Series 347 8 Bit Digital Phase Invariant Attenuator

Contact us

Application Notes for Microwave Attenuator

The Series 347 digitally controlled PIN diode attenuators offer essentially phase free operation over a wide dynamic range in multi-octave frequency bands between 2 and 18 GHz. The attenuators utilize a unique double balanced arrangement of diodes and quadrature couplers to achieve the phase independent attenuation characteristic. Excellent temperature stability is maintained by employing a self-compensating biasing scheme. See Fig. 1.

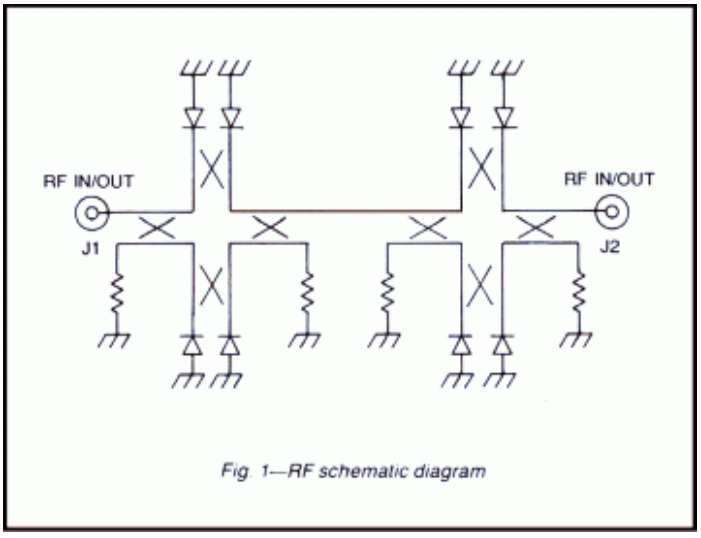
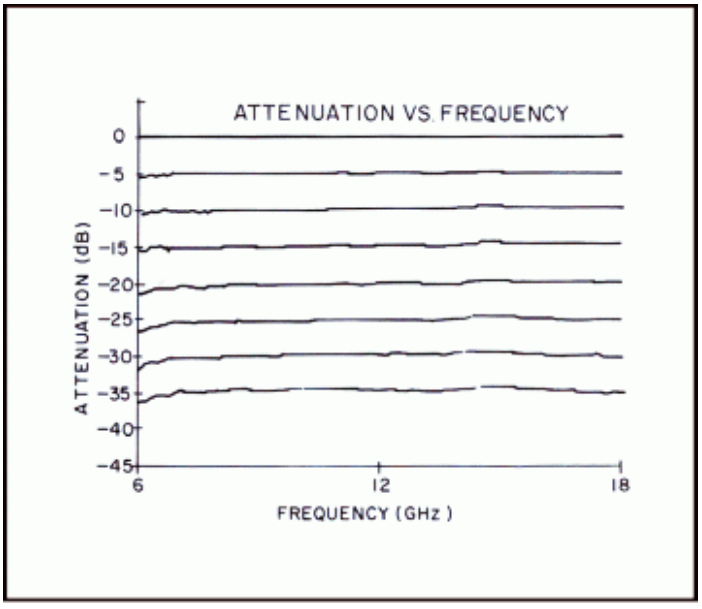


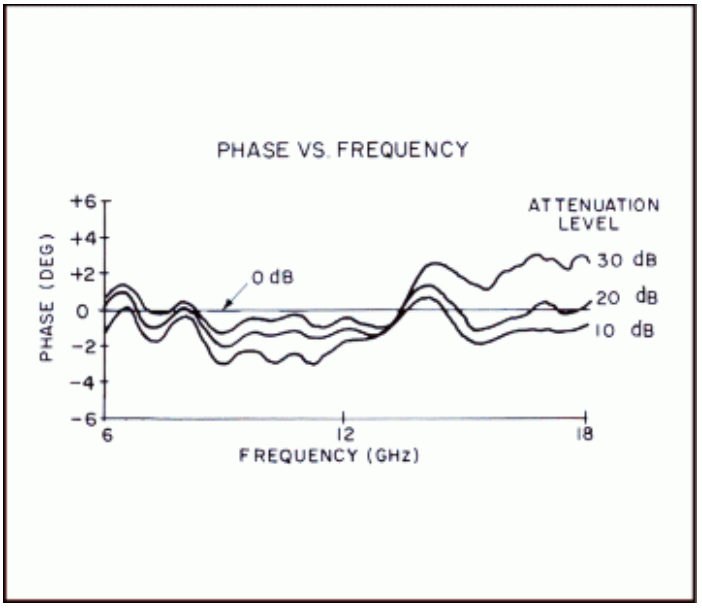
Fig. 1—RF schematic diagram

SPECIAL ORDER PRODUCT
- CONSULT FACTORY BEFORE ORDERING -

- **Low Phase Shift**
- **Frequency range: 2=18 GHz**
- **Non-reflective**
- **Attenuation range: to 45 dB**
- **LSB: 0.125 dB**
- **High Speed**

TYPICAL PERFORMANCE





PERFORMANCE CHARACTERISTICS

MODEL	3472	3474	3478
Frequency Range (GHz)	2-6	4-11	6-18
Mean Attenuation Range	32 dB		
Insertion Loss (Max)	4dB	5dB	7 dB
VSWR (Max)	2.0	2.0	3.0

Accuracy of Attenuation	± 0.5 dB		
Amplitude Flatness **0 to 20 dB** **> 20 to 32 dB**	± 0.4 dB ± 0.6 dB	± 0.4 dB ± 0.8 dB	± 0.8 dB(1) ± 1.3 dB(1)
Monotonicity	Guaranteed		
Phase Shift **0 to 20 dB** **> 20 to 32 dB**	± 4 ° ± 8 °	± 4 ° ± 8 °	± 5 ° ± 10 °
On Time, Off Time	350 nsec		
Temperature Coefficient	.02 dB/°C		
Max. RF Power Input (Operating)	100 mW		
Max. RF Power Input (Survival)	0.5 W		
Harmonic Distortion @ Pin = +10 dBm	-40 dBc	-50 dBc	-50 dBc
Control	8 bit TTL, 0.125 dB LSB		
Control Input Impedance	@ Logic "0" (- 0.3 to +0.8 V) 500 µA max. @ Logic 1" (+2.0 to +5.0 V), 100 µA max.		
Logic Input	Logic "0" = Bit OFF Logic "1" = Bit ON		
Power Supply Requirements	+5V ± 5% @ 325 mA +15V ± 5% @ 15 mA -15V ± 5% @ 70 mA		

SPECIFICATIONS WITH EXTENDED RANGE OPTION (OPTION 45)

Mean Attenuation Range	45 dB		
Accuracy of Attenuation	± 1.0 dB		
Amplitude Flatness **0 to 20 dB** **> 20 to 32 dB** **> 32 dB**	 ± 0.4 dB ± 0.6 dB ± 1.5 dB	 ± 0.4 dB ± 0.8 dB ± 1.5 dB	 ± 0.8 dB(1) ± 1.3 dB(1) ± 2.0 dB
Phase Variation **0 to 20 dB** **> 20 to 32 dB** **> 32 dB**	 ± 4 ° ± 8 ° ± 15 °	 ± 4 ° ± 8 ° ± 20 °	 ± 5 ° ± 10 ° ± 30 °
Control	8 bit TTL, 0.176 dB LSB		

(1) Except from 8-18 GHz, flatness is ± 0.5 dB up to 20 dB, ± 1.0 dB up to 32 dB.

ENVIRONMENTAL RATINGS

Operating Temperature Range..... -54°C to + 110°C

Non-Operating Temperature Range.... -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

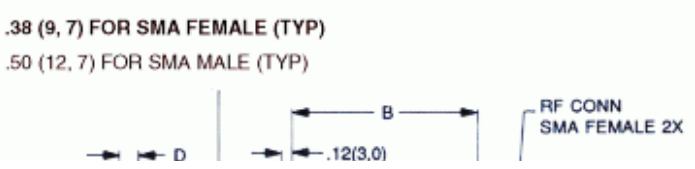
Option No.	Description
7	Two SMA male RF connectors
10	One SMA male (J1) and one SMA female (J2) RF connector
45	Extended attenuation range to 45 dB
65	± 12V operation

ACCESSORY FURNISHED

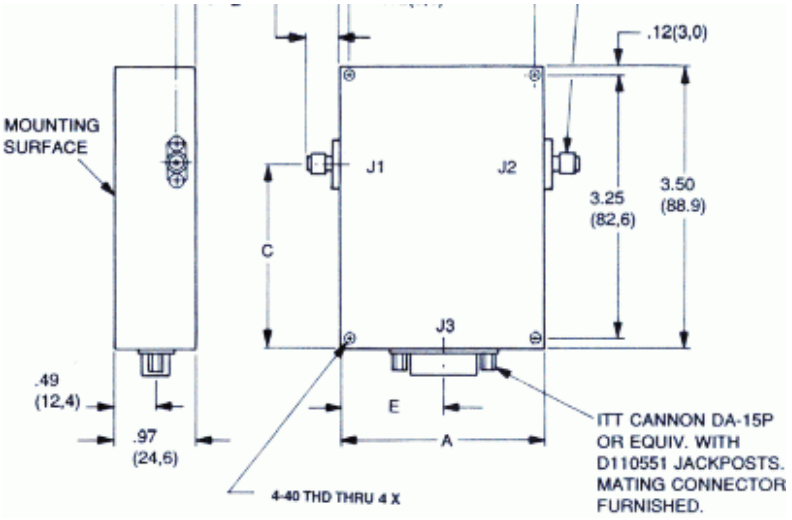
Mating power/logic connector

J3 PIN FUNCTIONS		
PIN NO.	**BINARY**	**OPTION 45**
1	-15V	-15V
2	+15V	+15V
3	Do Not	Do

DIMENSIONS AND WEIGHT



3	Do Not Connect	Do Not Connect
4	0.125dB(LSB)	0.18 dB
5	0.5 dB	0.70 dB
6	4 dB	5.62 dB
7	16 dB (MSB)	22.5 dB
8	8 dB	11.25 dB
9	GROUND	GROUND
10	NOT USED	NOT USED
11	2 dB	2.81 dB
12	0.25 dB	0.35 dB
13	1 dB	1.41 dB
14	NOT USED	NOT USED
15	+5V	+5V



SERIES 347
Wt. 5 oz (142 gm) approx.)

MODEL	A	B	C	D	E
3472	2.5 (63,5)	2.26 (57,4)	2.28 (57,9)	0.22 (5,6)	1.25 (31,7)
3474	2.0 (50,8)	1.76 (44,7)	2.43 (61.7)	0.18 (4,6)	1.0 (25,4)
3478	2.0 (50,8)	1.76 (44,7)	2.58 (65,5)	0.18 (4,6)	1.0 (25,4)

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

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