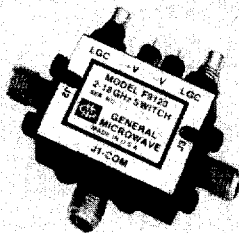
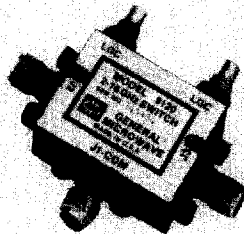


Series 91 and 92 Miniature Broadband SP2T Switches

- **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**



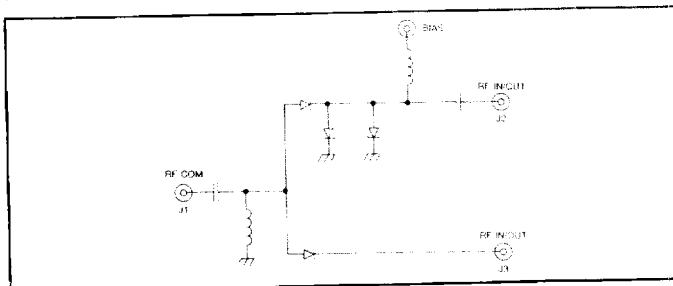
F9120
(WITH INTEGRATED
DRIVER)



9120-500
(DRIVERLESS)

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.



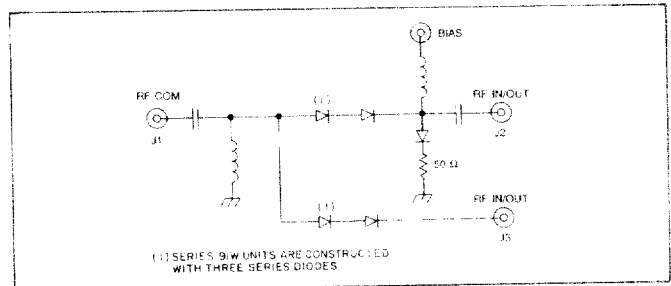
Series 91 and 92 schematic diagram

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.

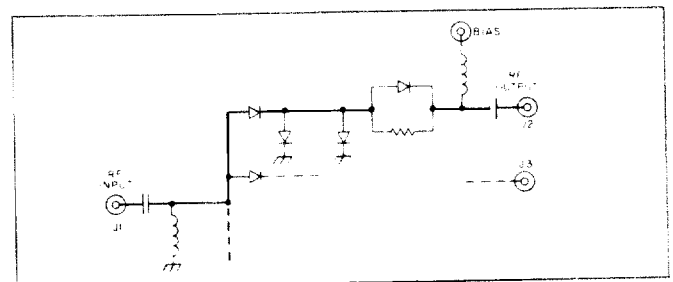
Note that when all output ports are OFF, a high VSWR will be present at the common port.

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

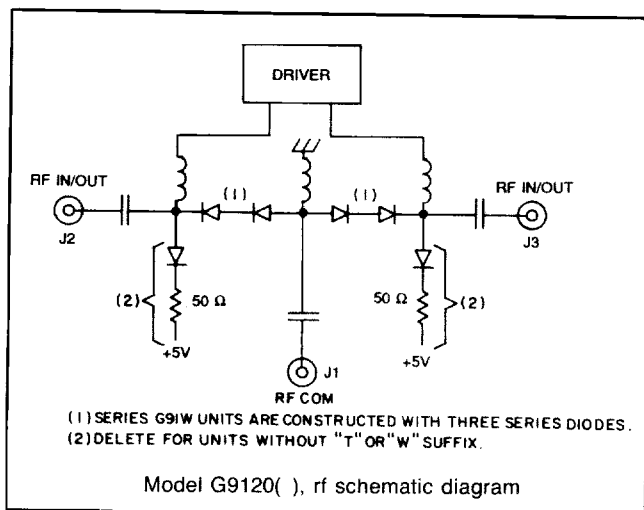
The Series F91/F92 units are the same as the Series 91/92 units except they are equipped with integrated drivers that are powered by +5 and -12 to -15 V supplies. The proper currents required to switch the ports ON or OFF are provided by the drivers, which are controlled by external control signals.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



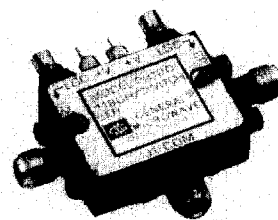
Series 91 and 92 Miniature Broadband SP2T Switches

SERIES G91 and G92

Operating from +5 and +15V power supplies only, the G-series switches provide high performance characteristics at relatively high speeds over multi-octave frequency ranges. The series includes low insertion loss and high isolation models in both reflective and non-reflective configurations. Series G91 units cover the frequency range of 1 to 18 GHz; Series G92 units cover the frequency range of 0.2 to 4 GHz. The design is based on an integrated circuit assembly of PIN diodes mounted in a microstrip transmission line as shown below. The currents required to switch the ports ON or OFF are provided by the integrated driver, which is controlled by external TTL logic signals.



- **Frequency range (Series G91):**
1 to 18 GHz
- **Frequency range (Series G92):**
0.2 to 4 GHz
- **Reflective and nonreflective models**
- **Low VSWR and insertion loss**
- **Up to 60 dB isolation**
- **Positive dc supplies only**
- **Miniature size, light weight**



MODEL G9120

SERIES G91T/G92T and G91W

These switches are non-reflective versions of the switches described above.



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 μ sec max. pulse width)

Units with "T" or "W" suffix

Input to any "OFF" port: 1W average, 10W peak (1 μ sec max. pulse width)

Input to any "ON" port: 1W average, 75W peak (1 μ sec max. pulse width)

Input to common port: 1W average, 75W peak (1 μ sec 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 91/92/F91/F92

Units without "H" suffix

ON time 500 nsec max.
OFF time 500 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 G91/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 . . . +50mA
Units with "H" suffix +30mA

PORT ON

Units without "H" suffix . . . -50mA
Units with "H" suffix -35mA

Units With Integrated Drivers

(For one port ON)

	+5V $\pm$ 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 $\pm$ 5%, 100 mA
+15V $\pm$ 5%, 30 mA

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

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 μ A source current.)

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

Control Logic Logic "0" (-0.3 to +0.8 V) 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 μ A source current.)

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



Series 91 and 92 SP2T Switches Specifications

ENVIRONMENTAL RATINGS

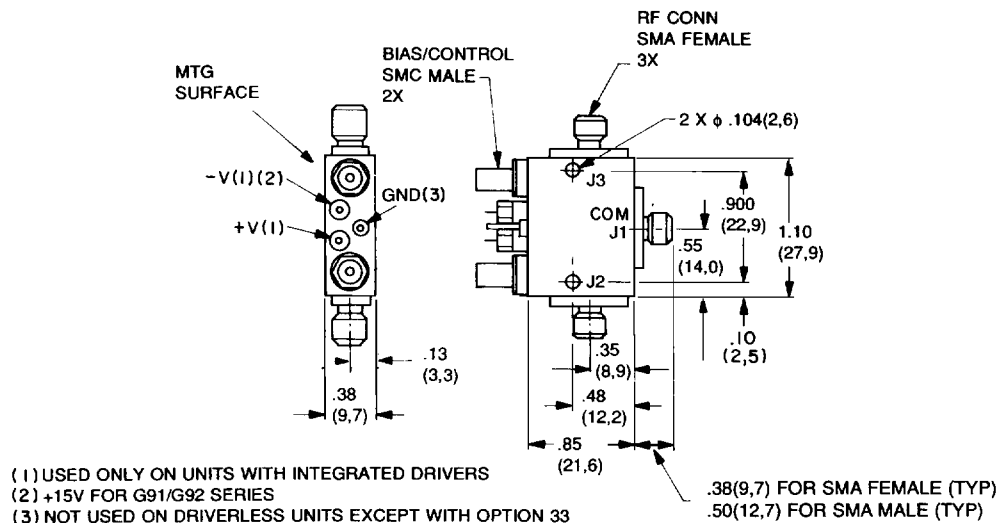
Temperature Range	
Units With Integrated Drivers	
Operating	-65°C to +110°C
Non-Operating	-65°C to +125°C
Driverless Units	
Operating and Non-Operating	-65°C to +125°C
Humidity	MIL-STD-202F, Method 103B, Cond. B (96 hrs. at 95%)
Shock	MIL-STD-202F, Method 213B, Cond. B (75G, 6 msec)
Vibration	MIL-STD-202F, 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
64A	SMB male bias/control connectors

*Not applicable to Series 92/F92/G92. See chart following the power handling discussion on page 98.

DIMENSIONS AND WEIGHT



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

Dimensional Tolerances, unless otherwise indicated: .XX $\pm$.02; .XXX $\pm$.005

