

# Benchtop/Rackmount Programmable Switches

## SB/SC/SCG Series



### Key Features

#### SB and SC series

- SB series can accommodate up to 48 channels and offer up to two input channels
- SC series can accommodate up to 180 channels and offer up to four input channels
- Low IL, 0.4 dB typical
- Excellent repeatability, +/- 0.003 dB typical
- High return loss (RL) > 65 dB typical
- GPIB and RS-232 remote control

#### SCG series

- Offer up to 45 input channels and 90 output channels
- Mass input reconfiguration possible
- Low IL, 0.5 dB typical for D configuration
- High RL > 65 dB typical
- Excellent repeatability, +/- 0.005 dB typical
- Replaces multiple switch elements with one switch instrument



### Applications

- Fiberoptic component testing and measurement
- System testing
- Research and development (R&D)
- Mass reconfiguration of large numbers of inputs/outputs with SCG series (D configuration)
- Connection of multiple wavelength sources to any one of a number of devices with SCG series (F configuration)
- Network monitoring

### Safety Information

- Complies to CE requirements plus UL3101-1 and CAN/CSA-C22.2 No. 1010.1

The JDSU SB, SC, and SCG series of Benchtop/Rackmount Programmable Switches can be controlled using the front panel keys and a numeric pad or via GPIB and serial RS-232 interface. The SCG series ganged input switches allow a single switch instrument to replace multiple switch elements while maintaining low loss. In this series of switches, the inputs are ganged together in a particular sequence and are thus able to offer three different modes of operation.

The SB, SC, and SCG series switches are available in four basic configurations:

- C configuration - is a single common input model (SB, SC)
- D configuration - provides simultaneous connection of a bank of input fibers to output fibers (SB, SC, SCG)
- E configuration - allows any input to be connected to any output while other inputs/outputs are aligned to subsequent/adjacent channels. The switch is non-blocking in this mode and other inputs/outputs are aligned (SB, SC, SCG)
- F configuration - enables one of the inputs to be aligned with an output in a blocking sense, with a result in reduction of available output channels and a low-loss M x N blocking switch. (SB, SC, SCG)

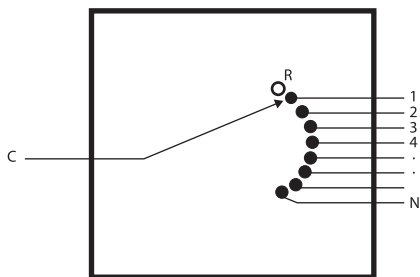
Operation of these switches is based upon JDSU's proven expanded beam lens technology, which utilizes a precision stepper-motor to align optical channels. The use of collimating lenses minimizes insertion loss (IL) and improves repeatability and performance. Internal temperature control of the switching mechanism ensures excellent operational stability.

**Continued**

Both single-mode (SM) and multimode (MM) versions of the SB, SC, and SCG series switches are available. The series features the high level of performance required for multi-unit testing in R&D and in manufacturing environments. The compact, portable SB switch and the standard rackmount enclosure SC and SCG switches are highly suited for applications in telecommunications, manufacturing, and test environments.

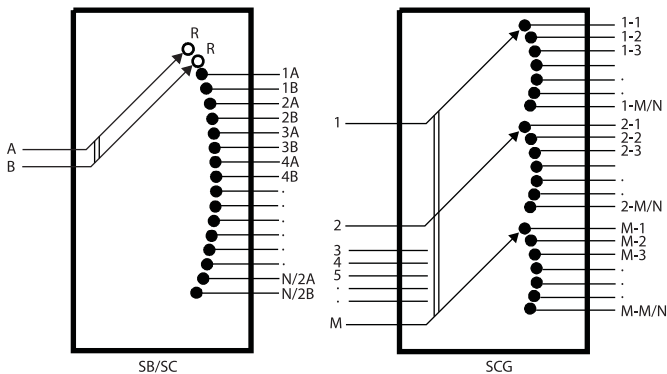
JDSU's SB, SC and SCG switches are known in the fiberoptic industry for their low IL and excellent repeatability. In addition to the many standard options available, we also customize switches in this series to meet your specific application needs.

**Configurations**



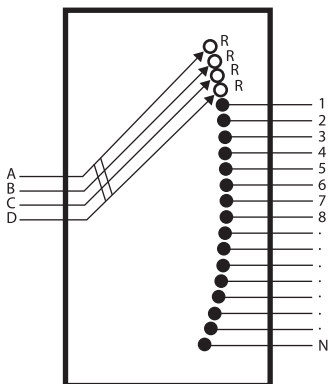
**1x N Switching: C Configuration (SB and SC)**

The 1xN configuration allows a single common input to be switched to any of the outputs.



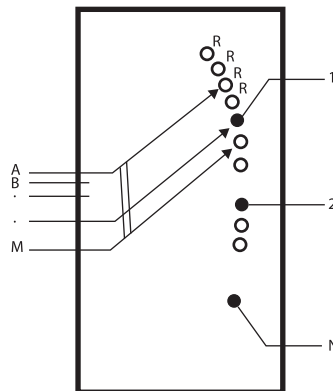
**Ganged Switching: D Configuration (SB/SC/SCG)**

The MxN configuration allows for mass reconfiguration of optical paths. It provides simultaneous connections of a bank of inputs to outputs, and replaces several 1xN with single switch element.



**Sequential Switching: E Configuration (SB/SC/SCG)**

The MxN configuration aligns any input with any output, while other inputs are aligned to adjacent outputs.



**Blocking Switching: F Configuration (SB/SC/SCG)**

The MxN configuration allows any one of a bank of inputs to connect with any output with only one active connection at a time.

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#### SB Model Specifications

Parameter <sup>1</sup>	Single Common C Configuration		Multiple Common D Configuration		Multiple Common E and F Configurations	
	Typical	Maximum	Typical	Maximum	Typical	Maximum
Insertion loss (IL)						
Single-mode (SM)	0.4 dB	0.7 dB	0.4 dB	0.7 dB	0.5 dB	1.0 dB
Multimode (MM)	0.4 dB	0.7 dB	0.4 dB	0.7 dB	0.5 dB	1.0 dB
Return loss (RL) <sup>2</sup>						
SM standard/analog	≥ 65 dB	60/65 dB	≥ 65 dB	60/65 dB	65 dB	60 dB
MM <sup>3</sup> standard/analog	25/35 dB	20/30 dB	25/35 dB	20/30 dB	> 25 dB	20 dB
Polarization dependent loss (PDL) SM	0.02 dB	0.05 dB	0.02 dB	0.05 dB	0.03 dB	0.07 dB
IL stability <sup>4</sup>	± 0.03 dB	± 0.05 dB	± 0.03 dB	± 0.05 dB	± 0.03 dB	± 0.05 dB
Repeatability <sup>5</sup>						
Sequential switching	± 0.003 dB	± 0.005 dB	± 0.005 dB	± 0.01 dB	± 0.005 dB	± 0.01 dB
Random switching	± 0.01 dB	± 0.025 dB	± 0.02 dB	± 0.04 dB	± 0.02 dB	± 0.04 dB
Crosstalk (maximum) SM	-80 dB					
Maximum input power (optical)	300 mW					
Lifetime	> 80 million cycles					
Switching time						
One channel	300 ms					
Each additional channel	12 ms					
Power supply	100 to 240 V, 50 to 60 Hz					
Power consumption	100 V A maximum					
Control	Local and remote via GPIB and serial RS-232 interfaces					
Drivers for external switch modules	Four open collector drivers with maximum 100 mA sink current					
Operation temperature	0 to 55 °C					
Storage temperature	- 40 to 70 °C					
Humidity	maximum 95 % RH from 0 to 55 °C non-condensing					
Dimensions (W x H x D)	21.2 x 8.9 x 35.5 cm					
with rackmount kit (optional) <sup>6</sup>	48.3 x 8.9 x 35.5 cm					
Weight	3.75 kg					

1. Excluding connectors. All optical measurements taken after temperature has been stabilized for one hour, at ambient (room) conditions.

2. RL specification based on 1 m pigtail length.

3. Values shown for 62.5 μm diameter maximum fiber core.

4. Drift of any channel relative to reference channel at ± 3 °C deviation of ambient temperature over a seven-day period.

5. Measured between two consecutive readings over 100 cycles.

6. ED000899-A-00 standard rackmount kit, ED000899-A-01 Japan rackmount kit. Requires two kits to mount two units side-by-side.

Please specify part number when ordering (if needed).

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## SC and SCG Models Specifications

Parameter <sup>1</sup>	Single Common C Configuration (SC model only)		Multiple Common D Configuration		Multiple Common E and F Configurations	
	Typical	Maximum	Typical	Maximum	Typical	Maximum
IL						
SM	0.4 dB	0.7 dB	0.4 dB	0.7 dB	0.5 dB	1.0 dB
SC with 3 and 4 inputs and SCG models	-	-	0.5 dB	1.0 dB	0.7 dB	1.5 dB
MM	0.4 dB	0.7 dB	0.4 dB	0.7 dB	0.5 dB	1.0 dB
SC with 3 and 4 inputs and SCG models	-	-	0.5 dB	1.0 dB	0.7 dB	1.5 dB
RL <sup>2</sup>						
SM standard/analog	≥ 65 dB	60/65 dB	≥ 65 dB	60/65 dB <sup>3</sup>	≥ 65 dB	60 dB
MM <sup>4</sup> standard/analog	25/35 dB	20/30 dB	25/35 dB <sup>3</sup>	20/30 dB <sup>3</sup>	> 25 dB	20 dB
PDL SM	0.02 dB	0.05 dB	0.02 dB	0.05 dB	0.03 dB	0.07 dB
IL stability <sup>5</sup>	± 0.03 dB	± 0.05 dB	± 0.03 dB	± 0.05 dB	± 0.03 dB	± 0.05 dB
Repeatability <sup>7</sup>						
Sequential switching	± 0.003 dB	± 0.005 dB	± 0.005 dB	± 0.01 dB	± 0.005 dB	± 0.01 dB
Random switching	± 0.01 dB	± 0.025 dB	± 0.02 dB	± 0.04 dB	± 0.02 dB	± 0.04 dB
Crosstalk (maximum) SM	-80 dB					
Maximum input power (optical)	300 mW					
Lifetime	> 80 million cycles (> 10 million cycles on SCG)					
Switching time						
One channel (SCG model)	300 ms (420 ms)					
Each additional channel (SCG model)	12 ms (20 ms)					
Power supply	100 to 240 V, 50 to 60 Hz					
Power consumption	100 V A maximum					
Control	Local and remote via GPIB and serial RS-232 interfaces					
Drivers for external switch modules	Four open collector drivers with maximum 100 mA sink current					
Operation temperature	0 to 55 °C					
Storage temperature	-40 to 70 °C					
Humidity	Maximum 95 % RH from 0 to 55 °C non-condensing					
Dimensions (W x H x D) single (double height <sup>6</sup> )	48 x 13 x 37 cm (48 x 26.6 x 37 cm) excluding handles					
Weight single (double height <sup>6</sup> )	9 kg (14 kg)					

1. Excluding connectors. All optical measurements taken after temperature has been stabilized for one hour, at ambient (room) conditions.

2. RL specification based on 1 m pigtail length.

3. Analog version available on one and two input SC model switches (C and D configurations).

4. Values shown for 62.5 μm diameter maximum fiber core.

5. Drift of any channel relative to reference channel at ± 3 °C deviation of ambient temperature over a seven-day period.

6. Applies to SC model only.

7. Measured between two consecutive readings over 100 cycles.

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## SB Switch Configuration

Configuration	C 1xN	D 2xN	E 2xN	F 2xN
Output Channel Counts (N)	2 to 48	4 to 44	2 to 44	2 to 20

## SC Switch Configuration

Configuration	C 1xN	D 2xN	D 3xN	D 4xN	E 2xN	E 3xN	E 4xN	F 2xN	F 3xN	F 4xN
Output Channel Counts (N)	2 to 180	4 to 180	6 to 180	8 to 180	2 to 180	3 to 180	4 to 180	2 to 90	3 to 60	4 to 45

## SCG Switch Configurations

### Configuration Restrictions

D: Up to 45 x 90 such that 'number of outputs' [N] is divisible by 'number of inputs' [M]

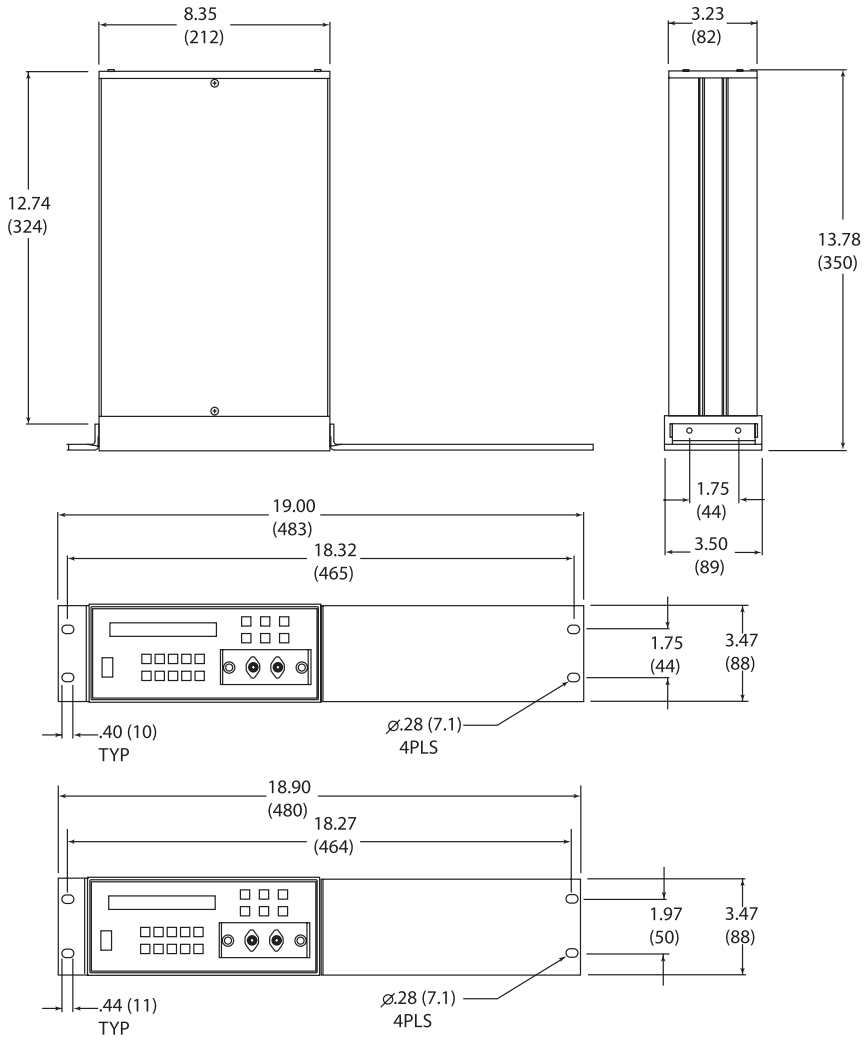
E: Up to 45 inputs [M] and up to 84 outputs [N], such that M + N is not more than 90

F: Up to 13 inputs [M] and up to 14 outputs [N], such that M x (N + 1) is not more than 93

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SB Model Dimensions Diagram

(Specifications in inches [mm] unless otherwise noted.)



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Ordering Information

SB Model Sample: SB2E10141+27XF000FP

SB

Code	Number of Input Channels
1C	1 input channel, C config.
2D	2 input channels, D config.
2E	2 input channels, E config.
2F	2 input channels, F config.

Code	Input Port Type <sup>1</sup>
1	Bulkheads on front
4	Pigtails on back

Code	Output Port Type <sup>1</sup>
1	Bulkheads on front
4	Pigtails on back

Code	Number of Output Channels
002	2 output channels
:	:
020	20 output channels
:	:
024	24 output channels
:	:
048	48 output channels

Code	Return Loss
X	Standard
A	Analog
B	Bidirectional, standard RL <sup>2</sup>
C	Bidirectional analog RL <sup>2</sup>

Code	Fiber Type (μm)
7	9/125
1	50/125
2	62.5/125

Code	Connector Type
FP	FC/PC (bulkhead max. 24)
FA	FC/APC (bulkhead max. 24)
SC	SC/PC (bulkhead max. 24)
SU	SC/APC (bulkhead max. 24)
NC	No connector

Code	Cable Length (3mm diameter)
001	1 m
003	3 m
009	9 m
000	Not applicable (bulkheads only)

Code	Wavelength Range (nm)
F	1270 to 1670
Q	850 to 1350 (MM only)
B	750 to 940 (MM only)

- Bulkheads and pigtails cannot be mixed in the same panel unless custom ordered.
- For reverse direction, use bidirectional.

SB Switch Package Information

Connector Type	Chassis Size	Switch Configuration	Max Channel Counts (input + output)
Bulkhead	2U bench top	C, D, E	24
Bulkhead	2U bench top	F	22
Pigtail	2U bench top	C, D	49
Pigtail	2U bench top	F	22

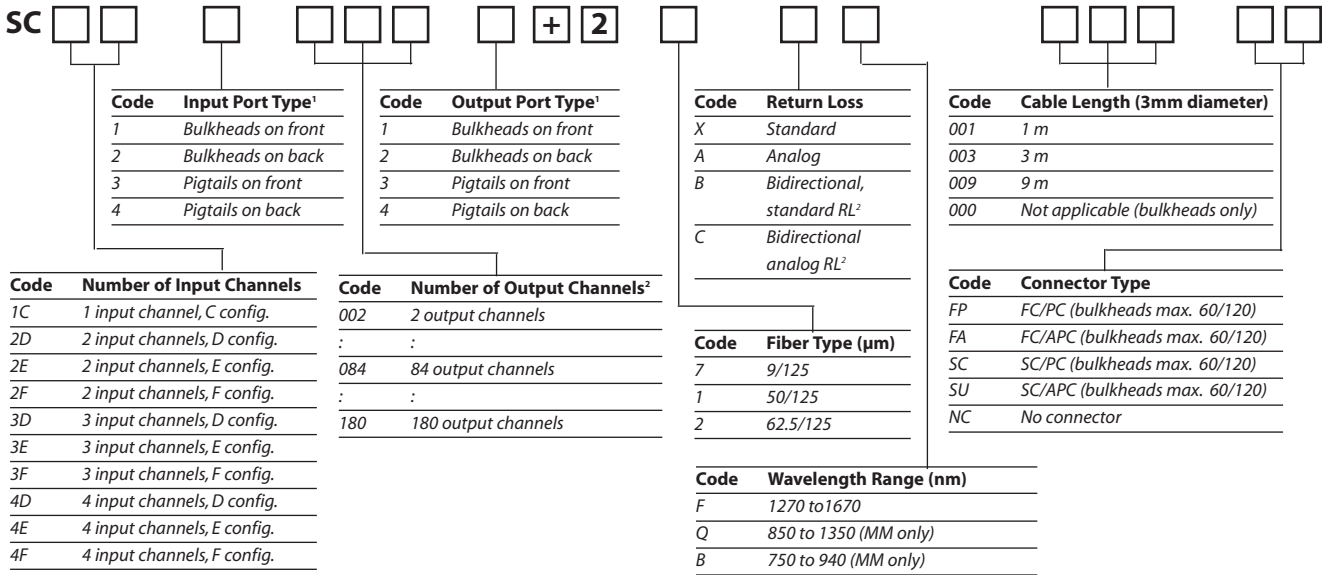


If the configurations available do not meet your performance requirements, please contact our global sales and customer service team to discuss the potential for specialized solutions.

Ordering Information

Continued

SC Model Sample: SC2D30043+22XB009FP



1. Bulkheads and pigtails cannot be mixed in the same panel unless custom ordered.
2. Single height: 84 output channel maximum. Double height: 180 output channel maximum.
3. For reverse direction, use bidirectional.

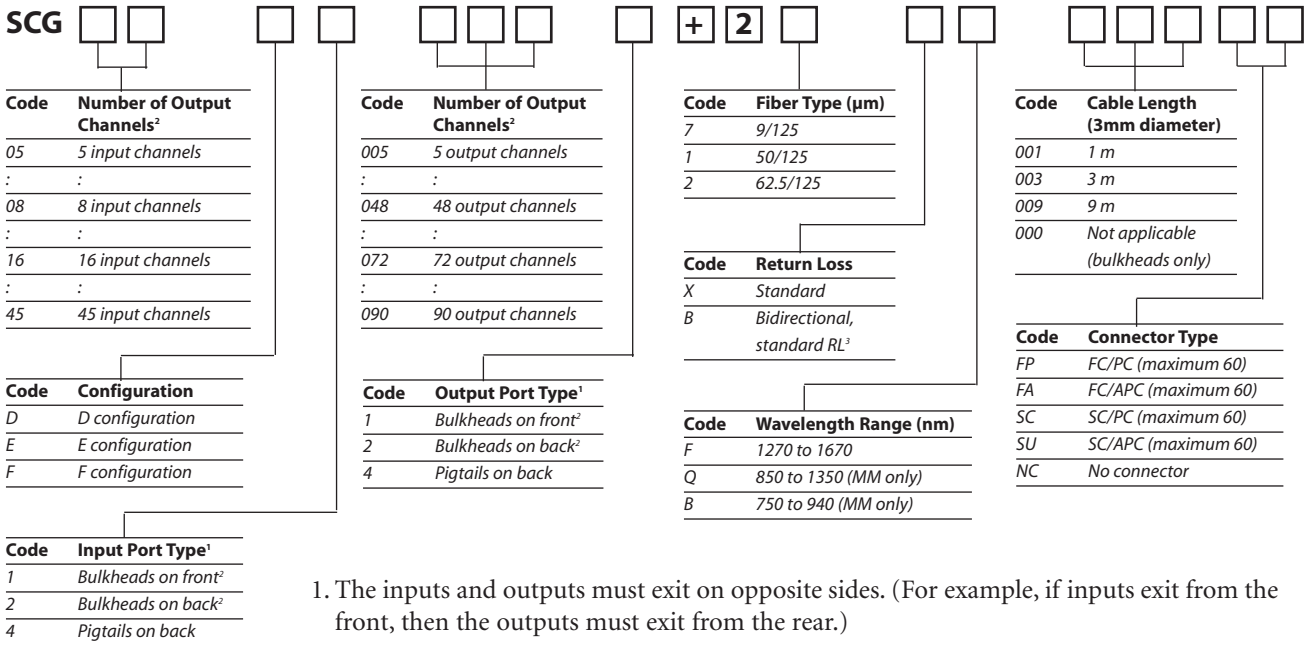
SC Switch Package Information

Connector Type	Chassis Size	Switch Configuration	Max Channel Counts (input + output)
Bulkhead	3U 19" rack mount	C, D, E	60
Pigtail	3U 19" rack mount	C, D, E	85
Bulkhead / Pigtail	3U 19" rack mount	F 2xN	46
Bulkhead / Pigtail	3U 19" rack mount	F 3xN	29
Bulkhead / Pigtail	3U 19" rack mount	F 4xN	24
Bulkheads	6U 19" rack mount	C, D, E	120
Pigtails	6U 19" rack mount	C, D, E	181
Bulkhead / Pigtail	6U 19" rack mount	F 2xN	92
Bulkhead / Pigtail	6U 19" rack mount	F 3xN	63
Bulkhead / Pigtail	6U 19" rack mount	F 4xN	49



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**Ordering Information**
**Continued**
**SCG Model Sample: SCG06D20241+27XF000FP**


1. The inputs and outputs must exit on opposite sides. (For example, if inputs exit from the front, then the outputs must exit from the rear.)
2. For exact layout of bulkheads and labeling, contact JDSU.
3. For reverse direction, use bidirectional.

**SCG Switch Package Information**

Connector Type	Chassis Size	Switch Configuration	Max Channel Counts (input + output)
Bulkhead	3U 19" rack mount	C, D, E, F	60 front panel; 60 rear panel
Pigtail	3U 19" rack mount	C, D, E, F	90 front panel; 90 rear panel



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