# DC~40GHz 2.4mm 110dB Programmable Step Attenuator P/N: YX-PSADC-40G-110-10P1

## Overview:

The 2.4mm 110dB programmable step attenuator can achieve 0 - 110dB step attenuation within a wide frequency range from DC to 40GHz, with a minimum step of 10 dB. It has advantages such as high attenuation accuracy, good repeatability, low insertion loss and long service life. It is mainly used to control the signal level amplitude entering the system, the output signal power of the system and adjust the matching between the signal source and the load. It can also simulate the loss of the signal transmission path in the communication system and is widely used in various broadband spectrum analyzers, broadband vector network analyzers, broadband synthetic signal sources, noise figure testers and various microwave automatic test systems and wireless communication systems.

## Features:

- High attenuation accuracy
- Good repeatability
- Low insertion loss
- Long service life

## Typical Applications:

- Broadband spectrum analyzers
- Broadband vector network analyzers
- Broadband synthesized signal sources
- Noise figure test instruments
- Microwave automatic test systems
- Wireless communication systems



RoHS

| Electrical &Mechanical Specifications | |
|---|---|
| Frequency Range | DC~40GHz |
| Attenuation | 110dB |
| Step Amount | 10dB |
| Connector Type | 2.4mm |
| Electrical Connector Type | Pitch: 2.54mm×2.54mm;<br>Straight pin section: 0.64mm×0.64mm;<br>Number of cores: 10 |
| VSWR | ≤2.0 |

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|---|---|---|---|---|
| Insertion loss | ≤3.5dB (At 0dB) | | | |
| Attenuation | 10dB | 20db | 40dB | 110dB |
| Attenuation Accuracy | ±1.0dB | ±1.0dB | ±1.2dB | ±3.5dB |
| Repeatability | ≤0.05dB (Typical)) | | | |
| Maximum Input Power | 1W (Continuous Wave) | | | |
| Minimum Service Life | 1 million times (Per Stage) | | | |
| Operational Temperature | -20℃~+70℃ | | | |
| Storage Temperature | -55℃~85℃ | | | |
| Shock (Working State) | 10g, 6ms, Three-Axis Six-Direction | | | |
| Vibration (Working State) | Acceleration 5g, 50~2000Hz | | | |
| Humidity Resistance | 240h@40℃、95%RH | | | |

| Environmental Specifications | |
|---|---|
| Weight | Max. 0.35kg |
| Switching Speed | Max. 20ms |
| Relay Drive Voltage | 20V ~ 28V,<br>Rated Voltage: 24V |
| Relay Drive Current | 126mA (At Rated Voltage at Normal Temperature, Per Level) |

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## Attenuation Composition：

The programmable attenuator contains four parts, each of which can be switched between straight-through and different attenuation plates to achieve the switching between straight-through and attenuation.

For example, the first part contains a straight-through plate and a 10dB attenuation plate, the second part contains a straight-through plate and a 40dB attenuation plate, the third part contains a straight-through plate and a 20dB attenuation plate, and the fourth part contains a straight-through plate and a 40dB attenuation plate. The combination of the straight-through plate and the attenuation plate can achieve an attenuation of 0dB to 110dB. The specific combination is as follows:

| **Attenuation** | First Stage | Second Stage | Third Stage | Fourth Stage |
|---|---|---|---|---|
| 0dB | O | O | O | O |
| 10dB | × | O | O | O |
| 20dB | O | O | × | O |
| 30dB | × | O | × | O |
| 40dB | O | × | O | O |
| 50dB | × | × | O | O |
| 60dB | O | × | × | O |
| 70dB | × | × | × | O |
| 80dB | O | × | O | × |
| 90dB | × | × | O | × |
| 100dB | O | × | × | × |
| 110dB | × | × | × | × |



Note: O indicates that the transmission signal is transmitted through the straight-through piece, × indicates that the transmission signal is transmitted through the attenuation piece.

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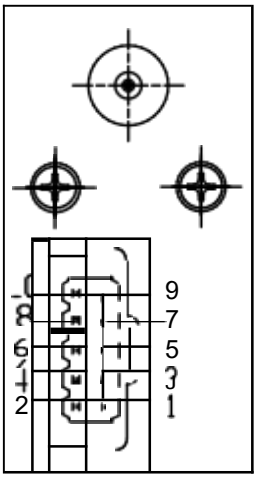
## Control Mode:

To drive the relay in the programmable step attenuator, a DC voltage of 20V - 28Vdc is needed, and the driving current is 126mA (at room temperature and 24V driving voltage per stage). The relay has a latching device. Once activated, the internal driving circuit automatically cuts off the power supply, with low power consumption. The relay switching time is ≤20ms.

To control the relay to select the through-chip or the attenuation chip, the corresponding connector needs to input the TTL level, and the driving mode is the falling edge trigger (the falling edge from high level to low level works, and the low-level duration must be over 20ms). The specific control relationship is as follows:

Power supply: Connector pin 10 is the positive pole of the power supply (+20 - +28Vdc), the rated voltage is +24Vdc, and pin 3 is the negative pole (ground).

Control: If the pin changes from TTL high level to low level (0V - +1.0Vdc) and the low-level duration is over 20ms, while the other pins (except pins 3 and 10) are TTL high level (+4.2V - +5Vdc), then their respective functions are achieved.




| | |
|---|---|
| Pin 1 | First stage pass-through |
| Pin 2 | First stage 10dB attenuation |
| Pin 3 | Negative (Ground) |
| Pin 4 | Second stage pass-through |
| Pin 5 | Third stage pass-through |
| Pin 6 | Fourth stage pass-through |
| Pin 7 | Fourth stage 40dB attenuation |
| Pin 8 | Third stage 20dB attenuation |
| Pin 9 | Second stage 40dB attenuation |



For example: To achieve 50dB attenuation, the connector needs to be powered as follows:

| | |
|---|---|
| Pin 1 | TTL High Level |
| Pin 2 | TTL high level turns to low level and the low-level duration is greater than 20ms |
| Pin 3 | Ground |
| Pin 4 | TTL High Level |
| Pin 5 | TTL high level turns to low level and the low-level duration is greater than 20ms |
| Pin 6 | TTL high level turns to low level and the low-level duration is greater than 20ms |
| Pin 7 | TTL High Level |
| Pin 8 | TTL High Level |
| Pin 9 | TTL high level turns to low level and the low-level duration is greater than 20ms |
| Pin 10 | +24Vdc |

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## Cautions:

1. When powering the programmable step attenuator, the 3rd pin must be well grounded, otherwise it may cause permanent damage to the internal components of the programmable step attenuator.
2. When installing the attenuator, in order to make it have better anti-vibration performance, please place the attenuator horizontally (that is, the mounting screws of the attenuator are perpendicular to the horizontal plane).
3. The attenuator can only withstand a maximum power of 1W (CW), so do not input more than 1W (CW) power into the attenuator port at this time.
4. The port of the programmable step attenuator is a precision female connector, which can only be connected to the matching connector. At the same time, when connecting, pay attention to whether the size of the port to be connected meets the national standard requirements to avoid damaging the connector and affecting the index and service life of the device.

In addition, it is best to use a torque wrench when connecting and disconnecting the connector. Cover the connector with a dust cap when not in use to prevent excess objects from entering the attenuator and affecting the index.

5. The programmable step attenuator is a non-sealed attenuator, please store it in a dry and dust-free environment.