



## S81510F 2.4mm 11dB Programmable Step Attenuator

### User Manual



Saluki Technology Inc.

## Content

1. Overview.....	3
2. Performance Characteristics.....	3
3. Mechanical Characteristics.....	4
4. Attenuation Size Compositions.....	4
5. Control Mode.....	5
6. Precautions.....	6

## 1. Overview

The S81510F 2.4mm 11dB programmable step attenuator can realize 0 - 11dB step attenuation in DC - 40GHz wide band range, and the minimum step size is 1dB. The programmable step attenuator is characterized by high attenuation accuracy, good repeatability, low insertion loss, long service life, etc., which is mainly applied to control signal level amplitude entering the system, control system output signal power, adjust matching between the signal source and load, and simulate the loss of signal transmission channel in the communication system. It is widely used in the broadband spectrum analyzers, broadband vector network analyzers, broadband synthesis signal sources, noise factor testers and microwave automatic test systems and wireless communications systems.

## 2. Performance Characteristics

(1) Frequency range: DC - 40GHz

(2) Attenuation size: 11dB

(3) Step size: 1dB

(4) Connector type:

Connector type: 2.4mm (female)

Electric connector type: Spacing: 2.54mm x 2.54mm;

Straight pin cross section: 0.64mm x 0.64mm;

Core quantity: 10;

Recommended supporting connector: 517.076.003.010 (ODU);

Recommended locking pin (preventing the connector from falling ofJ): 517.063.105.923.000 (ODU, optional, 2 pieces/set).

(5) Port standing wave ratio:  $\leq 2.0$

(6) Insertion loss:  $\leq 4.1$ dB (in case of 0dB)

(7) Attenuation accuracy:

Attenuation size	1	2	4	11
Attenuation accuracy (dB)	$\pm 1.0$	$\pm 1.0$	$\pm 1.5$	$\pm 2.0$

(8) Repeatability:  $\leq 0.05$ dB (typical value)

(9) Maximum input power: 1W (continuous wave)

(10) Minimum service life: 2 million times (per level)

(11) Working temperature:  $-20^{\circ}\text{C}$  -  $+70^{\circ}\text{C}$

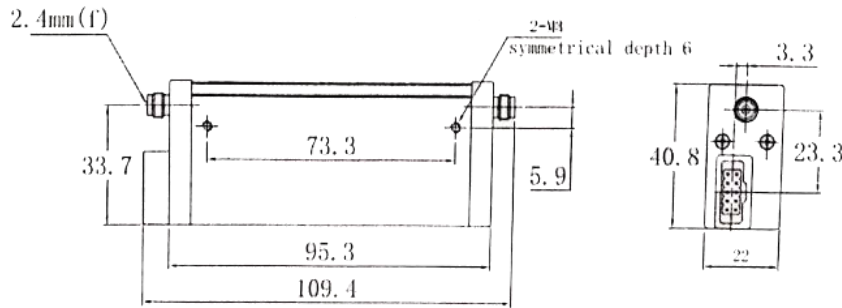
(12) Storage temperature:  $-55^{\circ}\text{C}$  -  $+85^{\circ}\text{C}$

(13) Impact (working status): 10g, 6ms

- (14) Vibration (working status): Acceleration 5g, 50 - 2000Hz
- (15) Humidity resistance: 240h@40°C, 95% RH

### 3. Mechanical Characteristics

- (1) Weight: maximum 0.35kg
- (2) Switching speed: maximum 20ms
- (3) Relay drive voltage and current:  
 Relay drive voltage: 20V - 28V, rated voltage: 24V  
 Relay drive current: 126mA (under normal temperature rated voltage, per level)
- (4) Overall dimensions: (unit: mm)



### 4. Attenuation Size Compositions

The programmable step attenuator contains four parts, and each part can be switched between the straight plate and the different attenuation plates to realize the switching between straight connection and attenuation. The first part includes the straight plate and 1dB attenuation plate, the second part includes the straight plate and 4dB attenuation plate, the third part includes the connection plate and 2dB attenuation plate, and the fourth part includes the straight plate and 4dB attenuation plate, the straight plate and attenuation plate can be combined to realize 0dB - 11dB attenuation. The specific combination mode is as follows:

Attenuation	Level 1	Level 2	Level 3	Level 4
0dB	○	○	○	○
1dB	×	○	○	○
2dB	○	○	×	○
3dB	×	○	×	○
4dB	○	×	○	○
5dB	×	×	○	○
6dB	○	×	×	○
7dB	×	×	×	○

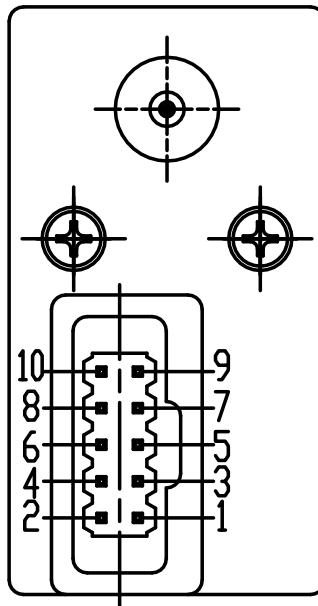
8dB	○	x	○	x
9dB	x	x	○	x
10dB	○	x	x	x
11dB	x	x	x	x

**Note:** ○ means the transmission signal transmitted through the straight plate, and x means the transmission signal transmitted through the attenuation plate.

## 5. Control Mode

The internal relay driving the programmable step attenuator shall be driven by 20V - 28Vdc DC voltage, and the driving current is 126mA (at normal temperature and 24V driving voltage, each stage). As the relay has the latching device, the internal drive circuit will automatically cut off the power supply after the relay operation, and the power consumption is reduced. The relay switching time  $\leq 20\text{ms}$ .

The TTL level shall be inputted to the corresponding connector to determine whether the straight plate or the attenuation plate shall be applied for the control relay, and the drive mode is triggered at the falling edge (acting on the falling edge of low level converted from high level, with the low level hold duration not shorter than 20ms. ). The specific control relationship is as follows:



**Power supply:** The connector Pin 10 is the positive pole of the power supply (+20 to +28Vdc), with the rated voltage is +24Vdc, and Pin 3 is the negative pole (ground).

**Control:** If the pin is converted to low level (0V to +1.0Vdc) from TTL high level and its hold duration is longer than 20ms, the other pins (except Pin 3 and Pin 10) can realize their respective functions if they are are TTL high level (+4.2V to +5Vdc).

Pin 1: first level straight plate

Pin 2: first level 1dB attenuation plate

Pin 4: second level straight plate

Pin 5: third level straight plate

Pin 6: fourth level straight plate

Pin 7: fourth level 4dB attenuation plate

Pin 8: third level 2dB attenuation plate

Pin 9: second level 4dB attenuation plate

**For example, to realize 5dB attenuation, the power shall be supplied to the connector as follows:**

Pin 1: TTL high level;

Pin 2: convert to low level from TTL high level, and its hold duration shall be longer than 20ms;

Pin 3: ground;

Pin 4: TTL high level;

Pin 5: convert to low level from TTL high level, and its hold duration shall be longer than 20ms;

Pin 6: convert to low level from TTL high level, and its hold duration shall be longer than 20ms;

Pin 7: TTL high level;

Pin 8: TTL high level;

Pin 9: convert to low level from TTL high level, and its hold duration shall be longer than 20ms;

Pin 10: +24Vdc.

## 6. Precautions

- (1) For the power supply of the programmable step attenuator, the Pin3 shall be well grounded, otherwise it may cause permanent damage to the internal device of the programmable step attenuator.
- (2) When the attenuator is installed, it shall be placed horizontally (namely the mounting screw of the attenuator shall be perpendicular to the horizontal plane) for better vibration resistance performance.
- (3) The attenuation plate can only withstand a power no more than 1W(CW), so please do not input a power higher than 1W(CW) into the attenuator port.
- (4) The port of programmable step attenuator is a kind of precision female connector, which can only be connected to its matching connectors. In addition, check whether the size of the port to be connected is consistent with the national standard requirement during connection, so as to avoid damaging the connector or affecting the device index and its service life. In addition, it is commended to use torque wrench when connecting and dis connecting the connector. Cover the connector with a dust-proof cap when not in use to avoid foreign matters entering the attenuator and affecting its index.
- (5) The programmable step attenuator is a non-scaled attenuator , so please store it in a dry and clean environment.

- End of Document -