

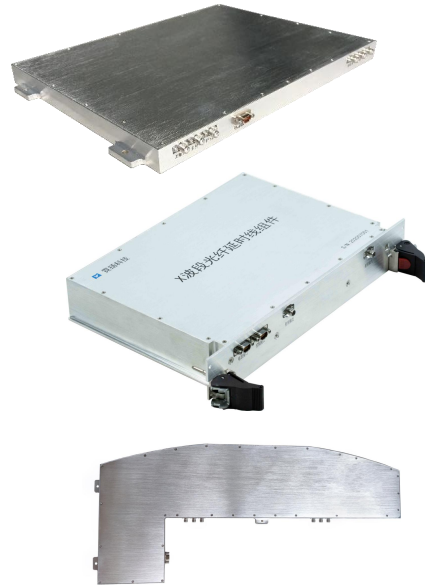
Automotive Radar Calibration Simulator

➤ Feature

- ※ Strong anti-interference
- ※ High simulation range and accuracy
- ※ Fast switching time
- ※ Ultra wideband

➤ Application

- ※ Automotive Electronics
- ※ Radar simulation
- ※ Signal processing
- ※ Electronic War



Description of NY037 and NY059 Series

NY037 and NY059 series Automotive Radar Calibration Simulator are mainly used in the vehicle millimeter wave radar echo simulation system, such as the calibration of the vehicle radar ranging system, driving assistance, anti-collision function, etc. This series of products can also be applied to satellite communication, inter-station transmission, unmanned driving, photoelectric systems (such as lidar, radio frequency radar, etc.), UAV(unmanned aerial vehicle), etc.

This series of products use optical fiber as the signal delay transmission medium. Compared with the traditional cable delay, optical fiber delay has the advantages of wider carrier bandwidth, stronger anti-interference, better confidentiality, lower system power consumption, smaller volume, lighter weight and so on. In addition, the higher-order version of this series of products adopts the magneto-optical switch. Compared with the traditional mechanical optical switch, the magneto-optical switch has faster switching speed, longer service life and shorter delay step.

This series of products is adapted to the mainstream industrial control communication protocols, such as the typical RS232, RS422, RS485, SPI, etc.

Typical series of automotive radar calibration simulator: NY 037 series and NY 059 series.

According to customer requirements, NEON will provide the following types of packages, standard chassis, portable chassis and core modules.

Operational Principle

NY 037 and NY 059 series automotive radar calibration simulators are mainly composed of input / output RF interface, electric / optical converter, delay optical fiber, optical / electric converter, matching amplifier and delay switching controller. NY 037 series and NY 059 series automotive radar calibration simulator adopts optical fiber delay technology, first to convert the radio frequency signal into laser signal, and the laser signal for different delay, and then the laser signal after the delay is reduced to radio frequency signal and output after matching and amplification.

Electrical / Optical Characteristics

● NY037-1 Photoelectric parameters

Parameter	Value			unit	remarks
	Min	Typ	Max		
Frequency	5.4	-	10.4	GHz	-
Input signal power	-45	-	-5	dBm	-
In-band amplitude flatness	-	-	±1.5	dB	-
RF insertion loss	-	0±1.5	-	dB	@9.9GHz
In-band spurious signal	-	-	-50	dBc	-
Input VSWR	-	-	2	Ω	-
Output VSWR	-	-	2	dBc	-
Fixed delay T0	-	-	3	ns	Including all the frequency points in the 5G band
Time delay	T0	-	2048+T0	ns	-
Time delay step	-	0.5	-	ns	-
Time delay accuracy	-	±0.1	-	ns	10ns and less
	-	±0.2	-	ns	10 ns to 1000 ns
	-	±0.3	-	ns	More than 1000ns
Fixed altitude H0	-	-	0.45	ns	Including all the frequency points in the 5G band
Altitude range	H0	-	307.2+H0	m	-
Altitude step	-	0.075	-	m	-
Altitude accuracy	-	0.015	-	m	1.5 m and below
	-	0.030	-	m	From 1.5 m to 150 m
	-	0.045	-	m	More than 150m meters
Switch time	-	-	5	ms	-
Switch life	3*10 ⁸	-	-	Times	-
Working temperature	10	-	55	°C	-
Storage temperature	-20	-	+70	°C	-
Voltage	-	±5	-	V	-
Control method	RS-485				
RF connector	SMA-K				

● NY037-2 Photoelectric parameters

Parameter	Value			Unit	Remarks
	Min	Typ	Max		
Frequency	5.4	-	10.4	GHz	-
Input signal power	-45	-	-5	dBm	-
In-band amplitude flatness	-	-	±1.8	dB	-
RF insertion loss	-	0±1.5	-	dB	@9.9GHz
In-band spurious signal	-	-	-50	dBc	-
Input VSWR	-	-	2	Ω	-
Output VSWR	-	-	2	dBc	-
Fixed delay T0	-	-	3.5	ns	Including all the frequency points in the 5G band
Time delay	T0	-	2047.5+T0	ns	-
Time delay step	-	0.5	-	ns	-
Time delay accuracy	-	±0.1	-	ns	10ns and less
	-	±0.2	-	ns	10 ns to 1000 ns

	-	±0.3	-	ns	More than 1000ns
Fixed altitude H0	-	-	0.525	ns	Including all the frequency points in the 5G band
Altitude range	H0	-	307.125+H0	m	-
Altitude step	-	0.075	-	m	-
Altitude accuracy	-	0.015	-	m	1.5 m and below
	-	0.030	-	m	1.5 m to 150 m
	-	0.045	-	m	More than 150m meters
Switch time	-	-	100	us	-
Switch life	3*10^8	-	-	Times	-
Working temperature	10	-	55	°C	-
Storage temperature	-20	-	+70	°C	-
Voltage	-	±5	-	V	-
Control method	RS-485				
RF connector	SMA-K				

● NY037-3 Photoelectric parameters

Parameter	Value			Unit	Remarks
	Min	Typ	Max		
Frequency	5.4	-	10.4	GHz	-
Input signal power	-45	-	-5	dBm	-
In-band amplitude flatness	-	-	±1.8	dB	-
RF insertion loss	-	12±1.5	-	dB	@9.9GHz
In-band spurious signal	-	-	-50	dBc	-
Input VSWR	-	-	2	Ω	-
Output VSWR	-	-	2	dBc	-
Fixed delay T0	-	-	5	ns	Including all the frequency points in the 5G band
Time delay	T0	-	4096+T0	ns	-
Time delay step	-	0.25	-	ns	-
Time delay accuracy	-	±0.1	-	ns	10ns and less
	-	±0.2	-	ns	10 ns to 1000 ns
	-	±0.3	-	ns	1000 ns to 2048 ns
	-	±0.5	-	ns	Over 2048ns
Fixed altitude H0	-	-	0.075	ns	Including all the frequency points in the 5G band
Altitude range	H0	-	614.4+H0	m	-
Altitude step	-	0.0375	-	m	-
Altitude accuracy	-	0.015	-	m	1.5 m and below
	-	0.030	-	m	1.5 m to 150 m
	-	0.045	-	m	150 m to 307.2 m
	-	0.075	-	m	Above 307.2 m
Switch time	-	-	100	us	-
Switch life	3*10^8	-	-	Times	-
Working temperature	10	-	55	°C	-
Storage temperature	-20	-	+70	°C	-
Voltage	-	±5	-	V	-
Control method	RS-485				
RF connector	SMA-K				

● Typical Curve for NY037 series

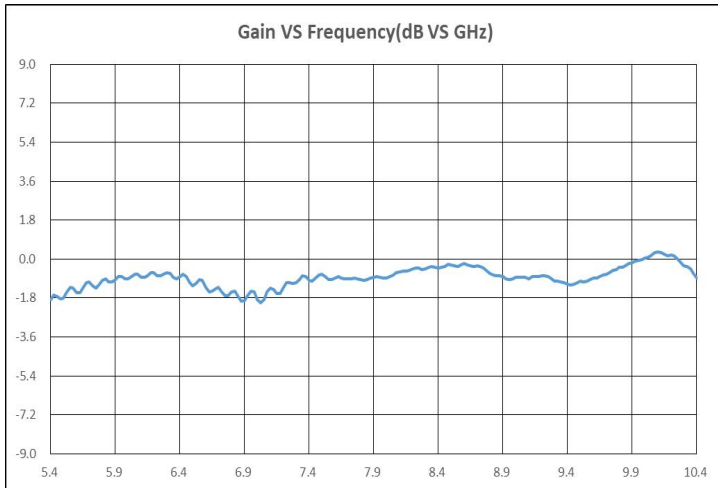


Figure 1. Insertion Loss of NY037 series

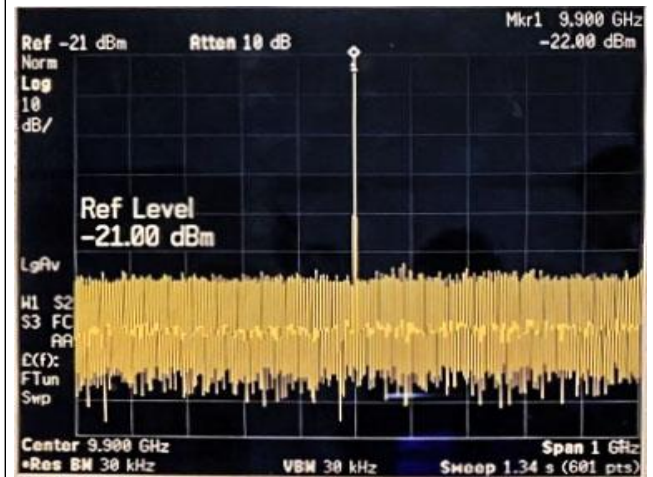


Figure 2 Typical stray spectrum of NY037 series

Electrical / Optical Characteristics

● NY059-1 Photoelectric parameters

Parameter	Value			Unit	Remarks
	Min	Typ	Max		
Frequency	4	-	12	GHz	-
Input signal power	-45	-	-5	dBm	-
In-band amplitude flatness	-	-	±1	dB	In 500 MHz
In-band power stability	-	-	±1	dB	-20°C/2h, 0°C/2h, 20°C/2h, 40°C/2h
RF input power	-18	-	16	dBm	-
RF input fire-resistant power	25	-	-	dBm	-
Gain of Input and output	-5	-	-	dB	-
Crosstalk	-	-	50	dB	-
Fixed delay T0	3.5	-	15	ns	-
Time delay	T0	-	10.23+T0	us	-
Time delay step	-	10	-	ns	-
Time delay accuracy	-	±0.5	-	ns	-
Fixed altitude H0	0.525	-	2.25	ns	-
Altitude range	H0	-	1534.5+H0	m	-
Altitude step	-	1.5	-	m	-
Altitude accuracy	-	0.075	-	m	-
Switch time	-	-	0.8	ms	-
Switch life	3*10 ⁸	-	-	Times	-
Working temperature	-10	-	45	°C	-
Storage temperature	-20	Switch	65	°C	-
Voltage	-	±12	-	V	-
Current	-	-	1.5	A	-
Control method	SPI				
Control interface	J30J-9ZKP				
Power supply interface	J30J-9ZKP				

● **NY059-2 Photoelectric parameters**

Parameter	Value			Unit	Remarks
	Min	Typ	Max		
Frequency	8	-	12	GHz	-
In-band amplitude flatness	-	-	±1.5	dB	In 1,000 MHz
RF input power	-18	-	16	dBm	-
RF input fire-resistant power	20	-	-	dBm	-
Gain of Input and output	-5	-	-	dB	-
Crosstalk	-	-	50	dB	-
Fixed delay T0	-	-	20	ns	-
Time delay	T0	-	4+T0	us	-
Time delay step	-	±1	-	ns	-
Time delay accuracy	-	1	-	ns	-
Fixed altitude H0	-	-	3	m	-
Altitude range	H0	-	600+H0	m	-
Altitude step	-	0.15	-	m	-
Altitude accuracy	-	0.15	-	m	-
Switch time	-	-	0.5	ms	-
working temperature	-10	-	45	°C	-
storage temperature	-20	-	65	°C	-
working voltage	-	±12	-	V	-
relative humidity	10	-	85	%	-
current	-	-	1.5	A	-
Output signal	No dispersion				
Control method	SPI				
Control interface	J30J-9 ZKP and CPCI connector				
Power supply interface	J30J-9 ZKP and CPCI connector				

● **Typical curves for NY059 series**

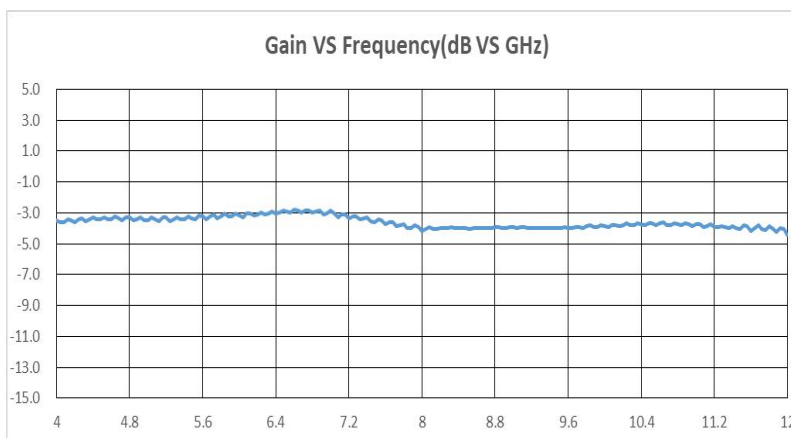


Figure 3. Insertion Loss of 059 series

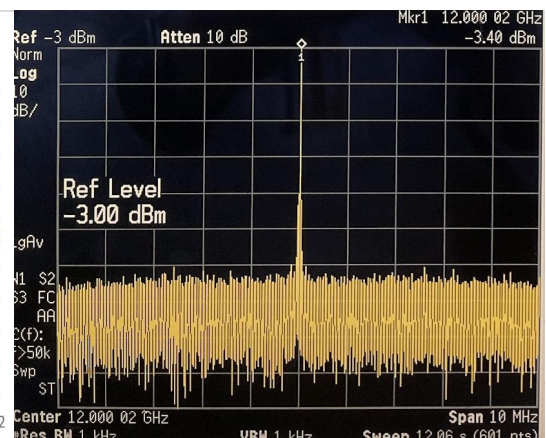


Figure 4. Typical Spectrum of NY059 series

Dimensions and interface

● **NY037 series**

➤ **NY 037-1 Dimensions and Interface**

unit: mm [inch]

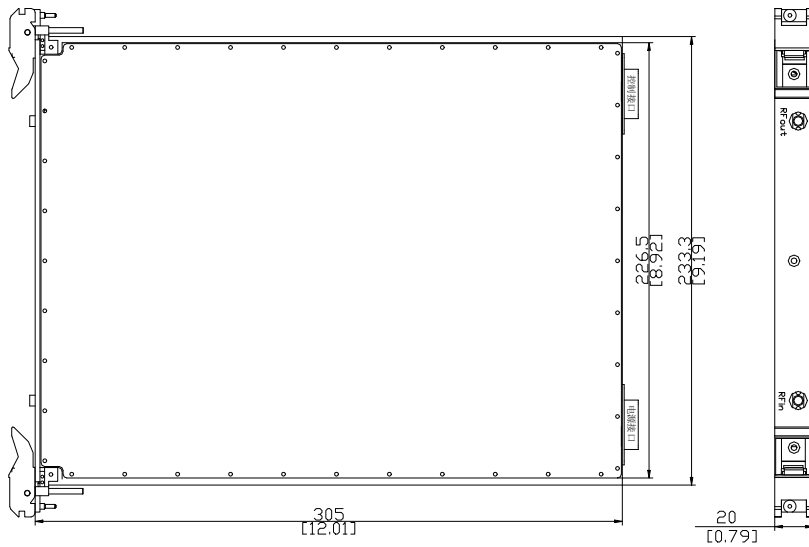
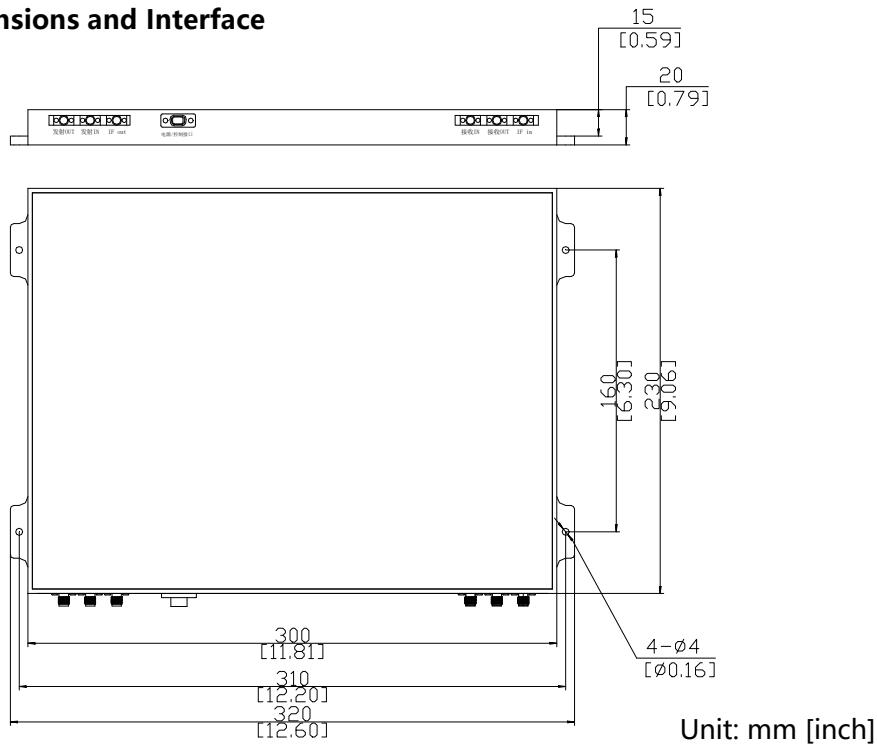


Figure 5. NY037-1 Dimensions

NY037-1 Interface Definition				
Interface	RF OUT	RF IN	Power interface	Control interface
Interface Type	SMA-K	SMA-K	DB15	DB15

➤ **NY037-2 Dimensions and Interface**



Unit: mm [inch]

Figure 6. NY037-2 Dimensions

Definitions of NY037-2 and NY037-3 interfaces							
Interface	Transmit Out	Transmit In	IF Out	Receive In	Receive Out	IF In	Power Interface
Interface Type	SMA-K	SMA-K	SMA-K	SMA-K	SMA-K	SMA-K	J30J-9ZKP

➤ NY 037-3 Dimensions and interface

Unit: mm [inch]

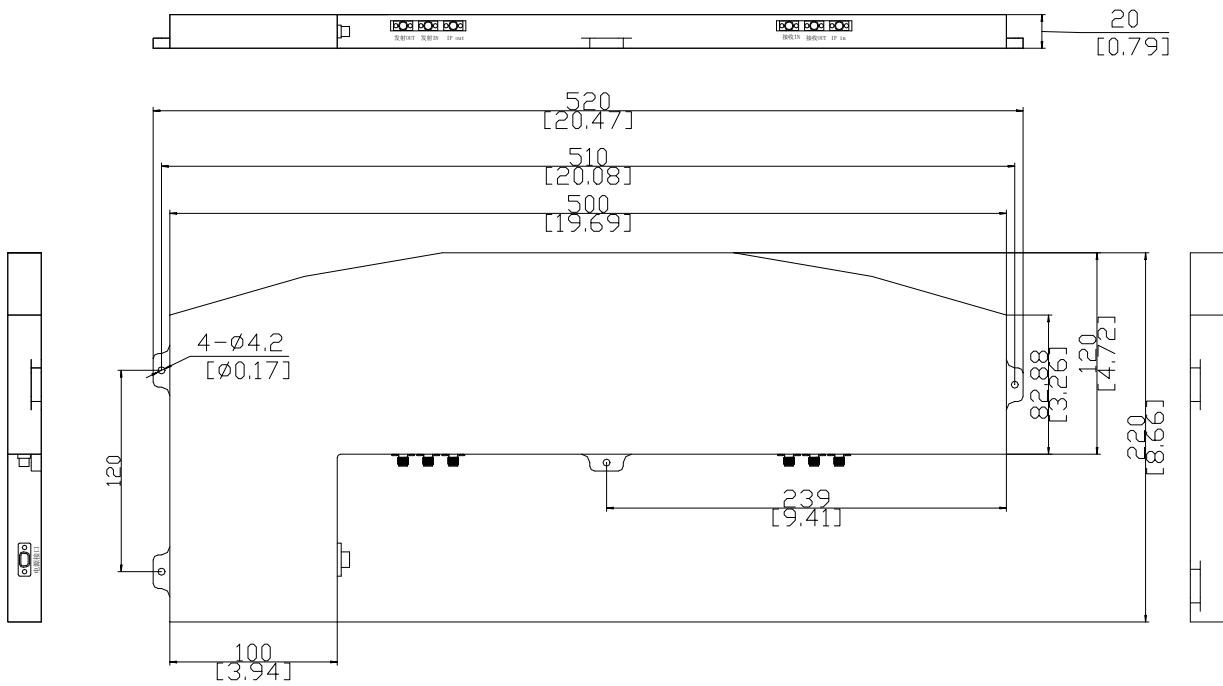


Figure 7. NY037-3 Dimensions

Definition of NY037 Series power supply and control interface			
Pin number	Definition	Pin number	Definition
1	+5VDC	5	RS-485 B
2	-5VDC	6	Signal ground
3	GND	7	Power to
4	RS-485 A	8、9	+5VDC
Connector-socket type		J30J-9ZKP	
Connector-plug type		J30J-9TJL	

● NY059 series Dimensions and interface

Unit: mm [inch]

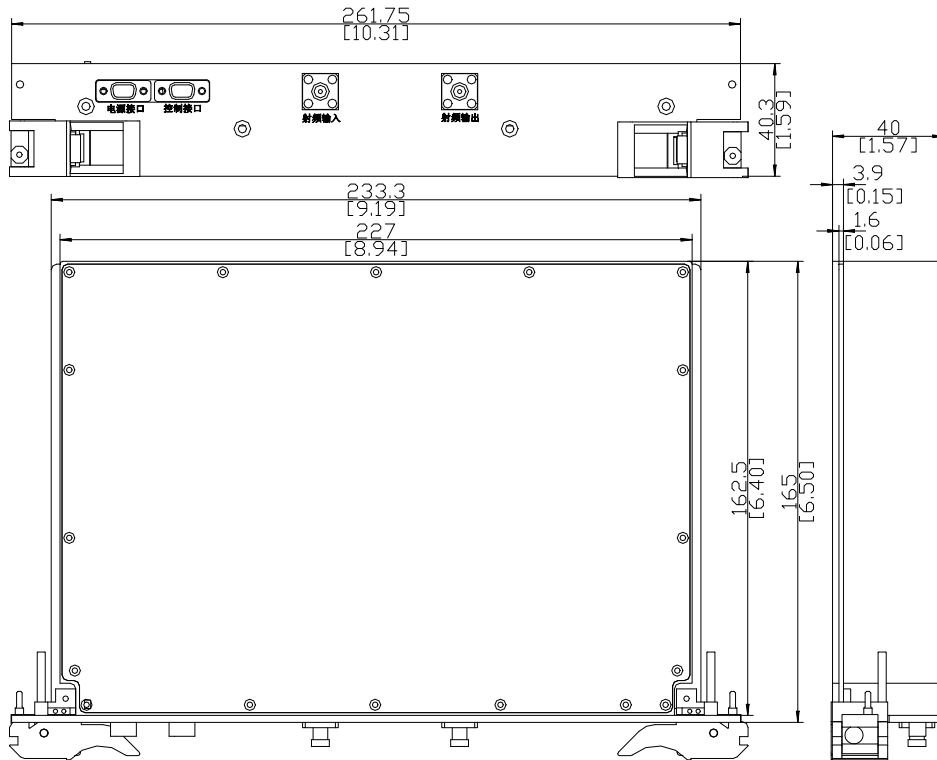


Figure 8. NY059 Series Dimension

Definition of NY059 series power supply and control interface

Power interface		SPI control interface	
Pin number	Definition	Pin number	Definition
1~4	+12VDC	1	SCLK
5	NC	2	Din (SDI)
6~9	GND	3	LE (CS)
-	-	4	GND
-	-	5~9	NC
Connector-socket type	J30J 9ZKP	Connector-socket type	J30J-9ZKP
Connector-plug type	J30J-9TJL	Connector-plug type	J30J-9TJL

- This series of products is customized, and the product information in this article is for reference only.