Benchtop/Rack-mount Programmable Switches
SB/SC Series

SB Series

SC Series

Applications

- Fiber optic component testing and measurement
- System testing
- Research and development (R&D)
- Network monitoring

Safety Information

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

Key Features

- SB series can accommodate up to 20 channels and offer up to two input channels
- SC series can accommodate up to 178 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 RS232 remote control

The JDSU SB and SC Series of Benchtop/Rack-mount Programmable Switches can be controlled using the front panel keys and a numeric pad or via GPIB and serial RS232 interface.

The SB and SC series switches are available in three basic configurations , which are illustrated in Figures 1, 2, and 3, respectively.

- **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)
- **E configuration**: allows for connecting any input 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).

Operation of these switches is based upon the JDSU-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.

Both single-mode (SM) and multimode (MM) versions of the SB and SC 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 rack-mount enclosure SC switches are highly suited for applications in telecommunications, manufacturing, and test environments.

The JDSU SB and SC switches are known in the fiber optics industry for their low IL and excellent repeatability. In addition to the many *Quick Picks* options available, JDSU can also provide *Specialized* switches in this series to meet your specific application needs.

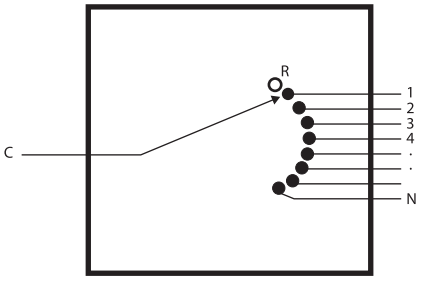

Figure 1. 1x N Switching: C Configuration (SB and SC)
The 1xN configuration allows a single common input to be switched to any of the outputs.

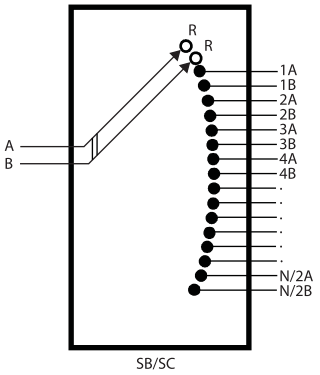

Figure 2. Ganged Switching: D Configuration (SB/SC)
The MxN configuration provides simultaneous connections of a bank of inputs to outputs.

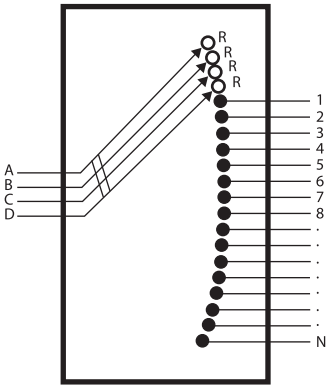

Figure 3. Sequential Switching: E Configuration (SB/SC)
The MxN configuration aligns any input with any output, while other inputs are aligned to adjacent outputs.

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SB Model Specifications

Parameter[1]	Single Common C Configuration		Multiple Common D Configuration		Multiple Common E 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)[2]						
SM standard/analog	>65 dB	60/65 dB	>65 dB	60/65 dB	65 dB	60 dB
MM[3] 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[4]	±0.03 dB	±0.05 dB	±0.03 dB	±0.05 dB	±0.03 dB	±0.05 dB
Repeatability[5]						
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 RS232 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 rack-mount kit (optional)[6]	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 7-day period.
5. Measured between two consecutive readings over 100 cycles.
6. ED000899-A-00 standard rack-mount kit. Requires two kits to mount two units side-by-side.
   Please specify part number when ordering (if needed).

SC Model Specifications

Parameter[1]	Single Common C Configuration (SC Model only)		Multiple Common D Configuration		Multiple Common E 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 4 inputs	—	—	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 4 inputs	—	—	0.5 dB	1.0 dB	0.7 dB	1.5 dB
RL[2]						
SM standard/analog	>65 dB	60/65 dB	>65 dB	60/65 dB[3]	>65 dB	60 dB
MM[4] standard/analog	25/35 dB	20/30 dB	25/35 dB[3]	20/30 dB[3]	>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[5]	±0.03 dB	±0.05 dB	±0.03 dB	±0.05 dB	±0.03 dB	±0.05 dB
Repeatability[6]						
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 (420 ms)					
Each additional channel	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 RS232 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 height6)	48 x 13 x 37 cm (48 x 26.6 x 37 cm) excluding handles					
Weight single (double height[7])	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 7-day period.
6. Measured between two consecutive readings over 100 cycles.
7. Applies to SC model only.

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Ordering Information

Quick Picks*

The following selection of switches are popular configurations used for majority of switching applications:

Product Code	*Description*
Single-Mode 1XN	
SB1C10081+27XF000FP	1x8 C Configuration, Single-Mode, Standard RL Bulkhead FC/PC
SB1C10081+27XF000FA	1x8 C Configuration, Single-Mode, Standard RL Bulkhead FC/APC
SB1C10161+27XF000FP	1x16 C Configuration, Single-Mode, Standard RL Bulkhead FC/PC
SB1C10161+27XF000FA	1x16 C Configuration, Single-Mode, Standard RL Bulkhead FC/APC
SC1C10241+27XF000FP	1x24 C Configuration, Single-Mode, Standard RL Bulkhead FC/PC
SC1C10241+27XF000FA	1x24 C Configuration, Single-Mode, Standard RL Bulkhead FC/APC
SC1C10321+27XF000FP	1x32 C Configuration, Single-Mode, Standard RL Bulkhead FC/PC
SC1C10321+27XF000FA	1x32 C Configuration, Single-Mode, Standard RL Bulkhead FC/APC
SC1C10401+27XF000FP	1x40 C Configuration, Single-Mode, Standard RL Bulkhead FC/PC
SC1C10401+27XF000FA	1x40 C Configuration, Single-Mode, Standard RL Bulkhead FC/APC
Single-Mode 2XN	
SB2E10161+27XF000FP	2x16 E Configuration, Single-Mode, Standard RL Bulkhead FC/PC
SB2E10161+27XF000FA	2x16 E Configuration, Single-Mode, Standard RL Bulkhead FC/APC
SC2E10241+27XF000FP	2x24 E Configuration, Single-Mode, Standard RL Bulkhead FC/PC
SC2E10241+27XF000FA	2x24 E Configuration, Single-Mode, Standard RL Bulkhead FC/APC
SC2E10401+27XF000FP	2x40 E Configuration, Single-Mode, Standard RL Bulkhead FC/PC
SC2E10401+27XF000FA	2x40 E Configuration, Single-Mode, Standard RL Bulkhead FC/APC
Multimode 1XN	
SB1C10041+22XQ000FP	1x4 C Configuration, 62.5/125 µm, Standard RL Bulkhead FC/PC
SB1C10081+22XQ000FP	1x8 C Configuration, 62.5/125 µm, Standard RL Bulkhead FC/PC
SB1C10121+22XQ000FP	1x12 C Configuration, 62.5/125 µm, Standard RL Bulkhead FC/PC
SC1C10241+22XQ000FP	1x24 C Configuration, 62.5/125 µm, Standard RL Bulkhead FC/PC
SB1C10041+21XQ000FP	1x4 C Configuration, 50/125 µm, Standard RL Bulkhead FC/PC
SB1C10081+21XQ000FP	1x8 C Configuration, 50/125 µm, Standard RL Bulkhead FC/PC
SB1C10121+21XQ000FP	1x12 C Configuration, 50/125 µm, Standard RL Bulkhead FC/PC
SC1C10241+21XQ000FP	1x24 C Configuration, 50/125 µm, Standard RL Bulkhead FC/PC
Multimode 2XN	
SC2E10241+22XQ000FP	2x24 E Configuration, 62.5/125 µm, Standard RL Bulkhead FC/PC
SC2E10241+21XQ000FP	2x24 E Configuration, 50/125 µm, Standard RL Bulkhead FC/PC

* Quick pick switches ship from stock with short lead times. All switches are shipped with north american style power cords.

If these configurations do not meet your performance requirements, please contact one of our regional sales team members to discuss potential specialized solutions.

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Ordering Information

Specialized Offering*

For 4 to 20 output channels in a 2U benchtop SB packaging with bulkhead connectors

SB □□ 1 □□□ 1+2 □ □□ 000 □□

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

Code	Number of Output Channels
004	4 output channels
008	8 output channels
012	12 output channels
016	16 output channels
020	20 output channels

Code	Return Loss
X	Standard
A	Analog
B	Bidirectional, standard RL
C	Bidirectional analog RL

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

Code	Wavelength Range (nm)
F	1270 to1670
Q	850 to 1350 (MM only)
B	750 to 940 (MM only)

Code	Connector Type
FP	FC/PC (bulkheads max. 60/120)
FA	FC/APC (bulkheads max. 60/120)
SC	SC/PC (bulkheads max. 60/120)
SU	SC/APC (bulkheads max. 60/120)

For 24 to 56 output channels in a 3U rack-mount SC packaging with option of bulkhead or pigtail connectors

SC □□ □ □□□ □□1+2 □ □□ □□□ □□

Code	Input Port Type
1	Bulkheads on front
4	Pigtails on back

Code	Number of Input Channels
1C	1 input channel, C config.
2D	2 input channels, D config.
2E	2 input channels, E config.
4D	4 input channels, D config.
4E	4 input channels, E config.

Code	Number of Output Channels
024	24 output channels
032	32 output channels
040	40 output channels
048	48 output channels
056	56 output channels

Code	Return Loss
X	Standard
A	Analog
B	Bidirectional, standard RL
C	Bidirectional analog RL

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

Code	Wavelength Range (nm)
F	1270 to1670
Q	850 to 1350 (MM only)
B	750 to 940 (MM only)

Code	Cable Length (3mm diameter)
003	3 m
000	Not applicable (bulkheads only)

Code	Connector Type
FP	FC/PC (bulkheads max. 60/120)
FA	FC/APC (bulkheads max. 60/120)
SC	SC/PC (bulkheads max. 60/120)
SU	SC/APC (bulkheads max. 60/120)

* All switches are shipped with north american style power cords.

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Ordering Information

Specialized Offering*

For 64 to 88 output channels in a 6U rack-mount SC packaging with option of bulkhead or pigtail connectors:

SC □□ □ □□□ □+2 □ □□ □□□ □□

Code	Input Port Type
1	Bulkheads on front
4	Pigtails on back

Code	Input Port Type
1	Bulkheads on front
4	Pigtails on back

Code	Number of Input Channels
1C	1 input channel, C config.
2D	2 input channels, D config.
2E	2 input channels, E config.
4D	4 input channels, D config.
4E	4 input channels, E config.

Code	Number of Output Channels
064	64 output channels
072	72 output channels
080	80 output channels
088	88 output channels

Code	Return Loss
X	Standard
A	Analog
B	Bidirectional, standard RL
C	Bidirectional analog RL

Code	Cable Length (3mm diameter)
003	3 m
000	Not applicable (bulkheads only)

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

Code	Connector Type
FP	FC/PC (bulkheads max. 60/120)
FA	FC/APC (bulkheads max. 60/120)
SC	SC/PC (bulkheads max. 60/120)
SU	SC/APC (bulkheads max. 60/120)

Code	Wavelength Range (nm)
F	1270 to1670
Q	850 to 1350 (MM only)
B	750 to 940 (MM only)

For 96 to 178 output channels in a 6U rack-mount SC packaging with pigtails:

SC □□ 4 □□□ 4+2 □ □□ 003 □□

Code	Number of Input Channels
1C	1 input channel, C config.
2D	2 input channels, D config.
2E	2 input channels, E config.
4D	4 input channels, D config.
4E	4 input channels, E config.

Code	Number of Output Channels
096	96 output channels
108	108 output channels
120	120 output channels
132	132 output channels
144	144 output channels
156	156 output channels
178	178 output channels

Code	Return Loss
X	Standard
A	Analog
B	Bidirectional, standard RL
C	Bidirectional analog RL

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

Code	Connector Type
FP	FC/PC (bulkheads max. 60/120)
FA	FC/APC (bulkheads max. 60/120)
SC	SC/PC (bulkheads max. 60/120)
SU	SC/APC (bulkheads max. 60/120)

Code	Wavelength Range (nm)
F	1270 to1670
Q	850 to 1350 (MM only)
B	750 to 940 (MM only)

* All switches are shipped with north american style power cords.

If these configurations do not meet your performance requirements, please contact one of our regional sales team members to discuss potential specialized solutions.

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