

# INSTALLATION & OPERATING INSTRUCTIONS

## Model 4246 & 4248 Phase Compensated GaAs Switched Programmable Attenuator



This documentation may not be reproduced in any form, for any purpose unless authorized in writing by Aeroflex / Weinschel, Inc..



© Aeroflex / Weinschel, Inc.  
Frederick, Maryland  
2006-2008

## GENERAL

This manual provides general installation instructions and wiring data to be used as an aid in installing the Aeroflex / Weinschel Model 4246 & 4248 Series Phase Compensated GaAs Switched Programmable Attenuators into any subsystem or application. Also included are specifications and other technical data to help in the installation and operation of your 4246 & 4238 Series Programmable Attenuators.



Each unit is supplied with a built-in TTL interface. Each unit is supplied with a mating 10 pin connector (Amp 746285-1). Refer to connector pin/wiring for mating details. Two wires are specified for supply voltage and ground. The remaining wires will accept TTL control signals to activate or deactivate a particular attenuation cell. A TTL high will energize a cell to the high attenuation state, whereas a TTL low will maintain a cell in its zero attenuation state.

**CONTROL CONFIGURATION:** Units are supplied with a built-in TTL interface. Each unit is supplied with a mating 10 pin connector (Amp 746285-1). Refer to connector pin/wiring for mating details. Two wires are specified for supply voltage and ground. The remaining wires will accept TTL control signals to activate or deactivate a particular attenuation cell. A TTL high will energize a cell to the high attenuation state, whereas a TTL low will maintain a cell in its zero attenuation state.

## CELL CONFIGURATION

The table below list all the standard attenuation ranges and cell configurations for Aeroflex / Weinschel Model 4246 & 4238 Series Phase Compensated GaAs Switched Programmable Attenuators. Note the dash number is the attenuation value of your attenuator.

## CONTROL CONFIGURATION

Model Number	NO. Cells	Attenuation Range/Steps (dB)	Cell Increments (dB)
4246-63	6	63/1	1, 2, 4, 8, 16, 32
4248-63.75	8	63.75/0.25	0.25, 0.50, 1, 2, 4, 8, 16, 32
4348-103	8	103/1	1, 2, 4, 8, 16, 24, 48*

\*48 dB cell comprised of two 24 dB cells

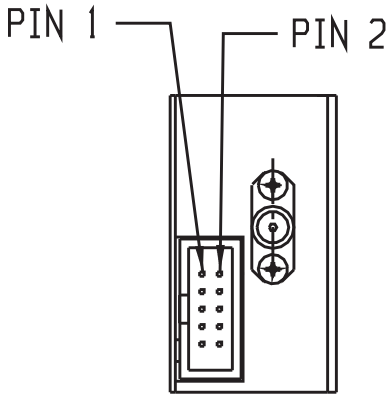
Units are supplied with a built-in TTL interface. Each unit is supplied with a mating 10 pin connector (Amp 746285-1). Refer to Physical Dimensions for mating connector pin/wiring details. Two wires are specified for supply voltage and ground. The remaining wires will accept TTL control signals to activate or de-activate a particular attenuation cell. A TTL high will energize a cell to the high attenuation state, whereas a TTL low will maintain a cell in its zero attenuation state.

## INSTALLATION

**MOUNTING:** Each Programmable Attenuator is supplied with two #4-40 UNC-2B X3.0 [0.12] mounting holes on either side of the attenuator. There are also two #2-56 UNC-2B X 3.0 [0.12] on the top and bottom of the attenuator which allows the attenuator to be mounted in any direction.

**RF CABLE INSTALLATION:** Care should be taken to prevent strain on the inter-connecting cables, since damage here may not always be apparent. Check the attaching RF cables and the SMA connectors for signs of cracked insulation and/or bent or worn pins prior to connection. Tests show that connectors must be clean for accuracy and stability. This requires an inspection and cleaning of each connector immediately before use. When cleaning precautions are observed regularly, connectors can maintain their stability for over several thousand connection cycles. Weinschel recommends a torque value of 7 to 10 inch pounds when connecting any RF cable to the attenuator's RF connectors.

**CONTROL CONNECTOR PIN/WIRING:** The table below shows the connectors contact pin numbering scheme and the signal designator for signal present at each contact pin.



**Control Connector J3 Pin Locations:**

TTL Conn PIN No. (J3)	4246-63 dB (Cell)	4248-63.75 dB (Cell)	4248-103 dB (Cell)
1	1	0.25	1
2	2	0.50	2
3	4	1	4
4	16	2	8
5	32	4	16
6	8	8	24
7	NC	16	48
8	NC*	32	NC*
9	+5 Vdc	+5 Vdc	+5 Vdc
10	COM	COM	COM

NC = Not Connected

\* For Factory use only.

## SPECIFICATIONS

**NOMINAL IMPEDANCE:** 50  $\Omega$

**FREQUENCY RANGE:** 10 MHz to 2.5 GHz

**SWR (Maximum):**

10 - 100 MHz	2.00
100 MHz - 200 MHz	1.60
200 MHz - 2.5 GHz	1.40

**MONOTONICITY:** 10 MHz to 2.5 GHz

### INCREMENTAL ATTENUATION ACCURACY:

CELL	0.25	0.50	1	2	4	8	16	24	32	48
dB	$\pm 0.15$	$\pm 0.15$	$\pm 0.2$	$\pm 0.2$	$\pm 0.2$	$\pm 0.2$	$\pm 0.3$	$\pm 0.4$	$\pm 0.6$	$\pm 0.8$

### INSERTION LOSS, Maximum (dB):

<u>Frequency Range</u>	<u>4246</u>	<u>4248</u>
10 MHz - 1 GHz	8.0	10.5
1 - 2 GHz	9.0	12.0
2 - 2.5 GHz	10.0	13.0

**3rd ORDER INTERMODULATION (IM3):** -60 dBm typical, measured with two +27 dBm tones @ 869 MHz (f1) and 894 MHz (f2), the IM3 frequency being 847 MHz (2f1-f2).

$$IP3 \text{ (input)} = +65 \text{ dBm}$$

The input IP3 is derived from the following relationship:

$$IP3 = \frac{3(Pin-\alpha)-IM3}{2} + \alpha$$

where  $\alpha$  = the insertion loss (dB) at the IM3 frequency; Pin=single tone input power (dBm).

**POWER RATING:** 4 Watts maximum

**SWITCHING TIME:** 5  $\mu$ sec. maximum

**OPERATING VOLTAGE:** + 5 V to +15V

**OPERATING CURRENT:** 25 mA typical

### INCREMENTAL RELATIVE PHASE:

$\pm 5^\circ$  between 0 and .25, 1, 2, 4, 8, 16 dB

$\pm 10^\circ$  between 0 and 32, 48 dB

**TEMPERATURE RANGE (Operating):** 0°C to +70°C

**TEMPERATURE COEFFICIENT:** <0.002/dB/dB/°C

**CONNECTORS:** SMA female connectors - mate nondestructively with MIL-C-39012 connectors.

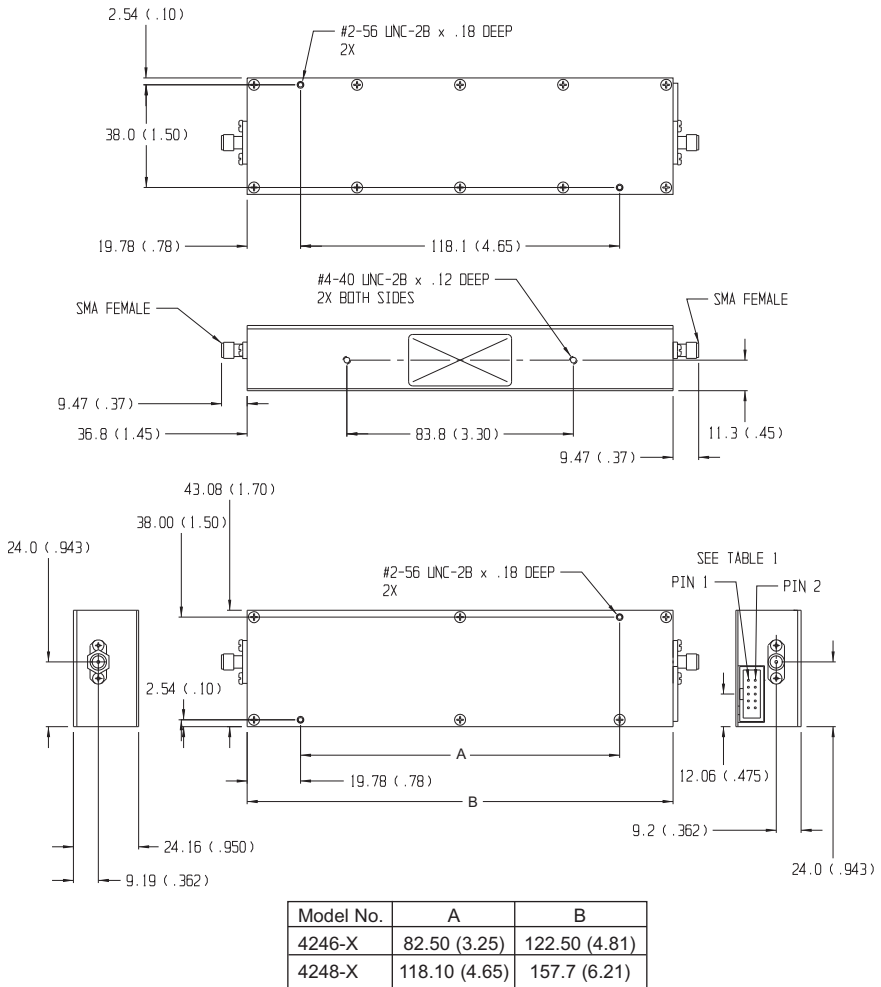
**CONTROL CONNECTOR:** AMP-Latch 10 pin ribbon cable connector mates with AMP P/N 746285-1 (supplied with each unit)

**CONSTRUCTION:**

Housing: Aluminum  
 Connectors: Stainless steel body and beryllium copper contacts.

**WEIGHT:** Model 4246: 227 g (8.0 oz)  
 Model 4248: 300 g (10.6 oz)

**PHYSICAL DIMENSIONS:**



NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

## Aeroflex / Weinschel Warranty

**PRODUCTS:** Aeroflex / Weinschel warrants each product it manufactures to be free from defects in material and workmanship under normal use and service anywhere in the world. Weinschel's only obligation under this Warranty is to repair or replace, at its plant, any product or part thereof that is returned with transportation charges prepaid to Aeroflex / Weinschel by the original purchaser within ONE YEAR from the date of shipment.

The foregoing Warranty does not apply to, and in Aeroflex / Weinschel's sole opinion, products that have been subject to improper or inadequate maintenance, unauthorized modifications, misuse, or operation outside the environmental specifications for the product.

**SOFTWARE PRODUCTS:** Aeroflex / Weinschel software products are supplied without representation or Warranty of any kind. Aeroflex / Weinschel, therefore, assumes no responsibility and will not accept liability (consequential or otherwise) arising from the use of program materials, disk, or tape.

The Warranty period is controlled by the Warranty document furnished with each product and begins on the date of shipment. All Warranty returns must be authorized by Aeroflex / Weinschel prior to their return.

Aeroflex / Weinschel's Quality System Certified to:



Certificate No. 289I

## **CONTACTING Aeroflex/ Weinschel**

In the event you're having difficulty or believe that the components are defective, please contact Weinschel immediately. An apparent malfunction may be corrected over the phone by contacting the Customer Service Department at Weinschel. DO NOT send the product back to the factory without prior authorization (RMA number). When it is necessary to return an item, state the symptoms or problems, catalog and type number of the attenuator, and date of original purchase. Also write the company name, your name, and phone number on an index card. Then attach the card to the attenuator to be returned.

For more information or any questions about your Programmable Step Attenuators and/or other Aeroflex/ Weinschel products, contact the Sales Department at Aeroflex/ Weinschel.



5305 Spectrum Drive, Frederick, Maryland 21703-7362  
TEL: (301) 846-9222, 800-638-2048, FAX: (301) 846-9116  
Web: [www.aeroflex.com/weinschel](http://www.aeroflex.com/weinschel), e-mail: [weinschel-sales@aeroflex.com](mailto:weinschel-sales@aeroflex.com)