

俊科<sup>®</sup> SHX

SHX-NG-VAM-1X32-2.3-3.8

1 进 32 出幅相一体系统



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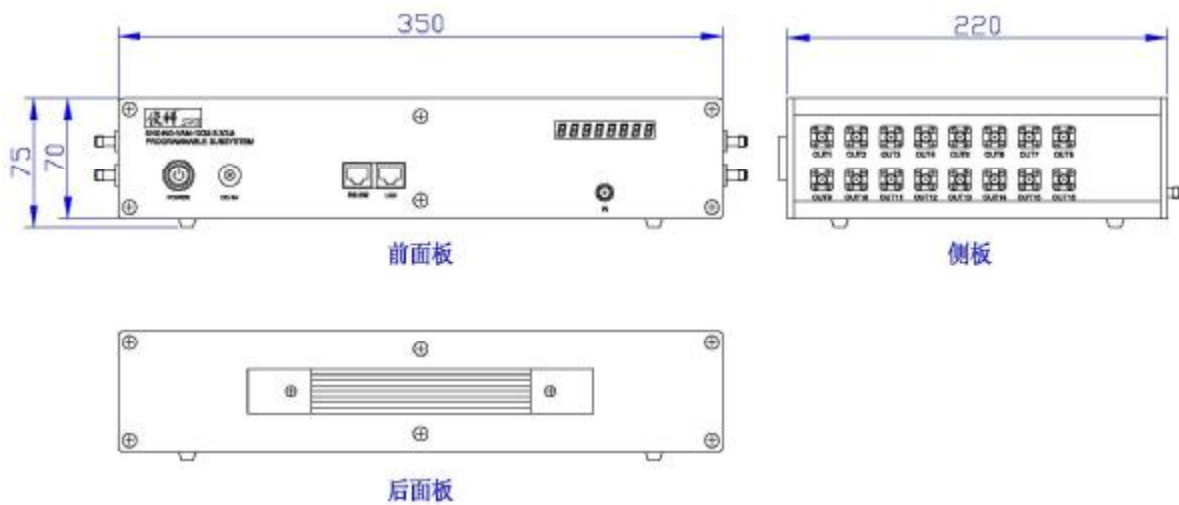
## 一、 产品概述:

1 进 32 出幅相一体系统由多个可编程移相器、衰减器和一个 32 端口功分器组成的一个一端口输入，三十二端口输出测试平台，频率范围 2.3-3.8GHz。

基于 Windows 操作系统的应用程序进行操作，通过网口（接口形式 RJ45）控制，其网络通讯按 TCP/IP 通讯协议。

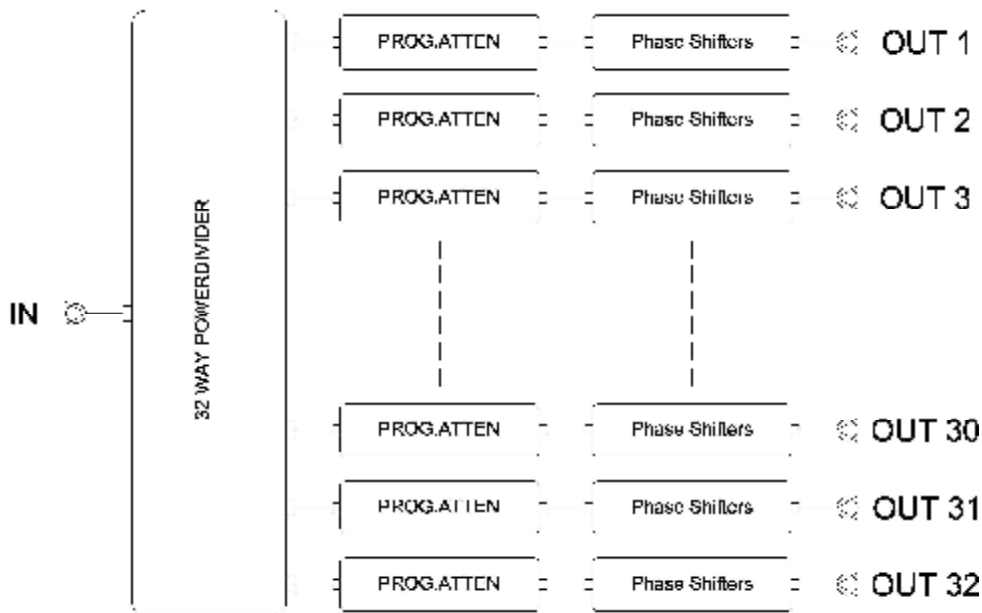
系统连接校准套件配以上位机控制软件，可实现 32 个通道的自动校准，使得所有通道的相位幅度一致性达到设计指标要求。

## 二、 外形尺寸图:



单位: mm

## 三、 工作原理图



## 四、性能技术指标

#	Name	Description
1	工作频率 Frequency Range(MHz)	2300-3800MHz
2	驻波比 Input VSWR	<1.5
3	特性阻抗 Impedance	50 Ω
4	输入最大功率 Max Power	37dBm
5	输出通路 Output	32 SMA-Female
6	输入通路 Input	1 SMA-Female
7	相位范围 Phase Shift Range(° )	360
8	相位步进 Phase Shift step(° )	1
9	移相精度 Phase Shift Accuracy(° )	±1.5
10	衰减范围 Attenuation Shift Range(dB)	0-63
11	衰减步进 Attenuation Shift step(dB)	0.25
12	衰减精度 Attenuation Shift Accuracy(dB)	±0.25dB@0-30dB ±0.5dB@30-50dB ±1dB@50-63dB
13	响应时间 Time	5ms
14	插损 Insertion Loss(dB)	<30dB
15	初始端口间相位精度	<1°
16	初始端口间衰减精度	<0.5dB
17	工作温度	-25 至 45 °C
18	工作湿度	10% 至 90% RH
19	重量	<5 kg
20	尺寸	350mm*220mm*70mm
21	供电	DC 24V
22	接头位置	侧端面
23	隐蔽式搬运把手	侧面

注：移相精度为点频精度，按客户提供频点进行校准，可设置多个校准频点！

## 五、通讯协议

<CR> = carriage return

<LF> = line feed

Command must be terminated by carriage return and line feed.

### 1、Identification

This command echoes back information and help information about the test system.

Syntax: HX<CR><LF>

Example: HX<CR><LF>

System will return: >>HuaXiang co.,ltd Firmware Rev A!

>>\*IDN?:Get Model Information  
 >>SP:Set Phase Shifter value!  
 >>RP:Get Phase Shifter value!  
 >>SA:Set attenuator value!  
 >>RA:Get attenuator value!  
 >>Enter "HX" and command without space to get more details!

Notes: Command is not case sensitive.

## 2、Set Attenuator

The set attenuator command is used to set the attenuation level of a specific attenuator.

Syntax: SA x y;<CR><LF>

x = attenuator number

y = attenuation level

Example:

SA 11 20;<CR><LF>	Sets attenuation of attenuator #11 to 20dB.
System will return:	>>A11:20;<CR><LF>
SA 1 10;SA 3 30;<CR><LF>	Sets attenuation of attenuator #1 to 10dB,#3 to 10dB.
System will return:	>>A1:10;A3:30;<CR><LF>
SA 1-4 20;<CR><LF>	Sets attenuation of attenuator from #1 to #4 to 20dB.
System will return:	>>A1:20;A2:20;A3:20;A4:20; <CR><LF>

## 3、Read Attenuator

The read attenuator command returns the attenuation setting for a specific attenuator.

Syntax: RA x;<CR><LF>

x = attenuator number

Example:

RA 11;<CR> <LF>	Reads attenuator #11 setting.
System will return	>>A11:20;<CR><LF>
RA 1;RA 3;<CR><LF>	Reads attenuation of attenuator #1,#3 setting.
System will return	>>A1:10;A3:30;<CR><LF>
RA 1-6;<CR><LF>	Reads attenuator from #1 to # 6 setting.
System will return	>>A1:10;A2:20;A3:10;A4:20; <CR><LF>

## 4、Set Phase Shifter

The set phase shifter command is used to set phase degree of a specific phase shifter.

Syntax: SP x y;<CR><LF>

x= phase shifter number

y= phase value (degree)

Example:

SP 1 2;<CR><LF>	Set phase degree of phase shifter #1 to 2degree.
System will return:	>>P1:2;<CR><LF>
SP 1 2;SP 3 4;<CR><LF>	Set phase degree of phase shifter #1 to 2degree,#3 to 4degree.
System will return:	>>P1:2;P3:4<CR><LF>
SP 1-6 5;<CR><LF>	Set phase degree of phase shifter from #1 to #6 5degree.
System will return:	>>P1:5;P2:5;P3:5;P4:5;P5:5;P6:5;<CR><LF>

## 5、 Read Phase Shifter

The read phase shifter command returns the phase degree setting for a specific phase shifter. Syntax: RP

x;<CR><LF>

x= phase shifter number

Example:

RP 1;<CR><LF>

Read phase value of phase shifter #1 setting.

System will return:

>>P1:1;<CR><LF>

RP 1;RP 3;<CR><LF>

Read phase shifter #1 ,#3 setting.

System will return:

>>P1:1;P3:4<CR><LF>

RP 1-6;<CR><LF>

Read phase shifter from #1 to #6 setting.

System will return:

>>P1:5;P2:5;P3:5;P4:5;P5:5;P6:5;<CR><LF>

## 6、 Set Attenuator And Phase shifter

The set attenuator and phase shifter command is used to set the attenuation level and the phase degree of a specific channel.

Syntax: SAP x y z;<CR><LF>

x = channel number (one channel include one attenuator and one phase shifter)

y = attenuation level

Z = phase value (degree)

Example:

SAP 1 20 3;<CR><LF>

Sets attenuation of attenuator #1 to 20dB,sets phase shifter #1 to 3°

System will return:

>>AP1:20 3;<CR><LF>

SAP 1 20 3;2 30 4;3 40 5<CR><LF>

Sets attenuation of attenuator #1 to 20dB,sets phase shifter #1 to 3°

Sets attenuation of attenuator #2 to 30dB,sets phase shifter #2 to 4°

Sets attenuation of attenuator #3 to 40dB,sets phase shifter #3 to 5°

System will return:

>> AP1:20 3;2:30 4;3:40 5;<CR><LF>

SAP 1-3 20 3;<CR><LF>

Sets attenuation of attenuator from #1 to #3 to 20dB,sets phase shifter #1

to #3 to 3°

System will return:

>> AP1:20 3;2:20 3;3:20 3;<CR><LF>

## 7、 Read Attenuator And Phase shifter

The read attenuator and phase shifter command is used to read the attenuation level and the phase shifter of a specific channel.

Syntax: RAP x;<CR><LF>

x = channel number (one channel include one attenuator and one phase shifter)

Example:

RAP 1;<CR><LF>

read attenuation of attenuator #1, phase shifter #1

System will return:

>>AP1:20 3;<CR><LF>

RAP 1;2;3;<CR><LF>

read attenuation of attenuator #1, phase shifter #1

read attenuation of attenuator #2, phase shifter #2

read attenuation of attenuator #3, phase shifter #3

System will return:

>> AP1:20 3;2:30 4;3:40 5;<CR><LF>

RAP 1-3;<CR><LF>

read attenuation of attenuator from #1 to #3, phase shifter

#1 to #3

System will return: >> AP1:20 3;2:30 4;3:40 5;<CR><LF>

### 8、Set Freq

Syntax: SFreq 0 x<CR><LF>

x = value of freq (Mhz)

Example:

SFreq 0 1600<CR><LF> set current working frequency 1.6Ghz

System will return: >> Freq0:1600;<CR><LF>

### 9、Read Freq

Syntax: RFreq<CR><LF>

Example:

RFreq<CR><LF> Read frequency point

System will return: >> Freq0:1600;1:1600;2:2300;<CR><LF>

current working frequency **1.6Ghz**,

The current frequency point in the data table is 1.6Ghz

The second frequency point in the data table is 2.3Ghz

>> Freq0; did not set any frequency

### 10、Set WORK MODE

Syntax: SMODE x<CR><LF>

x = 0,1 or 2 0:Normal 1:Download

Example:

SMODE 1<CR><LF> Download Mode, to prepare to download data form

System will return: >>SMODE:1;<CR><LF>

**Note: After the data download is completed, a command(SMODE 0<CR><LF>) must be issued to device to change to the normal working mode.**

### 11、Download datasheet of script

**Note: This command is sent in download mode**

**This command sends the phase value after sending the attenuation value.**

**Return to normal working mode after the command is sent.**

Syntax: SSCRIPTDATE n t x ch1 y1;ch2 y2;.....;chn yn<CR><LF>

n = index number in the file

t = delay time(ms)

x = type A: attenuation P: phase value

ch1~chn = channel number

y 1~yn = attenuation value or phase value

Example:

SSCRIPTDATE 1 10 A 1 10;2 20.....<CR><LF>

System will return:>> SSCRIPTDATE1:OK;<CR><LF>

### 12、Set Auto-Run

Syntax: SAutoRun x y<CR><LF>

x = 0 / 1 / 2 / 3      0 Stop script loop   1 Start script loop 2 pause   3 continue  
 y = Number of cycles or reservations      0 an infinite loop

Example:

SAutoRun 1 200<CR><LF>

System will return:      >> SAutoRun1:OK;<CR><LF>  
                                  >> SAutoRun1:error;<CR><LF>    Return error in abnormal  
                                  working mode  
                                  >> SAutoRun1:NO DATA;<CR><LF> Return NO DATE if there  
                                  is no data

### 13、 Read Auto-Run

Syntax: RAutoRun<CR><LF>

Query script running status

Example:

RAutoRun<CR><LF>

System will return:      >> RAutoRun:100-6;<CR><LF>  
                                  **Note:** 100 = the number of executions  
                                             6 = the index of the file  
                                  the index 6 of the 100th has just finished execution

### 14、 Network Setting

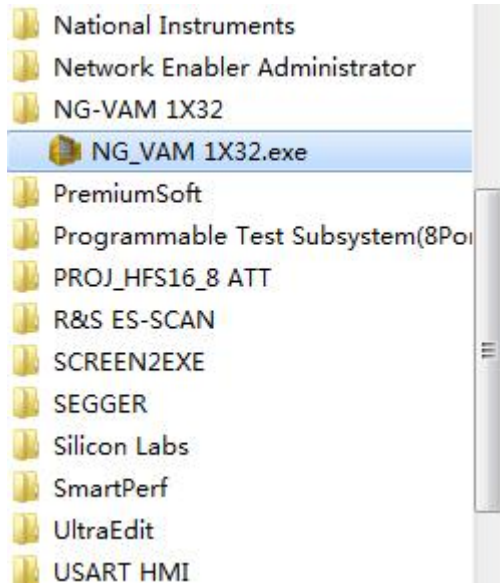
Network setting can be changed by direct access through internet explorer.



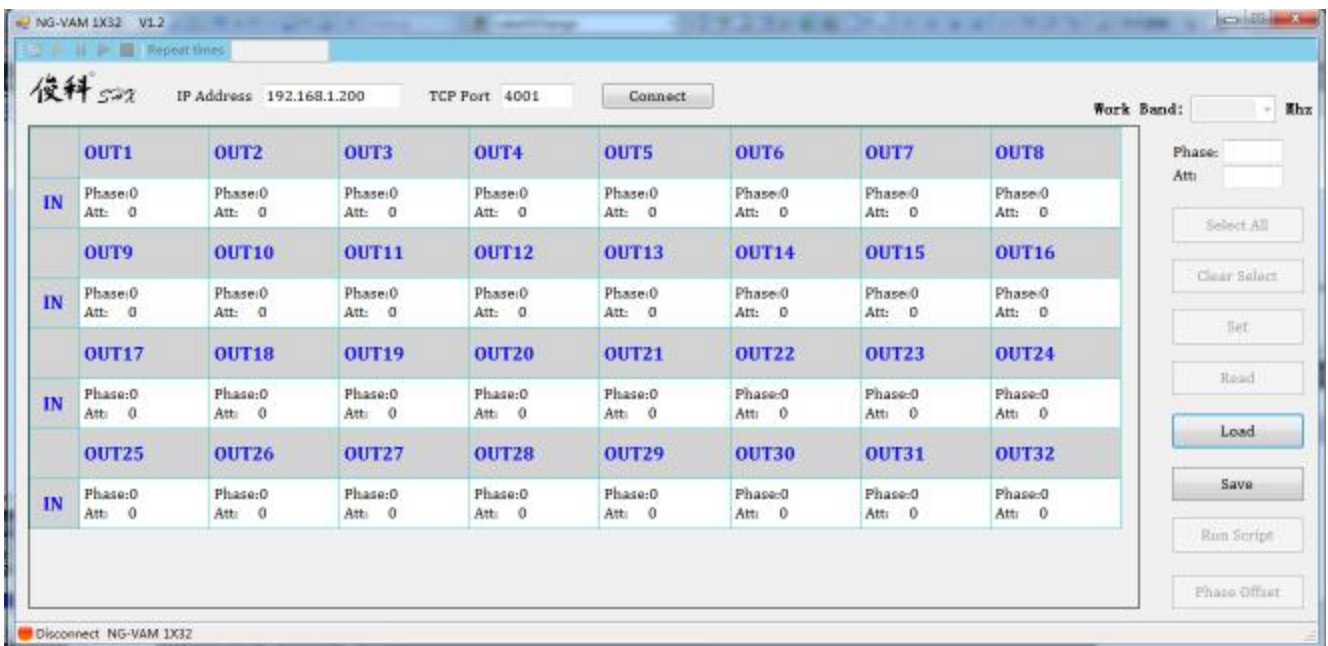


## 六、 软件使用说明

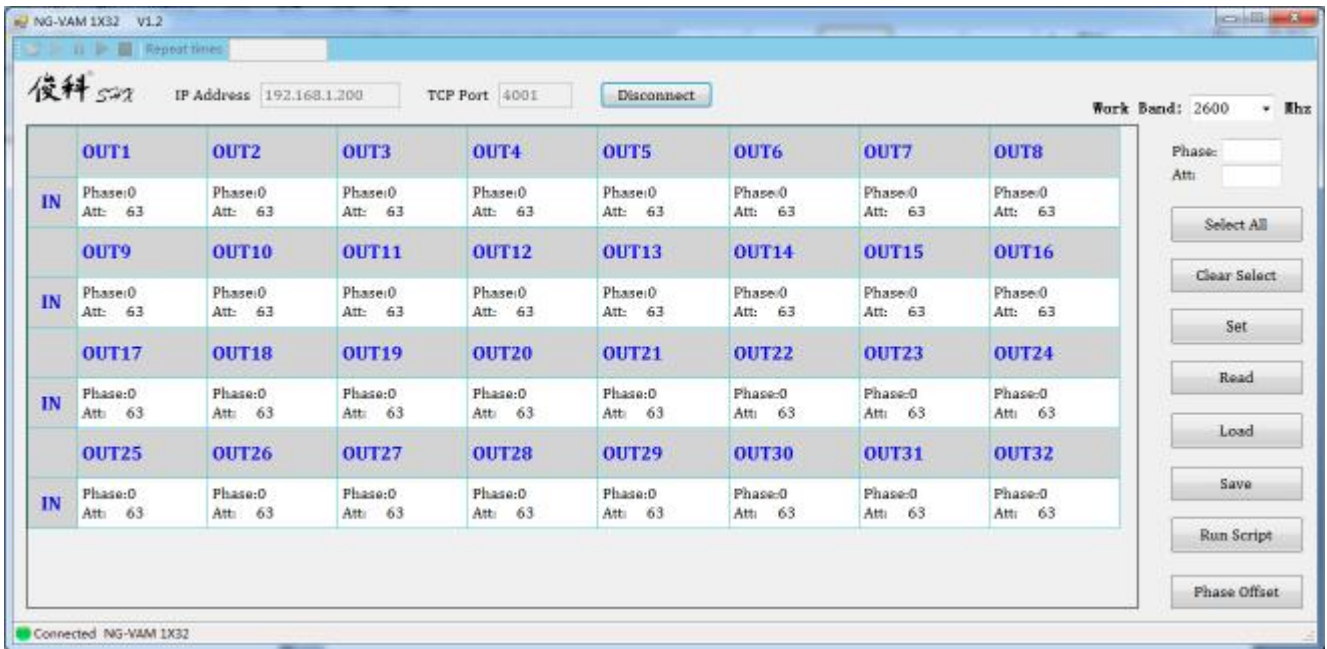
### 1、 运行软件



### 2、 连接设备

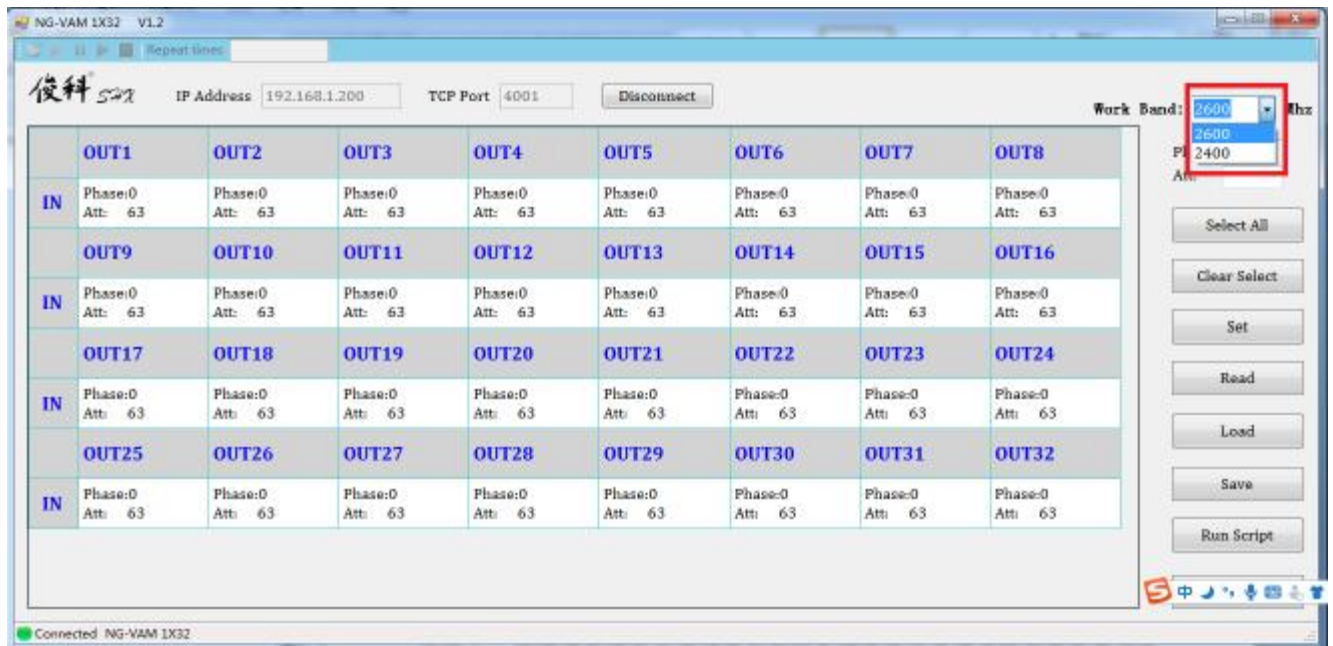


在 IP Address 和 TCP Port 里填写好设备的 IP 地址和端口号，按 Connect 键连接设备，设备连接上后左下角红色会变成绿色，并显示当前设备的移相和衰减值。



### 3、工作频段的设置

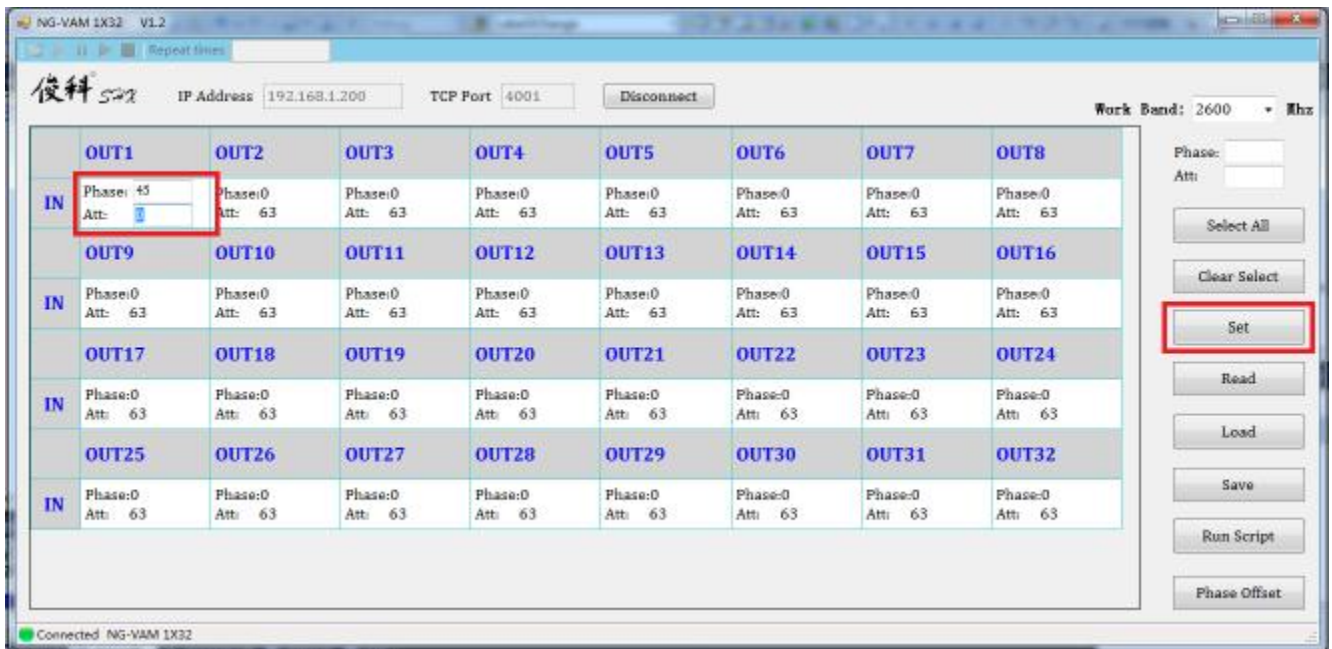
在工作频段的下拉框里选择目前的工作频段。



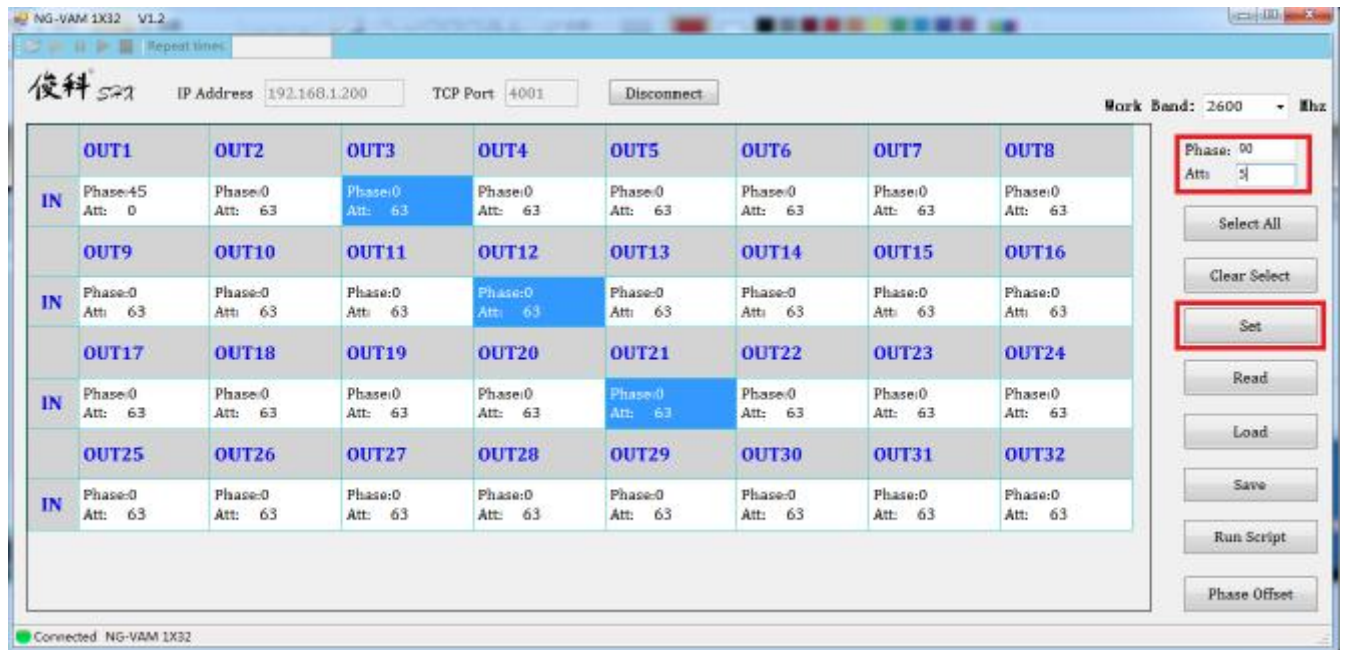
### 4、NG-VAM 的控制

#### (1) 移相值和衰减值的设置

a) 通过单选单元格编辑移相值和衰减值实现单通道移相值和衰减值的修改。然后按 Set 按钮或在修改完衰减值后按回车键就能对单通道移相值和衰减值进行设置。



b) 通过多选需要设置的通道对应的单元格，在界面右上角的编辑框里修改移相和衰减值，然后按 Set 按钮或修改完衰减值按回车键

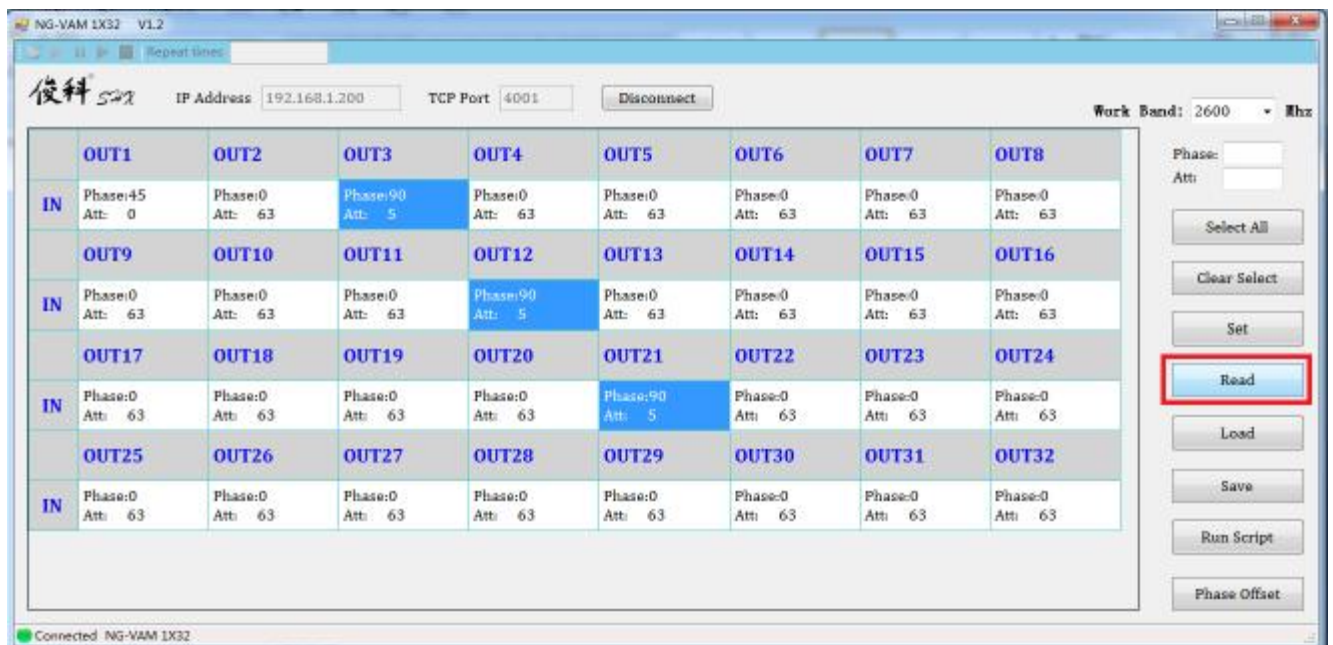




c) 结合 a), b) 的两个方法, 先修改单通道的移相和衰减值, 然后多选需要修改的通道, 然后按 Set 按钮进行设置。

## (2) 移相值和衰减值的读取

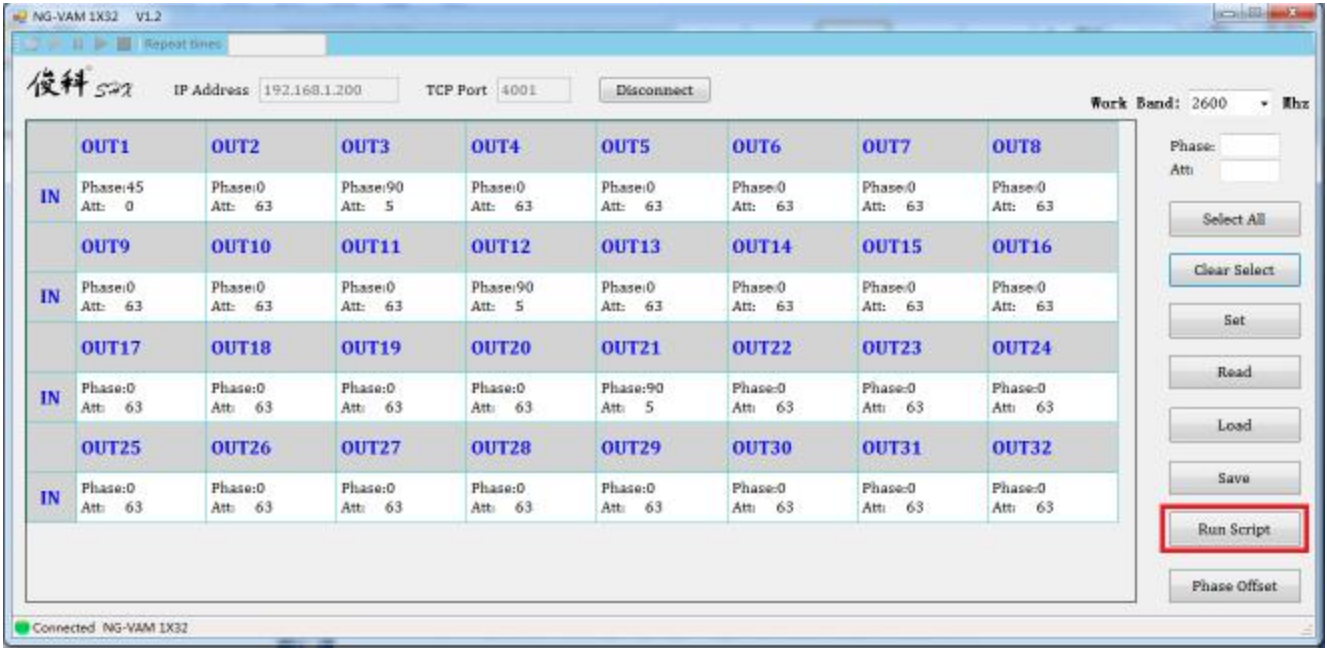
选择需要读取的通道对应的单元格, 然后按 Read 按钮, 就会读取被选择通道的移相和衰减值。



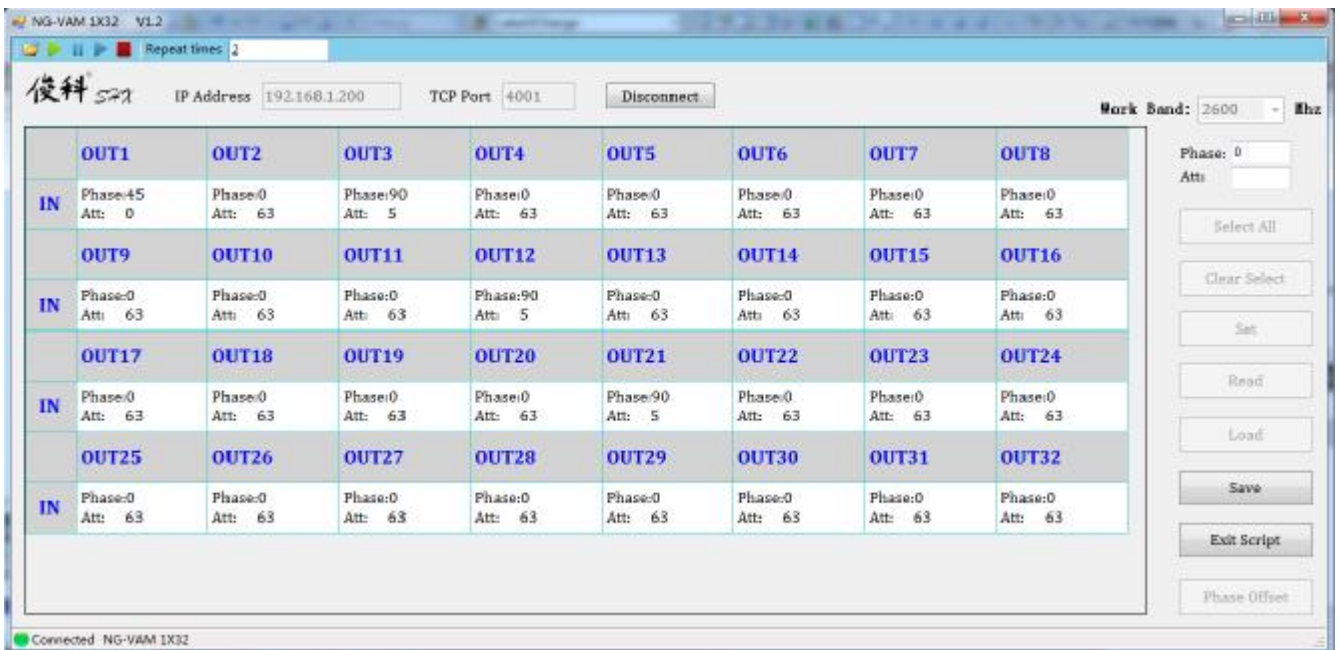
## (3) 界面的其他一些控制按钮的功能。

- Select All 按钮: 选中所有通道对应的单元格。
- Clear Select 按钮, 清除被选中通道对应的单元格。
- Load 按钮, 重新装载被保存的所有通道的移相和衰减值, 并进行设置。
- Save 按钮, 保存当前界面的所有通道的移相和衰减值。

5、自动化脚本运行



(1) 按 Run Script 按钮，选择要运行的自动化脚本；



(2) 自动化脚本运行工具条上按钮的功能



1. Open: 选择要运行的自动化脚本
2. Start: 开始运行自动化脚本
3. Pause: 暂停正在运行的自动化脚本

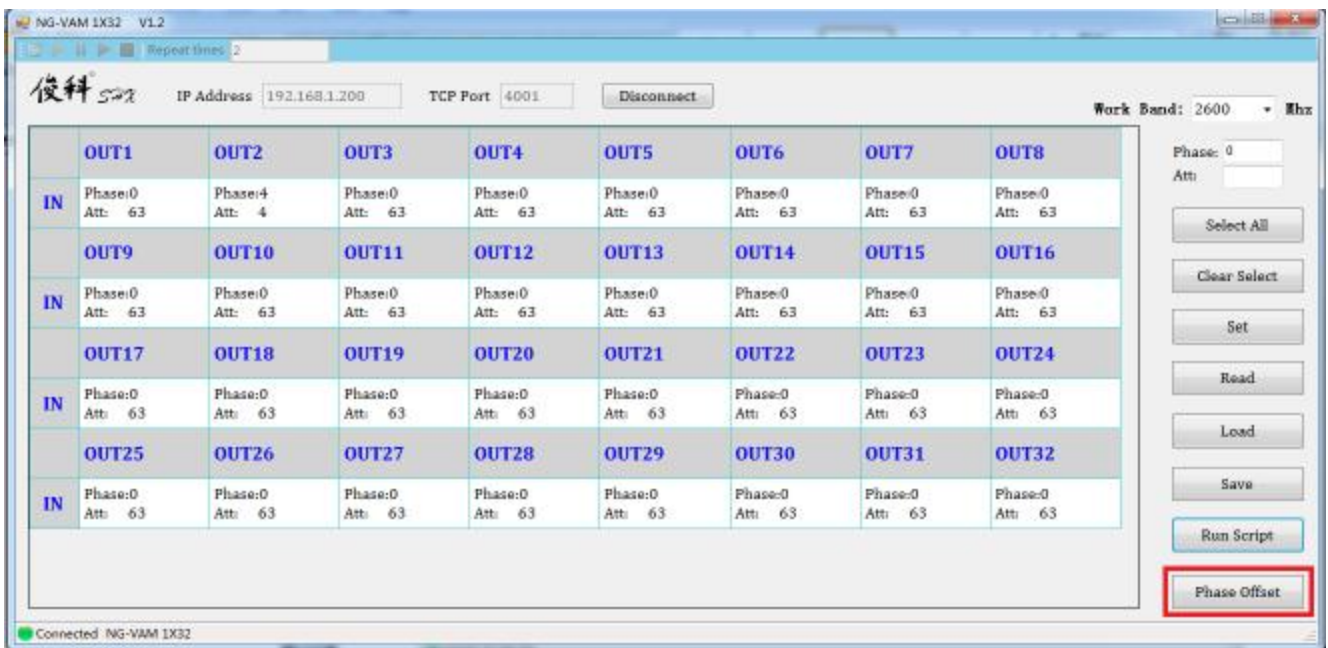
- 4. Continue: 继续被暂停的自动化脚本
- 5. Stop: 停止正在运行的自动化脚本
- 6. Repeat times: 自动化脚本要运行的次数。如果不填或填写是 0，将被认为自动化脚本将无限循环运行。

(3) 按 Exit Script 按钮将退出自动化脚本运行状态。

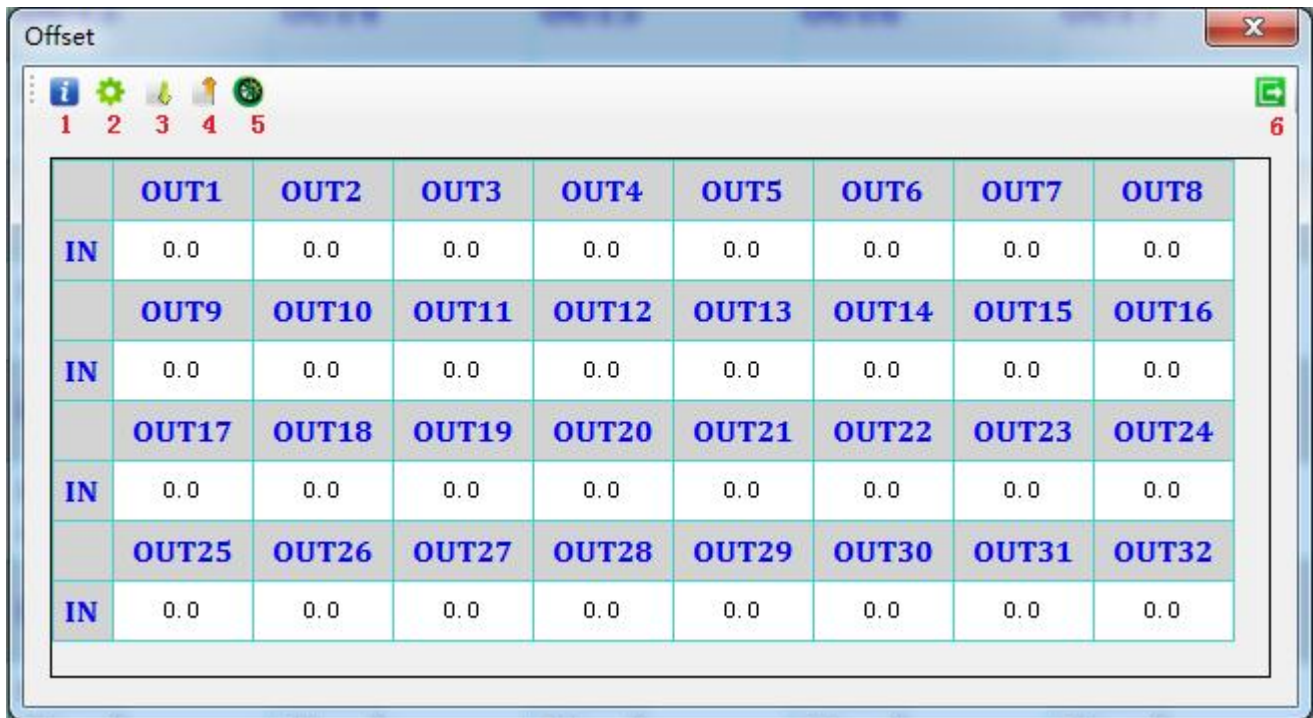
窗口最下面的状态条会显示目前工作状态。

### 6、相位偏移值设置

相位偏移值的设置是为了使设备连接电缆线后依旧能保持到电缆线端口的相位一致。



按 Phase Offset 按钮，会弹出如下窗口：



The screenshot shows a software window titled "Offset" with a toolbar containing six numbered icons (1-6). Below the toolbar is a table with 32 columns and 4 rows of data. The columns are labeled OUT1 through OUT32, and the rows are labeled IN. All values in the table are 0.0.

	OUT1	OUT2	OUT3	OUT4	OUT5	OUT6	OUT7	OUT8
IN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	OUT9	OUT10	OUT11	OUT12	OUT13	OUT14	OUT15	OUT16
IN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	OUT17	OUT18	OUT19	OUT20	OUT21	OUT22	OUT23	OUT24
IN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	OUT25	OUT26	OUT27	OUT28	OUT29	OUT30	OUT31	OUT32
IN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

1. Get Offset: 获取目前设备上的偏移值
2. Set Offset: 把目前界面上的偏移值设置到设备
3. Load Offset: 把文件中的偏移值设置到设备
4. Save Offset: 保存目前的偏移值到文件
5. Reset Offset: 重置目前的偏移值到 0, 恢复设备端口移相值一致状态
6. Exit: 退出偏移值设置界面