

Coax Switch Matrix Selection Guide

MIMO

USB



Filter Bank

Multiplexor



Ethernet



GPIB



TELEDYNE
COAX SWITCHES
Everywhere you look™



RoHS or Non-RoHS:
Your Choice!



Switching Solutions

Industry Leader

With over 50 years experience, Teledyne is the world's innovative leader in manufacturing ultraminiature, hermetically sealed, electromechanical and solid-state switching products. Our comprehensive product line meets a wide range of requirements for industrial, commercial, medical, RF & wireless, defense and aerospace applications.

Product Assurance

Under an aggressive Total Quality Management (TQM) program, Teledyne has embraced a "continuous improvement" culture. With recognized certifications such as Boeing D1-9000, DSCC MIL-STD-790, and ISO 9001/9002, Teledyne has become a primary supplier of switching solutions with the highest quality and reliability to industry leaders around the world.

Product Development

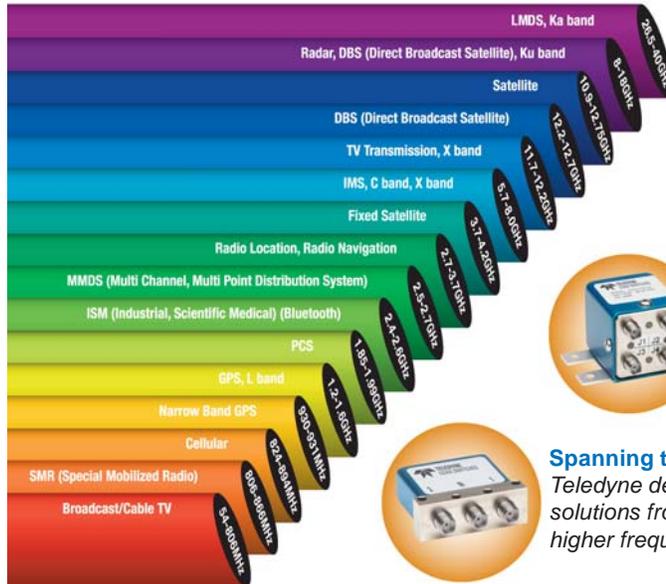
Teledyne offers a full range of comprehensive switching solutions. In addition to offering standard switching solutions, our experienced team works closely with our customers to develop tailored products for specific applications. We offer advanced engineering, state-of-the-art manufacturing techniques, and over 45 years of switching experience with a commitment to quality, costs and delivery.

Standard & Custom Matrix Assemblies

Teledyne offers a wide variety of RF matrix assemblies. Incorporating highly repeatable and long-cycle-life relays and switches, our matrices cover the spectrum from DC to 40GHz.

Teledyne's modular approach building matrices allows assembly of a vast array of customized matrices with the same standard subassemblies. The internal components utilize Teledyne's proven switches. Our universal programmable microcontroller can be used for any matrix configuration. The universal power supply allows the matrix assembly to be used worldwide.

Teledyne is highly vertically integrated, which reduces development time, qualification time, cost and leadtime, while ensuring high quality and cost-effective production.



Spanning the Spectrum —
Teledyne delivers switching solutions from DC to 40 GHz, with higher frequencies in development.



Featured switching solutions include:

Microwave Switch Matrix Assemblies

- Multiple standard and customized configurations
- Universal Power Supply
- Visual Display – LCD
- Standard and custom racks available



CCR-40 DC–40 GHz SPDT Switch

- Excellent insertion loss repeatability
- Ultra low passive intermodulation (PIM)
- Characterized at 5 million cycles
- Compact design up to 40 GHz



Space-Qualified Switches

- Screening as required per customer
- Custom designs available
- Proven heritage in space

Matrix Assemblies — Teledyne provides matrix assemblies, such as the Model CSM-0003 1x40 Switch Matrix, that incorporate coaxial switches.

Space-Qualified Switches

Teledyne's space-qualified coaxial switches are typically custom-designed and manufactured according to specific performance requirements. We also provide a complete line of standard, off-the-shelf switches that offer customers significant cost savings, while satisfying most typical requirements for scientific, meteorological and communication satellite applications.

Technical Service & Customer Support

Teledyne provides easy access to technical service and customer support. Our website makes it easy to find technical information, buy products and even get e-mail responses within 24 hours. Switching solutions are only a mouse click away at www.teledynecoax.com.

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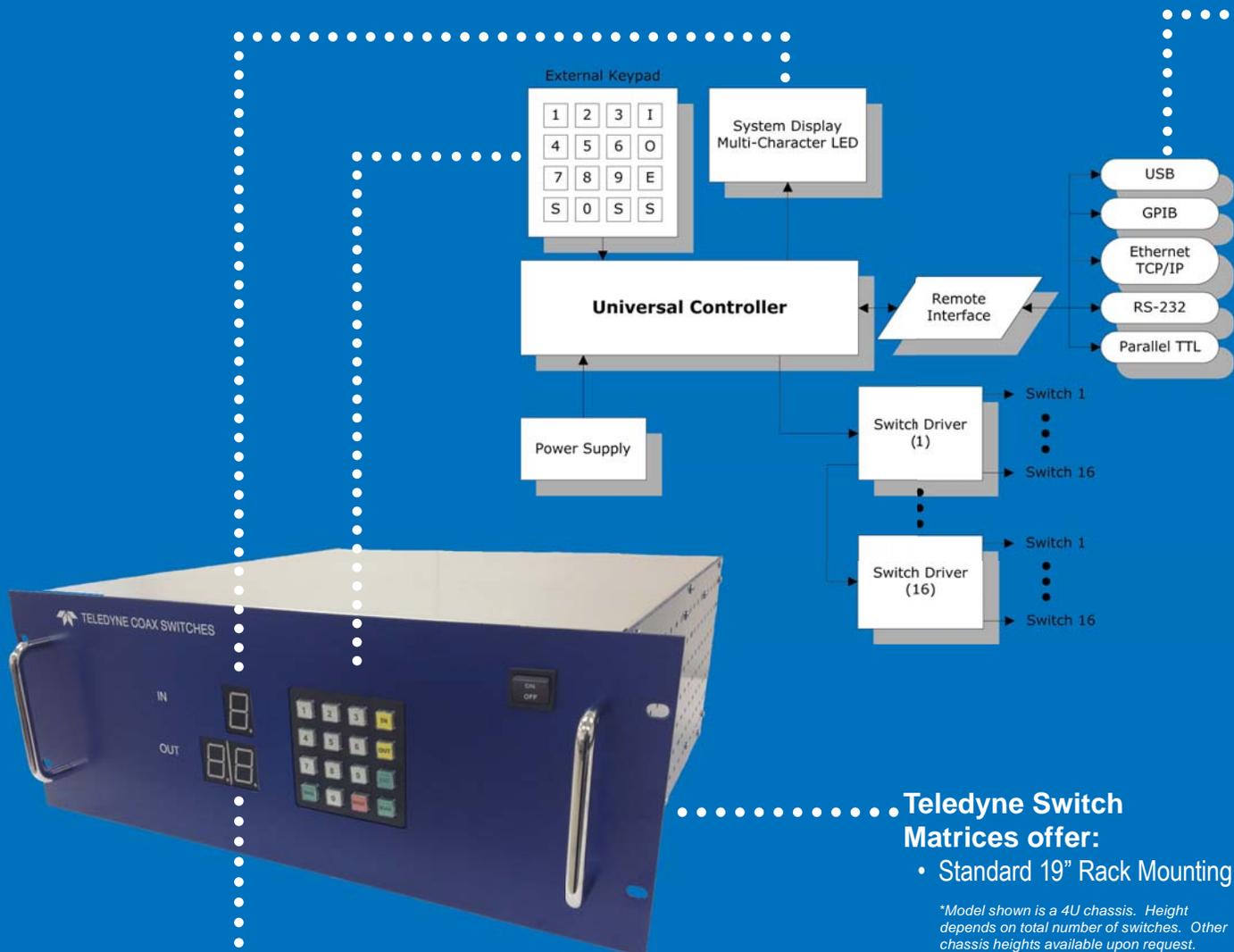
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Teledyne Coax Switch

What is a switch matrix?

A switch matrix is a system composed of multiple individual switches connected to achieve multi-input and multi-output configurations, allowing you to reduce space and cost. The system utilizes Teledyne's universal controller that offers multiple interface options. Integrated matrix systems by Teledyne simplify your complex switching needs by allowing you to select a combination of input ports to output ports, instead of tediously commanding individual switches to form a signal path.

Teledyne Matrix Systems come in standard and customized rack mount chassis. These matrix systems are available in 50Ω and 75Ω characteristic impedance. Teledyne Switch matrices offer a turn-key solution for customers in need of high switch count applications using proven reliable Teledyne Coax Switches.



Teledyne Switch Matrices Feature:

- Relay Switch Position Indicators
- Switch Cycle Count

Teledyne Switch Matrices offer:

- Standard 19" Rack Mounting

*Model shown is a 4U chassis. Height depends on total number of switches. Other chassis heights available upon request. (1U = 1.75" Height)

Matrix Intro



Teledyne Switch Matrices are available with a variety of RF connector types:

- SMA
- 2.92 mm
- TNC
- Type N
- QMA
- mini-SMB (75Ω)
- BNC (75Ω)

Standard Power Supplies support a wide variety of input sources including 400Hz airframe power

All remote communications options integrate easily with LabVIEW™

Additional optional capabilities:

Customized mounting or packaging solutions

Environmental testing:

- Acoustic Noise
- EMI/RFI
- Transient Suppression
- Ballistic Shock Fatigue
- Temperature
- Vibration
- Crash Load
- Humidity
- Altitude

Additional passive component integration such as:

- Filters
- Circulators
- Attenuators
- Splitters
- Power Dividers
- Power Combiners

Teledyne Coaxial Switch

SPDT Switches:



- DC-40GHz
- 2.92mm/SMA Connectors
- Failsafe & Latching
- Designed for 50Ω
- 5 Million Cycles



- DC-12GHz
- TNC & Type N Connectors
- Failsafe & Latching
- Designed for 50Ω
- High Power
- 2 Million Cycles



- DC-3GHz
- mini-SMB Connectors
- Failsafe & Latching
- 75Ω
- 5 Million Cycles



- DC-26.5GHz
- SMA Connectors
- Failsafe & Latching
- Internal 50Ω termination
- 5 Million Cycles

TRANSFER Switches:



- DC-18GHz
- SMA Connectors
- Failsafe & Latching
- Designed for 50Ω
- 5 Million Cycles



- DC-12GHz
- TNC & Type N Connectors
- BNC Connectors (Up to 3GHz)
- Failsafe & Latching
- Designed for 50Ω & 75Ω
- High Power
- 3 Million Cycles

2P3T Switches:



- DC-26.5GHz
- SMA Connectors
- Failsafe & Latching
- Designed for 50Ω
- 5 Million Cycles

Overview

Multi-Throw Switches:



- DC-26.5GHz
- SMA Connectors
- Normally Open & Latching
- SP3T to SP10T
- Designed for 50Ω
- 5 Million Cycles



- DC-12GHz
- TNC & Type N Connectors
- Normally Open
- Designed for 50Ω
- SP3T to SP8T
- High Power
- 3 Million Cycles



- DC-26.5GHz
- SMA Connectors
- Normally Open & Latching
- SP3T to SP10T
- Internal 50Ω termination
- Designed for 50Ω
- 5 Million Cycles

3-State Attenuated Switches:



- DC-25GHz
- SMA Connectors
- State 1: 50 Ohm Terminated Path
- State 2: 20dB Attenuated Path
- State 3: Thru Path
- Designed for 50Ω
- 5 Million Cycles

Teledyne Coax Switches

Teledyne Switch Matrix Systems feature high performance coaxial switches. Teledyne's broad product line allows for maximum versatility and unlimited configuration offering.



For complete review of Teledyne Coax Switches, please download our Selection guide at: www.teledynecoax.com

Teledyne Switch Matrix

Teledyne's Switch Matrix Systems encompass four different series. Below is a quick overview outlining the matrix types, features and additional options offered within each series. A standard Teledyne Matrix System features RS-232 and 4U rack-mountable chassis. Teledyne Systems can quickly translate from customer need, to block diagram, to reliable switching system.

CSM-1000 Series: MIMO/Blocking Switch Matrix

(See Example on Page 12)

- Maximum of 1024 switch paths
- SMA, mini-SMB, Type N, TNC or 2.92mm Standard options. Other connector types available upon request
- RS-232 (Standard), USB, GPIB, Parallel TTL, Ethernet TCP/IP interface options
(All remote communications options integrate easily with LabVIEW™)
- Failsafe, Latching or Normally Open Configurations
- Switching systems for 50Ω & 75Ω applications
- Internal termination available
- 1 Million Cycle Life (per port)

CSM-2000 Series: Multiplexor/Fanout Switch Matrix

(See Example on Page 13)

- Maximum of 1x1024 Configuration
- SMA, mini-SMB, Type N, TNC or 2.92mm Standard options, Other connector types upon request
- RS-232 (Standard), USB, GPIB, Parallel TTL, Ethernet TCP/IP interface options
(All remote communications options integrate easily with LabVIEW™)
- Failsafe, Latching or Normally Open Configurations, other configurations available upon request
- Switching systems for 50Ω & 75Ω applications, other impedances available upon request
- Internal Termination
- 1 Million Cycle Lifes (per port)



Series Overview



TELEDYNE
COAX SWITCHES
Everywhere you look™

CSM-3000 Series: MIMO Single Connection Switch Matrix

(See Example on Page 14)

- Maximum of 1024 switch paths
- SMA, mini-SMB, Type N, TNC or 2.92mm Standard options. Other connector types available upon request
- RS-232 (Standard), USB, GPIB, Parallel TTL, Ethernet TCP/IP interface options
(All remote communications options integrate easily with LabVIEW™)
- Failsafe, Latching or Normally Open Configurations
- Switching systems for 50Ω & 75Ω applications
- Internal termination available
- 1 Million Cycle Life (per port)

CSM-4000 Series: Custom Configuration Switch Matrix

(See Example on Pages 15-17)

- RS-232 (Standard), USB, GPIB, Parallel TTL, Ethernet TCP/IP interface options
- Custom switching configurations such as: Bypass, Expandable, Independent matrices in one chassis
- Integration of passive components such as Filters and Attenuators
- Custom displays, buttons, switches, LEDs and front panel schematics
- Custom marking, painting, labeling, flanges, handles, non-enclosure switch plates
- Custom matrix interface such as military-rated connectors, Indicators, Readback
- Switching systems for 50Ω & 75Ω applications
- Internal termination available
- 1 Million Cycle Life (per port)

See matrix gallery on pages 12-17



Teledyne Switch Matrix Program

Teledyne's Switch Matrix Systems offer switching systems for a variety of markets including: Military and Defense, Aircraft, Industrial, SATCOM, Advanced TeleComm, ATE, LTE 4G and many more. Teledyne's 50 years experience in switching technology make it the most reliable matrix system on the market.

Program Oriented Design Review

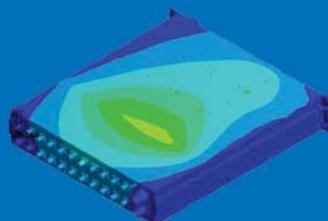
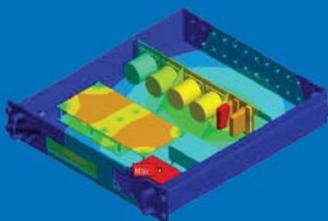
- Compliance Matrix against customer requirements
- Mechanical Layout against customer requirements
- Thermal Analysis
- Cascade Analysis with tolerances
- Power Analysis against customer requirements

Program Oriented Development Engineering

- Qualification Test Procedure
- Qualification Testing Report
- Acceptance Test Procedure
- Test Data
- Configuration and Data Management (traceability and sustainment/logistics support)

Coax Switch Matrix Testing Capabilities:

- Shock
- Ballistic Shock
- Crash Load
- Random Vibration
- Acoustic Noise
- Temperature
- Sinusoidal Vibration
- Altitude
- Humidity



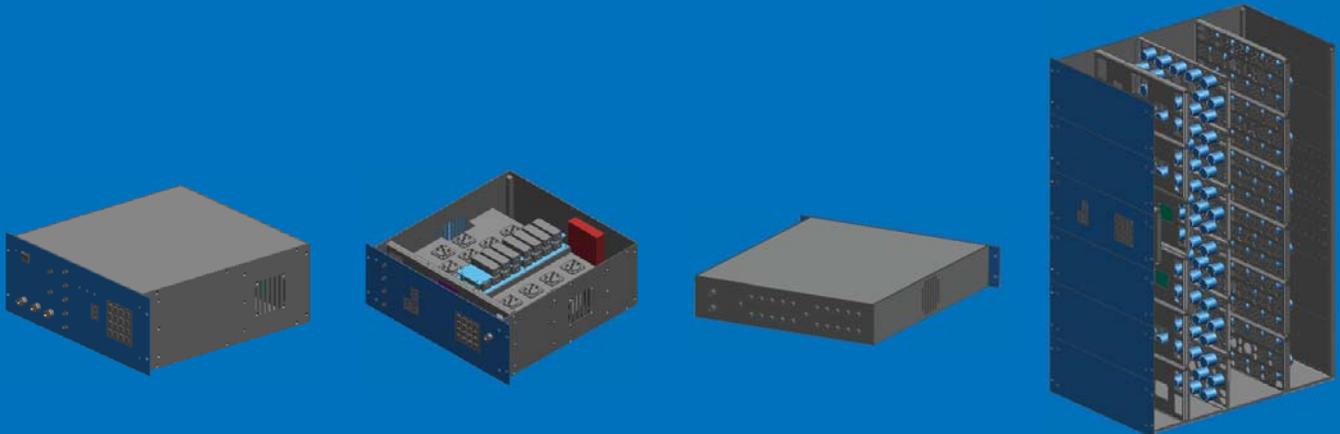
Management Capabilities

Additional Special Requirements:

- 3D Modeling
- Transient Suppression Diodes
- EMI/RFI Suppression
- Transient Suppression Resistors
- Distortion Products
- Hazmat Requirements
- Unique Identification Marking

Switch Matrix Applications:

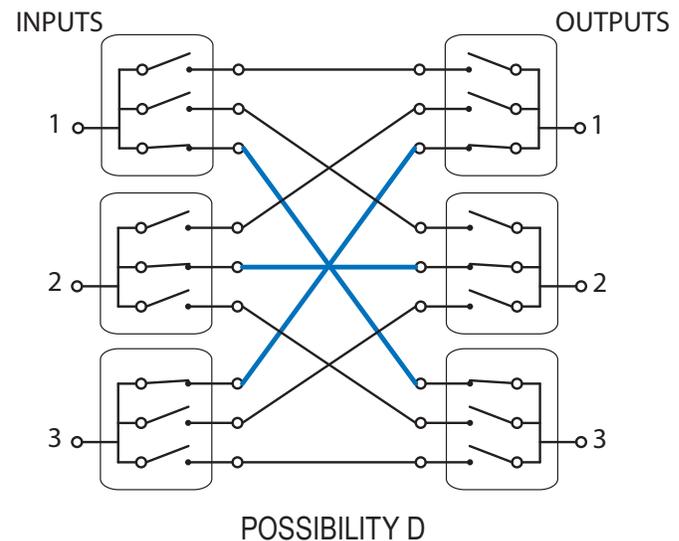
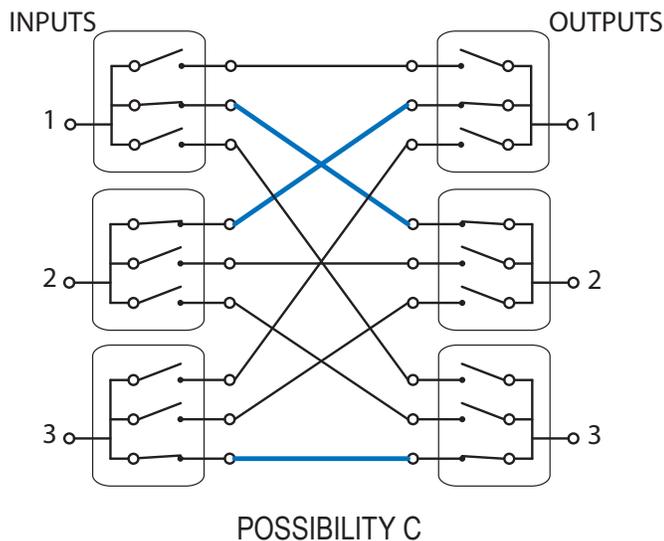
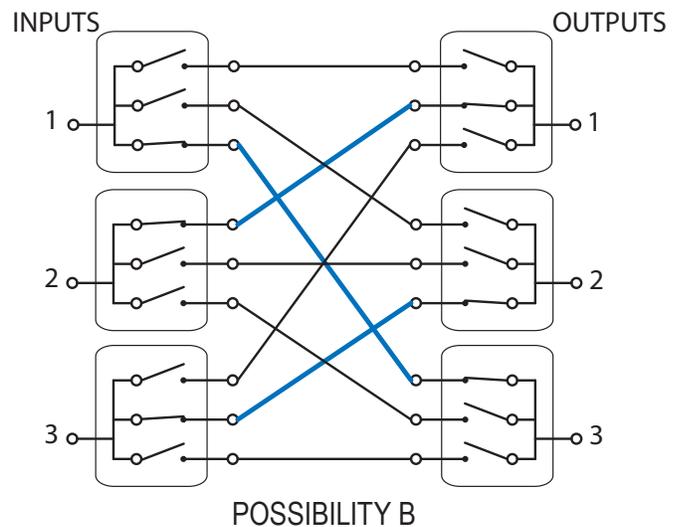
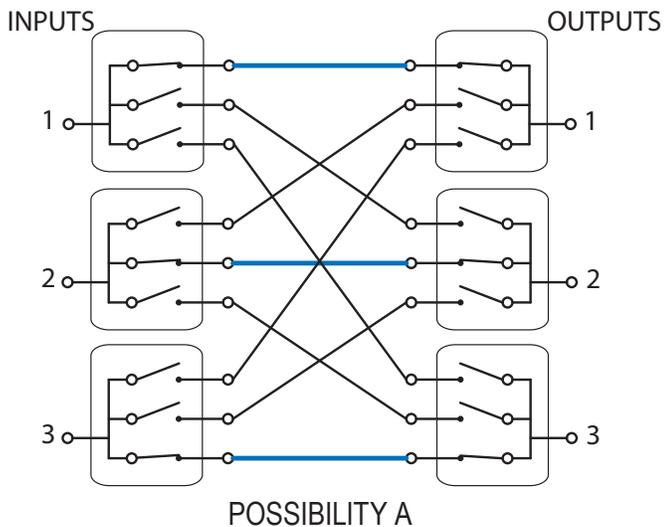
- ATE Systems
- RF Signal Switching
- Antenna Systems
- Airborne Surveillance Systems
- Video Routing & Distribution
- Flight Simulators
- Telemetry & Ground Stations
- Signal Conditioning
- 3G & 4G LTE Networks
- Calibration Fixtures/Modules
- Remote Calibration Correction
- Avionics Testing
- Electronics Warfare
- Specialized Test Equipment (STE)
- High Speed Serial Data Switching
- Wireless & Telecom Test
- Phase-Matching
- Telecommunication and Network Switching



Teledyne Switch Matrix

CSM-1000: MIMO/Blocking Switch Matrix

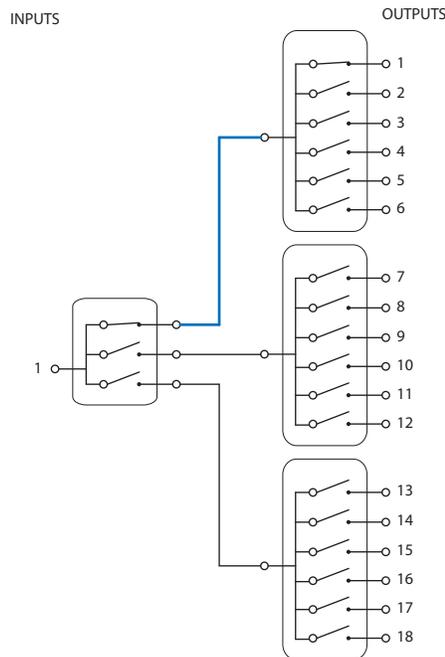
The standard MIMO matrix is a multiple-input, multiple-output (where the abbreviation MIMO comes from) matrix of size $N \times M$; N being the number of inputs and M , the number of outputs. This may also be known as a Blocking Matrix. Here are 4 examples of a 3x3 MIMO Matrix, with 4 possible connection combinations shown (more combinations exist, but are omitted for brevity):



This matrix type, while being multiple-input, multiple-output, will allow a single connection from any input to any output at a time. This means that the user can have (as shown in "Possibility B" Input 1 connected to Output 2, Input 2 connected to Output 1, and Input 3 connected to Output 3, all at the same time. The configuration shown would use 6 SP6T coaxial switches to create 9 distinct switch paths.

CSM-2000: Multiplexor/Fanout Switch Matrix

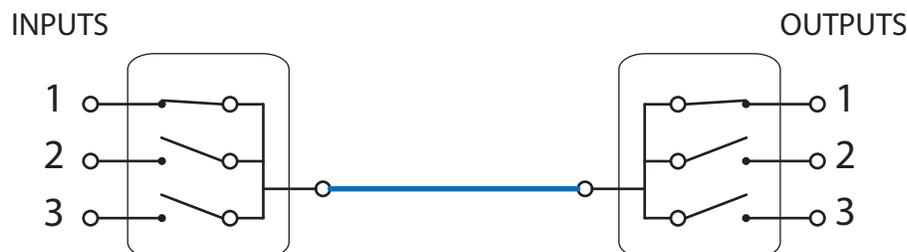
This may also be known as a fanout configuration. The Multiplexor Matrix is a 1xN matrix; a single input going to N number of outputs. Below is an example of a 1x18 Multiplexor Matrix:



The multiplexor is the simplest matrix configuration, allowing the input to be connected to any one output at a time. Before switching, for example, to Output 2 the connection to Output 1 needs to be disconnected.

CSM-3000: MIMO Single-Connection Switch Matrix

This type of matrix is also a multiple-input, multiple-output configuration, but unlike the standard MIMO, only a single connection can be made at any time. In the example below we have the same size matrix as the example in configuration #1, a 3x3, in a MIMO Single Connection Type:



In a MIMO Single Connection Matrix, you can have Input 1 connected to Output 3, but you must disconnect this path if you were to connect Input 2 to Output 1, or any other combination.



Description

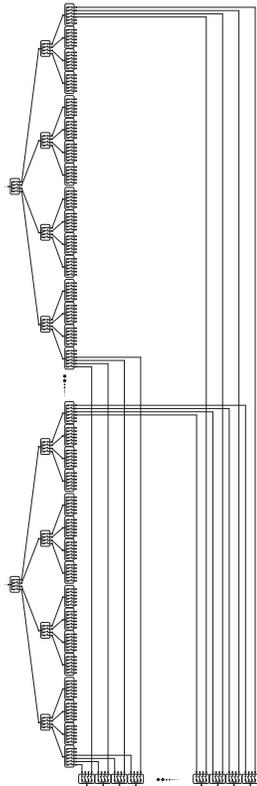
This matrix system consists of a 4x96 switching system in a 24U standard 19" chassis. This switching system was designed for an operating frequency range of DC-6GHz. The 4x96 matrix is controlled via TCP/IP (Ethernet) and features 7-segment displays which let the user know which input and output combination is currently active. There is also a local control keypad that allows users to manually command the switching system.

This matrix consists of (116) SP4T switches and (64) SP6T switches.

- Local control Via Keypad
- TCP/IP (Ethernet) Remote Control
- SMA Connectors
- 90-260 Vac, 47-63Hz Power

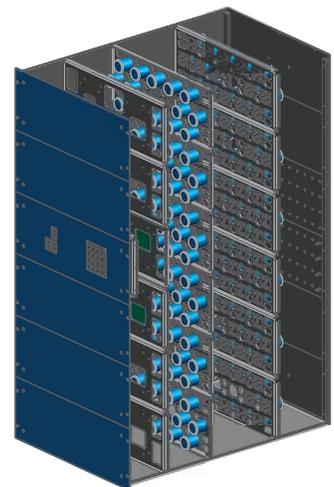
Switch Function	RF Characteristics		
Normally Open	Frequency Range	0.7-2.5GHz	2.6-6GHz
Switching Type	Insertion Loss (dB)	2.5	4.0
Electromechanical	VSWR	1.5:1	1.75:1
Temperature	Isolation (dB)	75	70
Storage: -40°C to +65°C Operating: -55°C to +85°C	Mechanical Information		
	Power Handling	1W Continuous	
	Line Power	Universal 90-260 VAC, 47-63Hz	
	Size (WxHxD)	19", 24U, 20" Depth	
	Typical Cycle Life	1M cycles per RF port	

4X96 MIMO MATRIX SCHEMATIC



FRONT VIEW

3D MODEL VIEW



Description

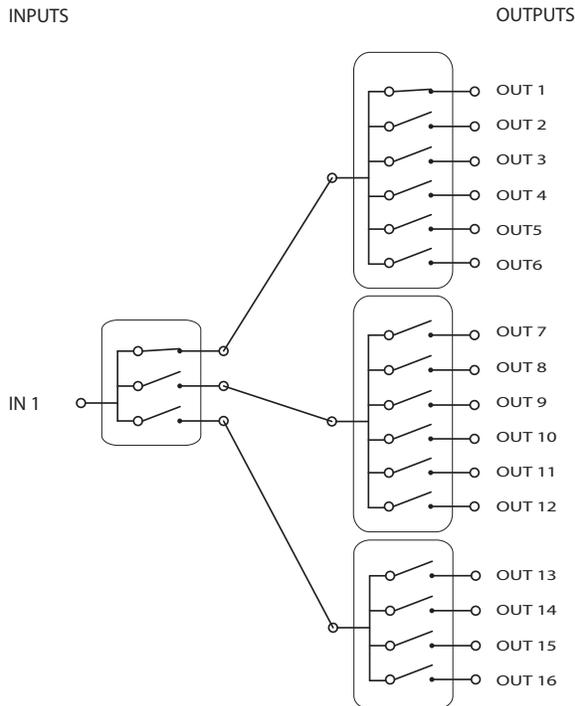
This matrix system consists of a 1x16 switching system in a 4U standard 19" chassis. This switching system has an operating frequency range of 2-4GHz (S-Band). The output ports are internally terminated to 50Ω, controlled via Ethernet and feature 7-segment displays which let the user know which output is currently active. There is also a local control keypad that allows users to manually command the switching system.

This matrix consist of (1) SP3T switch, (1) SP4T and (2) SP6T switches.

- Local control Via Keypad
- TCP/IP Remote Control
- Internal 50Ω termination
- SMA Connectors
- 90-260 Vac, 47-63Hz Power

Switch Function	RF Characteristics	
Normally Open	Frequency Range	2-4GHz (S-Band)
Switching Type	Insertion Loss	0.7dB Typical (0.8dB max)
Electromechanical	VSWR	1.15:1 (max)
Temperature	Isolation	60dB (min)
Storage: -40°C to +65°C Operating: -55°C to +85°C	Mechanical Information	
	Power Handling	1W Continuous
	Line Power	Universal 90-260 VAC, 47-63Hz
	Size (WxHxD)	19" Wide, 4U High, 20" Depth
	Typical Cycle Life	1M cycles per RF port

1X16 MATRIX SCHEMATIC



FRONT VIEW



REAR VIEW



Description

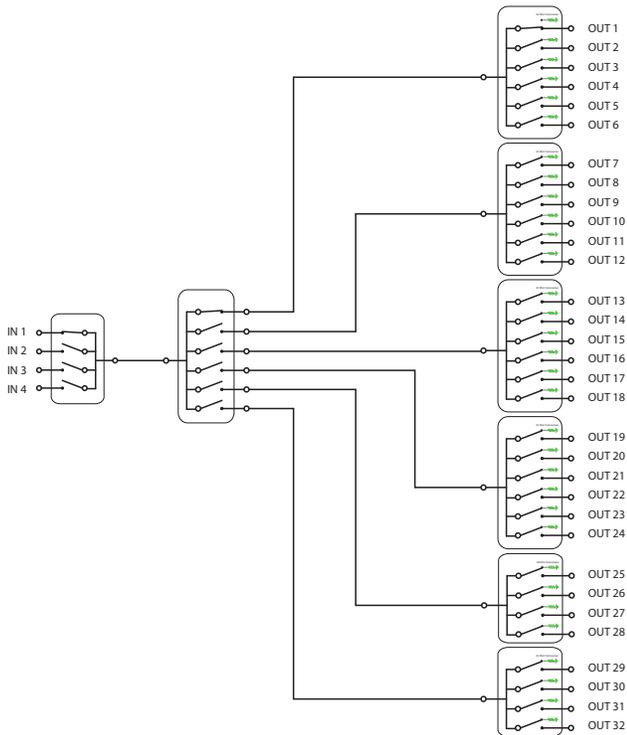
This matrix system consists of two 4x32 switching systems in a 4U standard 19" chassis. This switching system has an operating frequency range of 2-4GHz (S-Band). The output ports are internally terminated to 50Ω, controlled via USB and feature 7-segment displays which let the user know which output is currently active. There is also a local control keypad that allows users to manually command the switching system.

This matrix consist of (6) SP4T switches and (10) SP6T switches.

- Local control Via Keypad
- USB Remote Control
- Internal 50Ω termination
- SMA Connectors
- 90-260 Vac, 47-63Hz Power

Switch Function	RF Characteristics	
Normally Open	Frequency Range	2-4GHz (S-Band)
Switching Type	Insertion Loss	0.7dB Typical (0.8dB max)
Electromechanical	VSWR	1.15:1 (max)
Temperature	Isolation	60dB (min)
Storage: -40°C to +65°C Operating: -55°C to +85°C	Mechanical Information	
	Power Handling	1W Continuous
	Line Power	Universal 90-260 VAC, 47-63Hz
	Size (WxHxD)	19" Wide, 4U High, 20" Depth
	Typical Cycle Life	1M cycles per RF port

4X32 MATRIX SCHEMATIC



REAR VIEW



FRONT VIEW

Description

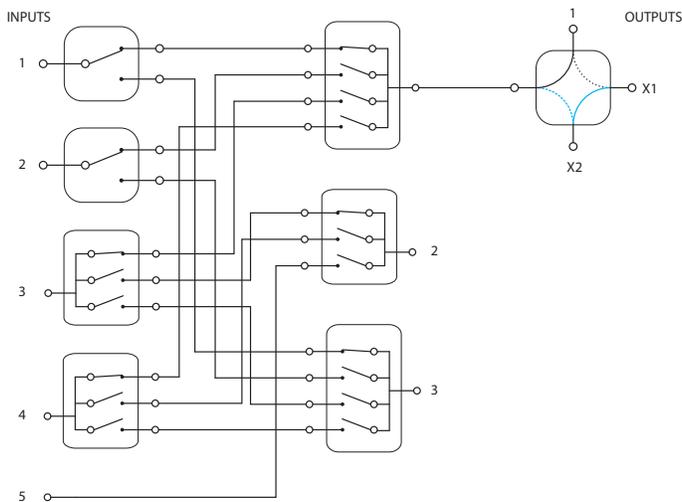
This matrix system consists of a 5x3 matrix with a bypass transfer switch in a 4U standard 19" chassis. This switching system was designed for an operating frequency range of DC-12GHz. This matrix system has unused ports unterminated, is controlled via TCP/IP or RS-232 and features 7-segment displays which lets the user know which output is currently active. There is also a local control keypad that allows users to manually command the switching system.

This matrix consists of (2) SPDT switches, (3) SP3T Switches, (2) SP4T Switches and (1) Transfer switch.

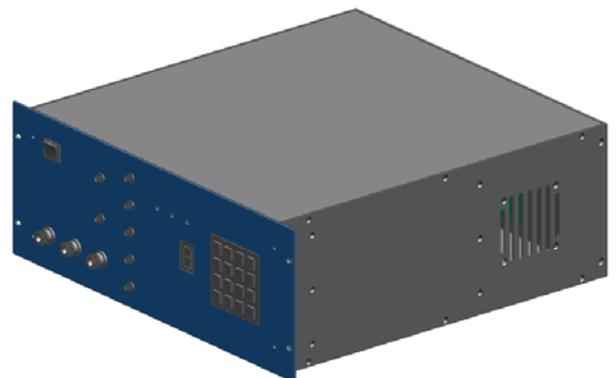
- Local control Via Keypad
- TCP/IP, RS-232 Interface
- Unterminated
- SMA & Type N Connectors
- 90-260 Vac, 47-63Hz Power

Switch Function	RF Characteristics			
Normally Open	Frequency Range	DC-3GHz	3-6GHz	6-12GHz
Switching Type	Insertion Loss (dB)	0.5	0.7	1.2
Electromechanical	VSWR	1.4:1	1.7:1	2.0:1
Temperature	Isolation (dB)	75	75	70
Storage: -40°C to +65°C Operating: -55°C to +85°C	Mechanical Information			
	Power Handling	1W Continuous		
	Line Power	Universal 90-260 VAC, 47-63Hz		
	Size (WxHxD)	19", 4U, 20" Depth		
	Typical Cycle Life	1M cycles per RF port		

5X3 SWITCH MATRIX WITH TRANSFER SCHEMATIC



FRONT VIEW



3D MODEL VIEW

Description

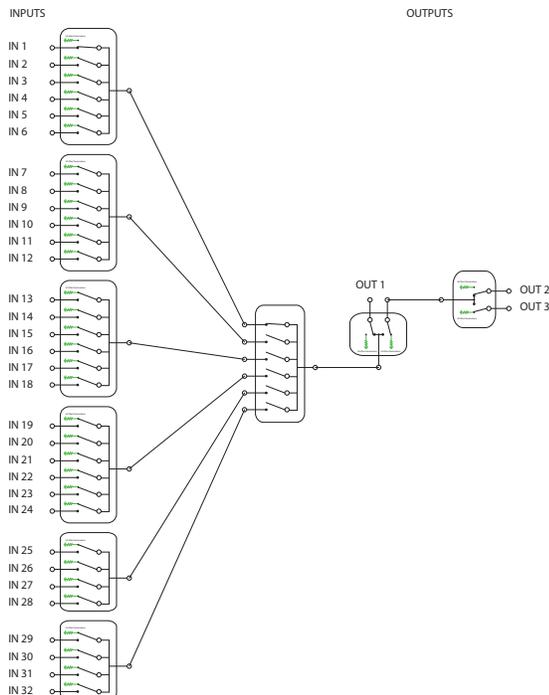
This matrix system consists of a 1x32 switching system with 2 bypass paths in a 4U standard 19" chassis. This switching system was designed for an operating frequency range of 2-4GHz (S-Band). The input and outputs are internally terminated to 50Ω, controlled via Ethernet port and feature 7-segment displays which let the user know which output is currently active. There is also a local control keypad that allows users to manually command the switching system.

This matrix consists of (4) SP6T with internal 50Ω terminated switches, (2) SP4T with internal 50Ω terminated switches, (2) SP2T with internal 50Ω terminated switches and (1) SP6T switch.

- Local control Via Keypad
- Ethernet Remote Control
- Internal 50 termination
- SMA Connectors
- 90-260 Vac, 47-63Hz Power

Switch Function	RF Characteristics	
Normally Open	Frequency Range	2-4GHz (S-Band)
Switching Type	Insertion Loss	1.0dB Typical (2.0 dB max)
Electromechanical	VSWR	1.15:1 (max)
Temperature	Isolation	60dB (min)
Storage: -40°C to +65°C Operating: -55°C to +85°C	Mechanical Information	
	Power Handling	1W Continuous
	Line Power	Universal 90-260 VAC, 47-63Hz
	Size (WxHxD)	19" Wide, 4U High, 20" Depth
	Typical Cycle Life	1M cycles per RF port

**1X32 W/ BYPASS SWITCH MATRIX
W/ BYPASS**



FRONT VIEW



BACK VIEW

Example System Datasheet

CSM-4000 Series: 1x16x4 Filter Bank

Description

This matrix system is a custom configuration used to switch filters into 4 test paths. This switching system was design for an operating frequency range of 2-4GHz (S-Band). The pair of 1x8 matrices are internally terminated to 50Ω, controlled via USB and feature 7-segment displays which let the user know which output is currently active. There is also a local control keypad that allows users to manually command the switching system.

This matrix consists of (2) SPDT switches and (4) SP4T switches.

- Local control Via Keypad
- USB Remote Control
- Internal 50 termination
- SMA Connectors
- 90-260 Vac, 47-63Hz Power

Switch Function	RF Characteristics	
Normally Open	Frequency Range	2-4GHz (S-Band)
Switching Type	Insertion Loss (dB)	0.7 Typical (0.8 max)
Electromechanical	VSWR	1.15:1 (max)
Temperature	Isolation (dB)	60 (min)
Storage: -40°C to +65°C Operating: -55°C to +85°C	Mechanical Information	
	Power Handling	1W Continuous
	Line Power	Universal 90-260 VAC, 47-63Hz
	Size (WxHxD)	19" Wide, 4U High, 20" Depth
	Typical Cycle Life	1M cycles per RF port

1X16X4 FILTER SWITCHING SYSTEM

The diagram shows a schematic of the switching system. It starts with a single 'IN 1' input on the left. This input splits into four parallel paths. Each path contains a series of switches and filter components. These four paths then converge back into a single line that splits into four separate outputs labeled 'OUT 1', 'OUT 2', 'OUT 3', and 'OUT 4' on the right.

FRONT VIEW

3D MODEL VIEW

Switch Matrix Application

SWITCHING CONFIGURATION

Configuration:

- CSM-1000 Series: MIMO/Blocking Matrix
- CSM-2000 Series: Multiplexor/Fanout Matrix
- CSM-3000 Series: MIMO Single-Connection Matrix
- CSM-4000 Series: Customized Matrix

Describe: _____

Input Ports x Output Ports:

Inputs X Outputs

RF Port Connector Type:

- SMA
- mini-SMB
- TNC
- N
- Other: _____

Switch Action:

- Non-Latching (Normally Open)
- Latching

Open Port Termination:

- Yes
- No

Switch Load:

- Carry Only
- Hot Switching
 - If Hot Switch: Expected Pulse Width
 - If Hot Switch: Expected Duty Cycle

RF PERFORMANCE

Required Frequency Range:

to ; MHz GHz

Or Choose

- VHF UHF L-band S-band C-band
- Other: _____

Characteristic Impedance:

- 50Ω
- 75Ω
- Other: _____

Signal Power Level:

dB W dBm mW
 CW Peak Avg.

Input to Output Insertion Loss (dB) (max.):

at ; MHz GHz

Return Loss (dB) or VSWR (X:1) (max.):

at ; MHz GHz

Port to Port Isolation (dB) (min.):

at ; MHz GHz

CONTROL INTERFACE

Remote Control:

- PIO (TTL)
- RS-232
- USB
- Ethernet
- GPIB
- Other: _____

Local Control (Front Panel):

- 4x4 Keypad
- Discrete Control Input Button
- Other: _____

Local Display:

- Alphanumeric
- LED Indicators
- 4x24 LCD
- Other: _____

OTHER REQUIREMENTS

Power Source:

- Universal 90-260 VAC, 47-63 Hz
- DC
- Other: _____

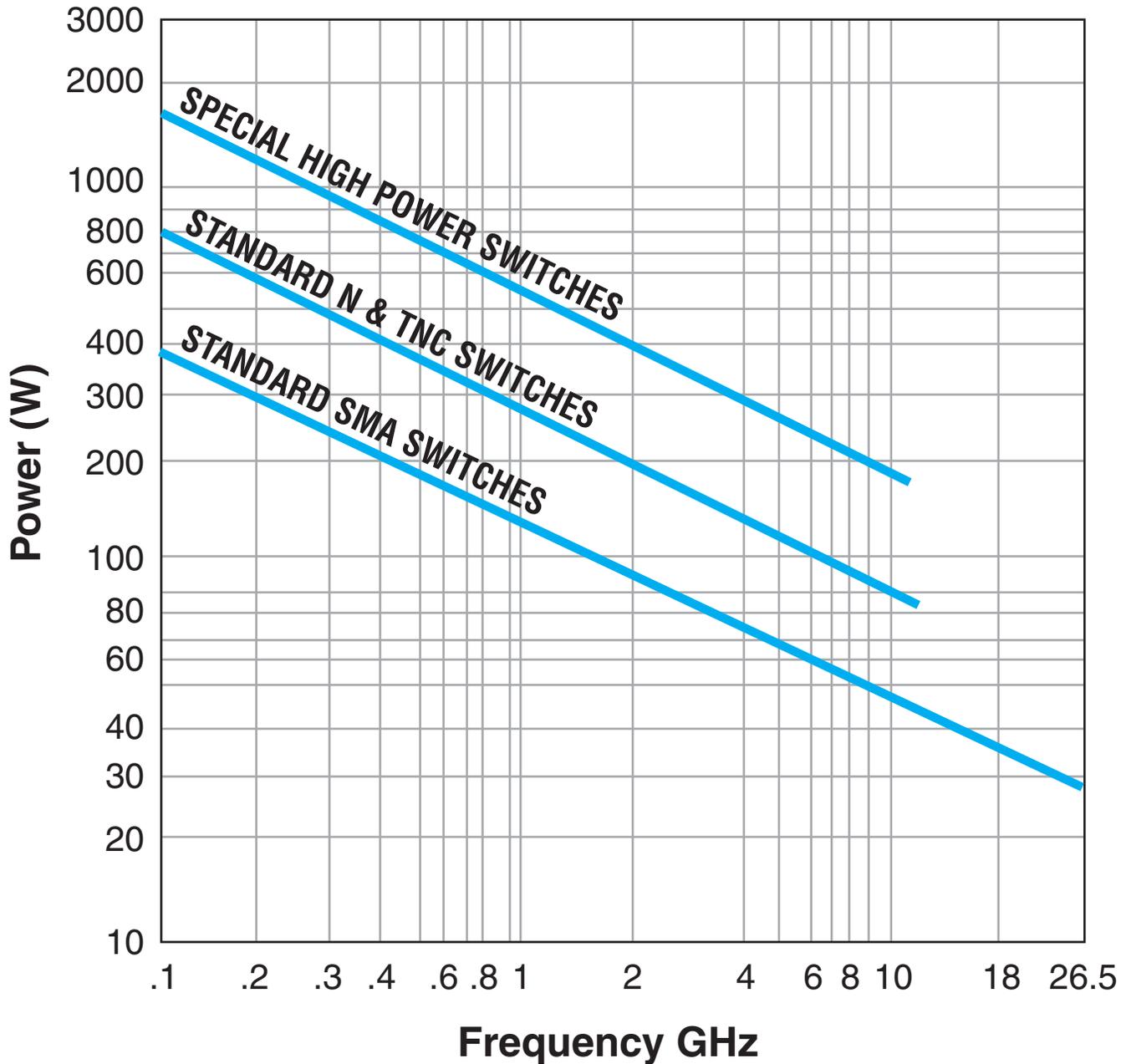
Chassis Dimensions:

Height X Width X Depth
Or
19" Standard Rack mount U*

Standard 4U chassis height, other chassis heights available upon request.

Coaxial Switches

Power Handling vs. Frequency



Estimates based on the following reference conditions:

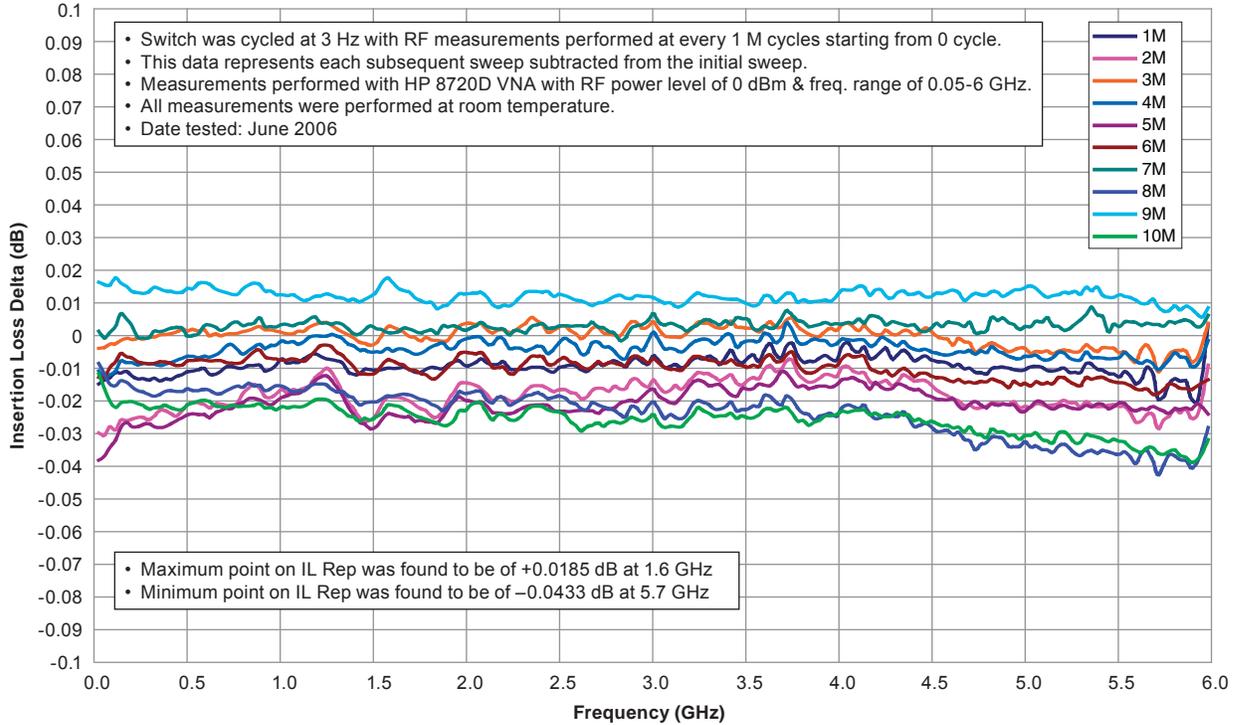
- Ambient temperature of 40°C or less
- Sea level operation
- Load VSWR of 1.20:1 maximum
- No high-power (hot) switching

Please contact Teledyne Coax Switches for derating factors when applications do not meet the foregoing reference conditions.

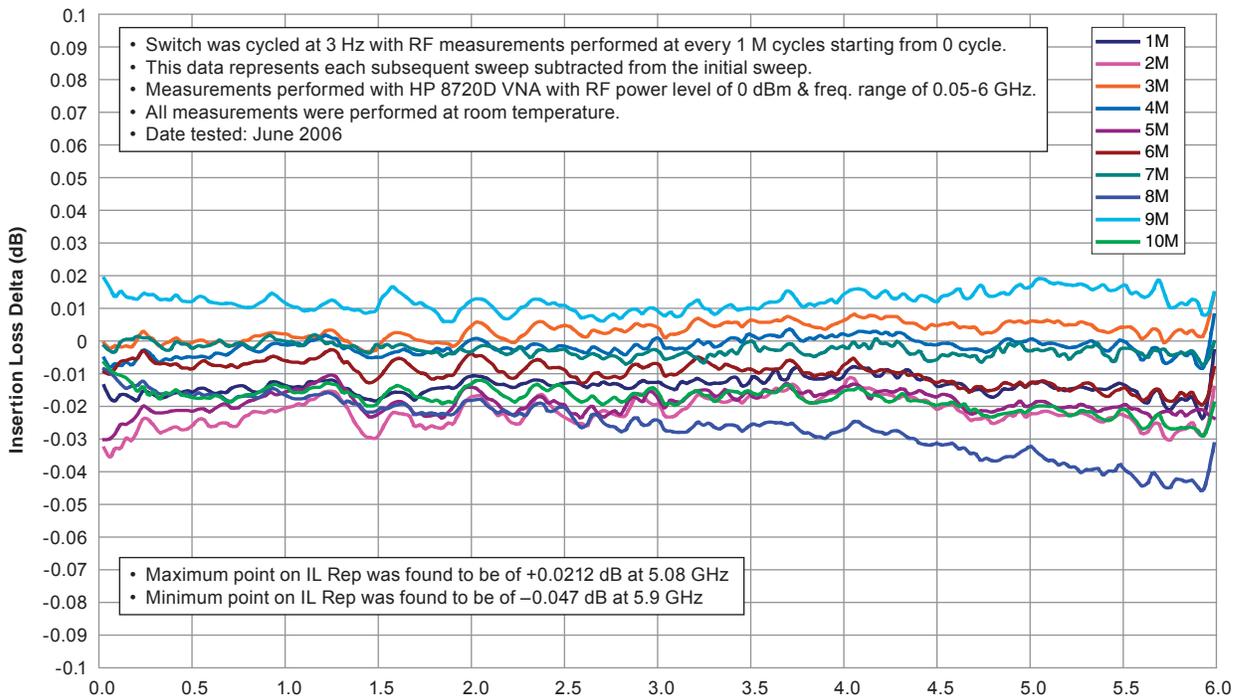
Teledyne Coax Switches

Insertion Loss Repeatability

SPDT Coaxial Switch 10 M Cycles Insertion Loss Repeatability (Contact 1)



SPDT Coaxial Switch 10 M Cycles Insertion Loss Repeatability (Contact 2)



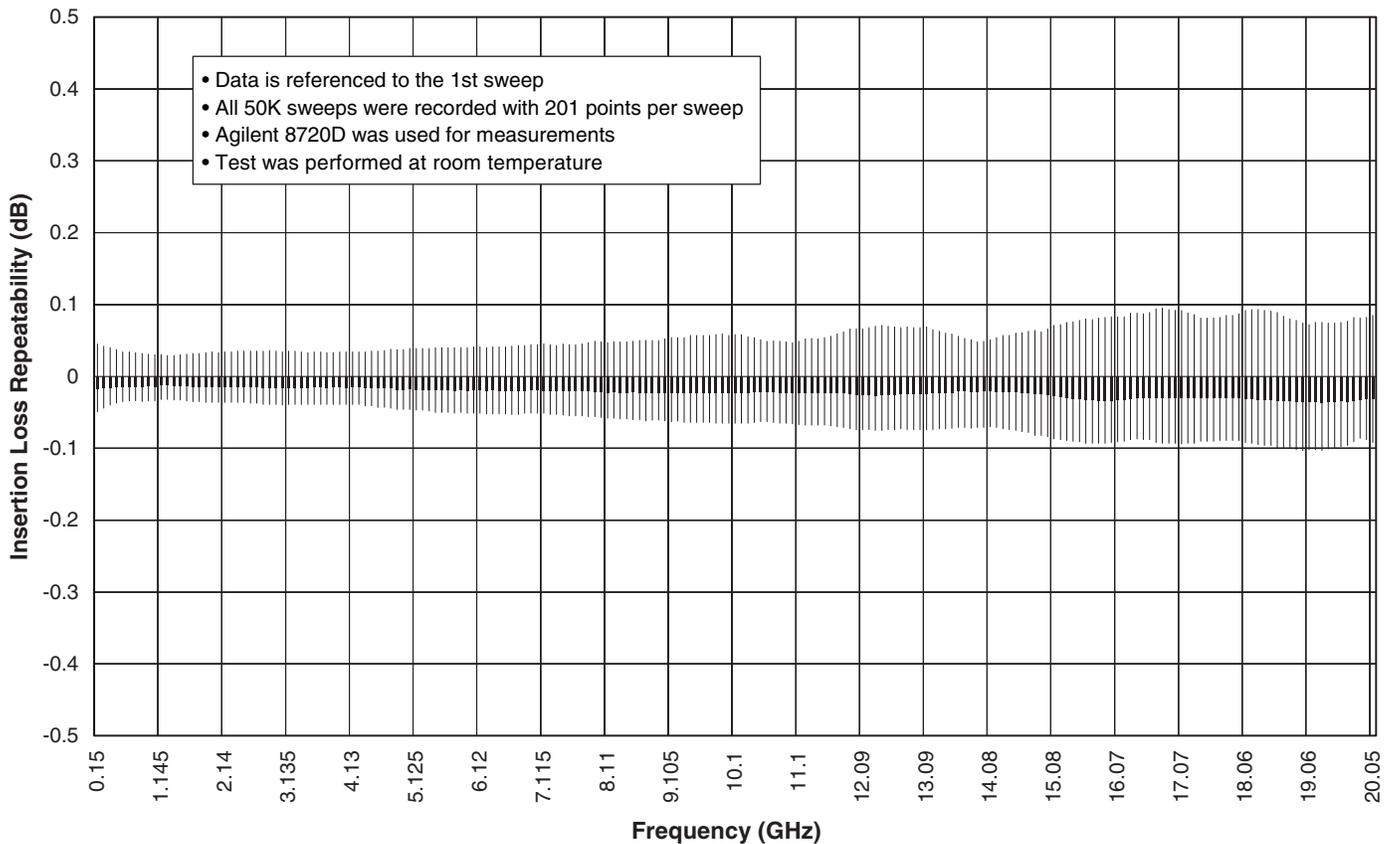
Teledyne Coax Switches

Insertion Loss Repeatability

RF relays are rated for $\pm 0.1\text{dB}$ repeatability for 1M cycles. Teledyne coaxial switches offer better than $\pm 0.1\text{dB}$ over certain frequencies. Teledyne Coax offers unrivaled repeatability.



CCR-33 Insertion Loss Repeatability, 50K cycles



Arc Suppression Diode

A diode is connected in parallel with the coil. This diode limits the “reverse EMF spike” generated when the coil de-energizes to 0.7 volts. The diode cathode is connected to the positive side of the coil and the anode is connected to the negative side.

Attenuator

A resistive network that provides reduction of the amplitude of an electrical signal without introducing phase or frequency distortion.

Electromagnetic Interference (EMI)

Electromagnetic phenomena which, either directly or indirectly, can contribute to a degradation in performance of an electronic receiver or system.

Ethernet

A high-speed interface used in local area networks (LAN). Ethernet is also known as IEEE 802.3 standard.

Failsafe

A failsafe switch reverts to the default or failsafe position when the actuating voltage is removed. This is realized by a return spring within the drive mechanism. This type of switch requires the continuous application of operating voltage to select and hold any position. (Multi-position switches are normally open with no voltage applied).

Filter

A selective network comprised of capacitors, inductors and/or resistors which passes a specific band of frequencies and attenuates the out-of-band frequencies.

General Purpose Interface Bus (GPIB)

An 8-bit wide digital interface designed to interconnect with equipment such as PCs and ATE. GPIB is also known as IEEE-488, unlike Ethernet, GPIB cannot be connected to a network.

Latching

A latching switch remains in the selected position whether or not voltage is maintained. This can be accomplished with either a magnetic or mechanical latching mechanism.

Indicator

Indicators tell the system which position the switch is in. Other names for indicators are telemetry contacts or tellback circuit. Indicators are usually a set of internally mounted DC contacts linked to the actuator. They can be wired to digital input lines, status lights, or interlocks. Unless otherwise specified, the maximum indicator contact rating is 30 Vdc, 50 mA, or 1.5 Watts into a resistive load.

Insertion Loss Repeatability

The variance in insertion loss that describes how nearly a measured value value is repeated on subsequent actuations of a switch. It is usually expressed by the maximum deviation from the mean of all measurements used for characterization.

Internal Termination

Unselected ports are connected internally to a matched load. The load is a 50-Ohm resistive device. The max RF power rating is 2 watts CW. Without the internal termination option, the unselected ports are open circuits.

Isolation

Isolation is the measure of the power level at the output connector of an unconnected RF channel as referenced to the power at the input connector. It is specified in dB below the input power level.

Multi-Throw Switch

A multi-throw switch is a switch with one input and three or more output ports. The CCT-58 can switch a microwave signal to any of 2, 3, 4, 5 or 6 outputs from a single common input.

Radio Frequency Interference (RFI)

Any electrical signal capable of being propagated into and interfering with the proper operation of electrical or electronic equipment.

SPDT Switch

A single-pole double-throw switch has one input and two output ports.

RS-232

A standardized serial port for connecting a computer to peripheral equipment.

Transfer Switch

A four-port switch consisting of two independent pairs of RF paths. These pairs are actuated simultaneously. This actuation is similar to that of a double-pole double-throw switch. See application notes for typical usage.

TTL

A digital logic design in which bipolar transistors act on direct-current pulses.

Universal Serial Bus (USB)

An industry standard that defines the cables, connectors and communication protocols used in a bus for connection, communication and power supply between computers and electronic devices.

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Special Feature

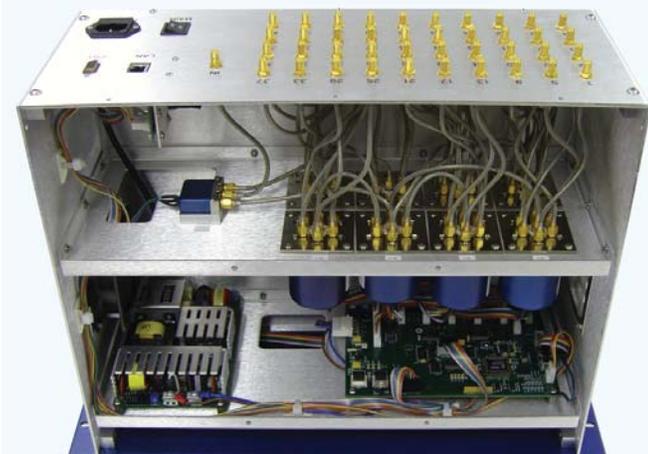
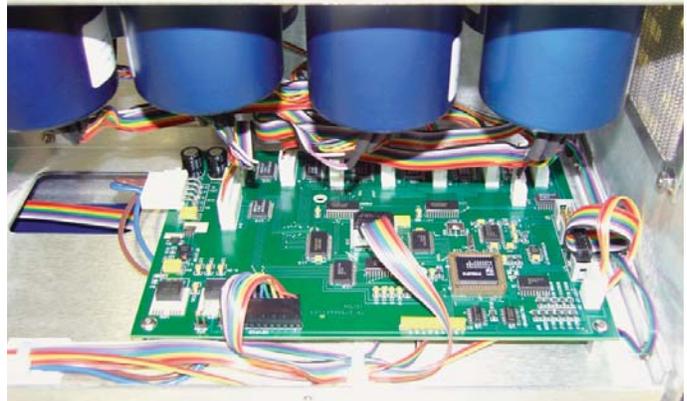
Switching High-Power or Highly Sensitive Signals

Ensure the most linear response with the best galvanically matched contact system in the industry. Extremely low passive intermodulation is standard on all of our switches.

Carrier Frequency 1	Carrier Frequency 2	PIM 3rd Order Frequency	PIM 5th Order Frequency
870 MHz	893 MHz	847 MHz	824 MHz

	3rd Order Intermodulation	5th Order Intermodulation
SPDT	-91 dBm	-110 dBm
	-134 dBc	-153 dBc
Transfer	-103 dBm	-123 dBm
	-146 dBc	-165 dBc
Multiple Positions	-96 dBm	-115 dBm
	-139 dBc	-158 dBc

Microwave Switch



FEATURES

- Multiple standard and customized switching configurations
- Universal Power Supply
- Visual Display – LCD
- Standard and custom racks available
- Manual/direct and/or remote control
- Multiple interface configurations:
RF ports – SMA, N, SMB, TNC, etc.
Control – RS-232, Ethernet, PIO, Keypad, etc.
- 50 and 75 ohm impedances

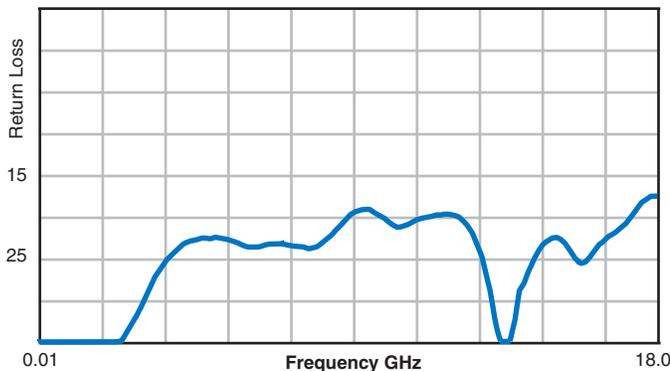
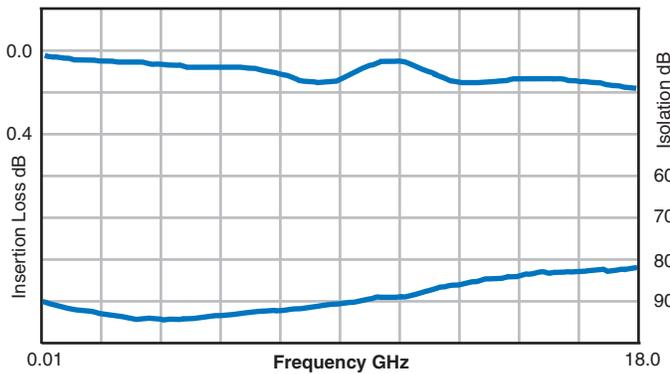
ADDITIONAL FEATURES

- Monitor cycle count
- System health/system status
- LEDs: Visual status
- In-circuit programming (firmware upgradeable)

Matrix Assemblies



TYPICAL RF SWITCH PERFORMANCE



Teledyne, the world's innovative leader in manufacturing electromechanical and solid-state switching products for more than 50 years, offers a modular approach to matrix assembly

switching.

Incorporating highly repeatable and long-cycle-life relays and switches, Teledyne's matrices cover the spectrum from DC to 40GHz.



Teledyne's modular approach building matrices allows assembly of a vast array of customized matrix assemblies with the same standard



subassemblies. The internal components of the assembly and main module utilize Teledyne's proven relays and switches.

Teledyne has developed a standard programmable microcontroller that can be used for any matrix configuration. The universal power supply allows the matrix assembly to be used worldwide. Teledyne is highly vertically integrated, which reduces development time, qualification time, cost and leadtime, while ensuring high quality and cost-effective production.



To learn more, call us or visit us online today. And see what Teledyne Coaxial Switches can do for you.

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