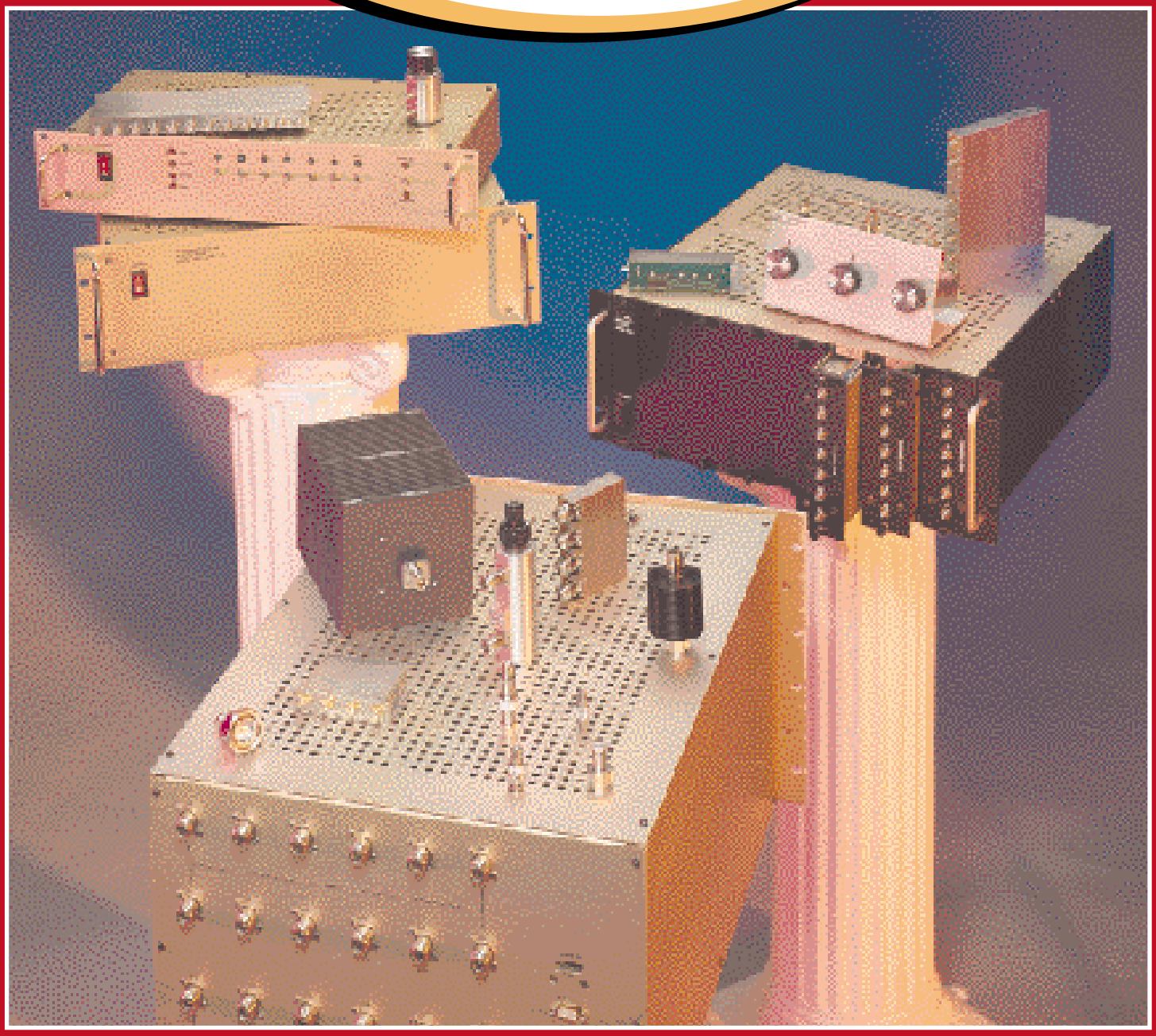
jfw



Specialists in Attenuation and RF Switching

2000 Catalog

The JFW Profile…

"JFW is committed to anticipating and exceeding customer's requirements and expectations through cost-competitive, quality products and services that are delivered on time."

Now entering our 4th decade, JFW Industries is a leading designer and manufacturer of innovative RF solutions that include Attenuators, Terminations, Switches, Power Dividers, Matrix Switches, and specialized Test Systems. Located in Indianapolis, Indiana, JFW has over 140 team members working in an ISO 9001 certified environment to exceed the Quality and Service expectations of every single customer.

Our dedicated Engineering team, with over 70 years of combined experience in the RF and Microwave industry, works together with our unsurpassed Customer Service department to provide application specific solutions at a price you can afford. The ability to respond to the specific needs of the customer has JFW devices being used in applications from Broadcast and Cable TV to Cellular/PCS signal verification and site installations.

New Innovations…

In response to a rapidly changing market, JFW is constantly introducing new products that include:

- Broadband Solid State Programmable Attenuators (800-3000 MHz)
- Complete Line of Low Cost Programmable Attenuators (DC-2500 MHz)
- Broadband Solid State Switches (20-4300 MHz)
- High Isolation, Narrow Band Power Dividers (40 dB minimum)
- Low Cost Fixed Attenuators (DC-3000 MHz)
- Complete Line of Fixed Attenuators and Terminations with 7/16 connectors
- New Miniature Rotary Attenuators (DC-2500 MHz)
- Surface Mount Voltage Variable Attenuator
- Multifunction Programmable Test Systems and Matrix Switches
- Improved Local Control Options on Test Systems via a Keypad/Display/Microcontroller

As part of an effort to stay ahead of engineering and buying trends, JFW has also redesigned our Home Page on the World Wide Web. Now easier to use, it features New Product Information, down-loadable specifications and outline drawings from all of JFW's published literature, as well as a direct Email link to our Customer Service department.

For more information on JFW and our products, please contact us or visit our web site at www.jfwindustries.com.

QUALITY POLICY

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JFW Industries, Inc. has standard terms of Net 30 days with approved credit. Alternate methods of payment include MASTERCARD and VISA. COD or ADVANCE PAYMENT.

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JFW PRODUCTS ARE WARRANTED AGAINST DEFECTS IN WORKMANSHIP AND MATERIAL UNDER NORMAL USE AND SERVICE AS FOLLOWS: (2) TWO YEARS FROM DATE OF SHIPMENT FOR ALL FIXED AND SOLID-STATE PRODUCTS. (1) ONE YEAR FROM DATE OF SHIPMENT FOR ALL MECHANICAL AND ELECTROMECHANICAL PRODUCTS. JFW INDUSTRIES' ONLY OBLIGATION UNDER THIS WARRANTY IS TO REPAIR OR REPLACE, AT ITS FACTORY, ANY JFW PRODUCT OR PART THEREOF THAT IS RETURNED TO JFW INDUSTRIES BY THE ORIGINAL PURCHASER WITHIN THE WARRANTY PERIOD.

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Factory Location

5134 Commerce Square Drive
Indianapolis, Indiana 46237
1-877-887-4**JFW**
317-887-1340 / Fax: 317-881-6790
Internet: http://www.jfwindustries.com
Email: sales@jfwindustries.com

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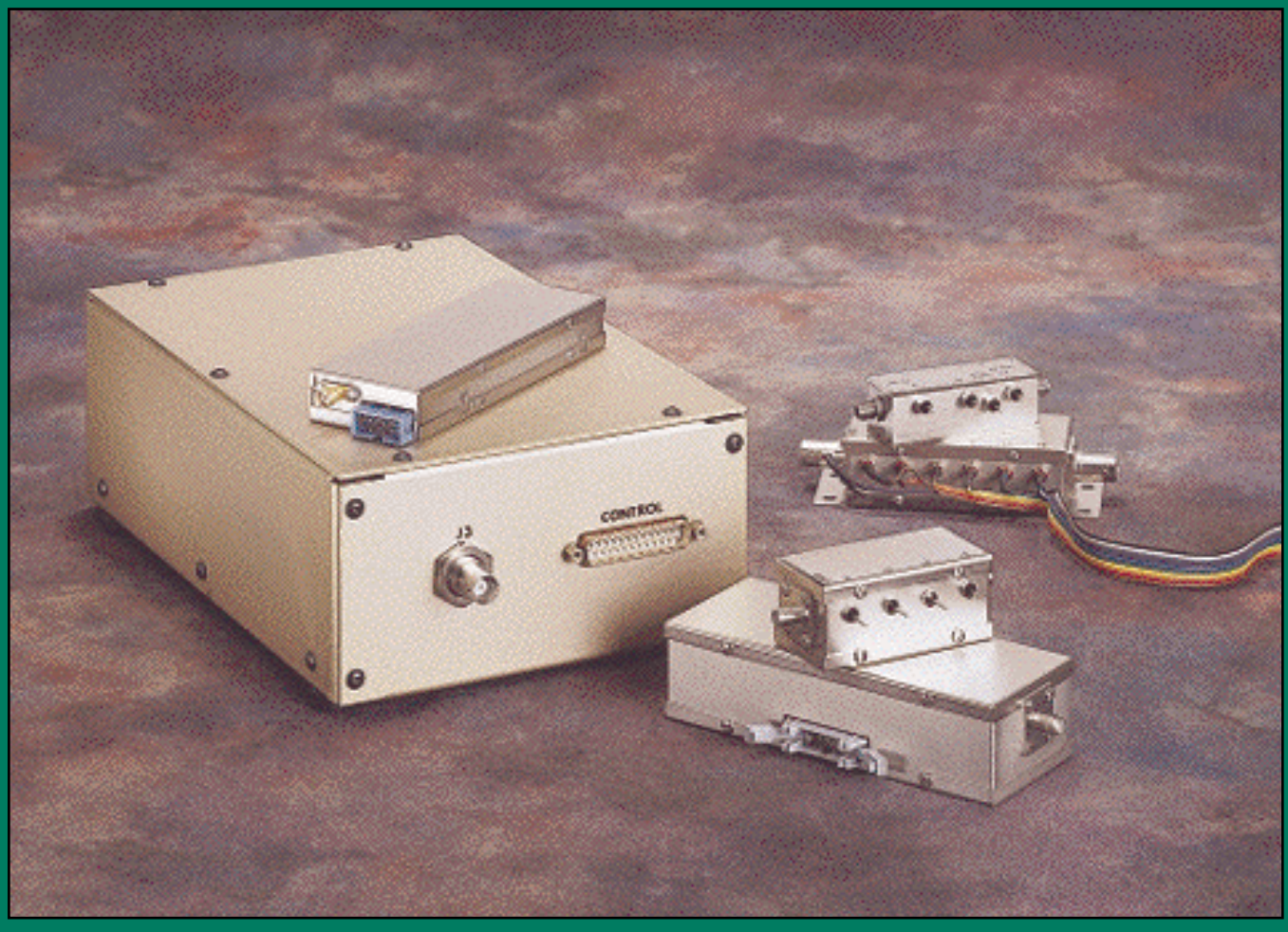
ISO 9001
Certificate Number: 31545

Programmable Attenuators

Solid State

Analog

Relay

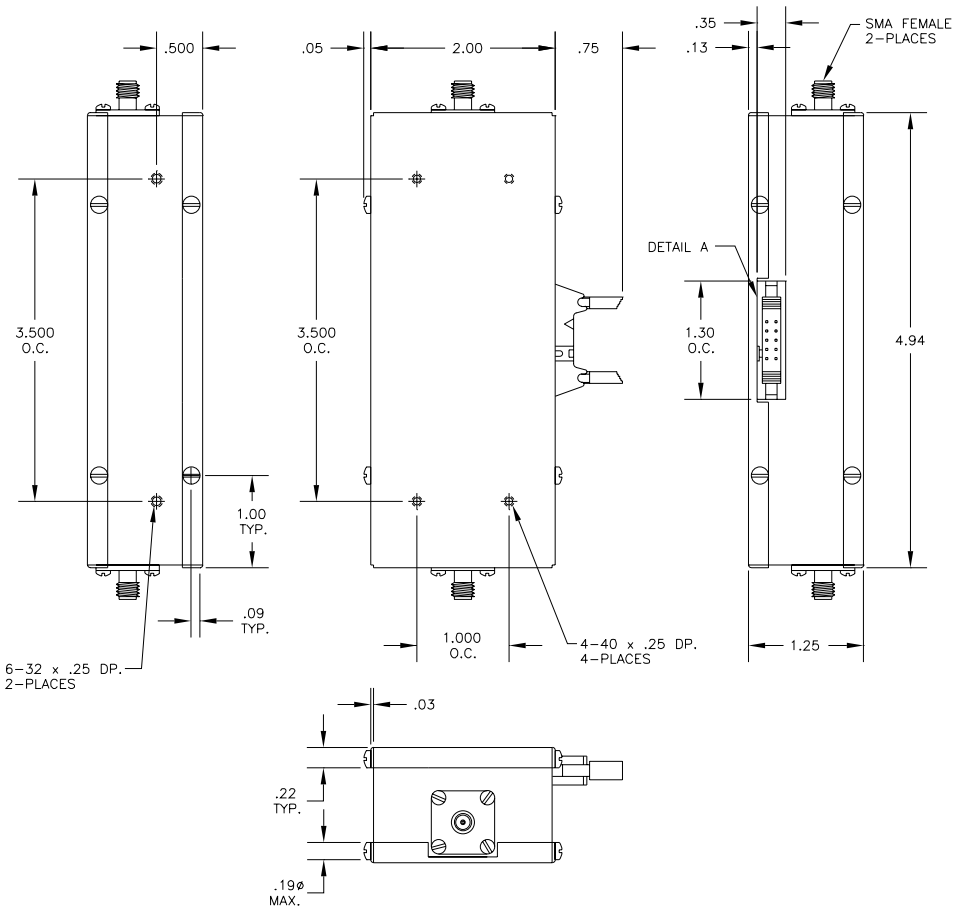


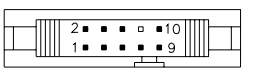
Solid State Programmable Attenuators

Model	Frequency Range	Attenuation Range/ Steps	Attenuation Accuracy	VSWR	Insertion Loss	DC Control Connector
50P-1225	400-2200 MHz	0-63.5 dB / .5,1,2,4,8,16 and 32 dB	+/- .25 dB .5,1,2,4,8 dB +/- .35 dB 16 and 32 dB accumulated error +/- .5 dB or 2% of programmed	1.5:1 maximum	2.5 dB to 1000 MHz 4 dB to 2200 MHz	3M # 3793-5303
50P-1226	400-2200 MHz	0-127 dB / 1,2,4,8,16,32 and 64 dB	+/- .25 dB 1,2,4,8 dB +/- .35 dB 16,32,64 dB accumulated error +/- .5 dB or 2% of programmed	1.5:1 maximum	2.5 dB to 1000 MHz 4.5 dB maximum to 2200 MHz	3M # 3793-5303
50P-1320	500-2500 MHz	0-127 dB / 1,2,4,8,16,32 and 64 dB	+/- .5 dB or 2% of programmed (whichever is greater)	1.6:1 maximum to 2500 MHz	3 dB nominal @ 1000 MHz 5 dB nominal @ 2000 MHz	3M # 3793-5303

Common Specifications

Impedance	Switching Speed	Operating Temperature	RF Input Power	Control Logic (7 lines)	DC Supply	RF Connectors
50 Ohms	2 microseconds (maximum)	0º C to +70º C	+20 dBm operating +30 dBm no damage	TTL low for “zero” setting TTL high for attenuation	+5 Vdc @ 300 mA (nominal)	SMA, N, BNC, TNC





DETAIL A
3M NO. 3793–5303

PIN	FUNCTION
1	LSB
2	
3	
4	
5	
6	
7	MSB
8	
9	+5 Vdc
10	GROUND

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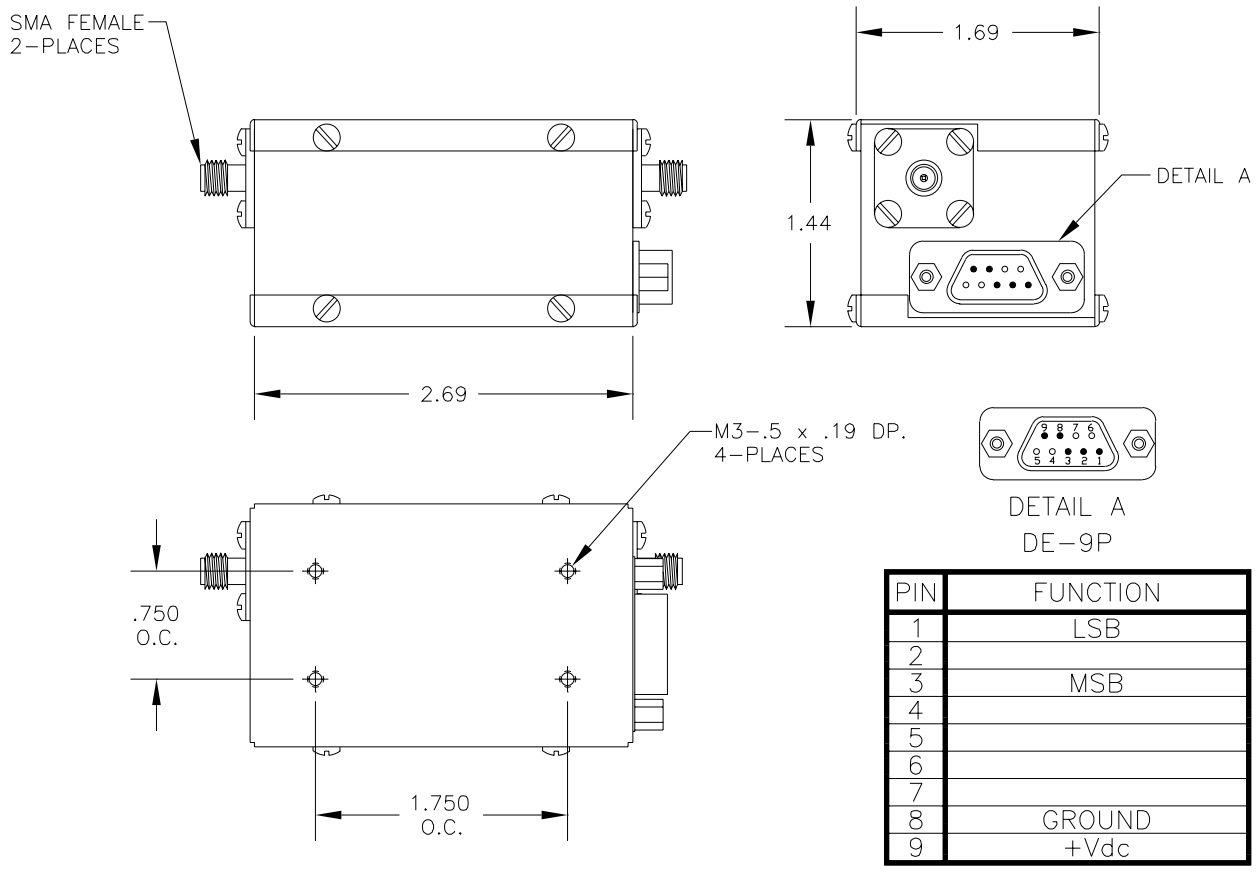
Solid State Programmable Attenuators

Model	Frequency Range	Attenuation Range / Steps	Attenuation Accuracy	VSWR	Insertion Loss	RF Input Power	DC Control Connector
50P-706	400-2700 MHz	0-60 dB / 10,20 and 30 dB	+/- .5 dB or 1% 400-1200 MHz +/- .5 dB or 3% 1200-2700 MHz	1.5:1 maximum	3 dB nominal 400-1200 MHz 4 dB nominal 1200-2700 MHz Flatness +/- 1.5 dB	+15 dBm	DE-9P
50P-1009	500-2500 MHz	0-70 dB / 10,20 and 40 dB	+/- .5 dB or 1% 500-1200 MHz +/- .5 dB or 2% 1200-2500 MHz	1.4:1 maximum	2 dB nominal 500-1200 MHz (2.5 dB maximum) 3 dB nominal 1200-2500 MHz (3.6 dB maximum) Flatness +/-1 dB	+15 dBm	DE-9P

Model	Impedance	Switching Speed	Operating Temperature	Control Logic	DC Supply	RF Connectors
50P-706	50 Ohms	5 microseconds	0° C to +70° C	12 Volt CMOS or Open Collector TTL (High Voltage)	+12 Vdc @ 200 mA	SMA, N, BNC, TNC
50P-1009	50 Ohms	5 microseconds	0° C to +70° C	5 Volt CMOS or Open Collector TTL (High Voltage)	+5 Vdc @ 100 mA	SMA, N, BNC, TNC



PIN	FUNCTION
1	LSB
2	
3	MSB
4	
5	
6	
7	
8	GROUND
9	+Vdc

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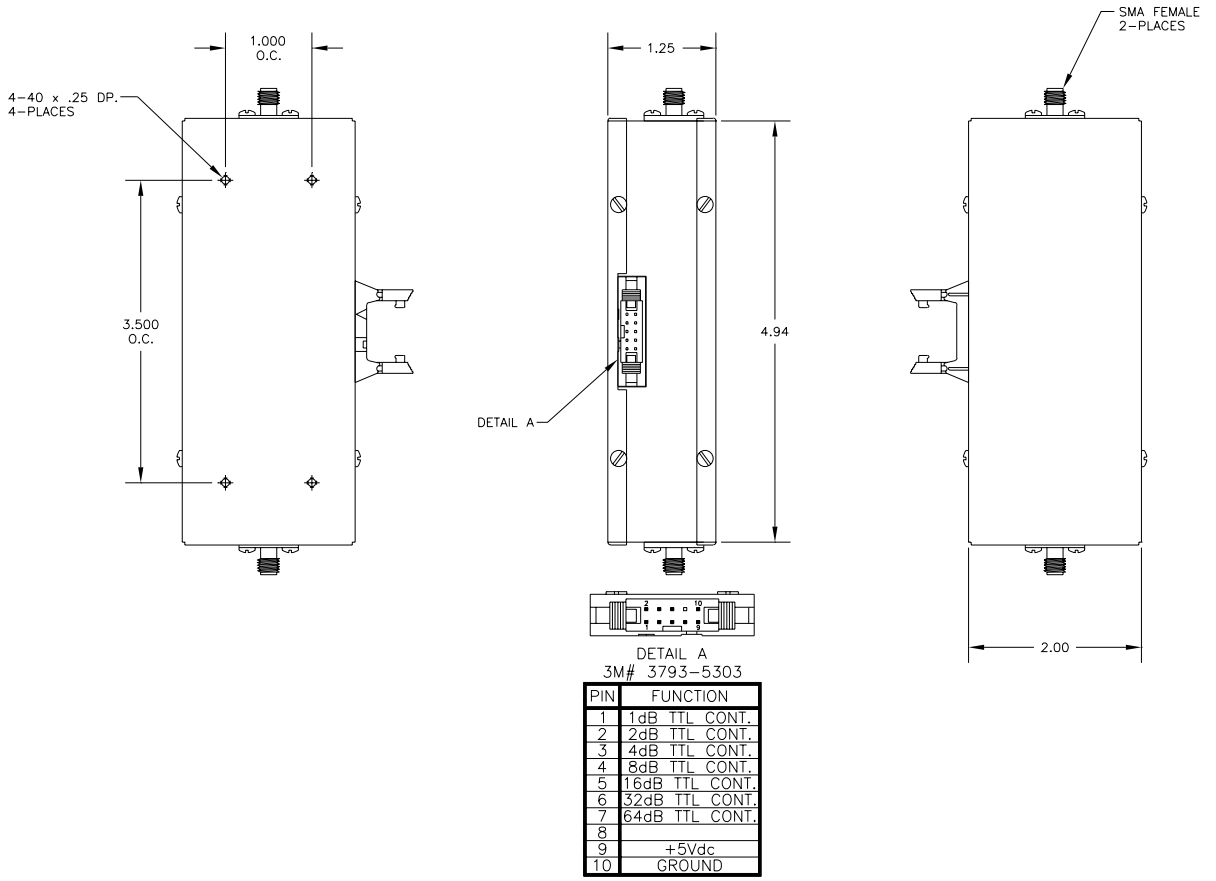
Solid State Programmable Attenuators

Model	Frequency Range	Attenuation Range / Steps	Attenuation Accuracy	VSWR	Insertion Loss	Operating Temperature Range
50P-686	20-1000 MHz	0-127 dB / 1,2,4,8,16,32 and 64 dB	+/- .2 dB or 2% 20-500 MHz +/- .4 dB or 2% 500-1000 MHz	1.4:1 maximum	3 dB nominal 4 dB maximum	0° C to + 70° C
50P-796	20-1500 MHz	0-127 dB / 1,2,4,8,16,32 and 64 dB	+/- .3 dB or 1% 20-500 MHz +/- .5 dB or 2% 500-1500 MHz	1.5:1 maximum	3 dB maximum @ 500 MHz 4 dB maximum @ 1000 MHz 5 dB maximum @ 1500 MHz	-20° C to +85° C
50P-1080	2-1215 MHz	0-127 dB / 1,2,4,8,16,32 and 64 dB	+/- .2 dB or 2% 2-500 MHz +/- .4 dB or 2% 500-1215 MHz	1.4:1 maximum	3 dB nominal 4 dB maximum Flatness: +/- .75 dB maximum	0° C to +70° C

Common Specifications

Impedance	Switching Speed	RF Input Power	DC Control Connector	Programming Logic	DC Supply	RF Connectors
50 Ohms	5 microseconds	+10 dBm	3M 3793-5303	TTL low for “zero” setting TTL high for attenuation	+5 Vdc @ 300 mA	SMA, N, BNC, TNC



PIN	FUNCTION
1	1dB TTL CONT.
2	2dB TTL CONT.
3	4dB TTL CONT.
4	8dB TTL CONT.
5	16dB TTL CONT.
6	32dB TTL CONT.
7	64dB TTL CONT.
8	
9	+5Vdc
10	GROUND

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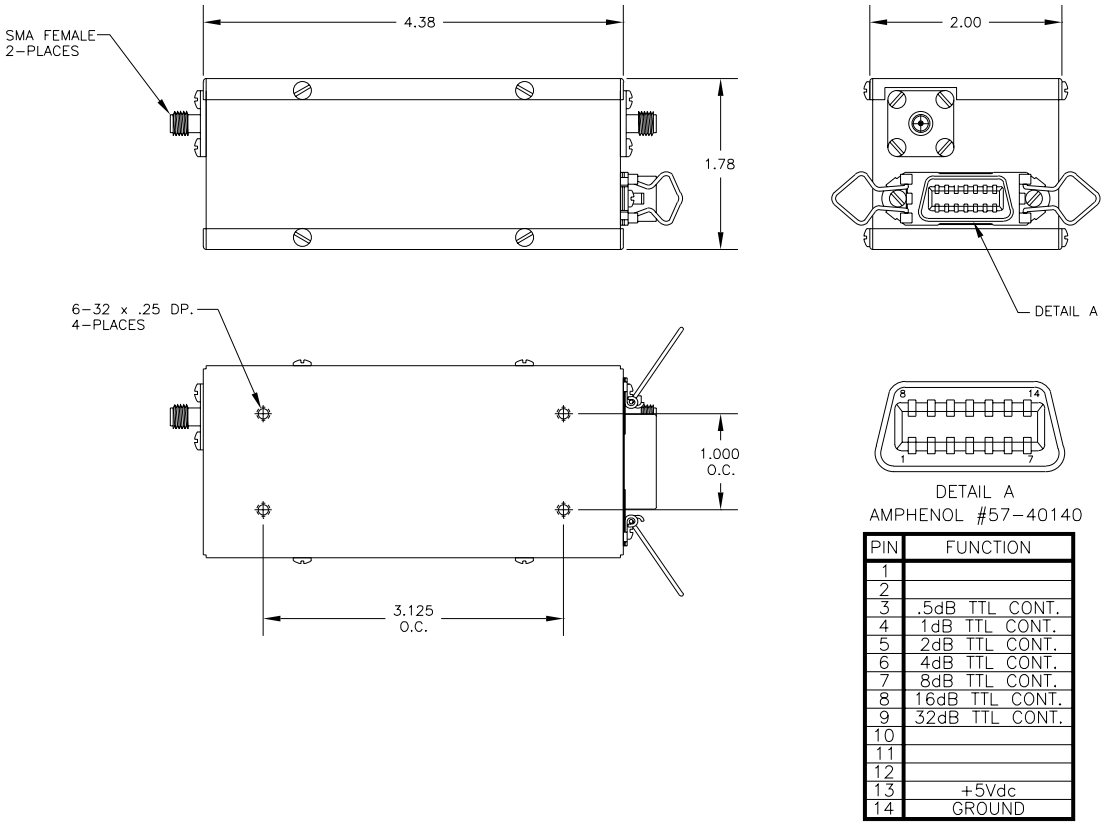
Solid State Programmable Attenuators

Model	Frequency Range	Attenuation Range / Steps	Attenuation Accuracy	VSWR	Insertion Loss	RF Input Power	DC Control Connector
50P-609	20-1000 MHz	0-63.5 dB / .5,1,2,4,8,16 and 32 dB	+/- .3 dB or 1% 20-300 MHz +/- .3 dB or 2% 300-800 MHz +/- .4 dB or 2% 800-1000 MHz	1.4:1 maximum	3 dB nominal 4 dB maximum	+10 dBm average	Amphenol 57-40140
50P-918	750-1500 MHz	0-63.5 dB / .5,1,2,4,8,16 and 32dB	+/- .4 dB or 3%	1.5:1 maximum	4 dB nominal 5 dB maximum	+15 dBm average	Amphenol 57-40140

Common Specifications

Impedance	Switching Speed	Operating Temperature	Programming Logic	DC Supply	RF Connectors
50 Ohms	20 microseconds	0° C to +70° C	TTL low for "zero" setting TTL high for attenuation	+5 Vdc @ 300 mA	BNC, SMA, N or TNC female



DETAIL A
AMPHENOL #57–40140

PIN	FUNCTION
1	
2	
3	.5dB TTL CONT.
4	1dB TTL CONT.
5	2dB TTL CONT.
6	4dB TTL CONT.
7	8dB TTL CONT.
8	16dB TTL CONT.
9	32dB TTL CONT.
10	
11	
12	
13	+5Vdc
14	GROUND

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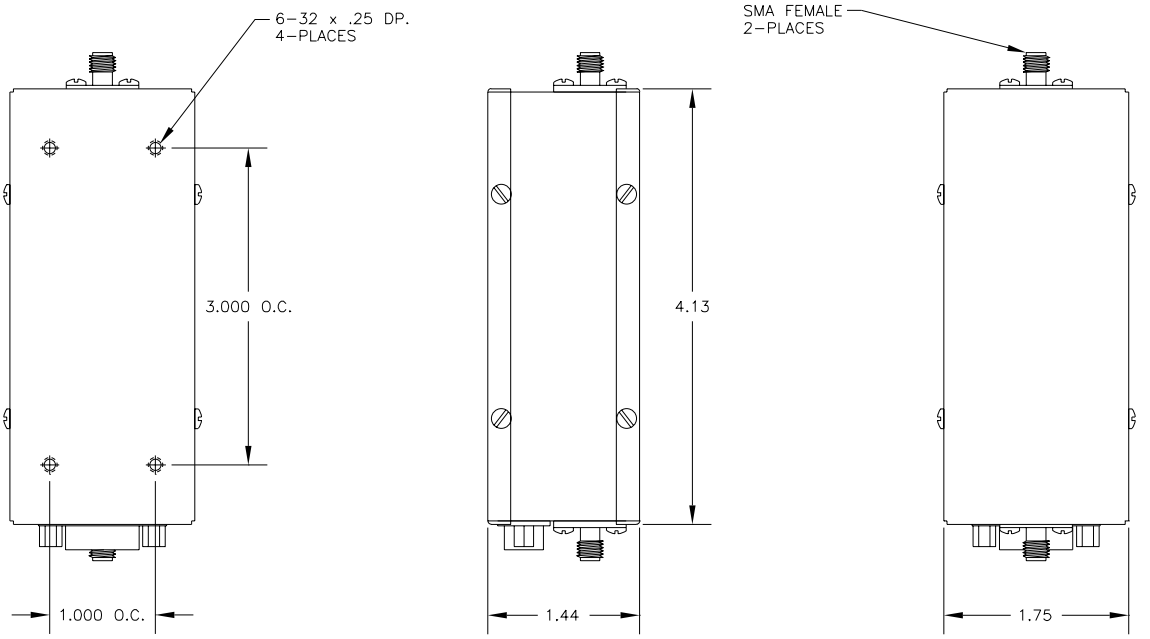
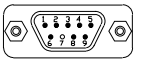
Solid State Programmable Attenuators

Model	Frequency Range	Attenuation Range / Steps	Attenuation Accuracy	VSWR	Insertion Loss	RF Input Power	DC Control Connector
50P-323/D	20-500 MHz	0-63 dB / 1,2,4,8,16 and 32 dB	+/- .5 dB or 2%	1.5:1 maximum	3 dB nominal	+10 dBm average	DE-9P
50P-853	500-1000 MHz	0-63 dB / 1,2,4,8,16 and 32 dB	+/- .5 dB or 1%	1.4:1 maximum	4 dB nominal	+10 dBm average	DE-9P
50P-1130	1-200 MHz	0-63.5 dB / .5,1,2,4,8,16 and 32 dB	+/- .3 dB or 1%	1.5:1 maximum	4 dB maximum	+10 dBm average	DE-9P

Model	Impedance	Switching Speed	Phase Shift	Programming Logic	DC Supply	RF Connectors
50P-323/D	50 Ohms	2 microseconds maximum 1.5 microseconds typical	+/- 5° @ any setting	TTL low for “zero” setting TTL high for attenuation	+5 Vdc @ 250 mA	BNC, SMA, N or TNC female
50P-853	50 Ohms	5 microseconds	N.A.	TTL low for “zero” setting TTL high for attenuation	+5 Vdc @ 300 mA	BNC, SMA, N or TNC female
50P-1130	50 Ohms	20 microseconds	+/- 3° @ any setting	TTL low for “zero” setting TTL high for attenuation	+5 Vdc @ 300 mA	BNC, SMA, N or TNC female





DETAIL A
DE-9P

PIN	FUNCTION
1	LSB
2	
3	
4	
5	
6	
7	MSB
8	GROUND
9	+5Vdc

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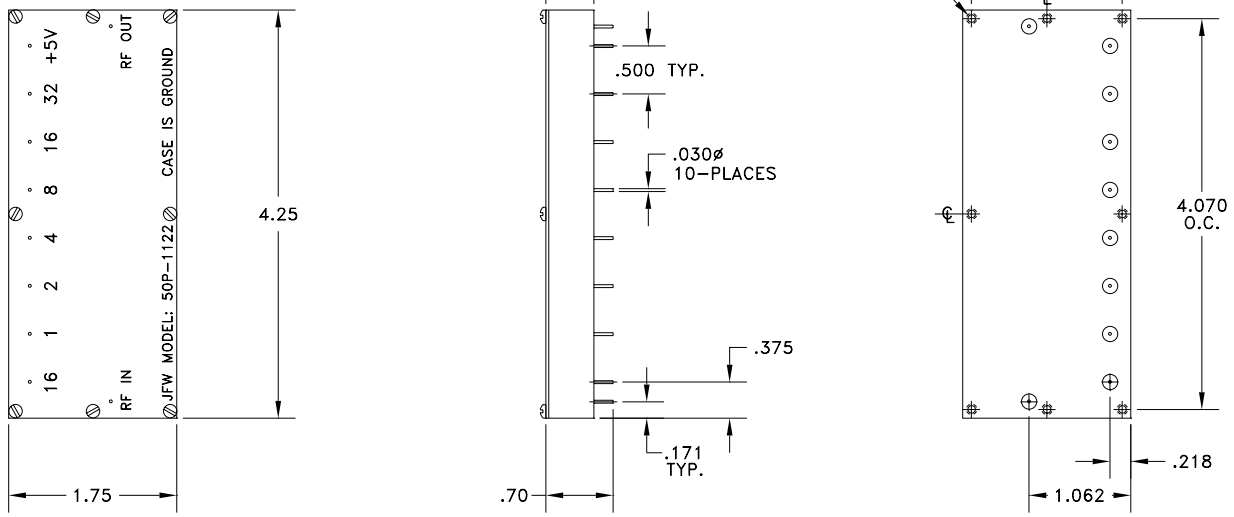
Solid State Programmable Attenuators

Model	Frequency Range	Attenuation Range / Steps	Attenuation Accuracy	VSWR	Insertion Loss / Flatness	RF Input Power	DC Control Connector
50P-827	10-600 MHz	0-63.5 dB / .5,1,2,4,8,16 and 32 dB	+/- .25 dB or 2%	1.4:1 maximum	3.5 dB nominal / +/- .5 dB maximum 10-200 MHz +/- .75 dB maximum 10-600 MHz	10-100 MHz +16 dBm 100-200 MHz +19 dBm 200-600 MHz +22 dBm	Plug-in Printed Circuit
50P-941	10-800 MHz	0-79 dB / 16,1,2,4,8,16 and 32 dB	10-600 MHz +/- .25 dB or 2% 600-800 MHz +/- .25 dB or 3%	1.4:1 maximum	3.5 dB to 600 MHz 4.5 dB to 800 MHz / +/- .5 dB maximum 10-200 MHz +/- .75 dB maximum 10-600 MHz +/- 1.25 dB maximum 10-800 MHz	10-100 MHz +16 dBm 100-200 MHz +19 dBm 200-800 MHz +22 dBm	Plug-in Printed Circuit
50P-1122	30-1000 MHz	0-79 dB / 16,1,2,4,8,16 and 32 dB	30-600 MHz +/- .35 dB or 3% 600-1000 MHz +/- .5 dB or 3%	1.5:1 maximum	3.5 dB to 600 MHz 5 dB to 1000 MHz / +/- .5 dB maximum 30-600 MHz +/- 1 dB maximum 600-1000 MHz	30-1000 MHz +22 dBm	Plug-in Printed Circuit

Model	Impedance	Switching Speed	Phase Shift	Control (7 lines)	DC Supply	RF Connectors
50P-827	50 Ohms	4 microseconds maximum	+/- 3° @ any setting 10-400 MHz +/- 5° @ any setting 400-600 MHz	TTL low for “zero” setting TTL high for attenuation	+5 Vdc @ 350 mA	Plug-in Printed Circuit
50P-941	50 Ohms	4 microseconds maximum	+/- 3° @ any setting 10-400 MHz +/- 5° @ any setting 400-800 MHz	TTL low for “zero” setting TTL high for attenuation	+5 Vdc @ 350 mA	Plug-in Printed Circuit
50P-1122	50 Ohms	500 nanoseconds maximum	+/- 5° 30-600 MHz +/- 8° 600-1000 MHz	TTL low for “zero” setting TTL high for attenuation	+ 5 Vdc @ 350 mA	Plug-in Printed Circuit



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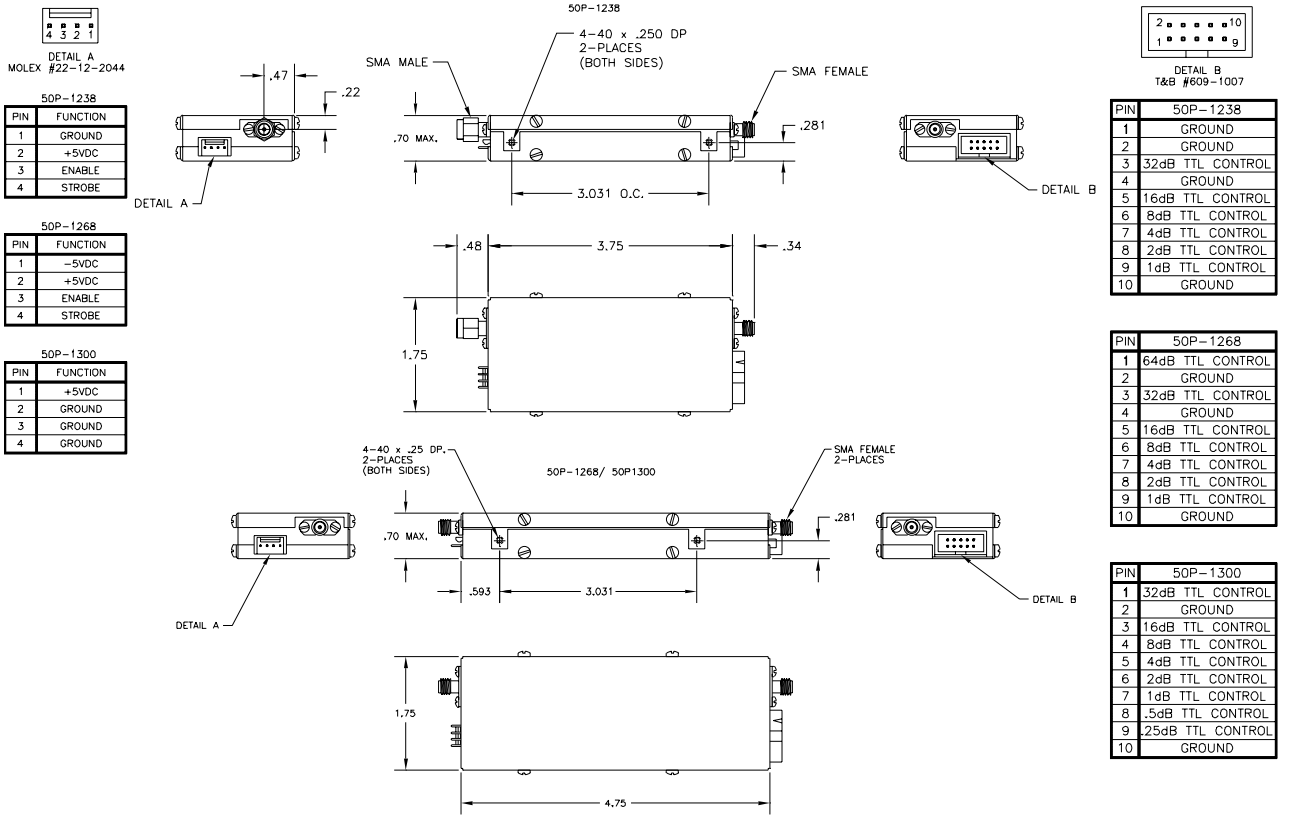
Solid State Programmable Attenuators

Model	Frequency Range	Attenuation Range/ Steps	Attenuation Accuracy	Insertion Loss / Flatness	RF Input Power	DC Control Connector
50P-1238 Latching	800-2200 MHz	0-63 dB/1,2,4,8,16 and 32 dB	+/- .3 dB or 2% of programmed	2 dB nominal @ 800 MHz 3.5 dB nominal @ 2200 MHz 4.0 dB maximum +/- .5 dB max. 800-1000 MHz +/- .5 dB max. 1700-2200 MHz	+20 dBm operating +24 dBm (1 dB compression)	T & B 609-1007
50P-1268 Latching	800-2400 MHz	0 to 127 dB/1, 2, 4, 8, 16, 32 and 64 dB	+/- .3 dB or 2% of programmed	2 dB maximum @ 800 MHz 4.3 db maximum @ 2400 MHz +/- .5 dB max. 800-1000 MHz +/- .5 dB max. 1700-2100 MHz +/- .5 dB max. 2100-2400 MHz	+20 dBm operating +24 dBm (1 dB compression)	T & B 609-1007
50P-1300	800-2200 MHz	0-63.75/.25, .5, 1, 2, 4, 8, 16 and 32 dB	**800-1000 MHz** .25 and .5 dB +/- .1 dB 1,2,4 and 8 dB +/- .25 dB 16 and 32 dB +/- .4 dB or programmed values +/- 2% **1000-2200 MHz** .25 and .5 dB +/- .15 dB 1,2,4 and 8 dB +/- .3 dB 16 and 32 dB +/- .5 dB or programmed values +/- 3%	3 dB maximum to 1500 MHz 4 dB maximum to 2200 MHz	+20 dBm Average +24 dBm (1 dB compression)	T & B 609-1007

Model	Supply Connector	Impedance	Switching Speed	Operating Temp.	VSWR	DC Supply	RF Connectors
50P-1238	Molex 22-12-2044	50 Ohms	5 microseconds	0° C to +70° C	1.5:1 maximum	+5 Vdc @ 250 mA	SMA male/female
50P-1268	Molex 22-12-2044	50 Ohms	20 microseconds	0° C to +70° C	1.4:1 maximum	+5 Vdc @ 100 mA -5 Vdc @ 300 mA	SMA female
50P-1300	Molex 22-12-2044	50 Ohms	5 microseconds	0° C to +70° C	1.5:1 maximum	+5 Vdc @ 300 mA	SMA female



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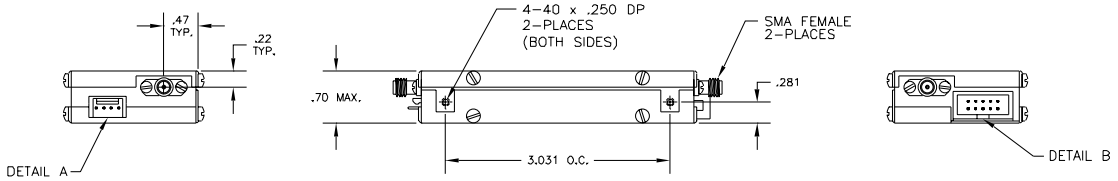
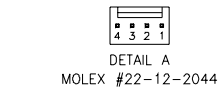
Solid State Programmable Attenuators

Model	Frequency Range	Attenuation Range / Steps	Attenuation Accuracy	Insertion Loss / Flatness	RF Input Power	DC Control Connector
50P-1267	800-2250 MHz	0 to 31.5 dB/ .5, 1, 2, 4, 8 and 16 dB	+/- .3 dB or 2% of programmed	2 dB nominal @ 800 MHz 4 dB nominal @ 2250 MHz	+20 dBm operating +24 dBm (1 dB compression)	T & B 609-1007
50P-1391	800-3000 MHz	0 to 63 dB/ 1, 2, 4, 8, 16 and 32 dB	+/- .3 dB or 2% of programmed 800-2000 MHz +/- .35 dB or 2% of programmed 2000-3000 MHz	2 dB nominal @ 800 MHz 3 dB nominal @ 2000 MHz 5.25 dB nominal @ 3000 MHz	+20 dBm operating +24 dBm (1 dB compression)	T & B 609-1007

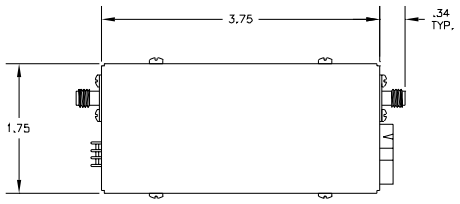
Model	Supply Connector	Impedance	Switching Speed	Operating Temp.	VSWR	DC Supply	RF Connectors
50P-1267	Molex 22-12-2044	50 Ohms	5 microseconds	0° C to +70° C	1.5:1 maximum	+5 Vdc @ 250 mA	SMA female
50P-1391	Molex 22-12-2044	50 Ohms	20 microseconds	0° C to +70° C	1.5:1 maximum	+5 Vdc @ 120 mA -5 Vdc @ 100 mA	SMA female

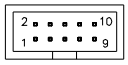
50P-1267/ 50P-1391





DETAIL A
MOLEX #22-12-2044





DETAIL B
T&B #609-1007

1391

PIN	FUNCTION
1	-5Vdc
2	+5Vdc
3	GND
4	GND

1267

PIN	FUNCTION
1	GND
2	+5Vdc
3	
4	

PIN	50P-1391	50P-1267
1	GROUND	GROUND
2	GROUND	GROUND
3	MSB	MSB
4	GROUND	GROUND
5		
6		
7		
8		
9	LSB	LSB
10	GROUND	GROUND

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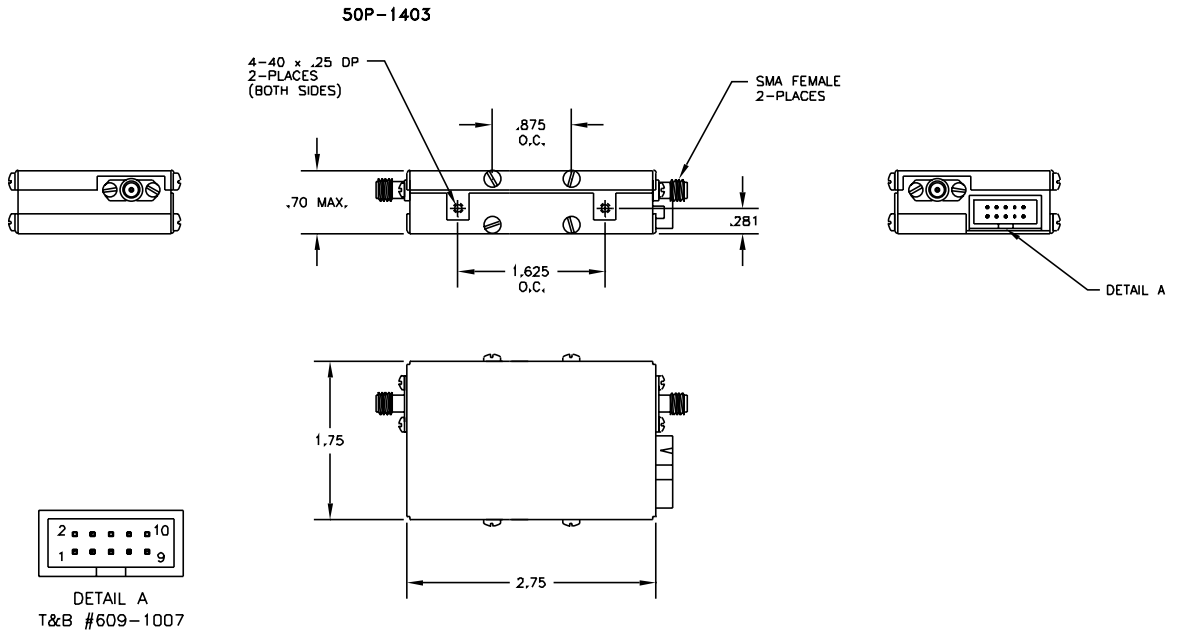
Solid State Programmable Attenuators

Model	Frequency Range	Attenuation Range / Steps	Attenuation Accuracy	Insertion Loss	RF Input Power
50P-1403	400-3000 MHz	0-70 dB/10, 20 and 40 dB	+/- .5 dB or 2% of programmed	.75 dB nominal @ 400 MHz 2dB nominal @ 3000 MHz	+10 dBm operating +17 dBm (1 dB compression)

Model	Impedance	Switching Speed	Operating Temperature	VSWR	DC Supply	RF Connectors
50P-1403	50 Ohms	1 microsecond	0° C - +70° C	<1.5:1 typical 1.6:1 maximum	+5 Vdc @ 70mA	SMA female



50P-1403	
PIN	FUNCTION
1	+5V
2	GROUND
3	GROUND
4	GROUND
5	GROUND
6	GROUND
7	MSB
8	
9	LSB
10	GROUND

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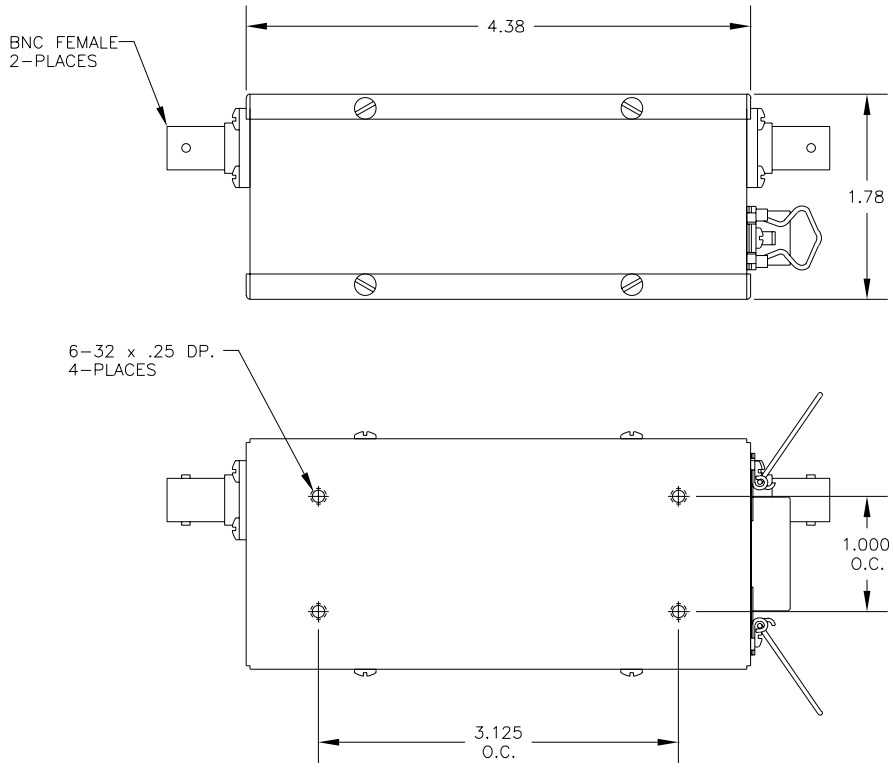
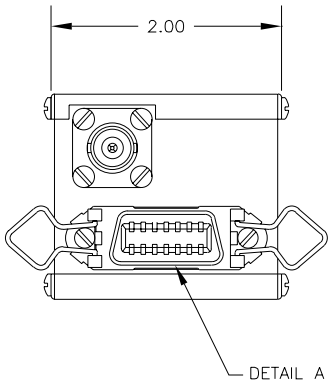
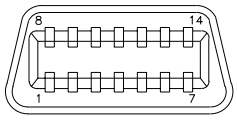
Solid State Programmable Attenuators

Model	Frequency Range	Attenuation Range / Steps	Attenuation Accuracy	Insertion Loss / Flatness	RF Input Power	DC Control Connector
75P-056	50-1000 MHz	0-63 dB / 1,2,4,8,16 and 32 dB	+/- .5 dB 50-300 MHz +/- .8 dB 300-1000 MHz	3 dB nominal / +/- .75 dB	+13 dBm average	Amphenol 57-40140
75P-075	20-1000 MHz	0-63.5 dB / .5,1,2,4,8,16 and 32 dB	+/- .3 dB or 1% 20-250 MHz +/- .3 dB or 2% 250-1000 MHz guaranteed monotonic	3 dB nominal / +/- .35 dB	+15 dBm average	Amphenol 57-40140

Model	Impedance	Switching Speed	Operating Temperature	VSWR	DC Supply	RF Connectors
75P-056	75 Ohms	20 microseconds	0° C to +70° C	1.4:1 maximum to 800 MHz 1.5:1 maximum to 1000 MHz	+5 Vdc @ 300 mA	BNC or F female
75P-075	75 Ohms	10 microseconds	0° C to +70° C	1.35:1 maximum to 250 MHz 1.5:1 maximum to 1000 MHz	+5 Vdc @ 250 mA	BNC or F female







DETAIL A
AMPHENOL #57–40140

PIN	FUNCTION
1	
2	
3	LSB
4	
5	
6	
7	
8	
9	MSB
10	
11	
12	
13	+5Vdc
14	GROUND

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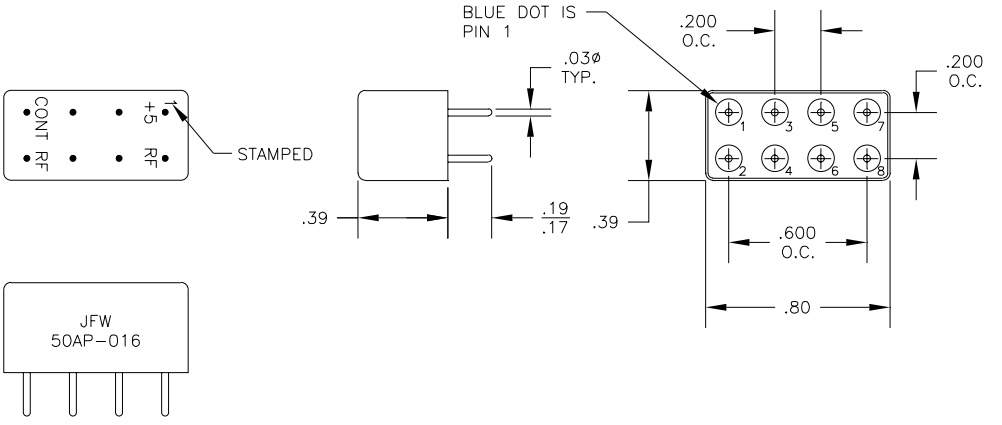
Analog Programmable Attenuators

Model	Frequency Range	Attenuation Range / Flatness	VSWR (any setting)	Insertion Loss	RF Input Power	Intercept Point
50AP-016	50-1000 MHz	0-25 dB / +/- 1 dB maximum +/- .5 dB typically thru 20 dB	1.5:1 maximum	3 dB maximum	+10 dBm	+35 dBm
50AP-076	50-2200 MHz	0-20 dB / +/- 1 dB maximum +/- .5 dB typically thru 10 dB	1.5:1 maximum to 1000 MHz 1.7:1 maximum to 2200 MHz	3 dB nominal	+10 dBm	+35 dBm
75AP-012	20-1000 MHz	0-25 dB minimum +/- 1 dB 0-15 dB +/- 1.5 dB 15-25 dB	1.4:1 maximum	2 dB nominal	+10 dBm	+30 dBm
75AP-014	40-860 MHz	0-15 dB minimum +/- .5 dB 0-15 dB	1.4:1 maximum	2 dB nominal	+10 dBm	+30 dBm

Model	Impedance	Switching Speed	Operating Temperature	DC Supply	Control (negative slope)	Connectors
50AP-016	50 Ohms	20 microseconds	-20° C to +70° C	+5 Vdc @ 2 mA	0 to 10 Volts @ 40 mA (10 Volts = insertion loss) (0 Volts = maximum attenuation)	P.C.B. Pins
50AP-076	50 Ohms	20 microseconds	-20° C to +70° C	+5 Vdc @ 2 mA	0 to 10 Volts @ 20 mA (10 Volts = insertion loss) (0 Volts = maximum attenuation)	P.C.B. Pins
75AP-012	75 Ohms	20 microseconds	-20° C to +70° C	+5 Vdc @ 2 mA	0 to 10 Volts @ 40 mA (10 Volts = insertion loss) (0 Volts = maximum attenuation)	P.C.B. Pins
75AP-014	75 Ohms	20 microseconds	-20° C to +70° C	+5 Vdc @ 2 mA	0 to 10 Volts @ 40 mA (10 Volts = insertion loss) (0 Volts = maximum attenuation)	P.C.B. Pins



50AP-016	
PIN #	FUNCTION
1	+5Vdc BIAS
2	RF IN/OUT
3	GROUND
4	NO CONNECTION
5	GROUND
6	NO CONNECTION
7	CONTROL
8	RF IN/OUT

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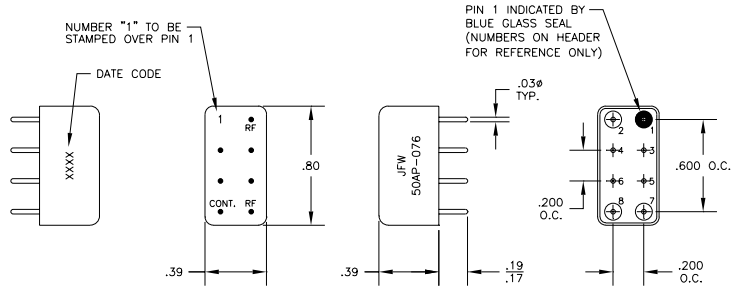
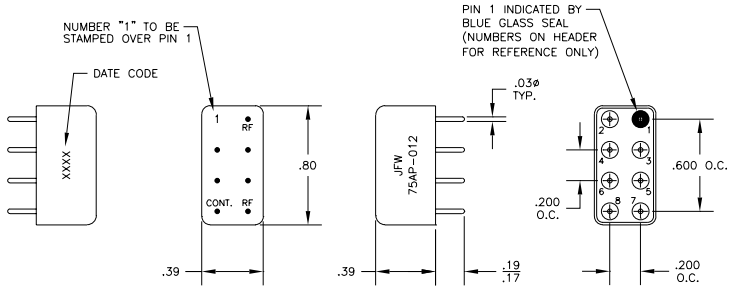
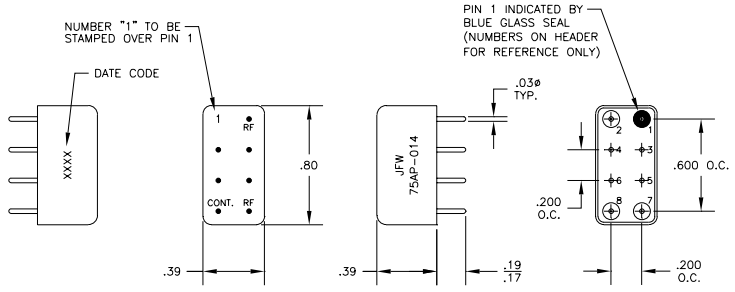
Analog Programmable Attenuators



50AP-076	
PIN #	FUNCTION
1	+5Vdc BIAS
2	RF IN/OUT
3	GROUND
4	GROUND
5	GROUND
6	GROUND
7	CONTROL
8	RF IN/OUT



75AP-012	
PIN #	FUNCTION
1	+5Vdc BIAS
2	RF IN/OUT
3	GROUND
4	NO CONNECTION
5	GROUND
6	NO CONNECTION
7	CONTROL
8	RF IN/OUT



75AP-014	
PIN #	FUNCTION
1	+5Vdc BIAS
2	RF IN/OUT
3	GROUND
4	GROUND
5	GROUND
6	GROUND
7	0-10 Vdc CONT.
8	RF IN/OUT

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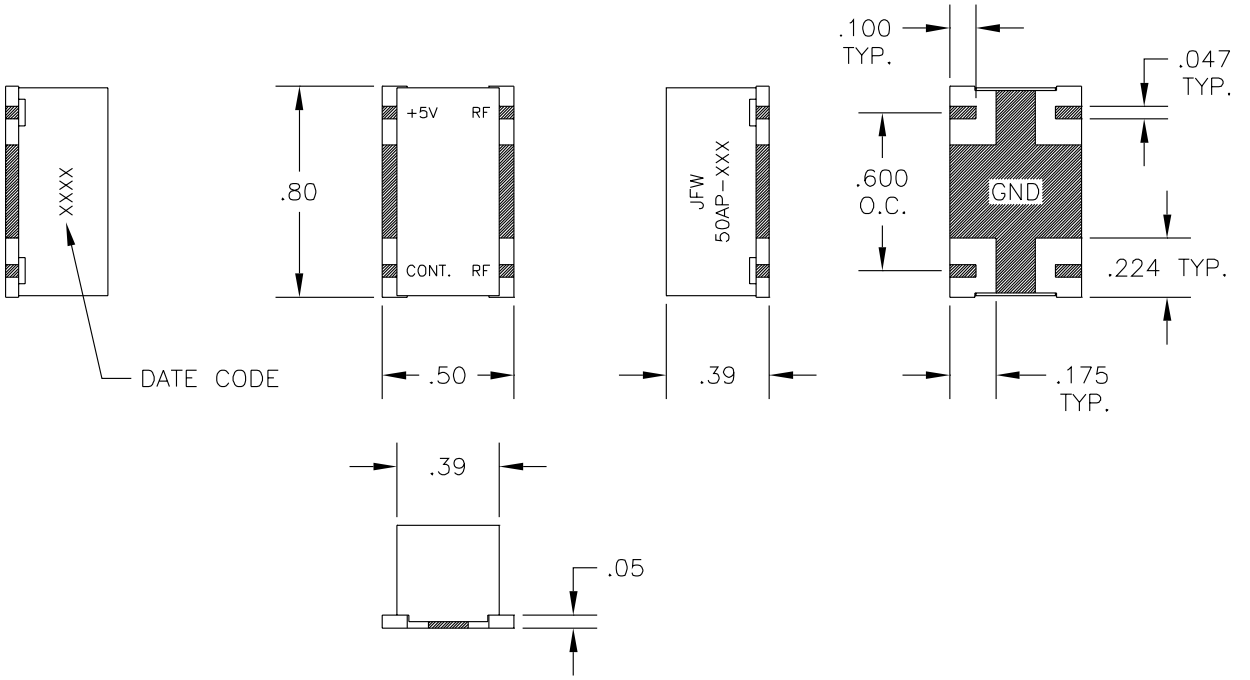
Analog Programmable Attenuators

Model	Frequency Range	Attenuation Range	VSWR (any setting)	Insertion Loss/ Flatness	RF Input Power Point	Intercept
50AP-079	50–1000 MHz	0 to 25 dB	1.5:1 maximum	2.5 dB maximum/ +/- 1dB max. typically +/- .5dB thru 20 dB	+10 dBm	+35 dBm
50AP-080	50–2000 MHz	0 to 20 dB	1.5:1 maximum	3 dB maximum/ +/- 1 dB max. typically +/- .5 dB	+10 dBm	+35 dBm

Model	Impedance	Switching Speed	Operating Temperature	Control (negative slope)	RF Connectors
50AP-079	50 Ohms	20 microseconds	0° C to +70° C operating -40° C to +85° C storage	0 to 10 Volts @ 30 mA (10 Volts = insertion loss) (0 Volts = maximum attenuation)	Surface mount
50AP-080	50 Ohms	20 microseconds	-20° C to +75° C operating -40° C to +85° C storage	0 to 10 Volts @ 30 mA (10 Volts = insertion loss) (0 Volts = maximum attenuation)	Surface mount

50AP–080



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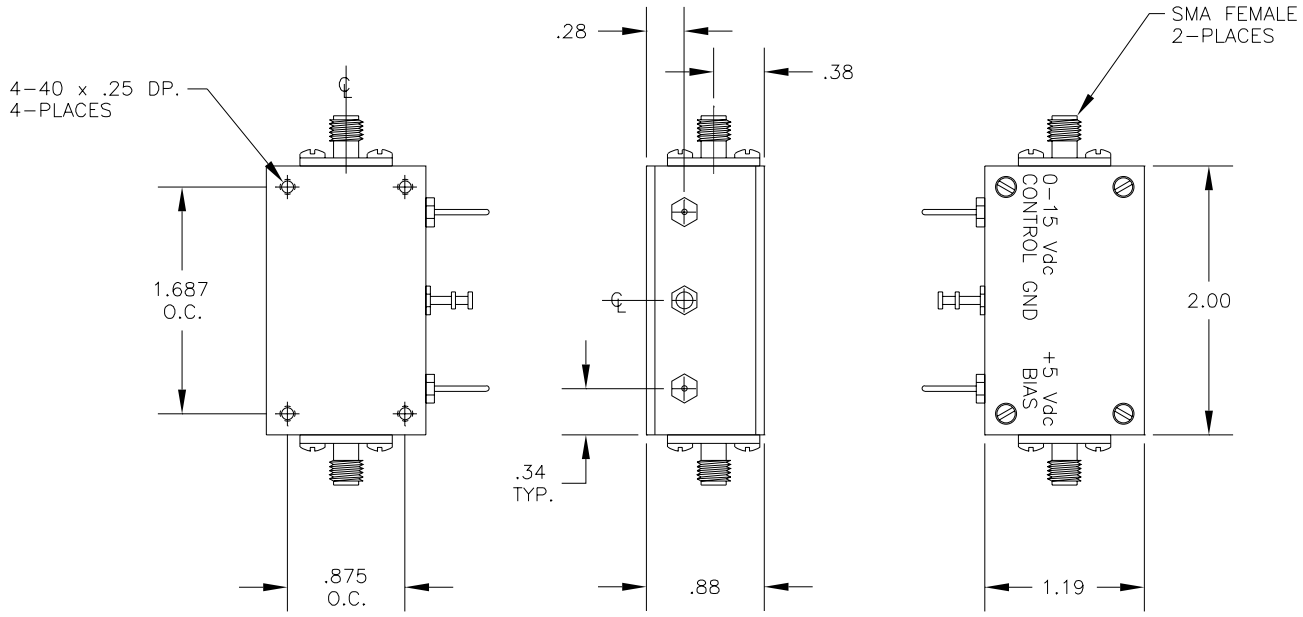
Analog Programmable Attenuators

Model	Frequency Range	Attenuation Range / Flatness	VSWR (any setting)	Insertion Loss	RF Input Power	Intercept Point
50AP-002	10-500 MHz	0-30 dB continuously variable / +/- .5 dB 0-15 dB +/- .75 dB 15-30 dB	1.4:1 maximum	2 dB maximum	+10 dBm	+30 dBm
75AP-001	10-500 MHz	0-30 dB continuously variable / +/- .5 dB 0-15 dB +/- .75 dB 15-30 dB	1.3:1 maximum	2 dB maximum	+10 dBm	+30 dBm

Model	Impedance	Switching Speed	Operating Temperature	DC Supply	Control (negative slope)	RF Connectors
50AP-002	50 Ohms	50 microseconds	0° C to +70° C	+5 Vdc @ 2 mA	0 to +15 Vdc @ 40 mA (15 Volts = insertion loss) (0 Volts = maximum attenuation)	BNC, SMA or N female
75AP-001	75 Ohms	50 microseconds	0° C to +70° C	+5 Vdc @ 2 mA	0 to +15 Vdc @ 40 mA (15 Volts = insertion loss) (0 Volts = maximum attenuation)	BNC, TNC or F female



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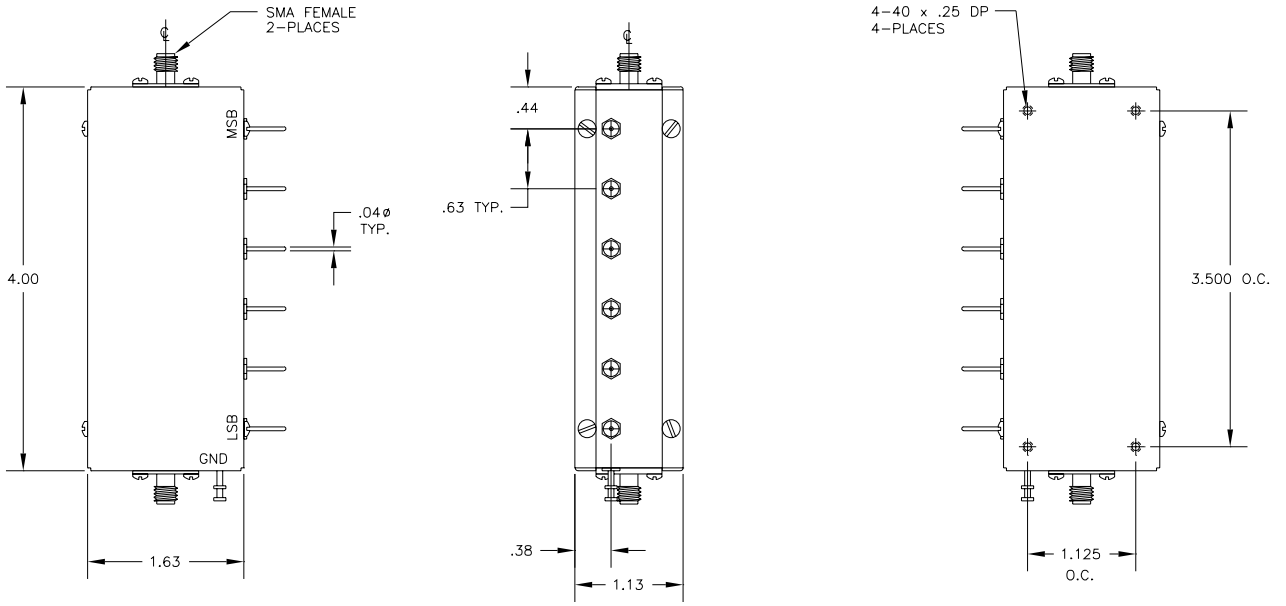
Relay Programmable Attenuators

Model	Frequency Range	Attenuation Range / Steps	Attenuation Accuracy	VSWR	Insertion Loss	RF Input Power	DC Supply/ Control
50P-975	DC-1000 MHz	0-63 dB / 1,2,4,8,16 and 32 dB	+/- .2 dB or 2%	1.25:1 maximum	.8 dB maximum @ 500 MHz 1.5 dB maximum @ 1000 MHz	.5 Watt average 100 Watts peak	+12 Vdc @ 15 mA per relay
50P-1126	DC-1000 MHz	0-31.5 dB / .5,1,2,4,8 and 16 dB	+/- .2 dB or 2%	1.25:1 maximum	.8 dB maximum @ 500 MHz 1.5 dB maximum @ 1000 MHz	1 Watt average 100 Watts peak	+12 Vdc @ 15 mA per relay
50P-1132	DC-1000 MHz	0-16.2 dB / .4,.8,1,2,4 and 8 dB	+/- .2 dB or 3%	1.25:1 maximum	.8 dB maximum @ 500 MHz 1.5 dB maximum @ 1000 MHz	1 Watt average 100 Watts peak	+12 Vdc @ 15 mA per relay
75P-121-1	DC-1000 MHz	0-16.2 dB / .4,.8,1,2,4 and 8 dB	+/- .2 dB or 3%	1.22:1 maximum	1 dB maximum @ 500 MHz 1.75 dB maximum @1000 MHz	1 Watt average 100 Watts peak	+12 Vdc @ 15 mA per relay

Model	Impedance	Switching Speed	Operating Temperature	DC Control Connector	RF Connectors
50P-975	50 Ohms	6 milliseconds	-20º C to + 85º C	.040 Diameter solder terminals	BNC, SMA, N or TNC (female)
50P-1126	50 Ohms	6 milliseconds	-20º C to + 85º C	.040 Diameter solder terminals	BNC, SMA, N or TNC (female)
50P-1132	50 Ohms	6 milliseconds	-20º C to +85º C	.040 Diameter solder terminals	BNC, SMA, N or TNC (female)
75P-121-1	75 Ohms	6 milliseconds	-20º C to +85º C	.040 Diameter solder terminals	BNC or F (female)



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Relay Programmable Attenuators

Model	Frequency Range	Attenuation Range / Steps	Attenuation Accuracy	VSWR	Insertion Loss	DC Control Connectors
50P-1208	DC-2500 MHz	0-15 dB / 1,2,4 and 8 dB	1,2,4 and 8 dB cells DC-1000 MHz +/- .2 dB or 2% 1000-2500 MHz +/- .3 dB or 3%	1.4:1 maximum to 1000 MHz 1.5:1 maximum to 2500 MHz	.8 dB maximum @ 500 MHz 1.5 dB maximum @ 1000 MHz 2 dB maximum @ 2500 MHz	.040 Diameter solder terminals
50P-1209	DC-2500 MHz	0-15.5 dB / .5,1,2,4 and 8 dB	.5 dB cell DC-2500 MHz +/- .2 dB 1,2,4 and 8 dB cells DC-1000 MHz +/- .2 dB or 2% 1000-2500 MHz +/- .3 dB or 3%	1.4:1 maximum to 1000 MHz 1.5:1 maximum to 2500 MHz	.8 dB maximum @ 500 MHz 1.5 dB maximum @ 1000 MHz 2.5 dB maximum @ 2500 MHz	.040 Diameter solder terminals
50P-1210	DC-2500 MHz	0-31 dB / 1,2,4,8 and 16 dB	1,2,4,8 and 16 dB cells DC-1000 MHz +/- .2 dB or 2% 1000-2500 MHz +/- .3 dB or 3%	1.4:1 maximum to 1000 MHz 1.5:1 maximum to 2500 MHz	.8 dB maximum @ 500 MHz 1.5 dB maximum @ 1000 MHz 2.5 dB maximum @ 2500 MHz	.040 Diameter solder terminals
50P-1211	DC-2500 MHz	0-31.5 dB / .5,1,2,4,8 and 16 dB	.5 dB cell DC-2500 MHz +/- .2 dB 1,2,4,8 and 16 dB cells DC-1000 MHz +/- .2 dB or 2% 1000-2500 MHz +/- .3 dB or 3%	1.4:1 maximum to 1000 MHz 1.5:1 maximum to 2500 MHz	.8 dB maximum @ 500 MHz 1.5 dB maximum @ 1000 MHz 3.5 dB maximum @ 2500 MHz	.040 Diameter solder terminals
50P-1212	DC-2500 MHz	0-63 dB / 1,2,4,8,16 and 32 dB	1,2,4,8,16 and 32 dB cells DC-1000 MHz +/- .2 dB or 2% 1000-2500 MHz +/- .3 dB or 3%	1.4:1 maximum to 1000 MHz 1.5:1 maximum to 2500 MHz	1.2 dB maximum @ 500 MHz 2.0 dB maximum @ 1000 MHz 3.5 dB maximum @ 2500 MHz	.040 Diameter solder terminals

Common Specifications

Impedance	Switching Speed	Operating Temperature	RF Input Power	DC Supply /Control	RF Connectors
50 Ohms	6 milliseconds	-20° C to +85° C	.5 Watt average 100 Watts Peak	+12 Vdc @ 15 mA per relay *Note: 32 dB cell requires 30 mA	BNC, SMA, N or TNC female

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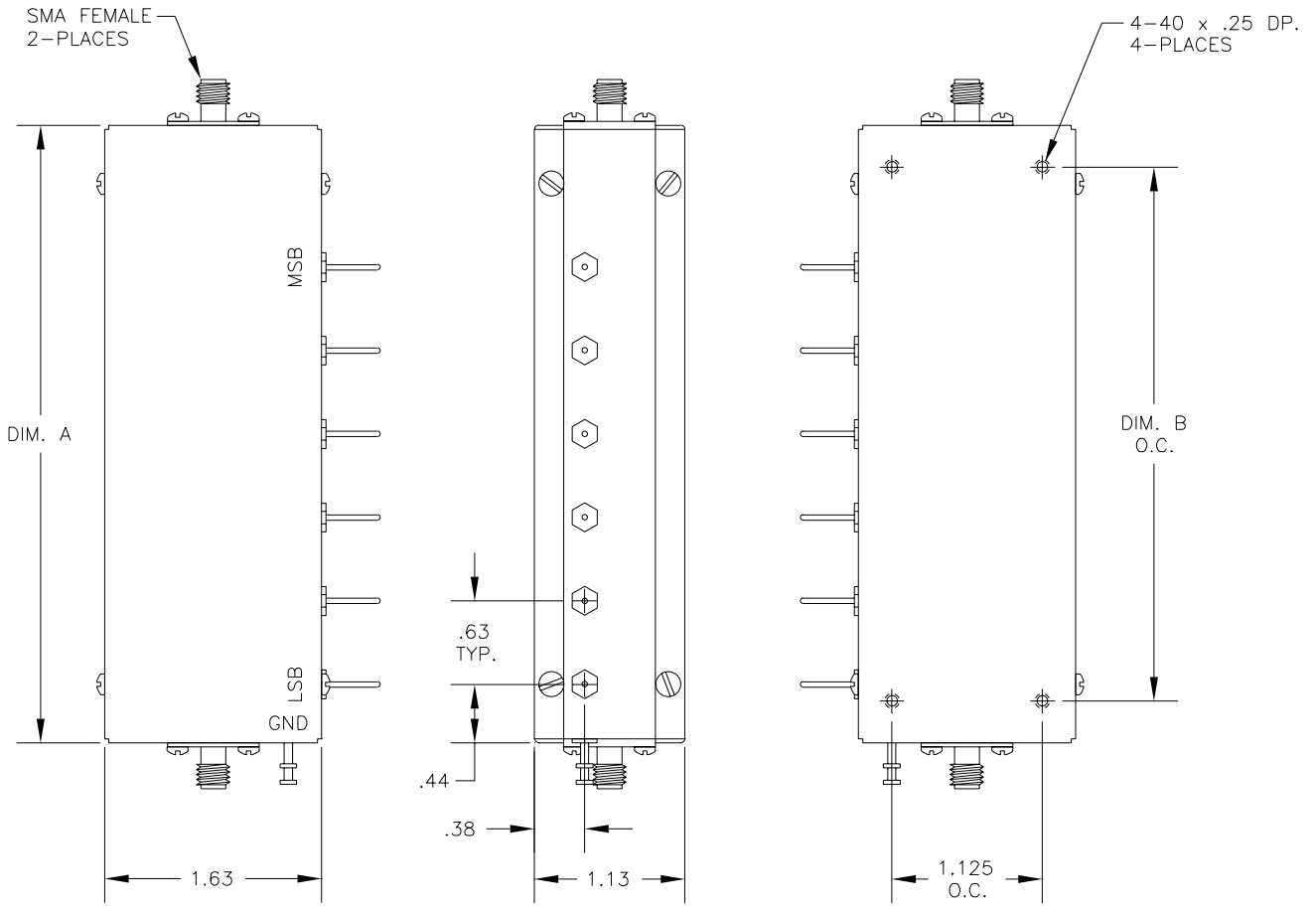
Relay Programmable Attenuators



MODEL	DIM A	DIM B
50P–1208	2.75	2.250
50P–1209	3.38	2.875
50P–1210	3.38	2.875
50P–1211	4.00	3.500
50P–1212	4.63	4.125

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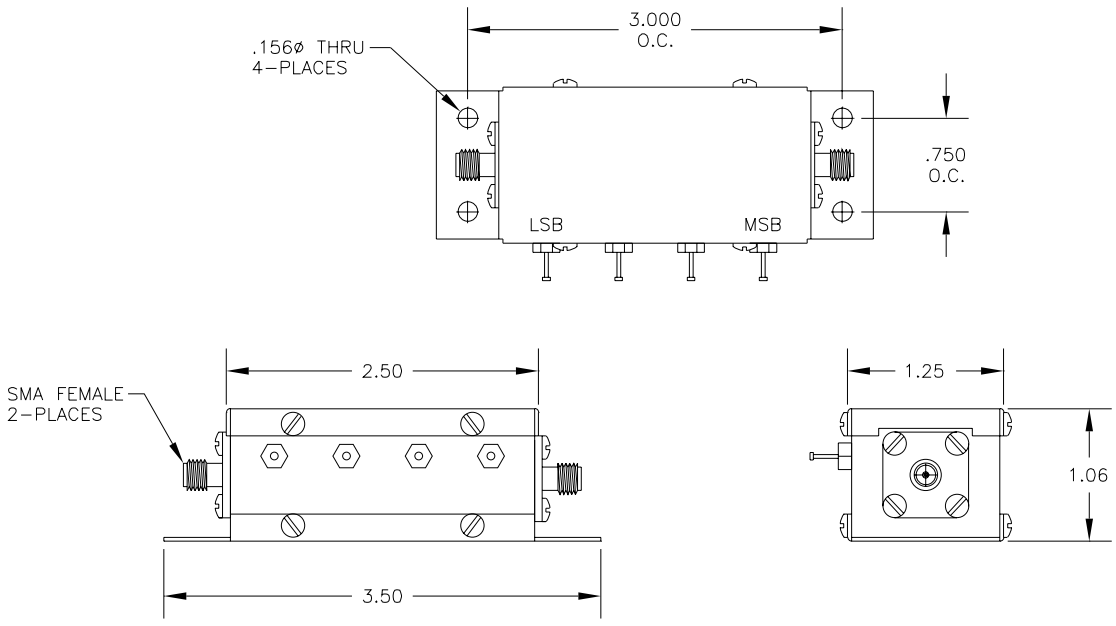
Relay Programmable Attenuators

Model	Frequency Range	Attenuation Range / Steps	Attenuation Accuracy	VSWR	Insertion Loss	RF Input Power
50P-033	DC-1500 MHz	0-10 dB / 1,2,3 and 4 dB	+/- .2 dB DC-500 MHz +/- .3 dB 500-1000 MHz +/- .4 dB 1000-1500 MHz	1.4:1 maximum DC-1000 MHz 1.5:1 maximum 1000-1500 MHz	2 dB maximum	2 Watts average 1000 Watts peak
50P-034	DC-1500 MHz	0-100 dB / 10,20,30 and 40 dB	+/- .5 dB DC-500 MHz +/- 1 dB 500-1000 MHz +/- 1.5 dB 1000-1500 MHz	1.4:1 maximum DC-1000 MHz 1.5:1 maximum 1000-1500 MHz	2 dB maximum	1 Watt average 1000 Watts peak
50P-542	DC-2800 MHz	0-10 dB / 1,2,3 and 4 dB	+/- .3 dB DC-1000 MHz +/- .5 dB 1000-2800 MHz	1.3:1 maximum DC-1000 MHz 1.5:1 maximum 1000-2800 MHz	3 dB maximum	2 Watts average 1000 Watts peak
50P-543	DC-2800 MHz	0-90 dB / 10,20,30 and 30 dB	+/- .5 dB or 2% DC-1000 MHz +/- .5 dB or 3% 1000-2800 MHz	1.3:1 maximum DC-1000 MHz 1.5:1 maximum 1000-2800 MHz	3 dB maximum	1 Watt average 1000 Watts peak

Common Specifications

Impedance	Switching Speed	Operating Temperature	DC Control Connector	DC Supply / Control	RF Connectors
50 Ohms	6 milliseconds	-20° C to +85° C	solder terminals	+12 Vdc @ 30 mA per relay	BNC, SMA, N or TNC female



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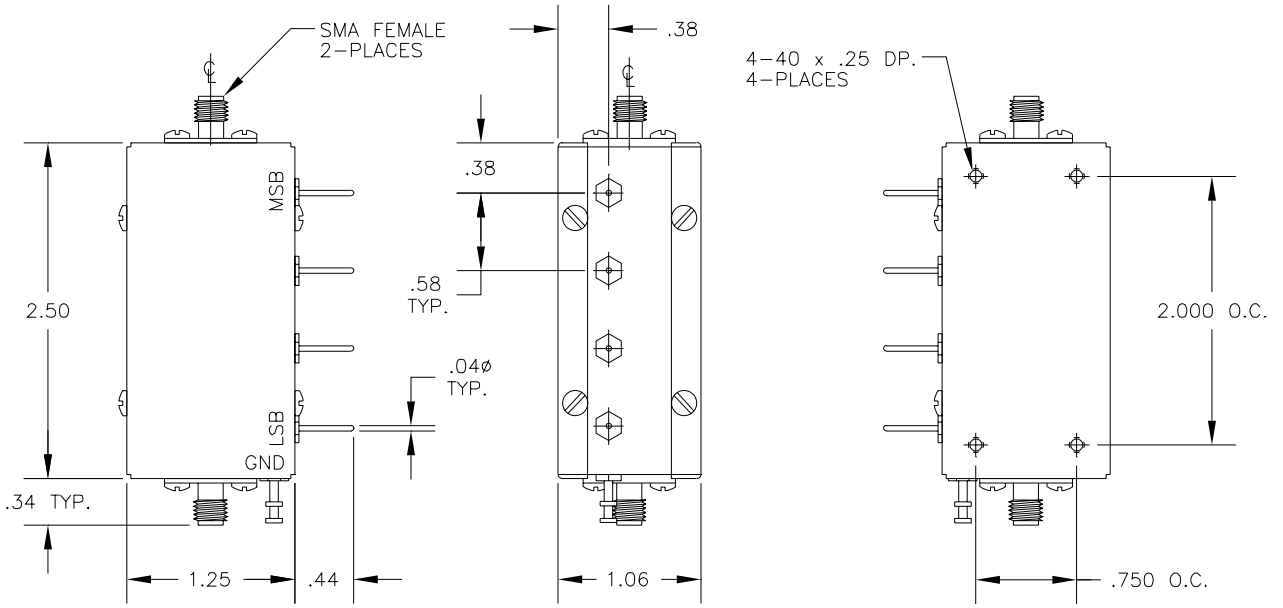
Relay Programmable Attenuators

Model	Frequency	Attenuation Range / Steps	Attenuation Accuracy (per cell)	Attenuation Accuracy (max Attenuation)	VSWR	Insertion Loss
50P-1139	DC-2000 MHz	0-1.5 dB / .1,.2,.4 and .8 dB	+/- .02 dB DC-500 MHz +/- .03 dB 500-1000 MHz +/- .05 dB 1000-2000 MHz	+/- .1 dB	1.4:1 maximum	3.5 dB @ 2000 MHz
50P-1179	DC-2000 MHz	0-15 dB / 1,2,4 and 8 dB	+/- .3 dB DC-1000 MHz +/- .5 dB 1000-2000 MHz	+/- .3 dB DC-1000 MHz +/- .5 dB 1000-2000 MHz	1.4:1 maximum	2 dB @ 2000 MHz

Common Specifications

Impedance	Switching Speed	Operating Temperature	RF Input Power	DC Control Connector	DC Supply / Control	RF Connectors
50 Ohms	6 milliseconds	-20° C to +85° C	1 Watt average 100 Watts peak	.040 Diameter solder terminals	+12 Vdc @ 30 mA per relay	SMA female



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Relay TTL Programmable Attenuators

Model	Frequency Range	Attenuation Range / Step	Attenuation Accuracy	VSWR	Insertion Loss	DC Control Connectors
50P-1203	DC-2500 MHz	0-15 dB / 1,2,4 and 8 dB	1,2,4 and 8 dB cells DC-1000 MHz +/- .2 dB or 2% 1000-2500 MHz +/- .3 dB or 3%	1.4:1 maximum to 1000 MHz 1.5:1 maximum to 2500 MHz	.8 dB maximum @ 500 MHz 1.5 dB maximum @ 1000 MHz 2 dB maximum @ 2500 MHz	3M 3793-5303
50P-1204	DC-2500 MHz	0-15.5 dB / .5,1,2,4 and 8 dB	.5 dB cell DC-2500 MHz +/- .2 dB 1,2,4 and 8 dB cells DC-1000 MHz +/- .2 dB or 2% 1000-2500 MHz +/- .3 dB or 3%	1.4:1 maximum to 1000 MHz 1.5:1 maximum to 2500 MHz	.8 dB maximum @ 500 MHz 1.5 dB maximum @ 1000 MHz 2.5 dB maximum @ 2500 MHz	3M 3793-5303
50P-1205	DC-2500 MHz	0-31 dB / 1,2,4,8 and 16 dB	1,2,4,8 and 16 dB cells DC-1000 MHz +/- .2 dB or 2% 1000-2500 MHz +/- .3 dB or 3%	1.4:1 maximum to 1000 MHz 1.5:1 maximum to 2500 MHz	.8 dB maximum @ 500 MHz 1.5 dB maximum @ 1000 MHz 2.5 dB maximum @ 2500 MHz	3M 3793-5303
50P-1206	DC-2500 MHz	0-31.5 dB / .5,1,2,4,8 and 16 dB	.5 dB cell DC-2500 MHz +/- .2 dB 1,2,4,8 and 16 dB cells DC-1000 MHz +/- .2 dB or 2% 1000-2500 MHz +/- .3 dB or 3%	1.4:1 maximum to 1000 MHz 1.5:1 maximum to 2500 MHz	.8 dB maximum @ 500 MHz 1.5 dB maximum @ 1000 MHz 3.5 dB maximum @ 2500 MHz	3M 3793-5303
50P-1207	DC-2500 MHz	0-63 dB / 1,2,4,8,16 and 32 dB	1,2,4,8,16 and 32 dB cells DC-1000 MHz +/- .2 dB or 2% 1000-2500 MHz +/- .3 dB or 3%	1.4:1 maximum to 1000 MHz 1.5:1 maximum to 2500 MHz	1.2 dB maximum @ 500 MHz 2.0 dB maximum @ 1000 MHz 3.5 dB maximum @ 2500 MHz	3M 3793-5303

Common Specifications

Impedance	Switching Speed	Operating Temperature	RF Input Power	Programming Logic	DC Supply / Control	RF Connectors
50 Ohms	6 milliseconds	-20° C to +85° C	.5 Watt average 100 Watts Peak	TTL low for “zero” setting TTL high for attenuation	+12 Vdc @ 15 mA per relay *Note: 32 dB cell requires 30 mA	BNC, SMA, N or TNC (female)

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Relay TTL Programmable Attenuators

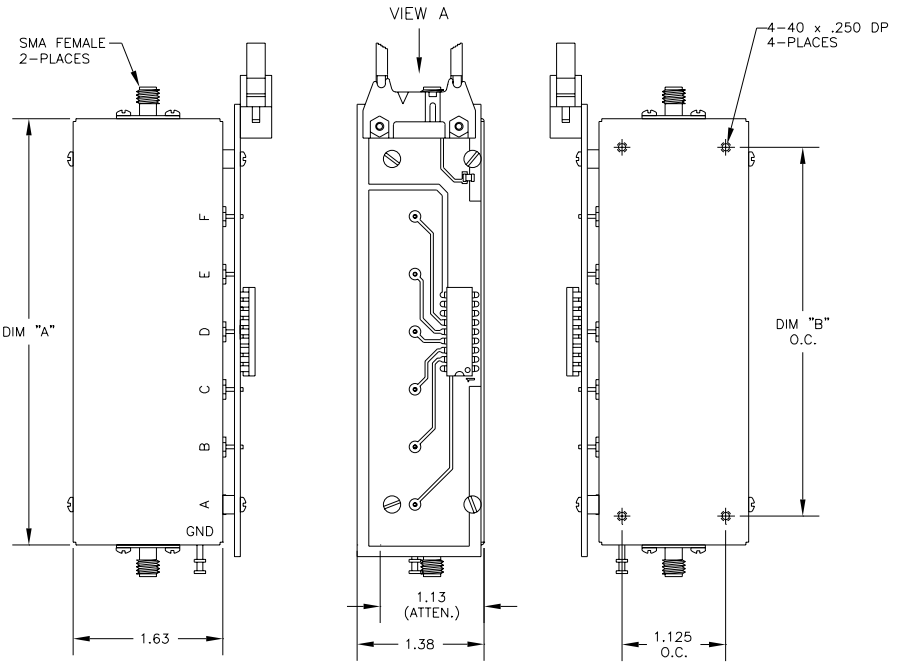
50P-1203-TTL	
PIN	FUNCTION
1	1dB TTL CONT.
2	2dB TTL CONT.
3	4dB TTL CONT.
4	8dB TTL CONT.
5	
6	
7	
8	
9	GND
10	+12Vdc

50P-1204-TTL	
PIN	FUNCTION
1	.5dB TTL CONT.
2	1dB TTL CONT.
3	2dB TTL CONT.
4	4dB TTL CONT.
5	8dB TTL CONT.
6	
7	
8	
9	GND
10	+12Vdc

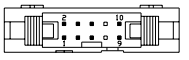
50P-1205-TTL	
PIN	FUNCTION
1	1dB TTL CONT.
2	2dB TTL CONT.
3	4dB TTL CONT.
4	8dB TTL CONT.
5	16dB TTL CONT.
6	
7	
8	
9	GND
10	+12Vdc

50P-1206-TTL	
PIN	FUNCTION
1	.5dB TTL CONT.
2	1dB TTL CONT.
3	2dB TTL CONT.
4	4dB TTL CONT.
5	8dB TTL CONT.
6	16dB TTL CONT.
7	
8	
9	GND
10	+12Vdc

50P-1207-TTL	
PIN	FUNCTION
1	1dB TTL CONT.
2	2dB TTL CONT.
3	4dB TTL CONT.
4	8dB TTL CONT.
5	16dB TTL CONT.
6	32dB TTL CONT.
7	
8	
9	GND
10	+12Vdc



MODEL	A	B	C	D	E	F	DIM "A"	DIM "B"
50P-1203-TTL	1	2	4	8	NA	NA	2.75	2.250
50P-1204-TTL	.5	1	2	4	8	NA	3.38	2.875
50P-1205-TTL	1	2	4	8	16	NA	3.38	2.875
50P-1206-TTL	.5	1	2	4	8	16	4.00	3.500
50P-1207-TTL	1	2	4	8	16	32	4.63	4.125



VIEW A
3M# 3793-5303

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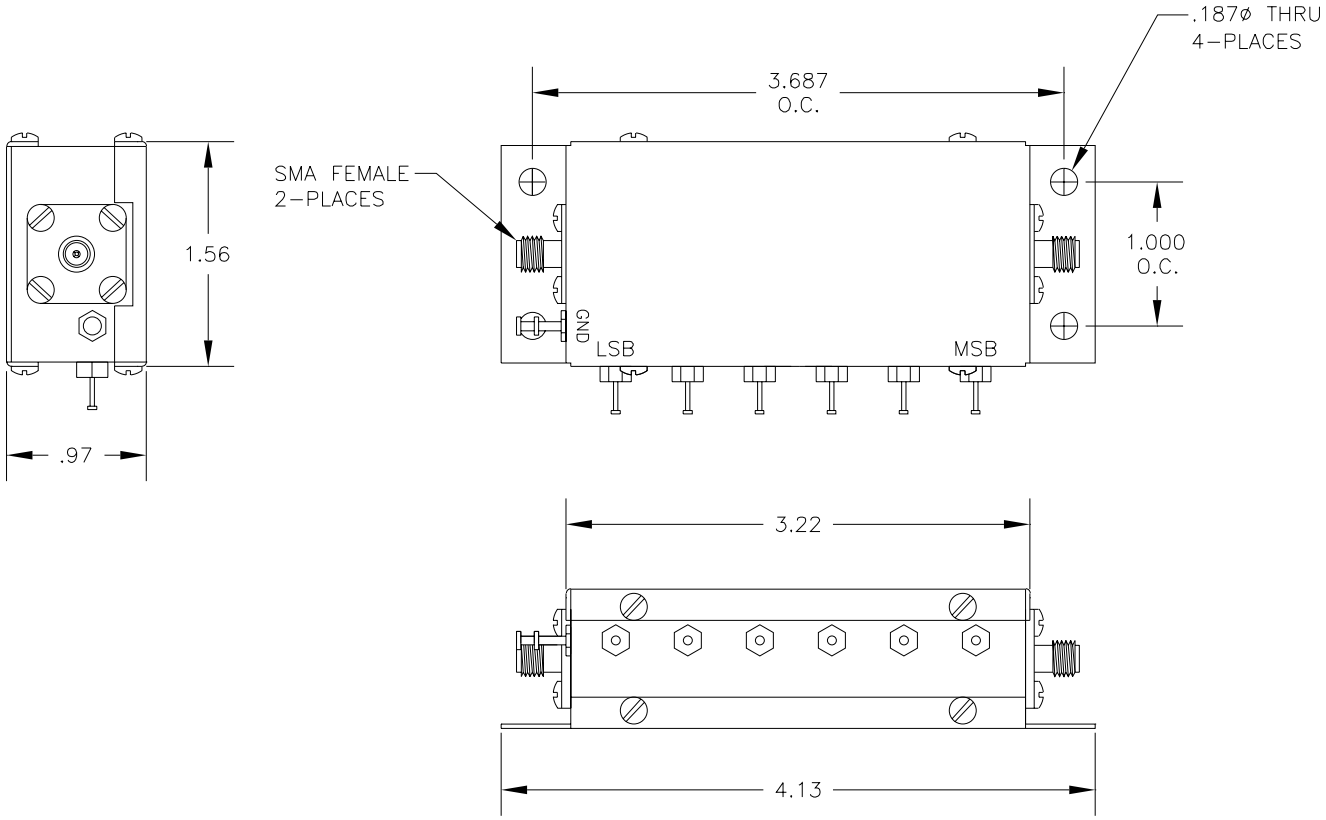
Relay Programmable Attenuators

Model	Frequency Range	Attenuation Range / Steps	Attenuation Accuracy	VSWR	Insertion Loss	DC Control Connector
50P-077	DC-1000 MHz	0-63 dB / 1, 2, 4, 8, 16 and 32	1,2,4 and 8 dB +/- .2 dB 16 and 32 dB +/- .4 dB maximum accumulative error (0-31 dB) +/- .5 dB maximum accumulative error (32-63 dB) +/- .75 dB	1.4:1 maximum	2.5 dB maximum	solder terminals
50P-990	DC-2500 MHz	0-31.5 dB / .5, 1, 2, 4, 8 and 16 dB	+/- .3 dB or 2% to 1000 MHz +/- .3 dB or 3% to 2500 MHz	1.4:1 maximum	.6 dB maximum @ 15 MHz 2 dB maximum @1000 MHz 3 dB maximum @ 2000 MHz 3.6 dB maximum @ 2500 MHz	solder terminals

Common Specifications

Impedance	Switching Speed	Operating Temperature	RF Input Power	DC Supply / Control	RF Connectors
50 Ohms	6 milliseconds	-20° C to +85° C	1 Watt average 100 Watts peak	+12 Vdc @ 30 mA per relay	BNC, SMA, or N female



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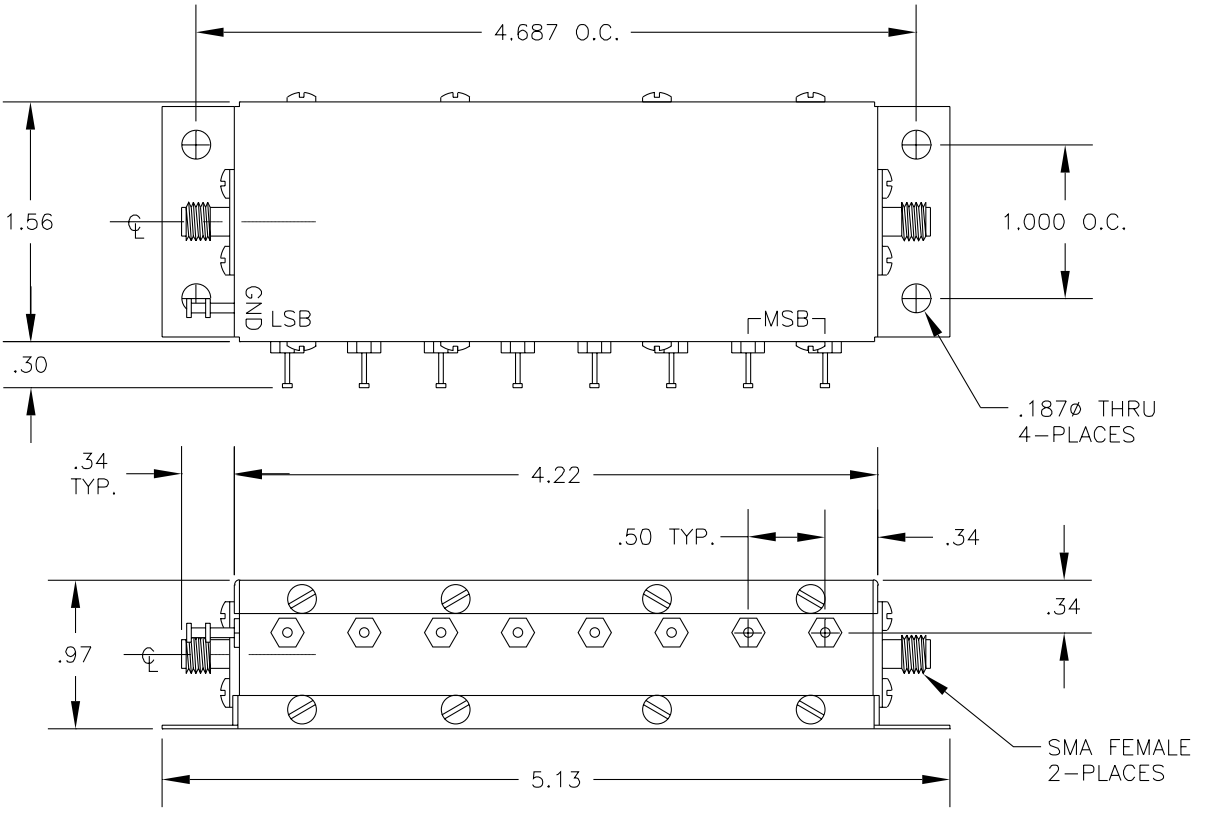
Relay Programmable Attenuators

Model	Frequency Range	Attenuation Range / Steps	Attenuation Accuracy	VSWR	DC Supply / Control	DC Control Connector
50P-076	DC-1000 MHz	0-127 dB / 1,2,4,8,16, 32 and 64 dB	1,2,4 and 8 dB +/- .2dB 16,32 and 64 dB +/- .4 dB maximum accumulated error (0-31 dB) +/- .5 dB maximum accumulated error (32-127 dB) +/- 1 dB	1.4:1 maximum	+12 Vdc @ 30 mA per relay (8 total)	solder terminals
50P-591	DC-3000 MHz	0-85 dB / 1,2,4,8,10,20 and 40 dB	+/- .3 dB or .5% DC-500 MHz +/- .4 dB or 1% 500-1000 MHz +/- .5 dB or 1% 1000-2000 MHz +/- .6 dB or 1.5% 2000-3000 MHz	1.35:1 maximum DC-1500 MHz 1.5:1 maximum 1500-3000 MHz	+12 Vdc @ 30 mA per relay (8 total)	solder terminals

Model	Impedance	Switching Speed	Operating Temperature	RF Input Power	Repeatability	Life (typical)	Insertion Loss	RF Connectors
50P-076	50 Ohms	6 milliseconds	-20° C to +85° C	1 Watt average 1000 Watts peak	+/- .2 dB at any setting	10 million operations per relay	3.5 dB maximum	BNC, N or SMA
50P-591	50 Ohms	6 milliseconds	-40° C to +85° C	.5 Watt average 100 Watts peak	+/- .2 dB at any setting	10 million operations per relay	2.5 dB maximum DC-1000 MHz 3.5 dB maximum 1000-2000 MHz 4.5 dB maximum 2000-3000 MHz	SMA female or N female



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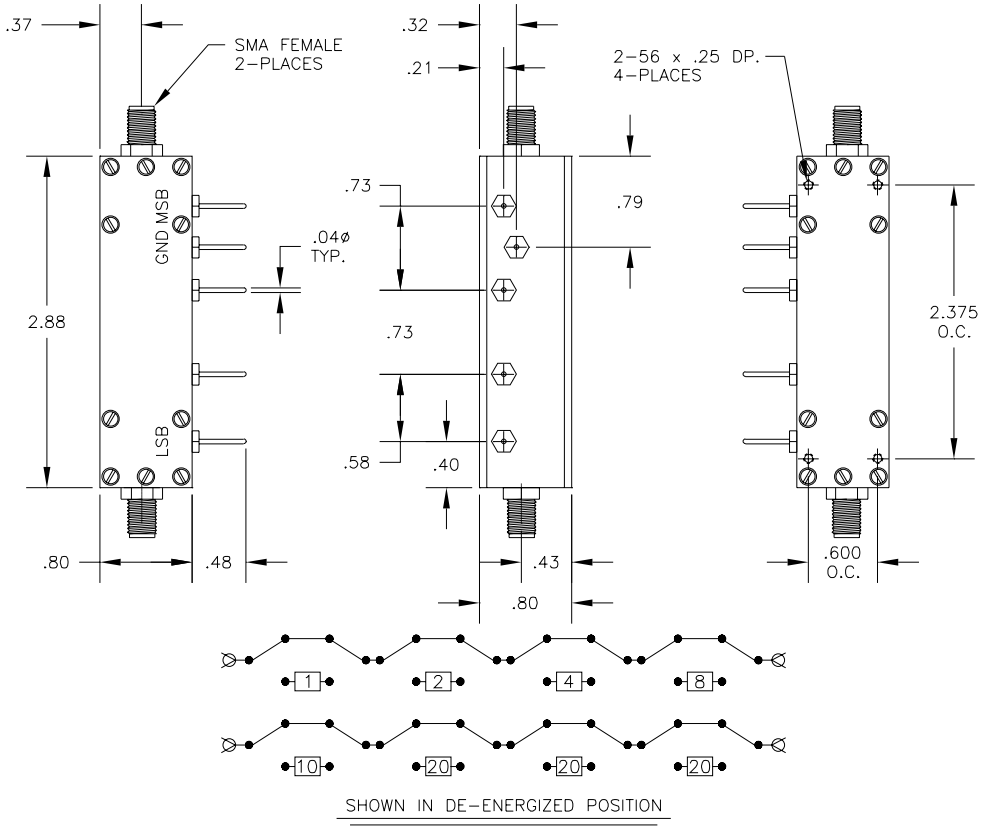
Relay Programmable Attenuators

Model	Frequency Range	Attenuation Range / Steps	Attenuation Accuracy	VSWR	Insertion Loss	DC Supply / Control	DC Control Connector
50P-766	DC-5000 MHz	0-70 dB / 10,20,20 and 20 dB	+/- .3 dB or 1% DC-1000 MHz +/- .5 dB or 1% 1000-3000 MHz +/- .5 dB or 2% 3000-5000 MHz	1.3:1 maximum to 2000 MHz 1.5:1 maximum to 5000 MHz	2 dB maximum to 2000 MHz 3 dB maximum to 5000 MHz	+12 Vdc @ 30 mA per relay	.040 Diameter solder terminals
50P-758	DC-3000 MHz	0-70 dB / 10,20,20 and 20 dB	+/- .3 dB or 1% DC-1000 MHz +/- .5 dB or 1% 1000-3000 MHz	1.4:1 maximum	2.5 dB maximum @ 3000 MHz	+24 Vdc @ 20 mA per relay	.040 Diameter solder terminals
50P-847	DC-5000 MHz	0-15 dB / 1,2,4 and 8 dB	+/- .3 dB or 3% DC-1000 MHz +/- .5 dB or 4% 1000-3000 MHz +/- .5 dB or 5% 3000-5000 MHz	1.3:1 maximum to 2000 MHz 1.5:1 maximum to 5000 MHz	2 dB maximum to 2000 MHz 3 dB maximum to 5000 MHz	+12 Vdc @ 30 mA per relay	.040 Diameter solder terminals

Common Specifications

Impedance	Switching Speed	Operating Temperature	RF Input Power	RF Connectors
50 Ohms	10 milliseconds	-20° C to +85° C	.5 Watt average 100 Watts peak	SMA female



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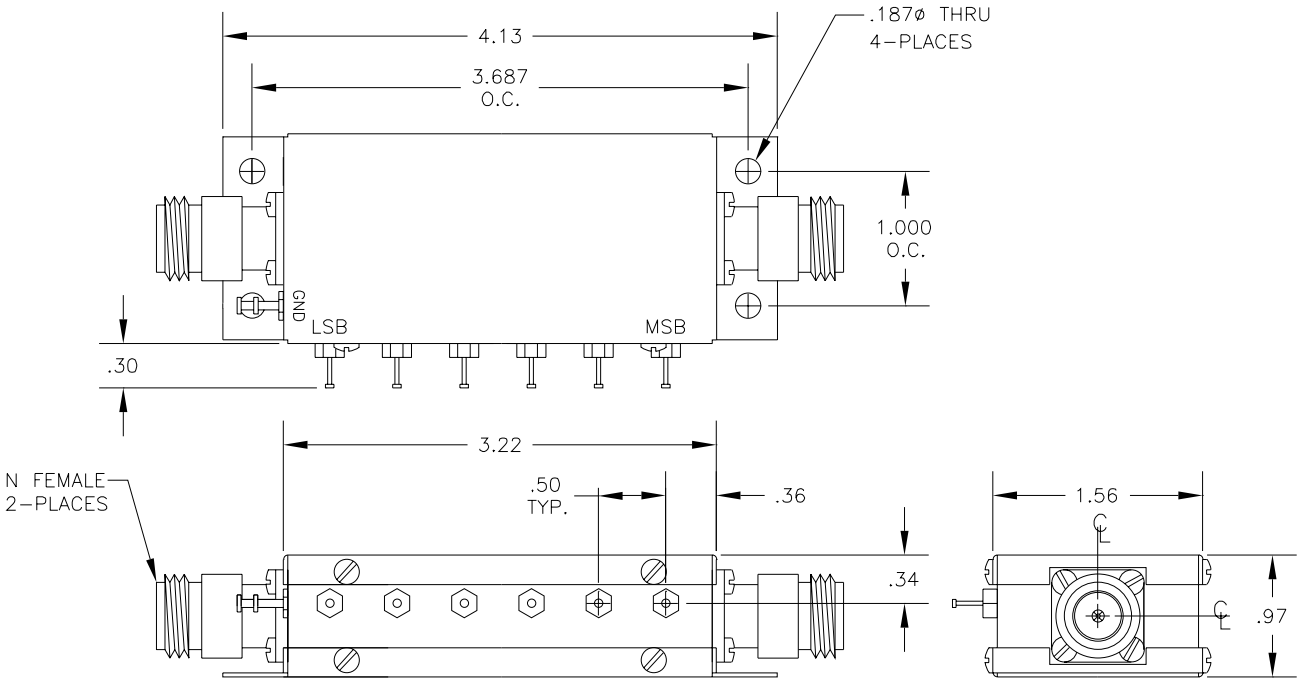
Relay Programmable Attenuators

Model	Frequency Range	Attenuation Range / Steps	Attenuation Accuracy	Insertion Loss	VSWR	DC Control Connector
75P-022	DC-1000 MHz	0-63 dB / 1,2,4,8,16 and 32 dB	+/- .3 dB DC-100 MHz +/- .3 dB or 1% 100-500 MHz +/- .3 dB or 1.5% 500-1000 MHz	2 dB maximum	1.4:1 maximum	solder terminals
75P-093	DC-1000 MHz	0-110 dB / 10,20,20,20,20 and 20 dB	+/- .3 dB DC-100 MHz +/- .3 dB or 1% 100-500 MHz +/- .5 dB or 1% 500-1000 MHz	2 dB maximum	1.4:1 maximum	solder terminals

Common Specifications

Impedance	Switching Speed	Operating Temperature	RF Input Power	DC Supply	RF Connectors
75 Ohms	6 milliseconds	-20° C to +85° C	1 Watt average 1000 Watts peak	+12 Vdc @ 30 mA per relay	BNC, F or N female



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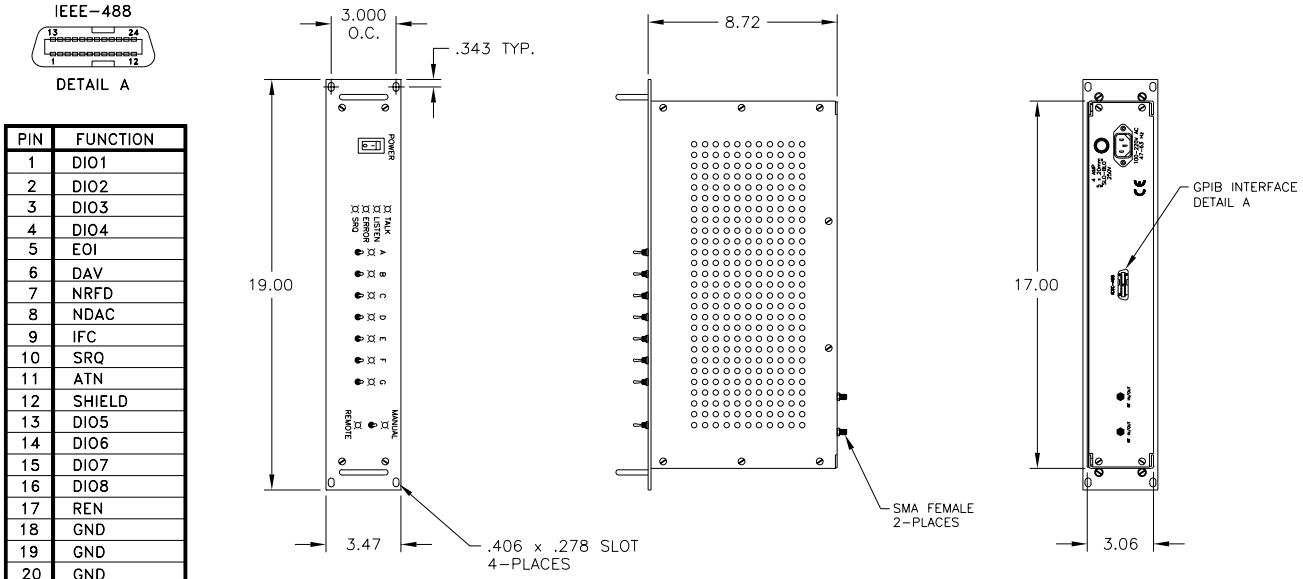
GPIB Programmable Attenuators

Model	Frequency Range	Attenuation Range / Steps	Attenuation Accuracy	VSWR	Insertion Loss	Switching Speed
50PA-010	750-2000 MHz	0-63.5 dB / .5,1,2,4,8,16 and 32 dB	+/- .25 dB .5,1,2,4,8 dB +/- .35 dB 16 and 32 dB +/- .5 dB or 2% maximum	1.4:1 maximum to 1500 MHz 1.5:1 maximum to 2000 MHz	3 dB nominal @ 1000 MHz 5.5 dB nominal @ 2000 MHz	5 microseconds
50PA-011	750-2000 MHz	0-127 dB / 1,2,4,8,16,32 and 64 dB	+/- .25 dB 1,2,4,8 dB +/- .35 dB 16,32,64 dB +/- .5 dB or 2% maximum	1.4:1 maximum to 1500 MHz 1.5:1 maximum to 2000 MHz	3 dB nominal @ 1000 MHz 5.5 dB nominal @ 2000 MHz	5 microseconds
50PA-014	DC-3000 MHz	0-85 dB / 1,2,4,8,10,20 and 40 dB	+/- .3 dB or .5% DC-500 MHz +/- .4 dB or 1% 500-1000 MHz +/- .5 dB or 1% 1000-2000 MHz +/- .6 dB or 1.5% 2000-3000 MHz	1.35:1 maximum DC to 1500 MHz 1.5:1 maximum 1500-3000 MHz	2.5 dB nominal DC-1000 MHz 3.5 dB nominal 1000-2000 MHz 5.0 dB nominal 2000-3000MHz	6 milliseconds
50PA-015	DC-150 MHz	0-63 dB / 1,2,4,8,16 and 32 dB	+/- .5 dB or 1%	1.5:1 maximum	2 dB maximum	6 milliseconds

Common Specifications

Impedance	Operating Temperature	AC Supply	Control	RF Connectors
50 Ohms	0º C to +50º C	110-220 V AC 47-63 Hz	GPIB *	SMA female

*** ALSO AVAILABLE WITH RS-232 CONTROL**



PIN	FUNCTION
1	DIO1
2	DIO2
3	DIO3
4	DIO4
5	EOI
6	DAV
7	NRFD
8	NDAC
9	IFC
10	SRQ
11	ATN
12	SHIELD
13	DIO5
14	DIO6
15	DIO7
16	DIO8
17	REN
18	GND
19	GND
20	GND
21	GND
22	GND
23	GND
24	LOGIC GND

MODEL NO.	A	B	C	D	E	F	G	RF POWER
50PA-010	.5	1	2	4	8	16	32	+10dBM
50PA-011	1	2	4	8	16	32	64	+10dBM
50PA-014	1	2	4	8	10	20	40	1 WATT AVERAGE
50PA-015	1	2	4	8	16	32	–	1 WATT AVERAGE

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JFW European Sales Office

Electron House
Hammall Street
Epping, Essex
CM 16 4LS U.K.
Tel: 01992-578231
Fax: 01992-576139

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JFW Industries, Inc.

5134 Commerce Square Drive

Indianapolis, Indiana 46237

1-877-887-4**JFW**

317-887-1340 / Fax: 317-881-6790

Internet: http://www.jfwindustries.com

Email: sales@jfwindustries.com