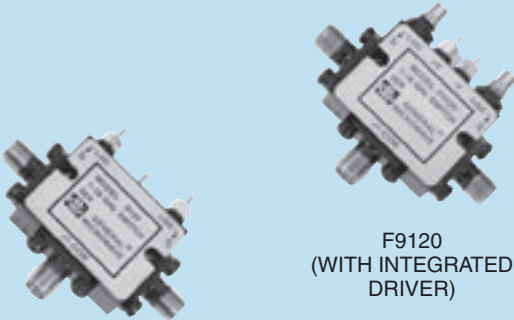


Series 91 and 92

Miniature Broadband SP2T Switches

- Frequency range (Series 91): 1 to 18 GHz
- Frequency range (Series 92): 0.2 to 4 GHz
- Rise and fall times as fast as 10 nsec
- Reflective and nonreflective models
- Low VSWR and insertion loss
- Miniature size, light weight

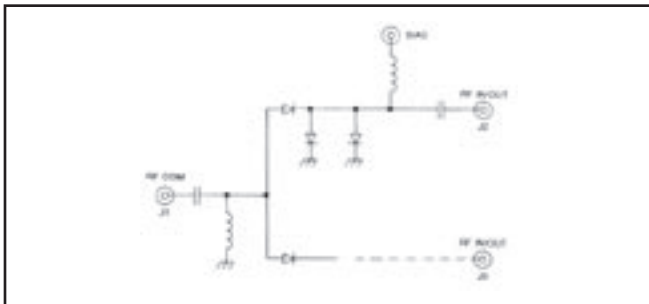


9120-500
(DRIVERLESS)

F9120
(WITH INTEGRATED DRIVER)

MODELS 9120-500 AND 9220-500

These switches provide high-performance characteristics over a multi-octave frequency range. Model 9120-500 covers the frequency range of 1 to 18 GHz; Model 9220-500 covers the frequency range of 0.2 to 4 GHz. Both models use an integrated circuit assembly of a series-shunt configuration of PIN diodes mounted in a microstrip transmission line as shown below.



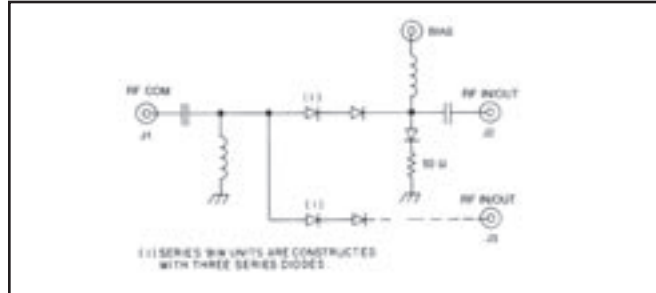
Series 91 and 92 schematic diagram

Port Control

By applying positive current to a bias terminal, the associated port is OFF since the corresponding shunt diodes are biased to a low resistance and the series diode to a high resistance. With negative current at the bias terminal, the converse conditions are established and the port is ON. Since bias terminals are individually available for both ports, the user has the option of any combination of ports ON or OFF.

MODELS 9120T-500, 9120W-500 AND 9220T-500

These switches are non-reflective versions of the switches described above. They are constructed in the configuration shown below.



Series 91T, 92T and 91W schematic diagram

When positive current is applied, the port is OFF since the associated series diodes are back-biased to a high resistance. At the same time, the corresponding shunt diode is biased to a low resistance, and the impedance at the port is then effectively that of the 50 ohm resistor in series with the shunt diode. When applying negative current, the converse conditions are established and the port is ON.

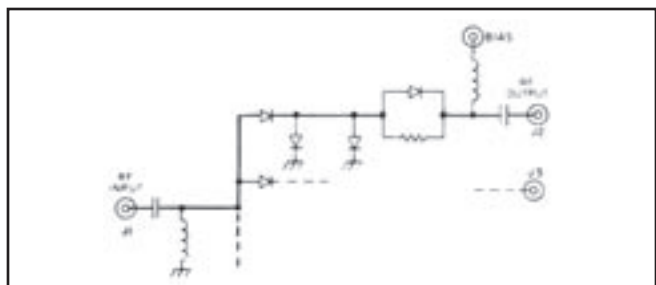
Note that when all output ports are OFF, a high VSWR will be present at the common port.

MODEL 9120AH-500

This switch has the same circuit topology as the 9120-500 except it is equipped with high-speed diodes to achieve rise and fall times of 10 nsec.

MODEL 9120AHT-500

This switch is similar to the 9120AH-500 except it includes a terminating network as shown below.



Model 9120AHT-500 schematic diagram

SERIES F91/F92

The Series F91/F92 units are the same as the Series 91/92 units except they are equipped with integrated drivers that are powered by +5 and -12 to -15V supplies. The proper currents required to switch the ports ON or OFF are provided by the drivers, which are controlled by external control signals. Standard units are wired so that a port is ON with the application of a logic "0" control signal.



Series 91 and 92 SP2T Switches Specifications

MODEL NO. ⁽¹⁾	CHARACTERISTIC	FREQUENCY (GHz)					
		0.2-1	1-2	2-4	4-8	8-12.4	12.4-18
9120-500 F9120	Min. Isolation (dB)	–	60	60	60	60	50
	Max. Insertion Loss (dB)	–	1.1	1.1	1.4	2.0	2.5
	Max. VSWR (ON)	–	1.75	1.75	1.75	1.75	2.0
G9120	Min. Isolation (dB)	–	60	60	60	60	50
	Max. Insertion Loss (dB)	–	1.8	1.8	1.8	2.2	2.5
	Max. VSWR (ON)	–	1.5	1.5	1.7	1.7	2.0
9220-500 F9220	Min. Isolation (dB)	60	60	60	–	–	–
	Max. Insertion Loss (dB)	1.5	1.5	1.5	–	–	–
	Max. VSWR (ON)	1.5	1.5	1.5	–	–	–
G9220	Min. Isolation (dB)	60	60	60	–	–	–
	Max. Insertion Loss (dB)	1.8	1.8	1.8	–	–	–
	Max. VSWR (ON)	1.5	1.5	1.5	–	–	–
9120T-500 F9120T G9120T	Min. Isolation (dB)	–	50	50	50	45	40
	Max. Insertion Loss (dB)	–	1.2	1.2	1.5	1.5	2.2
	Max. VSWR (ON or OFF)	–	1.5	1.5	1.7	1.7	2.0
9220T-500 F9220T G9220T	Min. Isolation (dB)	60	60	60	–	–	–
	Max. Insertion Loss (dB)	1.2	1.2	1.2	–	–	–
	Max. VSWR (ON or OFF)	1.5	1.5	1.5	–	–	–
9120W-500 F9120W G9120W	Min. Isolation (dB)	–	60	60	60	60	55
	Max. Insertion Loss (dB)	–	1.8	1.8	1.8	2.2	2.5
	Max. VSWR (ON or OFF)	–	1.5	1.5	1.7	1.7	2.0
9120AH-500 F9120AH	Min. Isolation (dB)	–	60	60	60	60	50
	Max. Insertion Loss (dB)	–	1.1	1.1	1.4	2.0	2.5
	Max. VSWR (ON)	–	1.75	1.75	1.75	1.75	2.0
9120AHT-500 F9120AHT	Min. Isolation (dB)	–	60	60	60	60	50
	Max. Insertion Loss (dB)	–	1.3	1.3	1.7	2.5	3.0
	Max. VSWR (ON)	–	1.75	1.75	1.9	2.0	2.0
	Max. VSWR (OFF)	–	1.75	1.75	2.0	2.2	2.3

PERFORMANCE CHARACTERISTICS

Power Handling Capability

Without Performance Degradation

Units without “T” or “W” suffix: 1W cw or peak

Units with “T” or “W” suffix

Input to any “OFF” port: 100 mW cw or peak

Input to any “ON” port: 1W cw or peak

Input to common port: 1W cw or peak

Survival Power

Units without “T” or “W” suffix: 1W average, 75W peak (1 μsec max. pulse width)

Units with “T” or “W” suffix

Input to any “OFF” port: 1W average 10W peak (1 μsec max. pulse width)

Input to any “ON” port: 1W average, 75W peak (1 μsec max. pulse width)

Input to common port: 1W average 75W peak (1 μsec max. pulse width)

(1) Models prefixed with “F” or “G” are equipped with integrated TTL-compatible drivers; models without the “F” or “G” prefix are current-controlled units and are furnished without drivers; models suffixed with “T” or “W” are non-reflective except a high VSWR will be present at the common port if all other ports are OFF; models suffixed with “H” are high-speed units.



Series 91 and 92 SP2T Switches Specifications

Switching Characteristics⁽¹⁾

SERIES 91/F91/G91

Units without "H" suffix

ON time 250 nsec max.

OFF time 250 nsec max.

Units with "H" suffix

Rise time 10 nsec max.

Fall time 10 nsec max.

ON time 25 nsec max.

OFF time 20 nsec max.

Repetition rate 20 MHz max.

SERIES 92/F92/G92

ON time 500 nsec max.

OFF time 500 nsec max.

Power Supply Requirements

SERIES 91/92/F91/F92

Driverless Units

Bias current required at each port for rated isolation and insertion loss.

PORT OFF

Units without "H" suffix +50 mA

Units with "H" suffix +30 mA

PORT ON

Units without "H" suffix -50 mA

Units with "H" suffix -35 mA

Units With Integrated Drivers

(For one port ON)

	+5V ±5%	-12 to -15V
Units Without "H" Suffix	65 mA	65 mA
Units With "H" Suffix	60 mA	50 mA
Units With "HT" Suffix	80 mA	50 mA

SERIES G91/G92

(For one Port ON)

+5V ±5%, 100 mA

+15V ±5%, 30 mA

Control Characteristics

SERIES 91/92/F91/F92

Units With Integrated Drivers

Control Input Impedance

Units without "H" suffix TTL, low power Schottky, one unit load. (A unit load is 0.8 mA sink current and 40 µA source current.)

Units with "H" suffix TTL, advanced Schottky, one unit load. (A unit load is 0.6 mA sink current and 20 µA source current.)

Control Logic Logic "0" (-0.3 to +0.8V) for port ON and logic "1" (+2.0 to +5.0 V) for port OFF.

SERIES G91/G92

Control Input Impedance .. Schottky TTL, one unit load. (A unit load is 2.0 mA sink current and 50 µA source current.)

Control Logic Logic "0" (-0.3 to +0.8V) for port ON and logic "1" (+2.0 to +5.0 V) for port OFF.

(1) For driverless units, shaped current pulses must be provided by user.



Series 91 and 92 SP2T Switches Specifications

ENVIRONMENTAL RATINGS

Temperature Range

Units With Integrated Drivers

Operating -65°C to +110°C

Non-Operating -65°C to +125°C

Driverless Units

Operating and

Non-Operating -65°C to +125°C

Humidity MIL-STD-202F, Method 103B, Cond. B (96 hrs. at 95%)

Shock MIL-STD-202F, Method 213B, Cond. B (75G, 6 msec)

Vibration MIL-STD-202F, Method 204D, Cond. B (.06" double amplitude or 15G, whichever is less)

Altitude MIL-STD-202F, Method 105C, Cond. B (50,000 ft.)

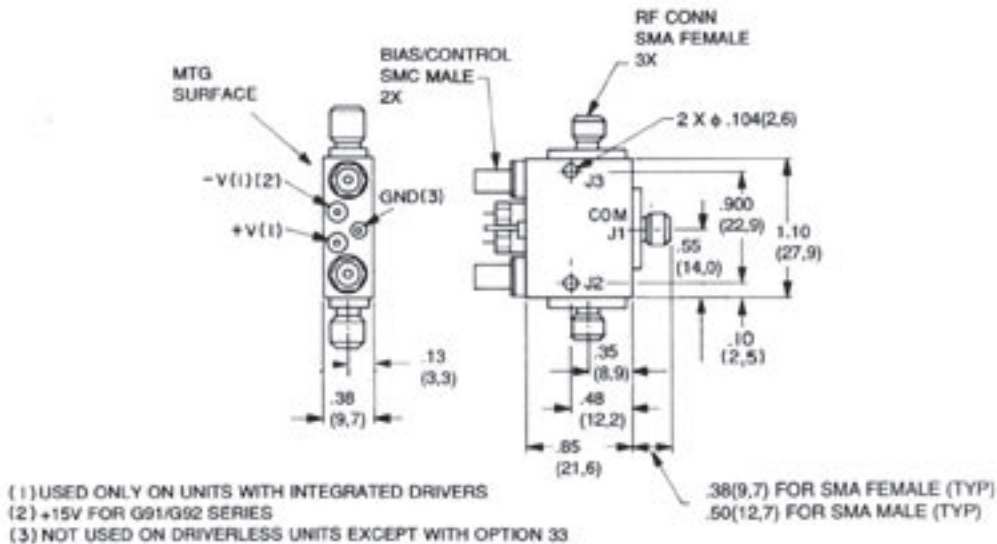
Temp. Cycling MIL-STD-202F, Method 107D, Cond. A, 5 cycles

AVAILABLE OPTIONS

Option No.	Description
3	SMA female bias/control connectors
7	J1, J2 and J3 SMA male
7A	J1 SMA male; J2 and J3 SMA female
7B	J1 SMA female; J2 and J3 SMA male
9	Inverse control logic; logic "0" for port OFF and logic "1" for port ON (Not applicable to Series 91/92)
27	Single-port toggle control; logic "0" connects J1 to J2 (Not applicable to the Driverless Units, Series 91/92)
33	EMI filter solder-type bias/control terminals
41*	Internal video filter, common port only
42*	Internal video filter, output ports only
43*	Internal video filter, all ports
55	Frequency range 0.5 to 18 GHz. See on page 87 the impact of this option on the switch specifications.
64A	SMB male bias/control connectors

*Not applicable to Series 92//F92/G92. See chart following the power handling discussion on page 87.

DIMENSIONS AND WEIGHT



SERIES 91/92/F91/F92/G91/G92
 Wt: .75 oz. (21 gm) approx.



Dimensional Tolerances, unless otherwise indicated: .XX ±.02; .XXX ±.005