

# 2025

Global Signal Switching, Conversion & Distribution Specialists

Telemetry - Automated Test - Communications















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Call and get our 8G USB stick with all our data sheets, information and software package. The table above uses an "X" to denote that a particular product on this page might be used for the application. Note that some pages have multiple products on the same page.

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- Quality Management System: ISO 9001:2015
- Standard Warranty Statement (extended warranties available)
- Return Loss to VSWR Conversion Table
- Factory Authorized Representatives: Domestic and InternationalCover



#### Hot-Swap dual CPU, power supplies & modules

Our products are designed for maximum reliability, featuring hot-swappable monitored power supplies, con-trol CPUs, and modules. This ensures seamless operation and minimal downtime, providing the ultimate in hardware dependability.

#### Cover

Our 2025A cover shows a detail of a new modular solidstate RF advanced matrix and RF distribution unit (100MHz to 20GHz). See page 26 for more information.



#### Features, features and more features

Our goal is to incorporate a wide range of standard features during the design phase to maximize the longevity and versatility of our hardware. By building in these capabilities upfront, we ensure that our products continue to meet evolving needs and stand the test of time.

What is the story behind the RR? You've likely noticed the RR graphic featured on our front cover and throughout our catalog, products, website, and social media channels like Twitter and Facebook. Curious about what it means? Discover the full story on page 31.



Plug-in C3 and C3-Lite Controllers certified LXI with TCP/IP, HTTPS (SSL/TLS), SNMP v1/v2c/v3, SNTP, IPv4/6 Latest in hot-swap control interface technology with the best in network security layers and protocols, plus fast 10/100/1GB hardware with auto-negotiation (page 31).





#### **Global Leader in Switching Technology**

Universal Switching Corporation (USC) is a globally recognized innovator in the switching industry, specializing in cutting-edge switching, distribution, and conversion equipment. Since its founding in 1992, USC has built a 32-year legacy of delivering high-quality, cost-effective products by combining continuous process improvement with full-spectrum technology solutions.

Operating from a state-of-the-art facility in Burbank, USC is driven by a talented team and a robust Quality Management System, further reinforced by ISO 9001:2015 certification. All equipment comes with a standard 2-year warranty, with the option to extend coverage to an industry-leading 7 years.

#### **Product Line Offering**

Our comprehensive product line includes high-performance switching systems, modules, and distribution units, designed to operate across a wide frequency range from DC to 67 GHz. We handle a variety of signal types such as AC/DC power, audio, ATE instrumentation, composite video, SD, HD, 4K, HF, RF, IF, and L-Band, as well as high-resolution RGB+HV video, high-speed digital data formats like 422, LVDS, PECL, or ECL, and extensive coverage of L-Band, S-Band, and C-Band signals—up to 67 GHz.

Our products feature embedded controllers and software for seamless, fast, and precise control and monitoring. With customizable adapter and remote control panels, we offer unmatched flexibility to meet your unique interface and control needs. Our mission is simple: to put you in control.

#### **Product Line Expansion and Legacy Items**

Since acquiring Matrix Systems Corporation's (MSC) switching product line in 2007, we have expanded the USC product range to include robust, rugged relay modules designed to support existing system installations and military programs globally. Our commitment to excellence is reflected in the continuous enhancements we've made to this legacy product line, driven by our strict adherence to ISO quality processes. These improvements ensure superior reliability and performance, even in the most challenging environments.

#### **COTS Solutions**

As a leader in the automated switching industry, USC offers the largest crosspoint capacity and a wide range of programmable switching systems and modules available in "off-the-shelf" configurations, perfect for addressing time-sensitive switching needs.

Unlike other manufacturers that require long lead times for custom or modified equipment, our ready-to-deploy solutions leverage cuttingedge technology and advanced design and manufacturing techniques, providing turnkey solutions quickly and efficiently.

In addition to off-the-shelf options, USC delivers custom and EOEM systems and modules with minimal lead times and expedited delivery. We specialize in switching, distribution, and conversion products, as well as equipment that integrates seamlessly with switching systems. Our expertise also extends to requirement evaluation, system design, translation, distribution, and full system integration, ensuring we can meet any switching-related challenge.

#### **Switching Expertise**

With deep expertise in the switching field, USC is dedicated to meeting the evolving switching and distribution needs of various industries, while anticipating future requirements. Our products are trusted in critical, high-reliability environments such as aerospace and defense, surveillance systems, and satellite communications, as well as in routine production testing and evaluation applications. No matter the application, USC delivers the performance and reliability required for both the most sensitive operations and everyday demands.

#### G2 Series Modular Product Line (G2T)

The G2T Series modular product line continues to evolve, delivering a host of advanced features and improvements. These include highperformance configurations, fully shielded modules, hot-swappable technology, field-upgradeable firmware, and optional redundant CPU and power supply setups. For over 24 years, USC has set the industry standard with Ethernet (TCP/IP) control, well ahead of competitors who are only now adopting this technology. Our C3 CPU, which is LXI compliant, supports TCP/IP, SNMP, SNTP, and IPv4/6, offering extensive capabilities for a wide range of operational demands. We've also introduced the C3-Lite controller, designed for applications where legacy systems require a more compact solution.



Includes 10/100/1G Ethernet (SNMP, TCP/IP, SNTP, IPv4/6) multi-serial and Alarm ports

Modular products, like our G2T Series, are often more cost-effective than the "dedicated purpose" systems many of our competitors offer. The advantages of our modular systems include:

- Flexible system architecture for simple requirement customization
- Front-panel hot-swappable power supplies for quick maintenance
- Efficient, space-saving modular design
- Unified control and command protocols for streamlined operations
- Compact physical footprint for better space management
- Multiple configurations housed in a single rack-mounted unit
- Simplified logistics for spare parts and maintenance

#### Scalable Switching Innovation

The innovative scalable design of the System S256xF combines cutting-edge component technology with advanced control and monitoring capabilities. Available in both analog and digital formats, this scalable system supports configurations up to 1024x1024 in a compact 5RU rack-mounted "building block" package. This modular approach extends across our entire product line, including our Wideband and RF systems, and is showcased in the high-performance SWM32X and similar products. Our new S5120FX unit, featuring the world's highest crosspoint count, delivers an impressive 52,000 crosspoints per rack unit (512x512 in 5RU).

#### **Technological Accomplishments**

Our globally recognized achievements include the field-proven G2T Series, launched in 2015, and the groundbreaking System S5120FX units. Notable innovations also include our advanced C3 Controller, along with new, compact, high-performance digital and analog product lines, and modular HF/RF systems, and now our first airborne product tested per DO-160G.

#### **Product Development**

At USC, ongoing product development fuels our cutting-edge, innovative designs. By continuously investing in research and development, we remain at the forefront of the switching industry. Our commitment to progress is reflected in new RF and digital products, adherence to LXI standards, Tri-Stage hardware, touchscreens, and enhanced control and security protocols—all part of our Continuous Process Improvement initiative. We regularly introduce new products and designs on our website, but you're always welcome to reach out to one of our engineering representatives or contact the factory directly for personalized consultation.

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Corporation Global Signal Switching and Distribution Specialists



Updated S256xFX Digital/Analog Switch Scalable from 32x32 to 1024x1024 Page 20 & 21

LS16A Modular "Linker System" Signal distribution, conversion & switching Page 17

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Updated G2T16: Modular System DC - 50GHz Sixteen-slot G2 Mainframe (8RU) Shown with dual CPUs & mixed modules installed Page 8 & 9





New SWM16X Modular Switch: 3GHz Scalable from 4x4 to 16x16 (4RU)







Digital distribution unit (dual 1x32), up to 3Gbps PECL, LVPECL, LVDS, LVTTL distribution (clk/data) Page 18

Updated

G2S47-6432-25

Model G2R12

G2T4 Modular System DC - 50GHz Four-slot G2T Mainframe (2RU) Page 8 & 9

G2 plug-in 32x32 IF matrix with expanders (20-250MHz) Page 8 & 9

G2 plug-in with five high power 1x6 relays (12GHz) Page 8 & 9

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SxM32 Modular Switch: Up to 6GHz Scalable from 4x4 to 64x64 (6RU)

New

Page 10



G2R40-71X6-60 G2 plug-in with seven 6x1 relays (40GHz) Page 8 & 9





G2 - CAS Critical Application Systems for IF, RF, L-Band, microwave and other types of signals Page 28



SLX320 & SIX321 L-Band Matrices Modular configurations up to 64x256 & 128x192 Page 14 SGM16: Up to 6GHz 8x8, 16x16 Wideband Matrix Units (1RU) Page 11





## Series G2T Rack-Mounted Modular Switching

#### Modules covering DC to 67GHz Configurations from 1x2, up to 64x64

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Series G2 products is our continuously evolving line of modular products tha provides the system engineer with cost effective configuration and performance options in a field proven standard design. Any Series G2 module can be installed by simply sliding the module into the rear module bay of a Series G2 Mainframe.

Solid-state, relay-based, digital and fiber-optic products are offered to meet most any requirement. The list of module types keeps growing with new products including both MxN switching arrays and 1xN types. Non-blocking (Fan-OUT), combining (Fan-IN) and blocking (1:1) arrays are available. Popular L-Band and IF switching plus fully digital types as well including TTL, E1/T1, 422, ECL, PECL and LVDS.

## What is the Series G2? How does it work?

The Series G2 is a comprehensive modular switching product design comprised of two system components. These two major system components are what's required to complete a high-performance modular switching system.

- Rack mount mainframe with hot-swap supplies and CPU
- Plug-in switching module(s)

#### **G2T** Mainframes with Touchscreen

Our rack-mount mainframes are available in four rack-mount sizes with 2RU, 3RU, 6RU and 8RU. Different sizes are offered to meet various sized switching and distribution demands from small to large. They provide control and power to any of our Series G2 plug-in modules. Modules install into the rear-facing module bay providing easy connection access for cable management.

Front installed redundant hot-swap power sections are available to meet the requirements of the various types of Series G2 modules. Supplies are self-monitoring with operational status reported to the C3 Controller. Single or redundant supplies install through hinged front panels for hot-swap replacement, perfect for critical requirements including independent AC power circuits.

Our two larger mainframes (6RU and 8RU) can be specified to include one or two (redundant) hot-swap C3 controllers, while the smaller 3RU (G2T6) and 2RU (G2T4) can only have one. These LXI compliant CPU's provide control for the modules as well as remote control interfacing to the user via the 10/100/1G Ethernet and multiserial port. Firmware is field upgradeable via the integrated web browser. For secure applications, the C3 accepts a removable uSD memory card to store settings and port alias names.

#### **G2** Plug-in Modules

The modules that plug-in to our Series G2T mainframes are designed to install at the rear of the units. This allows the signal I/O connectors to face the rear (inside of the rack) of the mainframe. This is best suited for most installations to simplify cable routing to and from the switching system. The Series G2 module series spans DC-50GHz to address many different applications including audio or video, high speed digital data, telemetry, IF & RF, L-Band, microwave and other types of installations. Each module occupies a certain number of module "slots" within a mainframe. Some modules occupy only one slot while others occupy up to 16 slots. Power and control for the module is supplied by the mainframe.

NOTE: Plug-in Model C3 Controller is backwards compatible for most systems, but provides new features such as SNMP, SNTP, and IPv6. It does not include an integrated GPIB port. A C3-Lite is included in some newer systems (non-G2T type).

## Custom systems or modules available.









Six module slots, 3RU



G2T12 Mainframe Twelve module slots, 6RU (shown with **Option X** display)



G2T16 Mainframe Sixteen module slots, 8RU (shown with **Option X** display)



- Realtime clock
- FLASH memory
- Removable microSD card (security) - SNMP (v1/v2c/v3), SNTP, TCP/IP, IPv4, IPv6
- Look for the C3 logo





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## Series G2 Modules: Switching Matrix Arrays - MxN (sorted by frequency range)

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	Series	Elements	Frequency Range	Isolation (dB) Typ	Impedance	Minimum Size	Maximum Size	Slots	Conn Type
New	G2S02A	Solid-state	DC-200kHz	>80dB @ 20kHz	100 or 1M	16in, 64out	64in, 64out	4	HD-Dsub
	G2R10	Relay	DC-10MHz (typ)	>45dB @ 10MHz	100 ohm balanced	4in, 4out, 2-wire	16in, 16 out, 2wire	1	D-Sub
	G2S11	Solid-state	T1 & E1 rates	n/a	100 ohm balanced	8in, 8out	16in, 16out	3	RJ45
	G2D62B	Digital	DC-50Mbps	n/a	100 ohm (422)	8in, 8out	64in, 64out	1-8	Triax (BJ77)
	G2D64B	Digital	DC-50Mbps	n/a	100 ohm (422)	32in, 32 out	64in, 64out	1 or 2	D-Sub
	G2D71	Digital	>100Mbps	LVDS in, ECL out	50 ohm (differential)	8in, 8out	64in, 64out	2-8	SMB
	G2D72	Digital	>100Mbps	LVDS in, LVDS out	50 ohm (differential)	8in, 8out	64in, 64out	2-8	SMB
	G2S32H	Solid-state	DC-75MHz	>60dB @ 10MHz	50 or 75 ohm	8in, 8out	64in, 64out	1-8	BNC
	G2S32	Solid-state	DC-125MHz	>40dB @ 125MHz	50 or 75 ohm	8in, 8out	64in, 64out	1-8	BNC
	G2S33	Solid-state	DC-160MHz	>40dB @ 125MHz	50 or 75 ohm	8in, 8out	64in, 64out	1-8	BNC
	G2S44	Solid-state	20-250MHz	>60dB @ 70MHz	50 or 75 ohm	8in, 8out	48in, 48out	4-6	BNC
	G2S47	Solid-state	20-250MHz	>60dB @ 70MHz	50 or 75 ohm	8in+EX, 8out+EX	48in+EX, 48out+EX	4-6	BNC
	G2S48	Solid-state	20-250MHz	>60dB @ 70MHz	50 or 75 ohm	8in, 8out+EX	48in, 48out+EX	4-6	BNC
	G2S54	Solid-state	20-250MHz	>60dB @ 70MHz	50 or 75 ohm (combine)	8in, 8out	48in, 48out	4-6	BNC
	G2S57	Solid-state	20-250MHz	>60dB @ 70MHz	50 or 75 ohm (combine)	8in+EX, 8out+EX	48in+EX, 48out+EX	4-6	BNC
	G2S58	Solid-state	20-250MHz	>60dB @ 70MHz	50 or 75 ohm (combine)	8in, 8out+EX	48in, 48out+EX	4-6	BNC
	G2D70A	Digital ECL	>600Mbps	n/a	50 ohm (differential)	8in, 8out	64in, 64out	2-16	SMA or SMB
	G2\$42	Solid-state	20-1000MHz	>50dB @ 1000MHz	50 ohm	8in, 8out	12in, 16out	4	BNC or SMA
	G2S75A	Solid-state	800-2400MHz	>50dB @ 2400MHz	50 ohm	8in, 8out	16in, 16out	4	SMA or N
New	G2S78A	Solid-state	20-3000MHz	>50dB @ 2400MHz	50 ohm	8in, 4out	16in, 16out	2-6	BNC, SMA or N
New	G2R19A	Relay	DC-18GHz	>80dB @ 18GHz	50 ohm	4in, 2out	12in, 12out	4-6	SMA or N

NOTE: See data sheet for full model number, specifications and suffix definitions.

## Series G2 Modules: 1xN Type Arrays (sorted by frequency range)

Series	Elements	Frequency Range	Isolation (dB) Typ	Impedance	Minimum Size	Maximum Size	Slots	Conn Type
G2S08	Solid-state	DC-400Hz	Power Relay	AC or DC switch	lea 1x1	lea 1x8	3	Terminal Screw
G2R04	Relay	DC-10MHz (typ)	>50dB @ 10MHz	100 ohm balanced	1ea 1x4, 2-wire	1ea 1x4, 8 wire	1	D-Sub
G2R06	Relay	DC-10MHz	>60dB @ 10MHz	General purpose	8ea 1x1 (DPDT)	4ea 1x16 (DP16T)	1	D-Sub
G2R16	Relay	DC-1.3GHz	>55dB @ 1GHz	50 or 75 ohm	6ea 1x2	lea 1x16 w/exp	1	BNC or SMA
G2R16T	Relay	DC-1.3GHz	>55dB @ 1GHz	50 or 75 ohm (self term)	6ea 1x2	lea 1x16 w/exp	1	BNC or SMA
G2R15	Relay	DC-3GHz	>60dB @ 1GHz	50 or 75 ohm	6ea 1x2	lea 1x16 w/exp	1	SMA
G2R15T	Relay	DC-3GHz	>60dB @ 1GHz	50 or 75 ohm (self term)	6ea 1x2	lea 1x16 w/exp	1	SMA
G2R13	Relay	DC-6GHz	>55dB @ 3GHz	50 ohm	6ea 1x2	2ea 1x8	1	SMA
G2R20	Relay	DC-12GHz	>80dB @ 4GHz	50 ohm	lea 1x2	6ea 1x2, 2ea 1x6	4	N-Type
G2R12	Relay	DC-12GHz	>80dB @ 4 GHz	50 ohm	1 ea 1x3	5ea 1x6	4	N-Type
G2R14	Relay	DC-18GHz	>60dB @ 18GHz	50 ohm (self terminating)	lea 1x3	6ea 1x6	3	SMA
G2R17	Relay	DC-18GHz	>60dB @ 18GHz	50 ohm	1ea transfer	8ea transfer	2	SMA
G2R18	Relay	DC-18GHz	>60dB @ 18GHz	50 ohm	lea 1x6	7ea 1x6	3	SMA
G2R21	Relay	DC-18GHz	>60dB @ 18GHz	50 ohm	lea 1x2	8ea,1x2 & transfer	2	SMA
G2R22	Relay	DC-18GHz	>60dB @ 18GHz	50 ohm	lea 1x6	10ea 1x6	2	SMA
G2R27	Relay	DC-18GHz	>60dB @ 18GHz	50 ohm (self terminating)	lea 1x8	4ea 1x10	5	SMA
G2R28	Relay	DC-18GHz	>60dB @ 18GHz	50 ohm	lea 1x8	7ea 1x10	3	SMA
G2R25	Relay	DC-26.5GHz	>55dB @ 26GHz	50 ohm	4ea 1x2	16ea 1x2	2	SMA
G2R40	Relay	DC-40GHz	>50dB @ 40GHz	50 ohm	lea 1x3	7ea 1x6	3	К-Туре
G2R50	Relay	DC-50GHz	>50dB@ 50GHz	50 ohm	lea 1x4	7ea 1x6	3	2.4mm
G2R67	Relay	DC-50GHz	>50dB@ 50GHz	50 ohm	lea 1x4	7ea 1x6	3	2.4mm

NOTE: See data sheet for full model number, specifications and suffix definitions.





Modular IF, L-Band, Wideband Switching SIM32 20-250MHz up to 32x32 SLM32 850-2450MHz up to 32x32 SWM32 20-3150Hz up to 32x32 SGM32 20-6000MHz up to 32x32 New

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#### 6RU - Flexible configurations from 4x4 to 32x32: 20MHz-6GHz

Introducing our SxM32 family of units, designed to streamline RF signal routing while eliminating the need for traditional multi-couplers, manual patch bays, and patch cords. This highly modular switch array offers flexible configurations and ensures superior performance with excellent crosstalk isolation, low noise figure, and optimal IP3.

Configurable in single-channel increments from 4x4 up to 32x32, and scalable to 128x128 by combining units—this solution meets diverse routing needs. Housed in a 6RU chassis, a fully populated unit provides 32 input and 32 output ports. For versatile applications, the SxM32 operates as a Fan-OUT (distributive) unit, while the SxM32 is serves as a Fan-IN (combiner) unit. Both options are available with a wide range of frequency bands, from 20MHz to 6GHz, and feature SMA or BNC connectors, with N-Type connectors available via 1RU transition panels. Key to its robust design is isolated failure capability, ensuring that any single-channel failure due to signal overload does not impact other channels. All components are securely housed for rugged, reliable operation.

User-friendly control is achieved through a front-panel touchscreen display, available in the standard 4.3" size or the enhanced 10.1" Option-X display, providing extended functionality. Customizable power options include single or dual redundant power supplies and CPUs. For antenna applications, Option "L" adds an LNB power supply with monitoring features (0/13/18V, 22kHz tone, and current monitoring). Additional options like variable gain control, AGC, and power monitoring are also available. For fiber optic applications, this unit is compatible with our FiberSTIK™ fiberoptic receiver, delivering seamless integration across systems.

System Type	Frequency Range	Features
SIM32	40-250MHz	IF-Band, non-blocking Fan-OUT
SIM32i	40-250MHz	IF-Band, non-blocking Fan-IN
SLM32	850-2450MHz	Extended L-Band, non-blocking Fan-OUT
SLM32i	850-2450MHz	Extended L-Band, non-blocking Fan-IN
SWM32	20-3150MHz	Wideband, non-blocking Fan-OUT
SGM32	20-6000MHz	Extreme WB, non-blocking Fan-OUT

NOTE: Not all models or features are listed. See data sheet for full model number, specifications, options and suffix definitions.

## Applications:

- Communications
- Teleport and last mile
- Encryption Tx/Rx modem
- Satellite ground stations
- Security installations
- Uplinks or downlinks



#### SLM32

Configurations from 4x4 to 32x32, or larger and shown with  $\ensuremath{\textbf{Option X}}$  display





Download our Monitor & Control software **RouteWarePRO** for a FREE 30-day trial today!



SXM32 SMA or BNC connectors Optional dual CPU Optional LNB power & control, gain, AGC



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Global Signal Switching and Distribution Specialists

L-Band & Wideband Fixed-Sized Switching SLM16 850-2450MHz sizes 8x8 to 16x16 SWM16 20-3150MHz sizes 8x8 to 16x16 New SGM16 20-6000MHz sizes 8x8 to 16x16

#### 1RU - Fixed configurations loaded with features: 20MHz - 6GHz

For smaller or budget-conscious yet high-performance applications such as ENG vans or trucks, our 1RU units are specifically designed for IF, L-Band and S-Band signal switching.

Available in 8x8 to 16x16 configurations with SMA or BNC connectors, these units deliver excellent RF performance, including high IP3, low noise figure, and superior isolation. Equipped with standard both 10/100/1G Ethernet as well as multi-serial control ports, these units offer comprehensive remote management through a web browser interface (supporting SNMP, IPv4/6, and LXI protocols).

They feature redundant fans and power supplies for enhanced reliability, ensuring continuous operation in demanding environments. The compact 1RU design places all signal connectors at the rear, keeping the front panel clean and accessible with an LCD display and control keys for easy operation.

For greater functionality, optional features include variable gain control, automatic gain control (AGC), power monitoring, and LNB power/control capabilities.These units combine performance and versatility, making them ideal for space-constrained and budget-sensitive applications without sacrificing RF performance quality.



**NOTE:** Not all models or features are listed. See data sheet for full model number, specifications, options and suffix definitions.



SLM16 16x16 L-Band Matrix

## Wideband Fixed-Sized Switching

New SGM24 20-6000MHz sizes 16x24 & 16x32 RF

#### 2RU - Fixed configurations loaded with features: 20MHz - 6GHz

For high-performance, mid-sized applications such as electronic warfare (EW) systems or mobile setups like SatCom vans and trucks, these 2RU units provide a robust solution for wideband signal switching, covering frequencies from 20MHz to 6GHz.

Available in 16x24 or 16x32 configurations with SMA connectors, these units deliver exceptional RF performance, including high IP3, low noise figure, and outstanding isolation. The units are designed with full fanout and non-blocking architecture, maintaining unity gain across all signal paths and come equipped with 10/100/1G Ethernet and multi-serial control ports, offering comprehensive remote management through a web browser interface that supports SNMP, IPv4/6, and LXI protocols. This allows for seamless integration and control in complex networked environments.

Designed for reliability, they feature monitored redundant fans and hotswappable power supplies to ensure uninterrupted operation, even in challenging environments. The 2RU chassis is optimized with all signal connectors located at the rear, while the front panel remains clean and user-friendly and features a standard touchscreen display for intuitive, easy operation. These 2RU units combine performance, flexibility, and reliability, making them ideal for mission-critical applications.



#### Global Signal Switching and Distribution Specialists

#### Applications:

- Communications
- Electronic warfare
- Encryption Tx/Rx modem
- Satellite ground stations
- SatCom vans or trucks







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## Available Q1-2025 Wideband Fixed-Sized Switching New SGM48 20-6000MHz sizes 24x32 & 24x48

#### 4RU - Fixed configurations loaded with features: 20MHz - 6GHz

For high-performance, mid-sized applications such as electronic warfare (EW) systems or mobile setups like SatCom vans and trucks, these 4RU units provide a robust solution for wideband signal switching, covering frequencies from 20MHz to 6GHz.

Available in 24x32 or 24x48 configurations with SMA connectors, these units deliver exceptional RF performance, including high IP3, low noise figure, and outstanding isolation. The units are designed with full fanout and non-blocking architecture, maintaining unity gain across all signal paths and come equipped with either single or dual 10/100/1G Ethernet and multi-serial control ports, offering comprehensive remote management through a web browser interface that supports SNMP, IPv4/6, and LXI protocols. This allows for seamless integration and control in complex networked environments.

Designed for reliability, they feature monitored redundant fans and rear installed hot-swappable power supplies to ensure uninterrupted operation, even in challenging environments. The 4RU chassis is optimized with all signal connectors located at the rear, while the front panel remains clean and user-friendly and features a standard touchscreen display for intuitive, easy operation. These 4RU units combine performance, flexibility, and reliability, making them ideal for mission-critical applications.





RHAMM



- Communications
- Electronic warfare
- Encryption Tx/Rx modem
- Satellite ground stations
- SatCom vans or trucks







## Modular IF, L-Band, Wideband Switching SWM16X 20-3000MHz up to 16x16 8x8, dual 8x8, 8x16 & 16x16

#### 4RU - Modular symmetric or asymmetric configurations

Compact and high performance, the SWM16W provides a cost effective switching capacity for smaller installations. All inputs and outputs are located at the rear of the unit. The SWM16X is a distributive nonblocking (Fan-OUT) product that can be ordered in array sizes from 4x16 to 16x16. The SWM16Xi is a combiner version (Fan-IN) in sizes from 16x4 to 16x16.

Standard redundant hot-swap power supplies with independent AC inputs deliver the ultimate in system reliability for critical applications. The unit can also be configured with dual control CPU capability. An optional Bias-T capability power supply is available (option P). Complete control and status of the unit is available at the single or dual 10/100/1G ports, multi-serial port, built-in web browser, touch-screen display, or via the RouteWarePRO software packaged provided (only in 2025).

Our popular RouteWarePRO software package (included) makes it easy to control multiple units from the same GUI, or you can manage the unit from a web browser window. Our critical new "X-Point Classing" feature is included. Custom configurations are available upon request, even 6GHz capability.

System Type	Features
SWM16X-1608-15N	8 input, 8 output, distributive Fan-OUT, single CPU
SWM16X-1608-25N	8 input, 8 output, distributive Fan-OUT, dual CPU
SWM16X-D1608-25N	Dual 8 input, 8 output, distributive Fan-OUT, dual CPU
SWM16X-2416-15N	8 input, 16 output, distributive Fan-OUT, single CPU
SWM16X-2416-25N	8 input, 16 output, distributive Fan-OUT, dual CPU
SWM16X-3216-25N	16 input, 16 output, distributive Fan-OUT, dual CPU

NOTE: Not all models or features are listed. See data sheet for full model number, specifications, options and suffix definitions.

Applications:

- Communications
- Teleport and last mile
- Encryption Tx/Rx modem
- Satellite ground stations
- ENG vans or trucks
- Uplinks or downlinks





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SWM16X N-Type connectors Optional dual CPU Optional LNB power & control, gain, AGC





Available Q4-2025

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## Large Format Modular L-Band Switching

**SLX320** 850-2450MHz up to 64x256 **SLX321** 850-2450MHz up to 128x192

#### 14RU - Modular symmetric or asymmetric configurations

Designed to be the "gold standard" for large format extended L-Band matrices, these new Tri-Stage products are rich with features. Leveraging the absolute latest in component technology and design concepts, these modular switch arrays are specifically designed for routing high performance signals in symmetric or asymmetric matrix configurations. They provide respectable crosstalk isolation, noise figure, IP3 and other critical RF parameters.

The SLX320 provides Fan-OUT (distributive) configuration up to 64in x 256out in 8-channel port increments. The SLX321 has the same structure, but has different "mid-stage" elements to allow a configuration up to 128x192. Both units are available in complementary Fan-IN configurations (combine multiple inputs to a given output) by adding an "i" to the model number which then provides a modular configuration up to 256x64 or 192x128 Fan-IN with 8-channel port expansion increments.

Units come standard with redundant hot-swap power supplies and can feature either one or two hot-swappable plug-in control CPUs. An extension of our CAS product line, all active modules, power supplies and assemblies are installed via the lockable hingestign panel. No rear panel access is needed to maintain the unit. 16x16 LBand Matrix

System Type	Frequency Range	Features
SLX320	850-2450MHz	Up to 64x256, distributive Fan-OUT
SLX320i	850-2450MHz	Up to 256x64, combining Fan-IN
SLX321	850-2450MHz	Up to 128x192, distributive Fan-OUT
SLX321i	850-2450MHz	Up to 192x128, combining Fan-IN
SWX320	20-3000MHz	Wideband, distributive Fan-OUT

#### Applications:

- Communications
- Teleport and last mile
- Encryption Tx/Rx modem
- Satellite ground stations
- ENG vans or trucks
- Uplinks or downlinks



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NOTE: Not all models or features are listed. See data sheet for full model number, specifications, options and suffix definitions.

## Available Q3-2025 **RF Over Fiber: 200-3000MHz F-LINK-II Mini and FiberSTIK**<sup>TM</sup>

#### Rugged IP67 Waterproof & Miniature

Our small F-LINK RFoF products are designed provide a fiber optic conversion to/from copper for analog signals from 200-3000MHz (min). They are compatible with both the LS16-FR2 & LS16-FT2 from our LS16A product offering (see page 15), and well as our miniature FiberSTIK<sup>™</sup> receiver.

F-LINK is designed for bulkhead installation, has a twist-lock DC power connector, stainless steel FC single-mode optical connector, status LED, and a choice of SMA, BNC or TNC connectors (50 ohm). The transmitter has a Class-1 Fabrey-Perot laser with 1310nm wavelength.

FiberSTIK<sup>™</sup> product allows the user to pick and choose what port(s) on their system they want to have fiber optic receiver (input) capability. DC power is provided by LNB power sourced from the host system where it is installed (must have LNB power option). The host system can typically monitor current for proper operation as well.

Model	Description
FLINK-II-MTX-x	Mini RFoF Transmitter, 200MHz-3000MHz, FC Optic
FLINK-II-MRX-x	Mini RFoF Receiver, 200MHz-3000MHz, FC Optic
FiberSTIK™	Miniature RFoF Receiver, 200MHz-3000MHz, FC Optic

NOTE: See data sheet for details





#### Applications:

- Antenna fiber links
- Teleport and last mile
- Backup antennas
- Satellite ground stations - Communications
- Uplinks or downlinks

New FiberSTIK™ Miniature Fiber Optic Receiver BNC



New FLINK-II-MTX-A Mini IP67 Fiber Optic RFoF SMA, BNC & TNC Available in Transmitter (T) or Receiver (R)

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## **Redundancy Switches & Universal Chassis**

**RSX4** Modular Redundancy Single, Dual or Quad UC1 Modular Universal Chassis PUC Technology

#### 1RU Sized Units For Up to Two "PUC" Elements: DC - 50GHz

These two 1RU compact modular units are identical with exception of the front panel button controls. The RSX4 front is tailored for redundancy applications, and the UC1 for any type of module.

#### About the RSX4

The RSX4 front panel is designed specifically for 1-4 channel redundancy (A/B) switching and is a drop-in replacement for our field proven 1094xB redundancy switchers (control, capability & performance). High value satellite communication assets (and other similar critical applications) require high reliability equipment and redundancy switching.



## Applications:

- Communication centers
- Signal redundancy
- L-Band, IF, RF signals
- Satellite systems
- ENG vans or trucks



#### About the UC1

The front panel of the UC1 is designed to control any switching element whether it be a full matrix element, or a simple Nx1 configuration. The front panel allows you to navigate an efficient menu system to name channels, make connections or any other common system operation.



#### Packed with features

Units feature a unique modular design with "PUC" elements that allows the user to remove/install a "PUC" to reconfigure, or field upgrade the unit. PUC's can also be remotely located outside the chassis up to 400 feet away with available extension cables.

Units include 10/100/1G Ethernet & Multi-Serial control ports (RS232/422/485), front panel control & display, alarm port with status hard contact, dual monitored fans, built-in web browser, real-time clock, cable support bracket, benchtop or flanges for rack mount, redundant power supplies and dual power input. Available in dual AC, DC or AC/DC powered versions.







FUC Type	Fiequency Runge	reuluies
PUC1-0117C	HD/SDI Video	Video Switch & Three-Way Distribution
PUC1-02/03/04/05	DC-18/6/40/26GHz	1 or 2: Transfer Relays (various frequencies)
PUC1-06nic	DC-3GHz	1 to 4: Terminated (1W) 2x1 Relay, BNC/N/SMA
PUC1-07niX	DC-100MHz	1 or 2: Terminated (1/2W) 1553 2x1 Relay, Triaxial
PUC1-08/09n0J	100Mbps/1Gbps	1 or 2: 8-Wire 2x1 Relay, RJ45
PUC1-16/17/18	DC-6/26/18GHz	1 or 2: Non-Terminated 2x1 Relay, SMA
PUC1-20n5A	DC-26GHz/50GHz	1, 2 or 3: Non-Terminated 6x1 Relay, SMA
PUC1-2115N	DC-3GHz	Terminated (1W) 4x1 Relay, N-Type
PUC1-2315N	DC-3GHz	Terminated (5W) 3x1 Relay, N-Type
PUC1-2615A	950-2450GHz	Single 1x4 Multicoupler with +/-10dB Gain Adjust, SMA



el number, specifications, options and suffix definitions



Global Signal Switching and Distribution Specialists

## Distribution, Conversion & Multicouplers

MDU4 Modular up to 4 Elements

#### 1RU - Mix Digital, RF & Analog Elements

The MDU4 draws inspiration from our legacy of rugged, high-performance products, delivering something fresh and versatile. This 1RU unit is equally at home in a rack-mount setup or on an R&D bench, with both rack-mount flanges and rubber feet included for flexible installation.

Designed for modularity, it allows you to easily configure the distribution or conversion elements you need. Mix and match up to four single-slot elements to create a customized solution tailored to your requirements.

Key features include redundant power supplies, visual and audible alarms, Ethernet-based SNMP monitoring, hard contact alerts, and dual AC inputs. Available in dual AC, DC, or AC/DC powered versions. For custom or modified elements at an affordable cost, simply contact the factory.

REAMINIM

MDU4

#### Applications:

- PCM Telemetry
- TTL Clock and Data
- Mixed analog signals
- 422 Clock and Data
- IRIG time code
- Audio or Video routing
- Digital conversion
- T1 Distribution



**NOTE:** Not all models or features are listed. See data sheet for full model number, specifications, options and suffix definitions.

## Distribution, Conversion, Multicouplers & Switching

**LS16A** Modular up to 16 Elements

#### **3RU - Mix Up to Sixteen Different Elements**

When you need to convert, buffer, distribute, or switch various signal types, our "Linker System" offers a cost-effective solution. Designed with flexibility in mind, this system can be configured with the right modules to serve as a drop-in replacement for units from APCOM, Apogee Labs, and others, while providing enhanced capabilities, more features, higher quality, and the latest technology.

The LS16A delivers an unbeatable combination of modularity, high performance, and reliability. Its unique design allows up to 16 modules to be installed from the rear, with front-panel indicators, controls, adjustments, and test points available depending on the module type. Signal connectors are typically located at the rear for streamlined cable management.

The system features hot-swappable modules and supports redundant hot-swap power supplies, ensuring maximum reliability for critical applications. You can mix and match digital, analog, conversion, switching, and RF-over-Fiber modules within the same frame.

Each slot is individually addressable allowing users to monitor and control specific modules independently with the optional plug-in controller, featuring a 10/100/1GB Ethernet port. The LXI-certified controller enables web browser control and TCP/IP access to monitor and manage power supplies, fans, and overall system health. Custom modules are also available to meet specific needs.



## Applications:

- PCM Telemetry
- RF Over Fiber Conversion

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- TTL, PCM Clock and Data
- Mixed analog signals
- 422 Clock and Data
- IRIG time code
- SDI Video routing
- Digital conversion
- Redundancy Switching



#### Updated

0 0

LS16A showing the "Open Window" front panel design w/test points & LEDs

Updated - 1Gb Ethernet LS16A populated with sixteen A24 cards dual 1x2 wideband distribution



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Element Frequency C3L Module Description Wideband Multicoupler (1x4): variable gain, power & gain monitor IS16-A18 50MHz-3GHz L-Band Multicoupler (1x4): variable gain, power & gain monitor, LNB control LS16-A19 850MHz-2450MHz γ DC-50MHz Analog Distribution Amplifier (1x6): digital adjust, BNC, 75 ohm LS16-A30 γ Distribution Module: Digital TTL/422 distribution (1x6), 3x TTL, 3x "422" LS16-D05 50Mbps Ν Distribution Module: Dual 1x2 TTL digital distribution, 50/75 or High Z input, BNC LS16-D09 40Mbps Ν Distribution Module: Flexible 1xX TTL digital distribution, 50/75 or High Z input, BNC Y LS16-D29 50Mbps RF Over Fiber (Rx): Dual channel, 1310nm (used with USC F-LINK-II Tx unit) 50MHz-3GHz LS16-FR2 γ RF Over Fiber (Tx): Dual channel, 1310nm (used with USC F-LINK-II Rx unit) LS16-FT2 50MHz-3GHz γ L-Band LNB Power: LNB control 850MHz-2450MHz Υ LS16-L02 L-Band Multicoupler (1x2): variable gain, power & gain monitor, LNB control LS16-LO3 850MHz-2450MHz Y Switch Module: 6x1 relay mux with input termination, BNC DC-3GHz LS16-S04 γ

DC-3GHz Y Switch Module: dual 2x1 relay mux with input termination, BNC

Switch Module: up to three 2x1 relay elements, SMA

NOTE: Not all models or features are listed. See data sheet for full model number, specifications, options and suffix definitions.

Υ

LS16-S06-x DC-18GHz (50GHz)



LS16-S10



Global Signal Switching and Distribution Specialists

1

2 3

4 5

6

#### **High Performance Multicouplers** New

MCU1 Single & Dual Channel, up to 5.5GHz 1RU - Sizes 1x4, 1x8 and 1x16, Single or Dual

The MCU1 multicoupler units provide a low cost, high performance RF signal distribution solution for a variety of signals up to 5.5GHz. They are available in 1x4, 1x8 and 1x16 configurations. Sometimes switching is not needed, but signals still need to be distributed to various destinations. This product delivers ultra-high signal performance coupled with rugged construction at an affordable price.

The unit comes with removable rack mount flanges, but can also has rubber feet for bench-top use. The flanges can be installed four different ways to provide installation flexibility. An optional cable restraint/support bracket is available as well.

NOTE: Not all models or features model number, specifications, op



#### Applications:

- Ground stations
- Head-in feed distribution
- Expanding matrix configs
- Antenna distribution
- Satellite installation
- Teleports

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Frequency Range1.5MHz to 32MHz20MHz to 250MHz20MHz to 3000MHz350MHz to 5.5GHz		Example: MCU1-D8NRAF34 Unit has two sections of 1x8 N-Type connectors, outputs gain and frequency range						rear via vIA, +3dB ).								
850MHz to 2450MHz	N	<u>/ C U 1</u> - <u>x</u>	n c		: I g	ſ										
10kHz to 30MHz		▲ ▲	. 🔺 🛉													
	Series Number – Sections: S=Single, D=Dual –						Freque	ency l	ange (s	ee table	)					
	Outputs per section: $n=4$ , 8 or F (16) –		-				Gain:	0=Uni	, 3=3dB,	6=6dB						
	Input connector type: A=SMA, N=N-Type _						Outpu	t con	nector Ic	cation: F	R=Rear	, F=Fror	nt			
	Input connector location: R=Rear, F=Front -						Outpu	t con	nector : .	A=SMA, I	N=N-Ty	pe				



pler with N-Type in, and SMA connectors out

## Precision Dual 1x32 Digital Distribution

#### **1RU - PECL, LVPECL, LVTTL & LVDS Types**

The DDU32 is a cost effective and purpose built unit for the precision distribution of digital signals. It comes in a standard dual 1x32 configuration, and is available for many digital signal applications.

Sized in a 1RU package, the unit is designed with rear facing high performance SMB connectors. The unit is rack mountable with an illuminated power switch on the front panel, and all I/O and power connectors on the rear. To assist with providing the slightest amount of skew between all ports, the dual inputs are positioned at the center rear of the unit.

For clock and data distribution applications, many times the skew and alignment of data and clock signals is critical. This unit has a very precise skew design. An optional purpose built trigger and clock alignment feature is available with timing skew of <75ps through all ports.

NOTE: Not all models or features are listed. See data sheet for full model number, specifications, options and suffix definitions.







DIGITAL

## Multi-Level Digital Routing - R\$530/422/232 **S24530B** 20Mbps up to 24x24 **S64530** 50Mbps up to 64x64

#### 5RU - Flexible configurations from 3x3 to 64x64: Up to 50Mbps

The S24530B and S64530 systems are fully digital, asynchronous switch arrays engineered for routing RS-530, RS-530A, and RS-232 bidirectional serial interfaces. These systems handle all data, clock, and handshaking signals, supporting complete bus functionality for each interface. Additionally, multi-channel bi-directional RS-422 buses are supported with optional interface cards.

Key features include activity detection, loopback testing, level conversion (RS-232 to RS-530), and RS-232 primary/secondary channel shifting. The systems utilize a fully digital asynchronous core to minimize timing skew and avoid the limitations found in multiplexed common bus architectures.

When fully populated, the S24530B can route up to 24 DTE and 24 DCE devices, while the S64530 can handle up to 64 DTE and 64 DCE devices in a single mainframe. These systems can be expanded to accommodate configurations as large as 128 DTE by 128 DCE, or even more.

All user connections use industry-standard DB25 connectors with EIAstandard pinouts. The S24530B offers direct rear-panel I/O and scales in 3-channel increments, while the \$64530 scales in 8-channel increments and uses external 1RU adapter panels for connectivity. Both systems are housed in a 5RU mainframe designed for minimal MTTR.

The ports are secured with stainless steel hardware to ensure rugged, trouble-free operation. For smaller configurations, filler plates are included to maintain a clean setup. Expanded S64530 systems utilize additional adapter panels for user connectivity.

Available with single or dual controllers, each providing 10/100 Ethernet with web browser access, USB ports, and multi-serial connections. Self-monitoring, redundant hot-swap power supplies can be powered by any international AC source. Optional "X" models include a touchscreen display with X-Point view and enhanced features. The MAC4 remote control panel can also be added to provide a 10" networked hardware control panel for rack or desktop mounting. Custom configurations are available to meet your specific needs.

NOTE: Not all models or features are listed. See data sheet for full model number, specifications, options and suffix definitions



\$64530X (shown with Option X display)



Universal Switching



ROUTEWARE

PRO



New

24X24

S24530B

RS-530/422/232 Digital Router

#### Applications:

- TDMA Satellite Control

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- FDMA Control
- TTL Clock and Data
- CDMA Satellite Control
- 422 Clock and Data







S64530 RS-530/422 Digital Router

Corporation Global Signal Switching and Distribution Specialists 64X64 with Adapter Panels

Modular Digital & Analog Systems S2560F Digital 50Mbps S2561F Analog 125MHz S2562F Analog 200kHz S2565F Hybrid (64x64) BNC's on unit - No Adapters Needed S2566F Hybrid S2560F & S2561F combined New S5120A Digital 50Mbps (512x512)

#### 5RU - Flexible Configurations from 32x32 to 1024x1024

With a global installation base, our field-proven units can be configured to support up to 256 input x 256 output systems within a single chassis (S256xF units) or expanded to a 512x512 system with the new double-density digital S5120A. Each system can be enhanced with up to eight input and eight output modules, with each module adding 32 channels for the S256xF or 64 channels for the S5120A, enabling flexible expansion as your needs grow.

Redundant signal paths provide each I/O connection with up to 30 different routes for maximum reliability. Both digital and analog cores deliver exceptional bandwidth and performance, with the digital version offering real-time crosspoint verification for added assurance. I/O modules come in various specifications, including digital 422, analog, and instrumentation, and can be paired with Series AP adapter panels to support a comprehensive range of signal types (422, TTL, analog) for diverse connectivity needs.

Our updated "FX" models feature the Option X touchscreen display with X-Point view and advanced functionality, while the "F" version provides a 4.3" touchscreen without X-Point view. Both models come equipped with single or dual controllers, a web browser interface, 10/100/1GB Ethernet, USB, multi-serial ports, and the new "X-Point Classing" feature for enhanced control.

As an example, the S2561F can be configured as an analog building block, enabling a full 512x512 configuration with >125 MHz bandpass capability using external 1RU adapter panel assemblies (Series AP32x), showcasing the system's scalability and performance.

System Type	Frequency Range	Features
S2560F(X)	>50Mbps	Differential 256x256 (422) I/O, SCSI-II/50
S2561F(X)	DC-125MHz	Single-ended analog, 50 Position D-Sub
S2562F(X)	DC-200kHz	Single-ended instrumentation analog
S2565F(X)	Hybrid - Direct	Digital & analog type with BNC's (64x64)
S2566F(X)	Hybrid	Digital & analog type, adapters required
S5120A(X)	>50Mbps	Differential 512x512 (422) I/O, SCSI-II/100

NOTE: Not all models or features are listed. See data sheet for full model number, specifications, options and suffix definitions.

New



#### Applications:

- PCM Telemetry
- TTL Clock and Data
- Mixed analog signals
- 422 Clock and Data
- IRIG time code



(shown with **Option X** display)





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Single box 512x512 digital matrix to configure 1024x1024 with four units





AP32 Adapter Panels IRU units available for various configurations (passive or active) with interconnect cables included, and in different lengths (Model AP512 shown)



S2560F & S2561F Multipin connectors at the rear of the unit









## Precision Instrumentation & Sensor Routing TS02A 16x64 up to 64x64

#### 2RU - Precision Automated Patch: DC-200kHz, 64x64

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Designed from scratch to improve on the legacy Precision Filters Model 4164, the TS02A uses the absolute latest in component technology. Many still use manual patch cords & patch panels to interconnect sensors, recorders, scopes and other instrumentation in test & evaluation labs.

Our TS02A can automate much of your lab's sensor connectivity eliminating errors from human patching as well as mechanical connectivity problems from continuous patch cord activity. The TS02A provides up to 64 inputs, and 64 outputs in a non-blocking full Fan-OUT array. It includes built-in self-tests that non-invasively verifies validity of closed crosspoints (Go/No-Go), and can also perform testing on the complete array (FAT).

Each input is a differential pair to help eliminate low frequency sensor noise, and each output is single-ended. Each negative input (of the input pair) can individually be switched to signal ground for applications dependent needs. The RED dip switch you see in the picture provides this function for each input (see block diagram).

The TS02A includes front panel touchscreen and single controller providing 10/100 Ethernet with web browser, USB port, and multi-serial. Self-monitoring redundant hot-swap power supplies can be powered by any international AC power source. Optional 1RU rackmount isolated BNC panels are available (see below). Customized configurations are available by contacting the factory.

**NOTE:** Not all models or features are listed. See data sheet for full model number, specifications, options and suffix definitions.

TS02A

Fully populated 64x64





## Modular 1553 Patching System (Triax) New BS1553F 8x8 up to 64x64, DC-15MHz

#### 5RU - Flexible configurations from 8x8 to 64x64

Automating "patch panels" is a proven & effective method to reduce facility operating costs by increasing efficiency, productivity, repeatability, and reliability. Our B\$1553F(X) unit is a modular high density 5RU automated patch unit that can be configured in symmetric or asymmetric configurations from 8x8 to 64x64 within the same chassis.

Designed specifically for a passive differential signal path, high reliability mechanical relay technology is used with DC coupling (no transformers). Each input and output is terminated with 78 ohms (center pin to inner shield) when not selected to be patched. The internal stub-breaking design provides a nearly "transparent" 1553B environment to allow for accurate bus simulations.

Since the signal path is passive, it can also be used in ATE applications for patching signals to make differential or single-ended measurements. The unit can also patch high-speed `422 differential data signals.

Fully populated, this 5RU unit contains a total of 64 inputs and 64 outputs where each input can be connected to any one of the 64 outputs. The BS1553FX is the same but has a 10.1" display (**Option X**), plus enhanced front panel features and capabilities.

The B\$1553F comes standard with redundant hot-swap power supplies and is available with either single or dual (redundant) hot-swap C3 controllers installed. The C3 controller features 10/100/1GB Ethernet (LXI certified), USB 2.0 and multi-serial (R\$-232C/422A/485) control ports. It also includes an important new feature called "X-Point Classing".

NOTE: Not all models or features are listed. See data sheet for full model number, specifications, options and suffix definitions.



#### Applications:

- 1553B Bus simulation
- Aircraft test lab facilities
- Clock and Data routing
- Differential 422 routing
- Differential ATE signals



New BS1553FX (shown with Option X display)

1553B Bus Simulation Automated patch for including cables

and hardware into the configuration.













## Modular DC-18GHz Matrix MS2010A 4x4 up to 12x12 Matrix - Low MTTR

Cascade multiple for 33x33 Matrix, or larger

### 2RU - Relay-based, high performance, simple to maintain

Unique in the industry, this 18GHz product delivers a full matrix configuration in a small 2RU package. It features our proprietary relay element and design construction providing up to a 12x12 in just 2RU plus the added feature of quick and easy relay replacement with simple hand tools in <30 seconds for low MTTR.

Providing complete 1:1 connectivity of any input to any output (no fanout), the MS2010A has very high performance, passive, fully shielded, and bidirectional signal paths. Intended to automate manual patch cords or physical cable swapping (or replace similar bulky and dated competitive products), this unit is designed for switching any coaxial signal within the DC-18GHz frequency while being as transparent as possible. The SMA connectors at the rear panel are standard with N-Type and others optional.

The unit can also be specified with external input and/or output terminations if required (up to 11x12, 12x11 or 11x11). The unit can also include "looping ports" to cascade multiple units into larger arrays that are either symmetrical or asymmetrical (such as 22x22, or 12x44 respectively). Multi-unit arrays are easy to control & monitor with our MAC4 array controller (see below).

The MS2010A comes standard with redundant hot-swap power supplies and includes our C3 controller, both with convenient access behind the hinged front panel. The C3 controller features 10/100 Ethernet (LXI certified), USB 2.0 and multi-serial (RS-232C/422A/485) control port. It also includes an important new feature called "X-Point Classing".





MS2010A Modular 18GHz Matrix Up to 12x12 with Low MTTR







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## Other DC-18GHz Configurations (50GHz) MSD0601 Dual 6x1 with A/B Select MS06X02 6x2 Matrix

#### 2RU - Relay-based, high performance

This selection of units provide relay-based solutions in a few different configurations in a compact cost effective 2RU package. Standard units have DC-18GHz relays, though additional performance is available with optional 26GHz, 40GHz or even 50GHz relays. Units include 10/100 Ethernet & Multi-Serial control ports (RS232/422/485), front panel control & display, built-in web browser, and real-time clock.

#### About the MSD0601

This unit has two individual 6x1 self-terminating DC-18GHz switch paths, plus an A/B output selector. For control, it has illuminated LED buttons adjacent to each port as well as 10/100 Ethernet and multi-serial ports. This unit is also available with 26GHz, 40GHz or 50GHz relays as well for additional performance. It can be ordered with connectors on front or rear.

#### About the MS06X02

Delivering a blocking (1:1 connection) bidirectional 6x2 matrix array, this unit has SMA connectors that can be ordered with connectors on front or rear. For control, it has illuminated LED buttons in a matrix array as well as 10/100 Ethernet and multi-serial ports.

## Coaxial Relay Modules: DC-3GHz/6GHz RM1X2, RCP1, RCP1R

#### Cascadeable module, optional control panels: DC-6GHz

The RM1X2 is a high performance low cost coaxial relay module with N-Type connectors that can be just a component, or mounted to one of two 1RU rack mount relay control panels. The module has a DE-9P connector with a DE-9S on the opposite side of the module so that one module can plug into another. Relay control lines are passed through the module and kept independent so up to four relays can be either gang controlled, or individually as requirements demand.

The 1RU sized RCP1 and RCP1R rack mount control panels include an integrated serial control port and relay drivers. The RCP1R unit is designed so the signal connectors to face inside the rack, and the RCP1 is designed so everything faces the front of the rack (see below). They can DC powered, or include an optional wall mount power supply.

Model	Description
RM1X2	Relay module DC-3GHz, N-Type normally open (add -6 suffix for 6GHz version)
RM1X2T	Relay module DC-3GHz, N-Type self terminating (50 ohms)
RCP1	1RU Relay control panel, everything faces front of rack
RCP1R	1RU Relay control panel, everything faces rear of rack

**NOTE:** See data sheet for model number suffix definitions for DC voltages and AC wall mount power options.



#### Applications:

- Telemetry routing
- Antenna Selection
- Mixed analog signals
- High speed data
- ATE selector or router







- Redundancy
- Teleport and last mile
- Backup antennas
- Satellite ground stations - Communications
- Communications
- Uplinks or downlinks

RFMMMM DIGITAL LILL ANALOG



RCP1 Panel Type Up to four relay elements (1RU)





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## Video Routers

## 1RU & 2RU - 4KSDI, HD-SDI, SDI and Analog Video Routers

Specifically designed for analog and digital video switching or distribution, this array of units provide an effective solution for smaller installations. Compact and feature loaded, they are only 1RU or 2RU high and turn-key out of the box. These "fixed" configurations systems are not modular to reduce their cost. Suffix dash numbers can define other options. Units include 10/100 Ethernet control ports and web browser.



#### HDVSU1-3216 16 input, 16 output HDsdi, SDI & NTSC (1RU)

e CIS			New HDVMU1 Low cost SDI video muxes 4Ksdi HDsdi, SDI & NTSC (1RU)	as HDVSU2 32 input, 32 HDsdi, SDI &	output NTSC (2RU)
Model	Digital/Analog	Function	Frequency Range	Typ Signal	Features
VSU1-3208	Analog	24in, 8out	DC-300MHz	+/-1.5V	BNC, 75 ohm
VSU1-3208H	Analog	24in, 8out	DC-75MHz	+/-5.0V	High Level, BNC, 75 ohm
VSU1-3208	Analog	16in, 16out	DC-300MHz	+/-1.5V	BNC, 75 ohm
VSU1-3208H	Analog	16in, 16out	DC-75MHz	+/-5.0V	High Level, BNC, 75 ohm
VSU1-3208	Analog	8in, 24out	DC-300MHz	+/-1.5V	BNC, 75 ohm
VSU1-3208H	Analog	8in, 24out	DC-75MHz	+/-5.0V	High Level, BNC, 75 ohm
VSU1-4P6T	Analog	Quad 6x1	DC-135MHz	+/-5.0V	High Level, BNC, 75 ohm
VSU1-4P6T-AB	Analog	Quad 6x1 A/B	DC-135MHz	Analog	Quad 6x1analog, high level with A/B
VSU2-6432	Analog	32in, 32out	DC-500MHz	Analog	BNC, 75 ohm
HDVSU1-3216	Digital	16in, 16out	270M/1.485G/2.97G	Digital	SMPTE 292M, 424M, BNC, 75 ohm
HDVSU2-6432	Digital	32in, 32out	270M/1.485G/2.97G	Digital	SMPTE 292M, 424M, BNC, 75 ohm
HDVMU1-08	Digital	8x1	270M to 5.98Gbps	Digital	NTSC to UHDSDI video mux, BNC, DC supply New
HDVMU1-16	Digital	16x1	270M to 5.98Gbps	Digital	NTSC to UHDSDI video mux, BNC, DC supply New
NOTE: Not all models model number, spec	or features are listed. See c ifications, options and suffix	data sheet for full definitions.			

## **Custom RF Configuration Units**

## Rack mounted, custom RF units per your specifications

Specifically designed for your needs, USC has over 30 years of RF design experience. Though our standard product offering is extensive, not everyone can used a COTS unit from our catalog. Custom RF configurations, special control needs, performance parameters, whatever is needed. Here are a few examples.



Airborne DO-160G 8x1 (1x8) 100MHz to 20GHz solid-state

**RF Distribution Matrix** Up to 10 input, 20 output Range of 50MHz to 20GHz with modular internal design (6RU)

Specialized RF Configuration Multi-in, Multi-out SMA connectors, hot-swap supplies (2RU)



Global Signal Switching and Distribution Specialists

4K HD5Di 8KHD5Di 8KHD5Di

## DIGITAL ANALOG

## Signal Types:

- SDI, HD-SDI, 4K-SDI Video
- NTSC and RGB Video
- DVI-D and HDMI - TTL or IRIG Timecode
- LVDS, PECL, LVTTL
- 1,00, i LOL, LVII



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## Master Array Controller - Remote Panel Model MAC4 Rackmount or Desktop

#### 4RU - Modular symmetric or asymmetric configurations

To support signal switching, distribution, and monitoring applications requiring large channel counts, the recommended system may be comprised of several units working in concert. Operation of such an array typically requires application specific control software.

The MAC4 (Master Array Controller) is specifically designed to streamline control of a multi-system array. It can operate a group of switching hardware while providing the user with a single cross point configuration to control. It supports the 488.2 protocol common to Universal Switching products and can create arrays with most in-service units manufactured in the last decade.

Although intended for use with large system arrays, the MAC4 can also be used as a remote access panel or expanded function display for smaller single-system applications. Since the MAC4 communicates over Ethernet, it can be physically located anywhere that it can communicate to the other systems in the array. The MAC4 is designed for standard 19-inch rack mounting or desktop use.

An additional feature is the capacity to control two locally connected "PUC" modules. The MAC4 functions as a 10" display controller option for our RSX4/UC1 product lines. For reliability, the unit includes redundant replaceable power supplies. The integrated C3 controller features 10/100/1G Ethernet supporting LXI certified TLS secured WEB access, SNMP v1/v2C/v3, and TCP/IP remote control access.

#### Applications:

- Communications
- Teleport and last mile
- Encryption Tx/Rx modem
- Satellite ground stations
- ENG vans or trucks
- Uplinks or downlinks

(use as 4RU rackmount or desktop)



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<complex-block>

1.....

#### PUC1 Modules

SNMP

Up to two "PUC" modules can be controlled directly from the AC4 controller at the same time for other miscellaneous switching tasks. Modules can be located over 100 meters away. Consult factory.



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## **Pre-Configured TS2 Systems**

2RU - Complete systems from our G2 Series of products

This convenient system package called "TS2" which takes common configurations from our Series G2 switching line (see pages 8 & 9) and makes it simple to order a complete "turn-key" unit. All units are based on the 2RU rack mounted G2T4 unit, include redundant power supplies and contain 10/100/1G Ethernet, Serial and Alarm ports.

The "TS2" supplants the "SS2" units. It incorporates our advanced C3 Controller and touchscreen display. See our website for additional details and individual data sheets.



Model	Frequency Range	Configuration	CMM
TS202A	DC-200kHz	Differential input, single-ended output analog matrix, audio/sensors 16x16 to 64x64	ONIT
TS214	DC-18GHz	Up to six 6x1 self-terminating microwave relays	253
TS215	DC-3GHz	Coaxial Nx1 switching, 2x1, 4x1, 8x1, 16x1 sizes, SMA connectors	DOM <sup>BCOV</sup>
TS216	DC-1.3GHz	Coaxial Nx1 switching, 2x1, 4x1, 8x1, 16x1 sizes, BNC or SMA	ID
TS216T	DC-1.3GHz	Coaxial Nx1 switching with self-termination, 2x1, 4x1, 8x1, 16x1 sizes, BNC or SMA	
TS218	DC-18GHz	Up to seven 6x1 normally open microwave relays, SMA connectors	
TS232	DC-125MHz	DC coupled system for high frequency video signals (+/- 1.5V)	
TS232H	DC-75MHz	DC coupled system for high-level PCM, video, TTL or similar signals (+/-5V)	~ ~
TS240	DC-40GHz	Up to seven 6x1 normally open microwave relays, SMA connectors	ROUTEW
TS244	20-250MHz	High performance non-blocking "fan out" IF matrix, 8x8 to 32x32, 50 or 75 ohm	5
TS254	20-250MHz	High performance combining "fan in" IF matrix, 8x8 to 32x32, 50 or 75 ohm	
TS262A	DC-50Mbps	Differential 422 digital matrix for clock/data, 8x8 to 16x16, single or dual, Triax	Download our Mor software <b>RouteW</b>
TS264B	DC-50Mbps	Differential 422 digital matrix for clock/data, 16x16 to 64x64, single or dual, Dsub	FREE SU-ddy If

**NOTE:** Not all models or features are listed. See data sheet for full model number, specifications, options and suffix definitions.

## Series G2 - CAS (Critical Application System)

Modules covering DC to 30GHz - Digital or Analog Rack Mounted Modular Switching Configurations

The **CAS** version of our field proven Series G2 products brings switching system technology to a new level. Derived from our Series G2, the **CAS** version is specifically designed for ease of maintenance and high reliability coupled with a streamlined rugged design.

The typical **CAS** configuration consists of a 2RU power and control head, plus one or more switch frames depending upon the overall system configuration. The 2RU head unit can be configured with front loading dual hot-swap power supplies and dual hot-swap control CPU's. Standard features include touchscreen controls. The switch frames are available in standard sizes to meet common system needs. The frames are easily configured to user needs providing all interconnect cabling required between the front loading **CAS** modules and the rear connector panels. Rear panel signal connectors can be specified to meet any user requirement.

All modules, CPU's and power supplies can be hot-swapped via the hinged front panels without disturbing any cabling whatsoever. Simply open the front panel, slide an item out and replace with a spare.



**G2 - CAS** Example switch frame, 7RU









- Ground stations
- Communication centers
- Defense or FAA needs
- Critical missions
- Shipboard installations



G2 - CAS Example switch frame, 17RU

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Global Signal Switching and Distribution Specialists

## **Custom, OEM & Special Build Services**

#### Complete switching, distribution and purpose built

Since 1992, Universal Switching Corporation has being engineering & developing products for industry, Government agencies and subcontractors. With nearly 30 years of experience, we are looked to for delivering quality products fitted with the latest in technology and excellent reliability.

We can design something to suit most any application and most any specification. We've developed OEM products for numerous companies, produced "build-to-print" items, custom RF boxes, and have delivered entire multi-rack systems complete with custom software. All products are built in our ISO 9001:2015 certified facilities. Contact our local representative or the factory directly.

**Custom Products** Develop and build what you need



Build-To-Print Manufacturing

Custom RF Boxes Design unique purpose built RF boxes with documentation & software

OEM Products Private label our products for you







Legacy Updates Update older legacy MSC products

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Custom Finishes We can provide any paint or finishes you need for your application





U11600-26

3RU rack mount relay chassis with power supply, GPIB and RS-232C port

Universal

## U70000, UR\$70000 & E70000 Coaxial Relays

Rugged Coaxial Relays: DC-800MHz (frequency is size dependent) Sizes from 2x1 to 24x1

In April 2007, USC acquired the product line of Matrix Systems Corporation, including its renowned coaxial relay series. Today, USC continues to manufacture these durable and well-shielded relays, maintaining the high-quality standards for which they are known.

The Series U70000 is an Nx1 relay featuring various coaxial contact types, operated by applying specific DC voltages. It can also be installed into the Model U11600 rack-mount chassis, which includes relay drivers, remote control ports, and power supplies. The chassis, equipped with an LCD display, can house up to 24 relay modules, each requiring LED-illuminated driver cards. Relay status is easily visible through the top of the chassis, ensuring efficient monitoring.

The Series UR\$70000, like the U70000, is an Nx1 relay but comes with an additional serial control port for enhanced functionality. This model can be used as a standalone system, complete with its own control port and wall-mount power supply.

The latest addition to the lineup is the Series E70000, which offers the same core relay design but with advanced 10/100 Power over Ethernet (PoE) capabilities and built-in web browser control. This model is upgradeable from serial to Ethernet control, providing flex-ibility for evolving system requirements.

USC has adjusted the model numbering of these original relay series for compatibility with its current inventory system. For users seeking to reorder older MSC units, please note that a minimum order quantity of five units is required. If you're uncertain about the updated model numbers or need assistance with reordering, contact our application team or your local salesperson for support.



U70000 Coaxial relay (see Table 1)

New E70000

(see Table 2)

Coaxial relay with 10/100 PoE

URS70000 Coaxial relay with RS232 port and wall mount power supply (see Table 2)





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#### TABLE 1

#### **U70000** Model Number Definition

## U7[CC][NT]-[V][D][X)

Example: U72512-1PA (contact 25, 12x1, 24vdc, diodes with common positive and SMA's)

#### [CC] - Contact Configuration Type

- 10 Standard (normally open) 100vdc, 250ma, 10W 25 Standard (self-terminating type, 50 ohm) 4vdc, 250ma, 1/3W
- 27 Standard (self-terminating type, 75 ohm) 4vdc, 250ma, 1/3W
- 30 Medium isolation (normally open) 100vdc, 250ma, 10W 40 High isolation (normally open) 28vdc, 250ma, 3W 65 High isolation (self-terminating, 50 ohm) 4vdc, 250ma, 1/3W

- 67 High isolation (self-terminating, 75 ohm) 4vdc, 250ma, 1/3W 70 Mercury wetted (normally open) 500vdc, 1A, 35W (Note 5) 90 Standard with Triaxial connector (BJ77) 100vdc, 250ma, 10W

#### [NT] - Number of throws

- 02 2x1
- 04 4x1
- 08 8x1
- 12 12x1
- 16 16x1 24 - 24x1

#### [V] - Coil voltage (nominal)

- 1 24vdc to 28vdc (1000 ohm coils)
- 2 15vdc (500 ohm coils)
- 5 5vdc (135 ohm coils with NO series polarity diode included: P or N
- (noitgo

#### [D] - Coil suppression diodes

- 0 Not included
  - P Suppression diodes included with coil common positive
  - N Suppression diodes included with coil common negative

#### [X] - Extra options

- A SMA signal connectors (only on contact types 10, 25, 27 & 65) F F-Type signal connectors (only on contact types 10, 27) T TNC signal connectors (only on contact types 10, 25, & 65)

- I Insulated coaxial shield (only on contact types 10, 25, 27 & 70)
- S Insulated & switched coaxial shield (only contact types 10, 25, 27, 70)
- L Lockscrews on control connector so mate can be secured

#### U70000 NOTES:

- 1. The I or S options are not available on the optional signal connectors or
- the contact type 90 (triaxial).
- 2. The "expander" port is not available any longer
- 3. No mating connectors or hardware are included.
- Contact type 70 must be mounted with signal connectors facing up.
  Due to new environmental laws, USC may or may not be able to sell relays with
- mercury wetted contacts. Spec was 2A, 50W. Connectors must be within 20 deg of up.
- 6. For installing into the U11600 chassis, the "-1" coil voltage is needed. 7. Type 27 and 67 use the standard 50 ohm MSC connector.



#### TABLE 2

URS70000 & E70000 Model Number Definition

## URS7[CC][NT]-[X) E7[CC][NT]-[X)

Example: URS71008-A (contact 10, 8x1, and SMA connectors)

#### [CC] - Contact Configuration

- 10 Standard (normally open) 100vdc, 250ma, 10W
  - 25 Standard (self-terminating type, 50 ohm) 4vdc, 250ma, 1/3W 27 Standard (self-terminating type, 75 ohm) 4vdc, 250ma, 1/3W 30 Medium isolation (normally open) 100vdc, 250ma, 10W

  - 40 High isolation (normally open) 28vdc, 250ma, 3W

  - 65 High isolation (self-terminating, 50 ohm) 4vdc, 250ma, 1/3W 67 High isolation (self-terminating, 75 ohm) 4vdc, 250ma, 1/3W
  - 70 Mercury wetted (normally open) 500vdc, 1A, 35W (Note 5)
  - 90 Standard with Triaxial connector (BJ77) 100vdc, 250ma, 10W

[NT] - Number of throws

- 02 2x1 04 4x1
- 08 8x1
- 12 12x1
- 16 16x1 24 24x1

#### [X] - Extra options

- A SMA signal connectors (only on contact types 10, 25, 27 & 65) F F-Type signal connectors (only on contact types 10, 27)

#### URS70000 & E70000 NOTES:

- 1. The I or S options are not available on the optional signal connectors or the contact type 90 (triaxial).
- 2. The "expander" port is not available any longer
- 3. No mating connectors or hardware are included.
- Contact type 70 must be mounted with signal connectors facing up.
  Due to new environmental laws, USC may or may not be able to sell relays with
- mercury wetted contacts. Spec used to be 2A, 50W.
- 7. Type 27 and 67 use the standard 50 ohm MSC connector.



- T TNC signal connectors (only on contact types 10, 25, & 65) I Insulated coaxial shield (only on contact types 10, 25, 27 & 70) S Insulated & switched coaxial shield (only contact types 10, 25, 27, 70)

#### Take Control of Your Requirements Controllers, Adapters and Interfaces

Universal Switching Corporation can provide the complete solution to your switching needs including remote control and status panels, rack-mounted control PC units, plus monitor and control software. All units are designed to be remotely controlled. We offer many choices including 10/100/1GB Ethernet, Serial (RS-232C,RS-422A & RS-485), GPIB and manual.

#### Updated

Plug-in C3 and C3-Lite Controllers certified LXI with TCP/IP, HTTPS (SSL/TLS), SNMP v1/v2c/v3, SNTP, IPv4/6 Latest in hot-swap control interface technology with the best in network security layers and protocols, plus fast 10/100/1GB hardware with auto-negotiation. Also includes multi-serial port, alarm port, realtime-clock, plus microSD memory slot.



## Control & Monitor Software RouteWarePRO 5.0

## Individual license, 5-pack. USB-KEY type available too.

Our product called RouteWarePRO is a self-contained GUI software package designed specifically to control and monitor Universal Switching Corporation's products. Engineered for ease of use, most users are up and running within minutes where you can control 1, 10 or 100+ units from anywhere. Download our Monitor & Control software **RouteWarePRO** for a FREE 30-day trial today!

GUI colors, channel labeling and configuration uploads are all user definable.

#### Version 5.0 new features:

- Updated Metro visual style and improved functionality
- Improved X-Point grid features
  - \* Touchscreen friendly grid size
    - \* Subset assignments and view to simplify navigating large matrices
- \* Lockout/Summary view for status-only display
- Fully updated for Windows 11/10/8.1/8 compatibility
- Class assignment/editor for creating connection restrictions
- Direct support for C3 generation CPU functions
  - \* Class assignment and management \* Names/Labels (Port, Memory Location, and Class)
  - \* Event Scheduler & Device Log
  - \* Time stamped memory locations & Device Log
  - \* Upload/download channel labels
- Signal activity status indicators (on supported hardware)
- Tri-Stage diagnostics (exemption table and active scan support)



## **Quality Management System**

Since 2007, Universal Switching Corporation has implemented and maintains a Quality Management System (QMS) which serves as the backbone for the products, services and innovative designs offered. Continuing our commitment to being the leader in the programmable switching industry, the company's QMS is certified to the latest ISO 9001:2015 quality standard.

Universal Switching Corporation's management fully supports the ISO process and its function within the company. The tremendous teamwork and dedication shown by all "Team USC" members to our Quality Management System has resulted in continuous re-certification by National Quality Assurance since our QMS was effected. Of all QMS regimes, the ISO 9000 family of standards is the most widely implemented across the globe.

#### **Quality Policy**

Universal Switching Corporation is committed to being the leader in the programmable switching industry by providing innovative products and services that continually exceed our customer expectations.

#### **Quality Statement**

Universal Switching Corporation has a Quality Policy that serves as the backbone for the products, services and innovative designs it offers. As a global supplier of cutting-edge switching equipment and associated support products, Universal Switching Corporation's management fully supports the ISO process and its function within the company. With our QMS achieving ISO 9001:2015 certification, Universal Switching Corporation has demonstrated to ANAB accredited third party auditors (National Quality Assurance) that we have an effective Quality Management System in place. These include the following types of processes:

- Management responsibility
- Management review
- Resources and work environment
- Product realization
- Design and development
- Customer relations
- Measurement, analysis and improvement
- Purchasing

- Outsourcing
- Production and service provisions
- Control of monitoring and measuring devices
- Control of nonconforming product
- Analysis of data
- Continual improvement
- Corrective action
- Preventative action
- Flevenianve achon

## What Is That RR All About?

A new graphic is throughout our catalog, products, website, Twitter, Facebook & elsewhere. Some switching manufacturers focus only on resiliency. While this common, it is only half of our product development mission. What sets Universal Switching Corporation apart from our competition is the first part of our mission; engineering absolute reliability into our products. We are displaying this graphic as a reminder that our mission is to engineer BOTH reliability and resiliency into each and every product we build.

reliability [ri-lahy-uh-bil-i-tee] noun

1: the ability to be relied on or depended on, as for accuracy, or achievement.

resiliency [ri-zil-yuhn-see] noun

1: the power or ability to return to the original form. 2: ability to recover readily from adversity, or the like.

#### The company was established with three objectives in mind:

1. Provide the best switching, distribution and conversion equipment on the market.

2. Provide superior service and serviceability utilizing modular, expandable, leading edge designs by blending the full spectrum of available technology.

3. Provide our customers with timely and cost-effective solutions for all their signal applications.

A little known fact is that the property that Universal Switching Corporation sits on was formerly Lockheed's secret division called "Skunk Works". This division was operated by Clarence L. "Kelly" Johnson where very famous aircraft were secretly conceived such as the XB80, U-2, F-117 Stealth Fighter, and the beautiful SR-71 Blackbird (which still hold the worlds flight speed record).







MANAGEMENT SYSTEMS





nga

**ISO 9001** 

QUALITY MANAGEMENT



## @US\_Corp

## **Standard Warranty Agreement**

Universal Switching products are warranted against manufacturing and workmanship defects for a period of two years from the date of shipment. During this period, Universal Switching Corporation will, at its option, either repair or replace products which prove to be defective or out of specification per the original purchase order or contract. Damage by misuse or abnormal conditions of operation, or evidence of partial or complete disassembly beyond normal maintenance or expansion procedures void this warranty in its entirety. Since Universal Switching Corporation has no control over conditions of use or applications for the products intended use, beyond such performance specifications set forth in the purchase order or contract at the time of order.

Equipment shipped FOB factory (Universal Switching Corporation) shall become the property of the Buyer upon delivery to the carrier. Equipment shipped FOB destination shall become the property of the buyer upon delivery acceptance of the carrier. All damages during shipment should be handled by immediately requesting the carrier's inspection upon evidence of damage or tampering of the packing material or equipment. This warranty excludes all other warranties expressed or implied. Universal Switching shall not be liable for any special, indirect or consequential damages.

## **Return Loss to VSWR Conversion Table**

For warranty service or repair, the buyer shall prepay all shipping charges to Universal Switching Corporation, and Universal Switching Corporation shall pay shipping charges to return the repaired or replaced item to the buyer. However, the buyer shall pay all shipping charges, duties and taxes for products returned to Universal Switching Corporation from a country other than that of the United States of America.

Universal Switching Corporation warrants that its software and firmware designated by Universal Switching Corporation for use with an instrument will execute its programming instructions when properly installed on that instrument. Universal Switching Corporation does not warrant that the operation of the instrument, or software, or firmware will be uninterrupted or error-free.

Extended warranties are available from the factory up to 7 years. For other support options, we also provide customized service contracts as needed. Contact the factory for more information.

Return Loss (dB)	VSWR (ratio)	Reflection Coefficient	Mismatch Loss (dB)	Reflected Power (%)	Through Power (%)
1	17.39	0.891	6.868	79.43	20.57
2	8.72	0.794	4.329	63.10	36.90
3	5.85	0.708	3.021	50.12	49.88
4	4.42	0.631	2.205	39.81	60.19
5	3.57	0.562	1.651	31.62	68.38
6	3.01	0.501	1.256	25.12	74.88
7	2.61	0.447	0.967	19.95	80.05
8	2.32	0.398	0.749	15.85	84.15
9	2.10	0.355	0.584	12.59	87.41
10	1.92	0.316	0.458	10.00	90.00
11	1.78	0.282	0.359	7.94	92.06
12	1.67	0.251	0.283	6.31	93.69
13	1.58	0.224	0.223	5.01	94.99
14	1.50	0.200	0.176	3.98	96.02
15	1.43	0.178	0.140	3.16	96.84
16	1.38	0.158	0.110	2.51	97.49
17	1.33	0.141	0.088	2.00	98.00
18	1.29	0.126	0.069	1.58	98.42
19	1.25	0.112	0.055	1.26	98.74
20	1.22	0.100	0.044	1.00	99.00
21	1.20	0.089	0.035	0.79	99.21
22	1.17	0.079	0.027	0.63	99.37
23	1.15	0.071	0.022	0.50	99.50
24	1.13	0.063	0.017	0.40	99.60
25	1.12	0.056	0.014	0.32	99.68
26	1.11	0.050	0.011	0.25	99.75
27	1.09	0.045	0.009	0.20	99.80
28	1.08	0.040	0.007	0.16	99.84
29	1.07	0.035	0.005	0.13	99.87
30	1.07	0.032	0.004	0.10	99.90
31	1.06	0.028	0.003	0.08	99.92
32	1.05	0.025	0.003	0.06	99.94
33	1.05	0.022	0.002	0.05	99.95
34	1.04	0.020	0.002	0.04	99.69
35	1.04	0.018	0.001	0.03	99.97
36	1.03	0.016	0.001	0.03	99.97
37	1.03	0.014	0.001	0.02	99.98
38	1.03	0.013	0.001	0.02	99.98
39	1.02	0.011	0.001	0.01	99.99
40	1.02	0.010	0.000	0.01	99.99



#### Sketch your secret design concept here...

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## **Factory Authorized Representatives** Domestic and International Offices - October 2025

Alabama GenTek Inc Phn: (813) 961-0689 GenTekRep.com

Alaska Elotek Systems Toll Free: (888) 435-6835 elotek.com

#### Arizona

**Elotek Systems** Toll Free: (888) 435-6835 elotek.com

Arkansas

CentraMark Phn: (972) 414-8188 cmatex.com

California Elotek Systems Toll Free: (888) 435-6835 elotek.com

Colorado Elotek Systems Toll Free: (888) 435-6835 elotek.com

Connecticut Claflin Associates Toll Free: (888) 252-3546 888claflin com

Delaware Claflin Associates Toll Free: (888) 252-3546 Web: 888claflin.com

Florida GenTek Inc Phn: (813) 961-0689 GenTekRep.com

Georgia GenTek Inc Phn: (813) 961-0689 GenTekRep.com

Hawaii Elotek Systems Toll Free: (888) 435-6835 Web: elotek.com

Idaho Elotek Systems Toll Free: (888) 435-6835 elotek.com

Indiana JR Johnson Associates Toll Free: (800) 637-6775 jamesr.com

Illinois JR Johnson Associates Toll Free: (800) 637-6775 iamesr.com

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Kansas JR Johnson Associates Toll Free: (800) 637-6775 iamesr.com

Louisiana

CentraMark Phn: (972) 414-8188 cmatex.com

Maine **Claflin Associates** Toll Free: (888) 252-3546 888claflin.com

**Massachusetts** Claflin Associates Toll Free: (888) 252-3546 888claflin.com

Maryland Delmarva Engineering Phn: (410) 990-9000 delmarva-eng.com

Michigan JR Johnson Associates Toll Free: (800) 637-6775 igmest com

Minnesota JR Johnson Associates Toll Free: (800) 637-6775 iamesr.com

Mississippi GenTek Inc Phn: (813) 961-0689 GenTekRep.com

Missouri JR Johnson Associates Toll Free: (800) 637-6775 iamesr.com

Montana Elotek Systems Toll Free: (888) 435-6835 elotek.com

Nebraska JR Johnson Associates Toll Free: (800) 637-6775 jamesr.com

Nevada Elotek Systems Toll Free: (888) 435-6835 elotek.com

**New Hampshire Claflin Associates** Toll Free: (888) 252-3546 888claflin.com

**New Jersey** Claflin Associates Toll Free: (888) 252-3546 888claflin.com

**New Mexico** Elotek Systems Toll Free: (888) 435-6835 elotek.com

New York Claflin Associates Toll Free: (888) 252-3546 888claflin.com

North Carolina Delmarva Engineering Phn: (410) 990-9000 delmarva-eng.com

North Dakota JR Johnson Associates Toll Free: (800) 637-6775 iamesr.com

Ohio JR Johnson Associates Toll Free: (800) 637-6775 iamesr.com

Oklahoma CentraMark Phn: (972) 414-8188 cmatex.com

Oregon Elotek Systems Toll Free: (888) 435-6835 elotek.com

Pennsylvania **Claflin Associates** Toll Free: (888) 252-3546 Web: 888claflin.com

**Rhode Island Claflin Associates** Toll Free: (888) 252-3546 888claflin com

South Carolina GenTek Inc Phn: (813) 961-0689 GenTekRep.com

South Dakota JR Johnson Associates Toll Free: (800) 637-6775 jamesr.com

Tennessee GenTek Inc Phn: (813) 961-0689 GenTekRep.com

Texas CentraMark Phn: (972) 414-8188 cmatex.com

Utah Elotek Systems Toll Free: (888) 435-6835 elotek.com

Vermont **Claflin Associates** Toll Free: (888) 252-3546 888claflin.com

Virainia Delmarva Engineering Phn: (410) 990-9000 delmarva-eng.com

Washington Elotek Systems Toll Free: (888) 435-6835 elotek.com

Washington D.C. Delmarva Engineering Phn: (410) 990-9000 delmarva-eng.com

West Virginia Delmarva Engineering Phn: (410) 990-9000 delmarva-eng.com

Wisconsin JR Johnson Associates Toll Free: (800) 637-6775 jamesr.com

Wvomina Elotek Systems Toll Free: (888) 435-6835 elotek.com

Australia SouthTech Systems Phn: +61-3-9459-4963 southtechsystems.com.au

Belaium *EEMCCOIMEX* Phn: +31-320-295-395 eemc.nl

Brunei TME Systems Pte Ltd Phn: +(65) 6747 7234 tmesystems.net

Egypt SHIMCO Engineering Consultants Phn: +202-330-36216

France Milexia Phn: +33 (0)1 69 53 80 00 milexia.fr

India AUM Microwave Phn: +91 (0) 9908806426 aummicrowáve.com

Indonesia TME Systems Pte Ltd Phn: +(65) 6747 7234 tmesystems.net

Ireland Castle Microwave LTD Phn: +44 (0)1635 271300 castlemicrowave.com

Israel A.Telemetry LTD Phn: +972-9-7450475 a-telemetry.com

Italy Milano Brothers Phn: +39-338.49.69.298 milanobro.com

Luxemburg EEMCCOIMEX Phn: +31-320-295-395 eemc.nl

Malaysia TME Systems Pte Ltd Phn: +(65) 6747 7234 tmesystems.net

**Netherlands EEMCCOIMEX** Phn: +31-320-295-395 eemc.nl

**New Zealand** SouthTech Systems Phn: +61-3-9459-4963 southtechsystems.com.au

**People's Republic of China** Mathilda Science Co. LTD Phn: +(86) 21-64753778 mathisci.com.cn

**Philippines** TME Systems Pte Ltd Phn: +(65) 6747 7234 tmesystems.net

Portugal Milexia

Phn: +34 917 216 630 milexia.com

Singapore TME Systems Pte Ltd Phn: +(65) 6747 7234 tmesystems.net

South Korea Adex Aerospace Phn: +1-714-280-0195 adexaero.com

> Lumax Aerospace Phn: +82-42-934-8293 lumaxaero.com

Spain Milexia Phn: +34 917 216 630 milexia.com

Taiwan (R.O.C.) Evergo Instruments Inc. Phn: +886-2-2752-0767 evergo.com.tw

Thailand TME Systems Pte Ltd Phn: +(65) 6747 7234 tmesystems.net

**United Kinadom** Castle Microwave LTD Phn: +44 (0)1635 271300 castlemicrowave.com

NOTE: For areas not mentioned on this list, please contact the factory directly



@US\_Corp

7671 North San Fernando Road Burbank CA 91505-1073 USA

Phn: +1 818-381-5111 Email: sales@uswi.com Web: uswi.com

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