other provider currently matches.

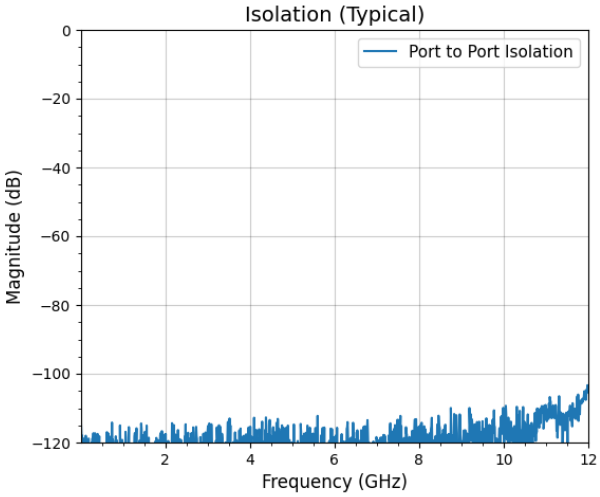
Our switch matrices are designed with maximum flexibility in mind, available as either compact benchtop units or fully integrated rack-mounted systems. They can be configured with virtually any number of ports and customised to match the exact routing requirements of each application. Control is provided via Ethernet or USB interfaces, with intuitive LED indicators that clearly display active paths and ports in real time. For highspeed test environments, intelligent sequencing can be programmed through TTL trigger lines, enabling automated path selection and significantly accelerating measurement workflows. This combination of adaptability, ease of use, and intelligent control ensures our solutions seamlessly into any customer's setup while delivering exceptional performance.

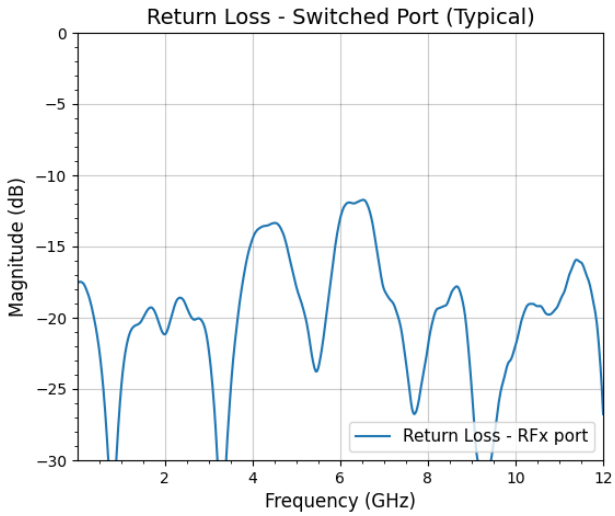
Our USB and Ethernet controlled (12GHz or 30GHz) matrices can be supplied as a bench module for 16 switched ports or rack mounted for 16 to 1024 switch ports. The number of common ports on each path can be configured as 1 or 4. Each matrix is dual path and full cross bar functionality which means you can connect any of the common ports to any of the switch ports. The switches utilise solid state technology and are oven stabilised for near zero drift performance meaning a single calibration (in phase and magnitude) can be used for all paths. The configurations can be tailored for reflective or absorptive (port always 50ohm matched) on the non-selected ports. Each port is DC blocked to 16V.

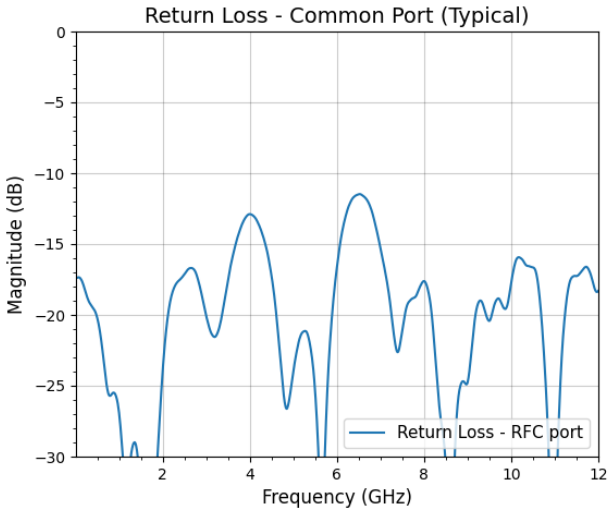
Equipped with SMA on the 12GHz version and 2.92mm connectors for the 30GHz version (other connector types available on request), the matrices are suitable for automated test environments, with the added flexibility of USB and Ethernet control interfaces. For time-sensitive applications we support the loading of predefined switching sequences, which can be triggered by logic signals, achieving rapid switching with microsecond-level timing. The module is also capable of standalone operation, powered directly through USB. We can also allow access to the powerful onboard CPU for all sorts of custom applications.

TYPICAL PERFORMANCE DATA - 12GHz Model

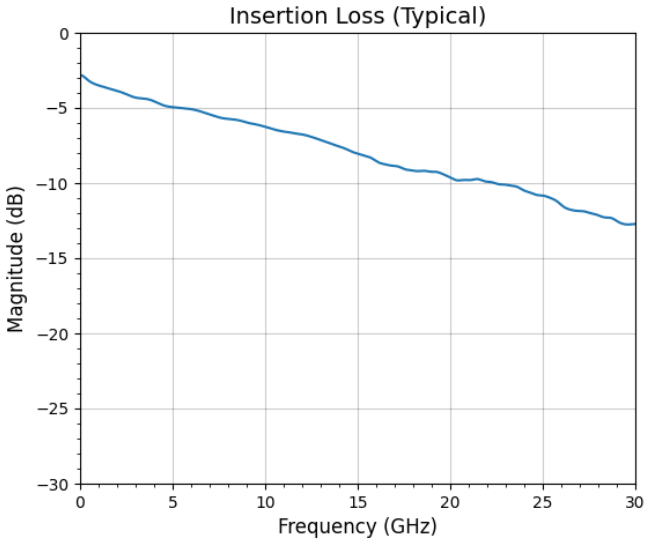


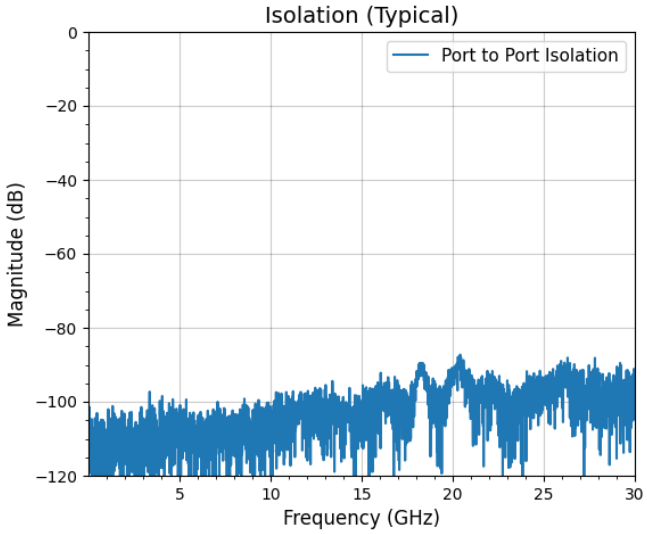


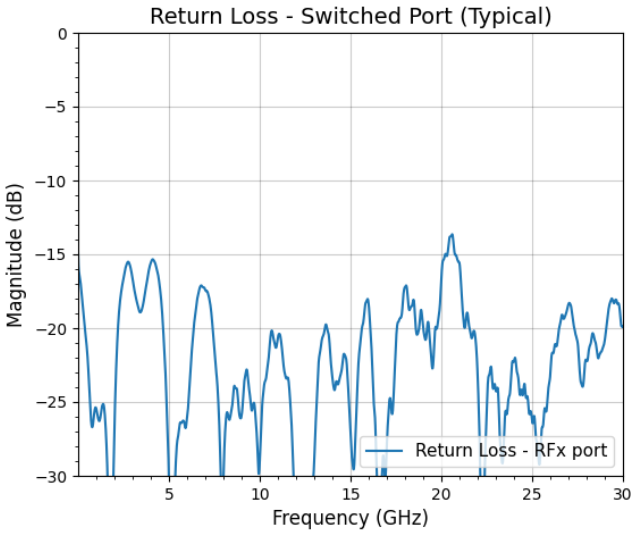


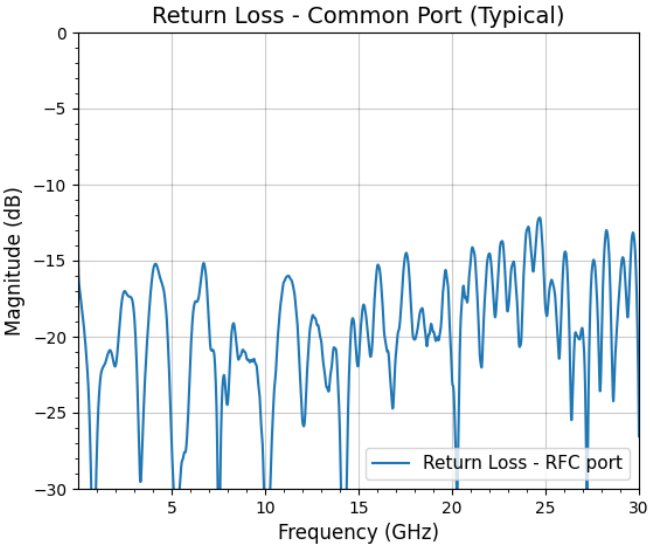


TYPICAL PERFORMANCE DATA - 30 GHz Model

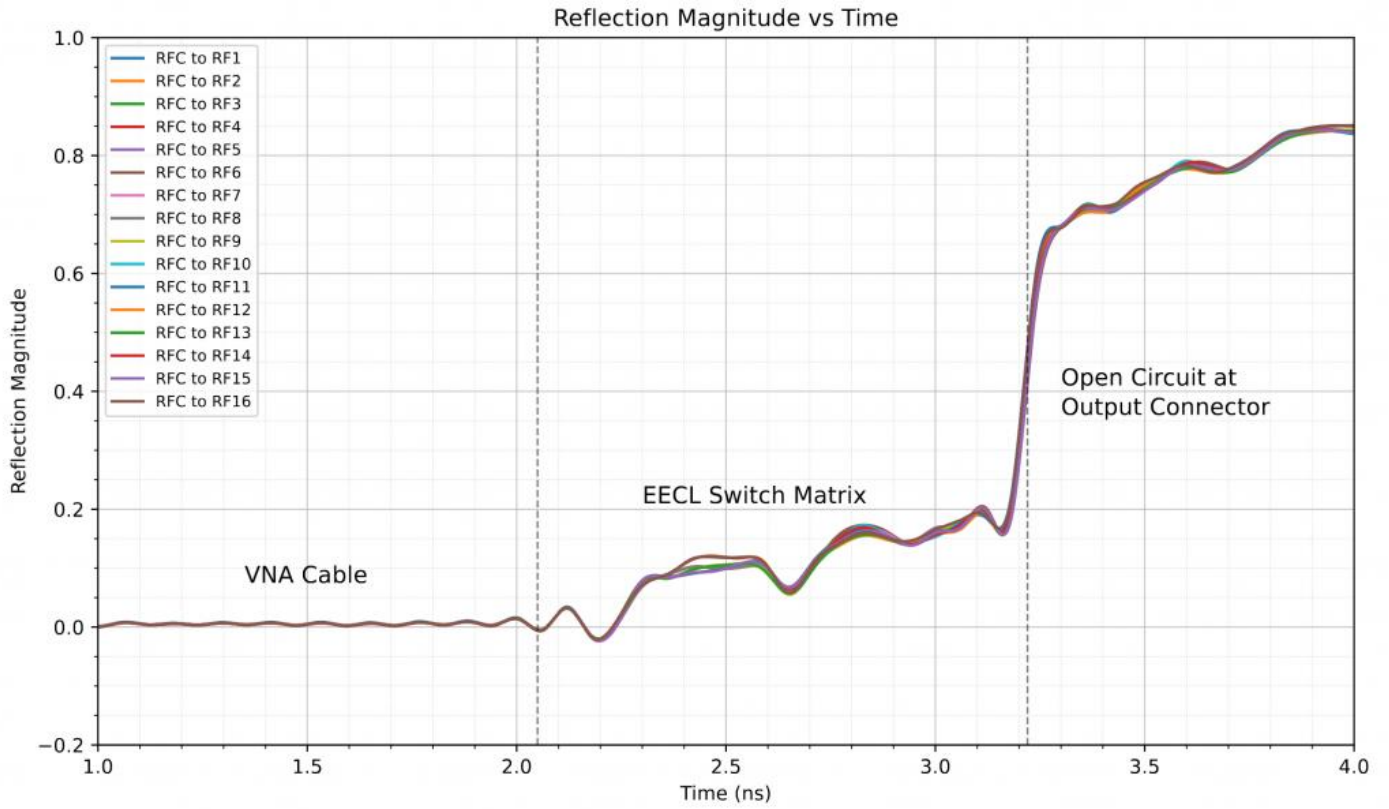








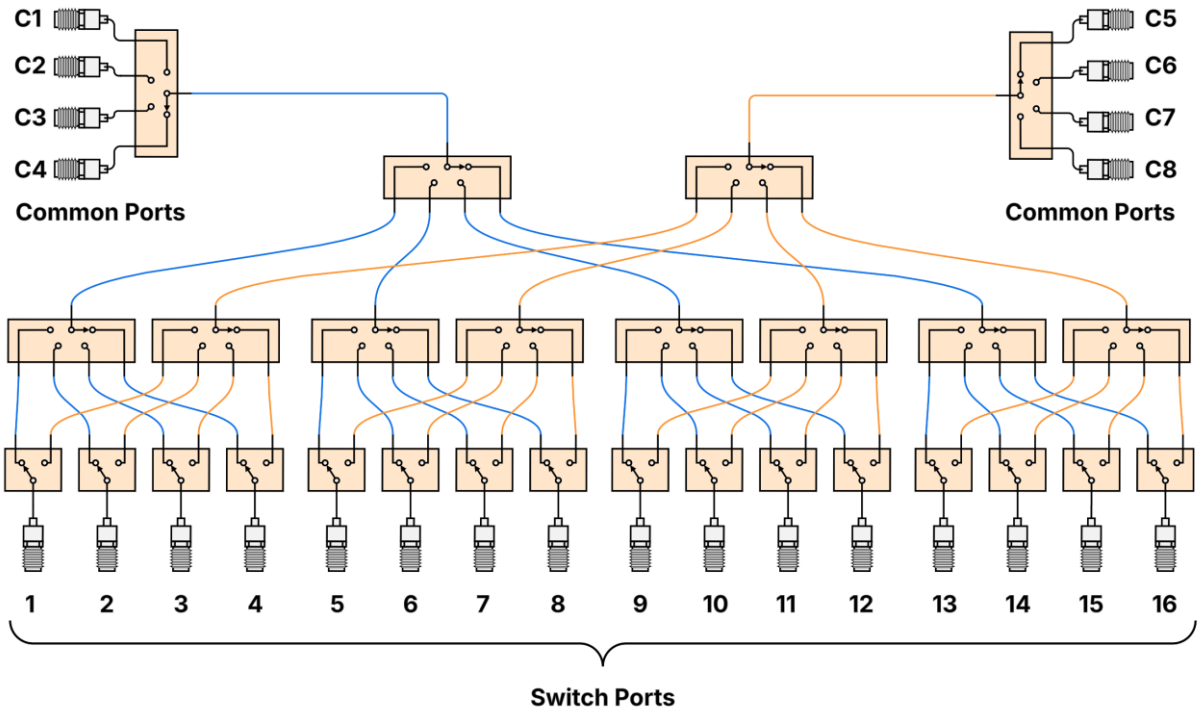
All paths are designed to be equal in length, the below plot shows a TDR measurement of the matrix from the common port to the switched ports (all of them) it can be seen that the path length is close to identical.



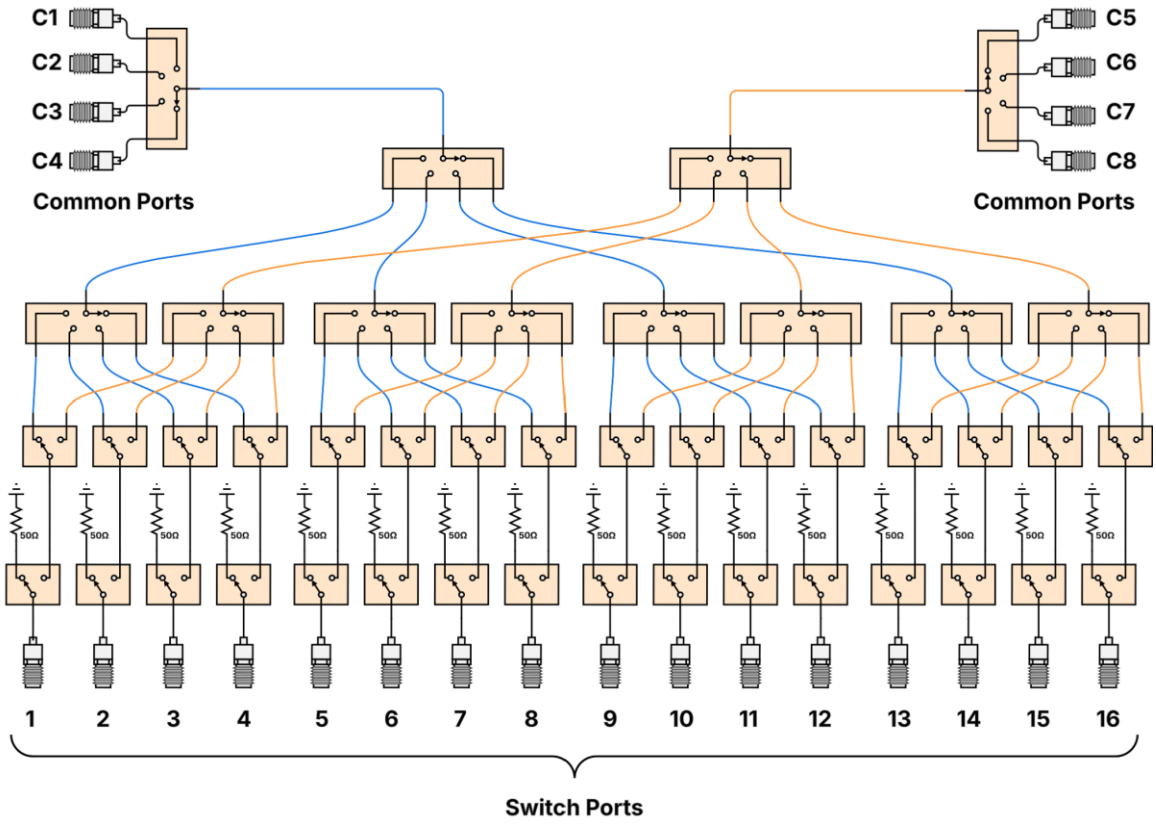
FUNCTIONAL BLOCK DIAGRAMS

The following plots show some of the possible configurations available, contact us for others.

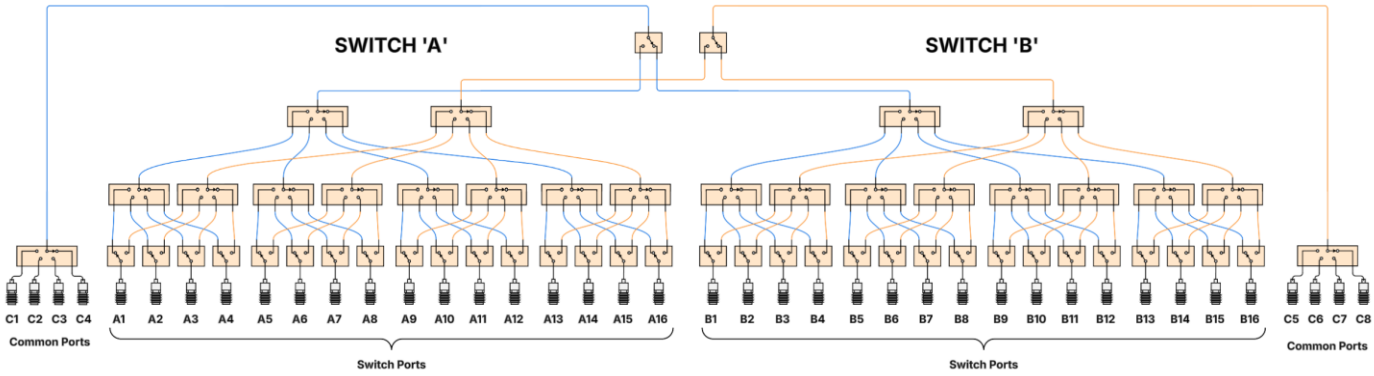
4 Common Ports - 2:16 - REFLECTIVE



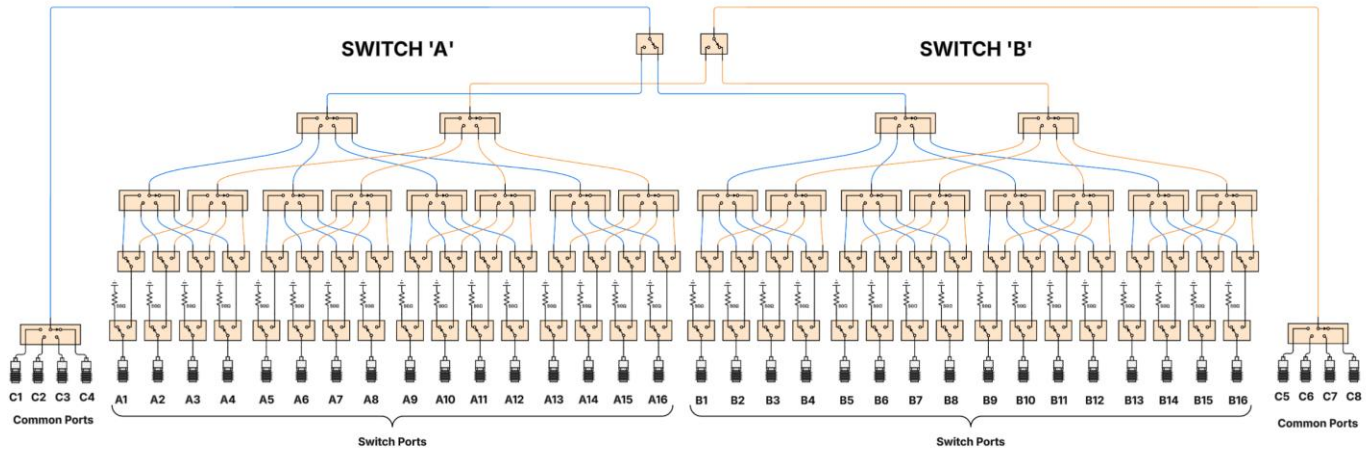
4 Common Ports - 2:16 - ABSORPTIVE



4 Common Ports - 2:32 - REFLECTIVE



4 Common Ports - 2:32 - ABSORPTIVE

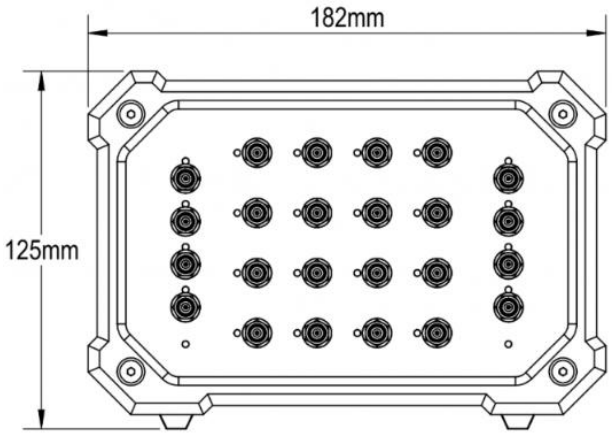


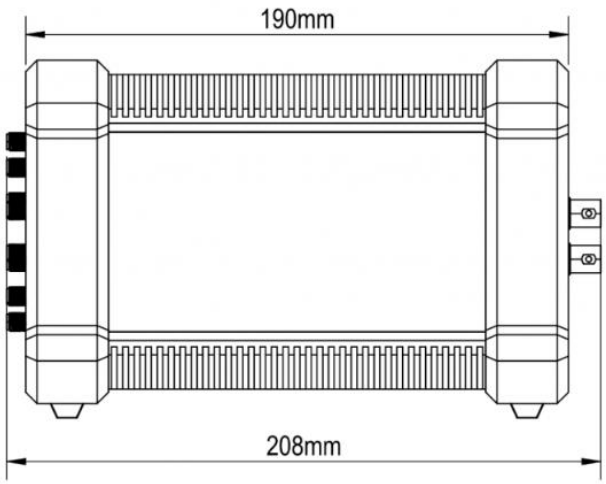
MECHANICAL INFORMATION

SMX-12B816R
SMX-12B816A
SMX-30B816R
SMX-30B816A

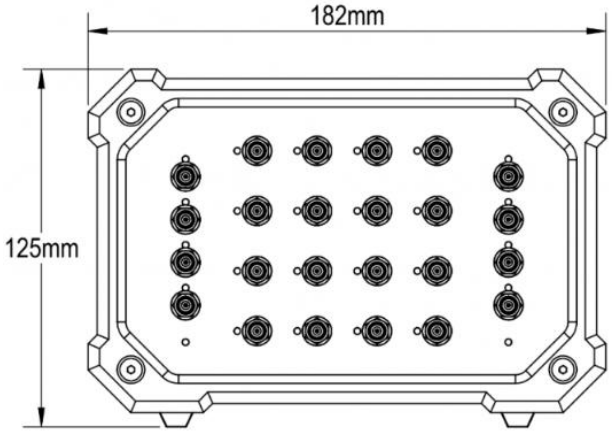
Dimensions are in mm (inches).

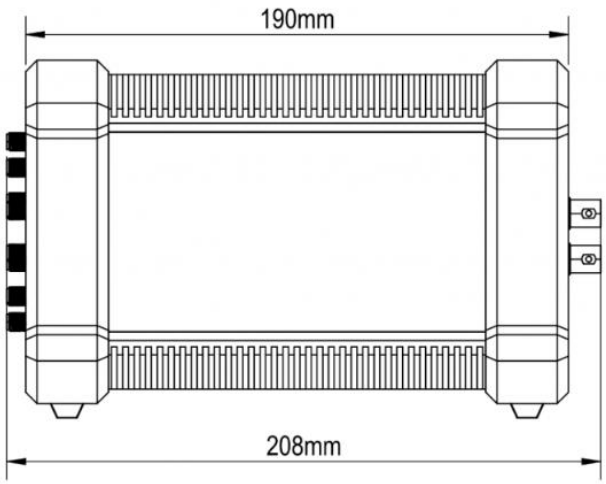
SMX-12B816R / SMX-12B816A / SMX-30B816R / SMX-30B816A



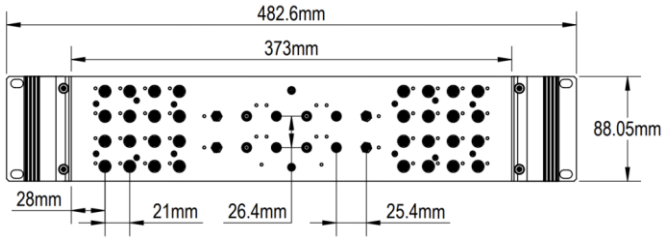


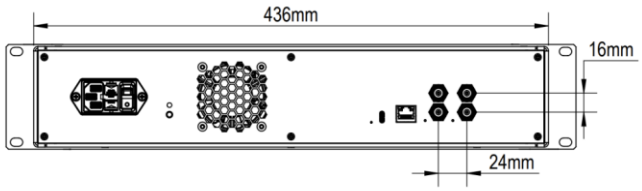
SMX-12B216R / SMX-12B216A / SMX-30B216R / SMX-30B216A



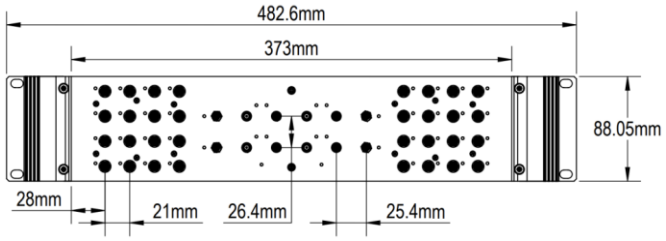


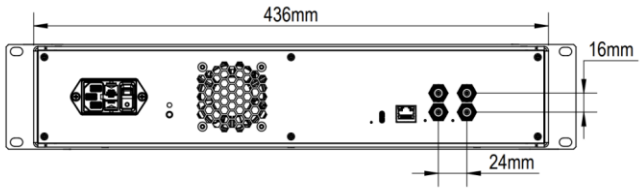
SMX-12R816R / SMX-12R816A / SMX-30R816R / SMX-30R816A



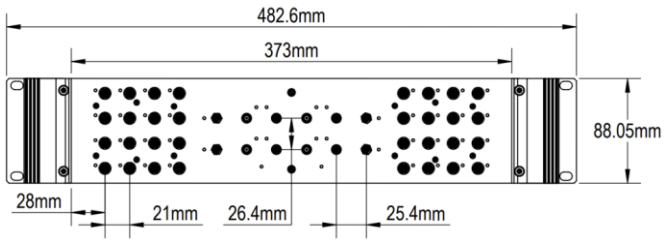


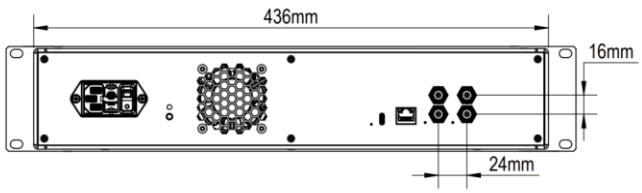
SMX-12R216R / SMX-12R216A / SMX-30R216R / SMX-30R216A



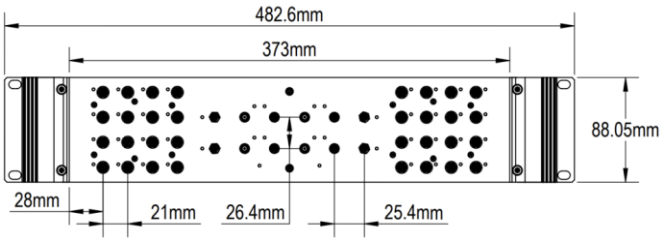


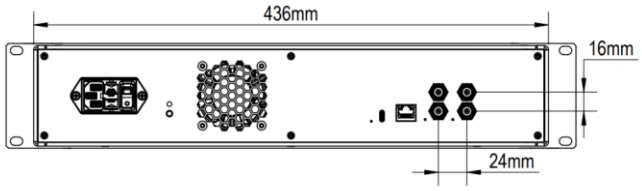
SMX-12R832R / SMX-12R832A / SMX-30R832R / SMX-30R832A



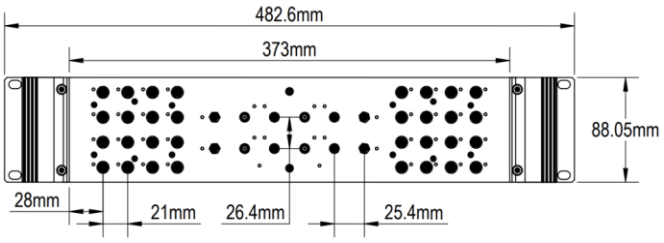


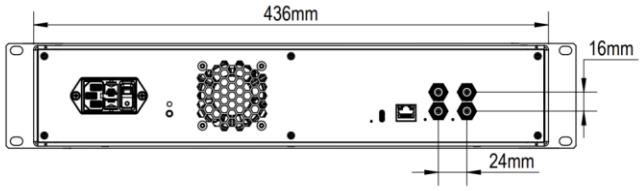
SMX-12R232R / SMX-12R232A / SMX-30R232R / SMX-30R232A



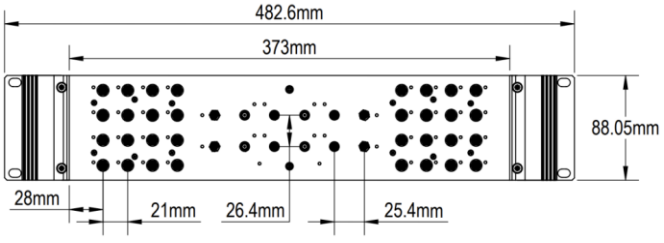


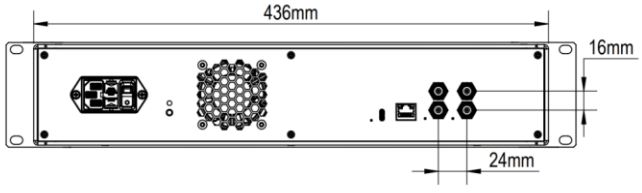
SMX-12R848R / SMX-12R848A / SMX-30R848R / SMX-30R848A





SMX-12R248R / SMX-12R248A / SMX-30R248R / SMX-30R248A





SPECIFICATIONS

	SMX-Benchtop	Rack – 16 Switch Ports	Rack – 32 Switch Ports	Rack – 48 Switch Ports
Net Weight	4.00 kg	2.00 kg	3.00 kg	4.00 kg
Power Handling	+20dBm, 16VDC MAX			
Typical Switch Speed (10% Trigger to 90% Output)	20µs			
Trigger	TTL 3V3			
Control Interfaces	USB 2.0 (USB C), Ethernet			
Operating Temperature	0 °C to +40 °C			
Operating Humidity	95% RH at 40 °C (non-condensing)			
Port Type	SMA for 12GHz Matrix, 2.92 for 30GHz Matrix			
Power Supply	DC Jack – 12-24V DC	AC Mains Input: 100-240V, 50 / 60 Hz		
Average Power Consumption	5W	5W	10W	15W