NEXT GENERATION
SWITCH MATRIX
ELECTROMECHANICAL SOLUTIONS

OUR EXPERIENCE, YOUR SWITCH SOLUTION
SINCE 1945
BETTER. FASTER. MORE MODULAR.
Commercial-Off-The-Shelf (COTS) solutions supporting the aerospace, military, transportation, and communications industries for signal routing and ATE applications.

Next Generation Matrix Platform
The next generation platform is engineered around a flexible and efficient modular system architecture comprised of a series of brackets, panels and electronic-boards that are universal among all Dow-Key electromechanical models. Commercial-Off-The-Shelf (COTS) solutions are not only cost effective, but can also easily be re-configured by adding RF switches to a single enclosure – from simple to complex combinations. This new platform is easily field upgradable and repairable.

Cost Effective Solution
- Flexible and efficient system architecture
- Compact physical form
- Multiple switch configurations in one box
- Same software control and command protocols across products
- Trouble-free maintenance (for field upgrades and repairs)
- Backward compatible with previous models

Features and Capabilities
- 1RU/2RU/3RU/4RU rack mountable chassis – larger size as needed
- Easy access to power supply & control card – the “brain” of the matrix resides on a single assembly
- Redundant power supplies – available as an option
- Highly scalable – can easily support smaller to larger RF switches and configurations
- COTS solutions – available “off the shelf” to solve time-sensitive switching requirements and low-cost solutions
- LCD/Keypad or touch screen manual control - depending on chassis size
- Remote controls: Ethernet (TCP/IP), HTTP Server, Lab View based software, RS-232 port, USB port, GPIB, RS-485/RS-422
- Faster switch time at system level
- Keeps track of the life of the switch – counts the number of times each position has been switched.
- Field upgradable firmware via boot loader*
- All electronic components and CAN bus switches are RoHS compliant
- EMI shielded Ethernet, USB and CAN bus connectors

Engineering Team
The best in the RF switch industry, Dow-Key’s engineering team is dedicated to support customers all the way from product selection, custom designed solution to RF system integration and post production support. Backed by decades of industry experience, our highly skilled technical staff is continuously improving the quality and variety of our product offerings to meet the needs imposed by the RF & Microwave industry. Our engineering team is dedicated to working with the customer’s specific needs to create the optimum switching solution.

MS-SERIES
Multiple Switches: The matrix is populated with individual RF switches

The MS-series populated with individual switches allows the user to control multiple coaxial switches easily through software and gives the user the flexibility to add as many switches as needed (limited to the size of the enclosure) on the rear panel starting with a 19” 1RU chassis up to 4RU (and larger enclosures for custom designs). For 2RU and larger enclosures, the switches can also be installed inside the chassis.

- Switches can be mixed & matched
- Terminated and non-terminated switches are offered
- Normally Open & Latching switches are available

MS-models can be configured with the following switches:
- SPDT (1x2)*
- Transfer DPDT (2x2)
- SP3T (1x3)
- SP4T (1x4)
- SP6T (1x6)
- SP8T (1x8)
- SPI0T (1x10)
- SPI2T (1x12)

* Contact Dow-Key for availability

Impedance: 50 Ohm
Operating Frequency: DC-18 GHz or DC-26.5 GHz or DC-40 GHz (depending on switch type)
Switching Time: 50 ms max. (including control delay)
Operating Life: 1,000,000 cycles min. (cold switching)

DC-18 GHz, Non-Terminated SP3T, SP4T & SP6T Switch

<table>
<thead>
<tr>
<th>Frequency (GHz)</th>
<th>VSWR</th>
<th>Isolation (dB)</th>
<th>Insertion Loss (dB)</th>
<th>CW Power Handling (W)</th>
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</thead>
<tbody>
<tr>
<td>DC-3</td>
<td>1.2:1</td>
<td>80</td>
<td>0.20</td>
<td>125</td>
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<tr>
<td>3-8</td>
<td>1.3:1</td>
<td>70</td>
<td>0.30</td>
<td>90</td>
</tr>
<tr>
<td>8-12.4</td>
<td>1.4:1</td>
<td>60</td>
<td>0.40</td>
<td>75</td>
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<tr>
<td>12.4-18</td>
<td>1.5:1</td>
<td>60</td>
<td>0.50</td>
<td>60</td>
</tr>
</tbody>
</table>

Contact Dow-Key for additional RF specs

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<tr>
<td>DC-4</td>
<td>1.20:1</td>
<td>70</td>
<td>0.20</td>
<td>100</td>
</tr>
<tr>
<td>4-8</td>
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<td>70</td>
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<tr>
<td>8-12</td>
<td>1.40:1</td>
<td>60</td>
<td>0.40</td>
<td>60</td>
</tr>
<tr>
<td>12-18</td>
<td>1.60:1</td>
<td>55</td>
<td>0.60</td>
<td>50</td>
</tr>
</tbody>
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**MP-SERIES**

**Multiplexer:** An input goes to multiple outputs OR multiple inputs are routed to a single output

The multiplexer (MUX) has the capability to route one input to as many as N outputs (it is bidirectional). It is offered with operating frequencies of 18 GHz and 26.5 GHz (terminated and non-terminated) depending on the type of configuration needed.

Typical designs are 1x13 up to 1x143 MUX and can be customized to support a larger MUX.

**Impedance:** 50 Ohm

**Operating Frequency:**
- DC-18 GHz or DC-26.5 GHz

**Switching Time:**
- 50 ms max. (including control delay)

**Operating Life:**
- 1,000,000 cycles min. (cold switching)

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**DO-IT-YOURSELF (DIY) MATRIX SOLUTIONS**

Silver Package or Gold Package: A modular and low-cost solution to create your own switch matrix

**Silver Package**

**MS-ENET**

The MS-ENET is a kit with hardware and software allowing the software savvy user to control a set of CAN bus switches via Ethernet (TCP/IP), RS-232 serial ports, USB port and HTTP protocol (built-in website provided). It is offered with Dow-Key SCPI commands that give the user the flexibility to control switches as needed. CAN bus switches are to be purchased separately.

**MS-GPIB**

The MS-GPIB is a kit with hardware and software that allows the user to control a set of CAN bus switches via GPIB (IEEE-488) parallel port and RS-422 serial port. Dow-Key SCPI commands are provided for controlling switches. CAN bus switches are to be purchased separately.

**Gold Package**

**MS-6101-ENET / MS-6101-GPIB**

The MS-6101 controller offers an ideal switch setup allowing anyone to build their own matrix solution. The 1RU controller is outfitted with 24 RJ-11 ports on the back that support 24 CAN bus switches and can be expanded to support additional switches as needed. It has all the great software features as the other COTS models and is equipped with LCD/Keypad manual control on the front along with redundant power supplies. The ENET option includes Ethernet, RS-232, USB, and HTTP, and the GPIB option includes IEEE-488 (GPIB) and RS-422. CAN bus switches are to be purchased separately.

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**Fan-Out:** Any input can be connected to one or multiple outputs simultaneously

**Fan-In:** One or multiple inputs can be connected to an output simultaneously

**FO-SERIES/ FI-SERIES**

**FO-SERIES**

For more advanced RF switching where the input ports need to be routed to all output ports simultaneously, a Fan-Out design is preferable. The design uses power dividers at inputs (divides the input signal to all outputs) and amplifiers (if required).

An example would be a 4x4 up to 12x12 fan-out switch matrix, which can be customized with additional components or support a larger configuration.

**FI-SERIES**

A Fan-In switch matrix combines all the input signals and routes them to an output simultaneously. Thus, the design has combiners at the output ports and amplifiers (if required).
The next generation platform gives the user more software capability, more network flexibility and more ways to control the switch matrix with the following features:

**Key Features:**
- Faster switch time - 50 ms max. (including control delay), which can be improved further upon request
- Built-in firmware to add, remove and program CAN bus switch ID for trouble-free switch replacement
- Capability to recognize and display CAN ID of a switch with unknown ID for more user flexibility
- Keeps the count history of each position in every switch
- Boot loader for remote firmware update*
- Application configuration available to the user through "configuration file" - transferred via HTTP, USB or COM ports
- LCD controller, Remote controller, and CAN bus patch panel – all reside on the same board for easier repairability and firmware updates.
- Wide range of SCPI commands are available to control the matrix - all commands are backward compatible to previous matrix models
- Dow-Key SCPI commands can easily be embedded into scripts and programming codes for user-specific needs
- LabView Software included - source code provided to allow the user to use as LabView drivers

**Manual Control:**
- LCD with Keypad control for 1RU switch matrices
- Touch Screen LCD for switch matrices 2RU and larger in size

**Ethernet Interface:**
- RJ-45 port for Ethernet over TCP/IP, 10/100 Mbps - backward compatible with previous platforms
- Access to a built-in HTTP Server (web-page interface)
- Both Static and Dynamic (DHCP) IP address assignments are supported

**Serial Interface:**
- RS-232 port for the user to control the matrix remotely

**USB Port:**
- USB port for the user to control the matrix remotely
- Remote PC treats the USB port as a RS-232 serial port.

**CAN Bus Port:**
- CAN bus port to be used for custom solutions such as adding external switches to the switch matrix

**GPIB Interface:**
- GPIB (IEEE-488) parallel port - backward compatible with previous platforms
- RS-422 serial port

*Contact Dow-Key for availability

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