

Power Relay Board PRL-9500G Operator's Guide



Preface

The Power Relay Board PRL-9500G is an option integrated into the Takaya Fixtureless tester *APT-9411 Series* and the sister models to extend its capabilities.

Please read this manual thoroughly before using this option. Then keep this manual handy for answers to any questions you may have.

If you have any questions or thoughts you would like to share with us – we would like to hear from you.

(NOTE)

- The design of the product and software are under constant review and while every effort is made to keep this manual up to date, we reserve the rights to change specifications and equipment at any time without prior notice.
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Introduction

Safety symbols

Symbol	Explanation					
WARNING	Calls attention to a procedure, practice, or condition that could possibly cause serious accident or death.					
DANGER	Calls attention to a procedure, practice, or condition that could possibly cause bodily injury or damage to the product.					
CAUTION	Calls attention to a procedure, practice, or condition that could possibly damage to the product.					
	Calls attention to general instruction. Failing to follow this could loss of data stored on disks causes possibly misjudge the unit under test, or damage to the product.					
	Calls attention to "One-point advice" which should be useful when you are at a loss to operate the products.					

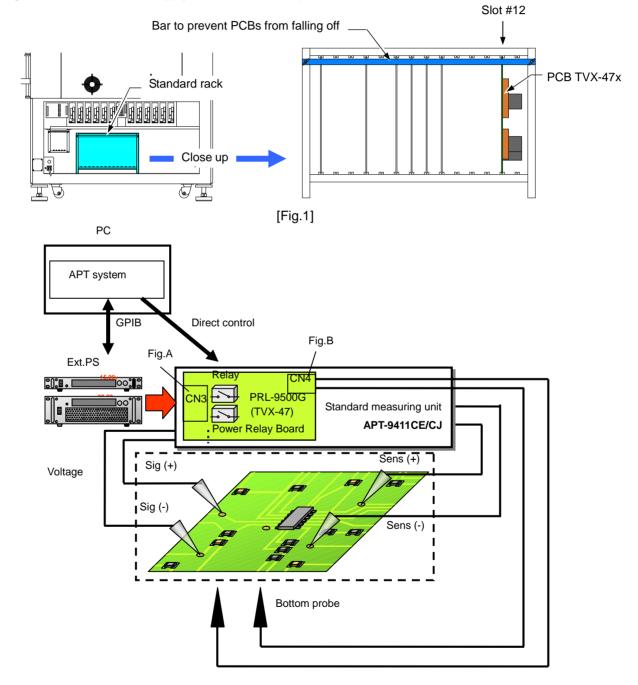
Power Relay Board

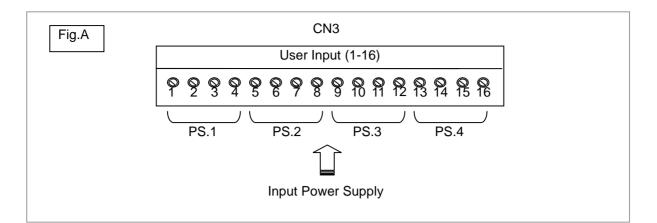
By integrating the Power Relay Board PRL-9500G (hereinafter called "PRL-9500G") into the APT-9411 Series and the sister models, the user can power up PC boards by multiple external power supplies prepared by them through Bottom probes (max. 12) or some connectors or flying probes. They can build-up the test program so that those external power supplies necessary for testing the PC boards is turned On/Off optionally.

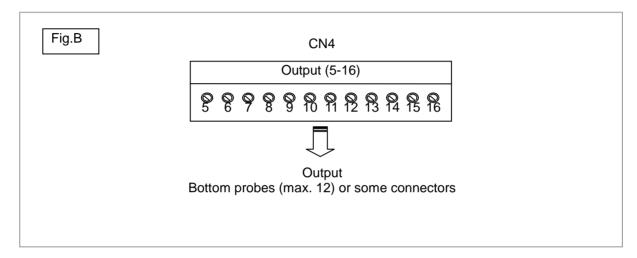
System Configuration

Hardware

Normally, the PCB TVX-47, as the major component of the PRL-9500G, is installed in the slot #12 of the standard rack in the tester. The PCB TVX-47 should be in the slot #10 only when the tester uses the Programmable DC Power Supply Board (PDC-9500) at the same time.

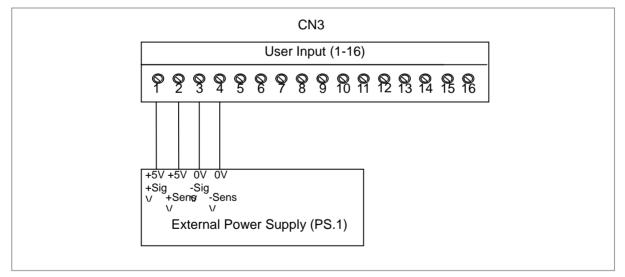






Example of connecting external power supplies

As shown in Fig.A, the user should connect the external power supplies in the order of PS.1 ~ PS.4.



Software

The APT-9411CE/CJ system software supports the PRL-9500G as standard. Prior to use the PRL-9500G, please configure the APT system properly. (Refer to "Option mode setup" in Page 6).

Specifications

Inport	16 terminals		
Quita art	16 terminals	Outport 1~4	The external power supplies are output to Bottom probes 1,2 and the flying probes. (Refer to Aux.1)
Outport	(Outport1~16)	Outport 5~16	The external power supplies are output to the connector (HS-644-02A) installed on the Tray. (Refer to Aux.2)

(Aux.1) The user cannot output more than two external power supplies for the bottom probe 1,2 at the same time. In addition, it is not possible to select the same external power supplies connected to Outport1~4 for the flying probes and the bottom probes.

(Aux.2) The wiring from the connector (HS-644-02A) installed on the Tray to the UUT should be prepared by the user.

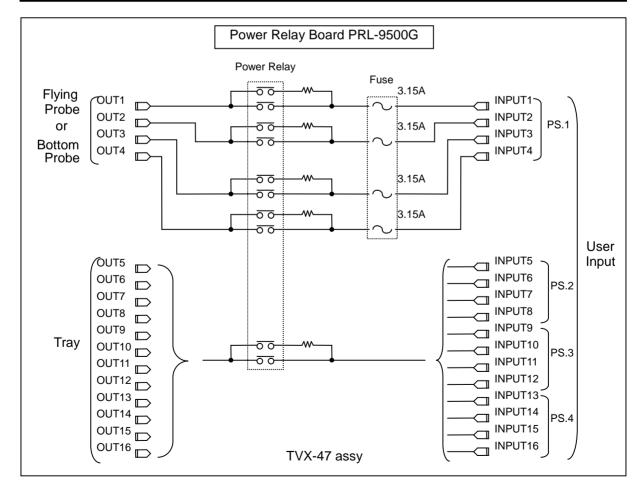
Max. rating / circuit

Max. voltage Inport1~16		DC100V / AC100Vrms
	Inport1~ 4	Max. 3A (in the case of using the flying probes), with NFB(3.15A)
Max. current	Inport5~16	Max. 3A (in the case of using a wire "AWG16") Max. 10A (in the case of using a wire "AWG12")



Max. current differs according to the line thickness between the PRL-9500G and the external power supplies and also the UUT.

So we invite you to give due consideration to the line thickness listed in above.

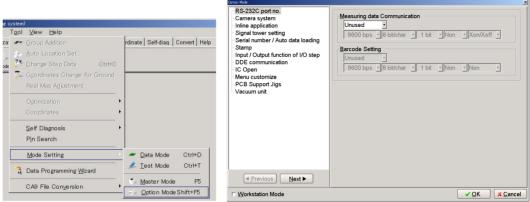


Option mode setup

When the PRL-9500G is used for the first time, Option mode requires initial setup by the user. This setting will be saved in Master.mdt file in the system directory.

Setup procedure

1. Choose [Tool] > [Mode Setting] > [Option mode] to open Option mode screen.



[Fig.2] Option mode

2. Click on Input / Output function of I/O step and select the box "Input / Output Function of I/O step".

ption Mode		×
visio kos RS-232C port no. Camera system Inline application Signal tower setting Serial number / Auto data loading Stamp Input / Output function of I/O step DDE communication IC Open Menu customize PCB Support Jigs	F Jump I/O steps when OP step judged SHORT F Jump I/O steps following this group P Specify output step number for jumped I/O step(s) 1	1255[step(s)]
	P Use I/O-9500 option (TVX-07 board) Standard Scanner Power Relay Board User Definition Terminal 1 Unregistered Terminal 3 Unregistered Terminal 5 Unregistered	Power supply
□ Workstation Mode		

[Fig.3] Input / Output function of I/O step

3. At this moment, the box "Jump all I/O steps following a failed step" is already selected as default. Be sure to hold this setting because it is preferred for the most users to jump (skip) the I/O steps when some failure was detected in the previous test. In addition, the following parameters affect the treatment of I/O steps following the failed step, so the user must configure them carefully;

Failed step number to jump I/O step

The I/O steps are not jumped (skipped) until the failed steps reach the specified numbers. But remember this box is specified by "1" as default. If this setting remains unchanged, the I/O steps are jumped (skipped) even if one failure was detected in the previous test.

□ Jump I/O steps when OP step judged SHORT

When the Failed step numbers to jump I/O step is specified by other than 1 (let's suppose "10"), the I/O steps are not jumped (skipped) until the failed steps reach the specified numbers. However, if the box "Jump I/O steps when OP step judged SHORT" is selected, the I/O steps are jumped (skipped) if any OP step (Function is substituted by OP) is judged fail even when the failed steps have not reached the specified numbers yet.

Jump I/O steps following this group

If the box is selected, the I/O steps to be jumped (skipped) are applied to other groups, not only the group where the failure was detected.

Use I/O-9500 option (TVX-07 board)

Fill only when IO/O and IO/I command is used. But in this case, the Takaya I/O board (TVX-07) is always necessary.

4. If the TVX-47 PCB was automatically recognized by the software during the tester's start-up process, "Power Relay Board" menu is displayed at the right of the Standard Scanner menu. (Refer to Fig.4) If the Power Relay Board menu is selected, the user can register signal name etc in each Outport number (1~16) within max 16 alphameric characters.

	User Definition	<u> </u>
Outport 1 (PS1)	Unregistered	
Outport 2 (PS1)	Unregistered	
Outport 3 (PS1)	Unregistered	
Outport 4 (PS1)	Unregistered	
Outport 5 (PS2)	Unregistered	-

[Fig.4] Power Relay Board

Use power supply

Fill only when the GPIB controllable external power supply is used. In this case, the IO/G command will be utilizable.

If the box is selected and the Power supply button at the right is pressed, it displays Fig.5 below.

Power supply								×
PS1	PS2	PS3	PS4	PS-AL	ıx.			
⊤ <u>U</u> se				11074				
						ок	<mark>≭</mark> <u>C</u> ancel	

[Fig.5] Use power supply

Select appropriate external power supply ("PS-1" to "PS-4" and "PS-Aux") which is connected to the PRL-9500G and select the box "Use power supply" on the display. (Max. 5 external power supplies are controllable by the GPIB) Then the display shows Fig.6 below.

Power supply					
PS1 PS2 PS3 PS4 PS-Aux.					
✓ Use power supply					
GPIB address : 0 ÷ 030					
Manufacturer : Agilent					
Power Supply :					
Click "Connection check" button if you want Connection check button if you want to verify that the power supply is connected with GPIB. = CAUTION = Be sure to turn on the power supply.					
<mark>✓ <u>O</u>K </mark>					

[Fig.6] Use power relay

GPIB address

Specify the GPIB address of the external power supply to use. (Refer to the manual for the external power supply)

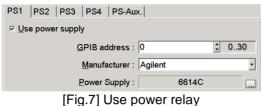
Manufacturer

The utilizable GPIB controllable external power supply is Agilent models only.

Power Supply

Click the right button to specify the GPIB controllable external power supply automatically.

Fig.7 shows an example of configuration.



Use secondary address

Fill the box only when more than one external power supply shares the GPIB address. In this case, you can specify the secondary address for them.

☑ Use secondary address	96	€ 96126
[Fig.	8]	

Connection check button

Pressing the button can make sure the connection with the external power supplies. If they are connected correctly are controllable by the GPIB, it displays Fig.7 below.

heck power supply	X
The power supply is now connected and contro	llable with GPIB.
UK	

[Fig.9]

5. After the respective setting was complete, click the OK button to get back to the main menu.

(NOTE 1)

When the external power supply is equipped with 2 output ports, it's possible to output voltages separately.

(Example of setting)

Conform the settings for PS1 to PS2 just like below.

PS1 PS2 PS3 PS4 PS-Aux.	PS1 PS2 PS3 PS4 PS-Aux.
<u>G</u> PIB address : 21	GPIB address : 21 ♀ 030
Manufacturer : Agilent	Manufacturer : Agilent
Power Supply : E3649A	Power Supply : E3649A
Range : 35V/1.4A 60V/0.8A	Range : 35V/1.4A 60V/0.8A
□ Use <u>s</u> econdary address	□ Use <u>s</u> econdary address
Example of setting PS1	Example of setting PS2

[Fig.10]

(NOTE 2)

The Agilent 66101A, 66102A, 66103A, 66104A and 66105A are modular type of external power supply. In fact, it's possible to use 8 modular power supplies on the main frame (66000A). Thus the user should configure modular by modular while specifying the secondary address as well.

(Example of setting)

Set the modular power supplies which are installed in Slot#1,2 to PS1, PS2.

PS1 PS2 PS3 PS4 PS-Aux.	PS1 PS2 PS3 PS4 PS-Aux.
✓ Use power supply	
<u>G</u> PIB address : 5 ♀ ♀ 030	<u>G</u> PIB address : 5 ≑ 030
Manufacturer : Agilent	Manufacturer : Agilent
Power Supply : 66104A	Power Supply : 66103A
Range : 60V/2.5A	Range : 35V/4.5A
✓ Use secondary address 96	✓ Use secondary address 97 ‡ 96126
Example of setting PS1	Example of setting PS2

[Fig.11]

Preparation for using GPIB controllable external power supplies

Install GPIB Driver

The user should install a driver for the GPIB interface board. (The GPIB interface board is limited to the product made by National Instruments.)

Setup Option Mode

The user should select the box "Use power supply" on Input / Output function of I/O step screen in Option mode and configure the GPIB equipment (External power supplies) properly. For details, refer to Page 7.



The box "Use power supply" appears only when the GPIB driver is installed in the PC.

Option Mode		X
RS-232C port no. Camera system Inline application Signal tower setting Stamp Input / Output function of I/O step DDE communication IC Open Menu customize PCB Support Jigs Vacuum unit	✓ Jump I/O steps follow	I/O Step wing a failed step imp I/O step 1 2 1255[step(s)] OP step judged SHORT ving this group umber for jumped I/O step(s) [p(s)] [VX-07 board)
<u>■ Previous</u> <u>Next</u>	✓ Use power supply	Power supply
□ Workstation Mode		✓ <u>O</u> K ¥ <u>C</u> ancel

[Fig.12] Input / Output function of I/O step

(NOTE)

The GPIB interface board can be connected on max 14 equipments. In addition, there is limitation to the bus connection;

- * The total cable length must be shorter than 20m and the number of equipments connected to the GPIB interface board multiplied by 2m.
- * One cable length must be shorter than 4m.
- * More than two-thirds equipments must be turned on with rare exceptions.
- * The equipments should not turn on whenever the APT-9411 software is in operation with rare exceptions.

Simple function test

To implement simple function test, the user should configure the I/O step by specifying I/O command, time and probe to apply signal and the applied voltage so on. Once the I/O step gets executed, the PRL-9500G applies voltage to the UUT in accordance with the established conditions.

There are two ways of configuring the I/O steps;

1. I/O Function (Step edit list > Tool > I/O Function)

On the I/O Function screen, the user should select appropriate I/O command (IO/W, IO/X, or IO/G) in accordance with the intended use. The limitation of applying voltage and the measuring contents vary depending on the I/O commands. The user should understand the specification and the property of each I/O command in that way.

I/O command	General application
IO/W	The IO/W command enables to power up the UUT with the external power supplies to measure multiple steps in series. The user cannot set the flying probe to apply voltage in this case.
IO/X	The IO/X command enables to power up the UUT with the external power supplies to measure the specified two points by the flying probes at the same time. The flying probes are able to apply voltage in this case. After the test finished, the voltage to the UUT will be terminated automatically.
IO/G	The IO/G command enables to control the external power supplies (Voltage / Current / Output ON/OFF) via GPIB.

2. Viewable Setup of Function steps (Step edit list > Tool > Viewable Setup of Function steps)

The user doesn't have to select I/O command in accordance with the intended use, but he can use the mouse to simply specify necessary connection on a graphic setup screen. The user can recognize the reality of whole connection with ease.

Basic precautions of I/O steps



The I/O step may cause serious damage to the PC boards and/or the measuring unit if the user misuses it (ex. wrong location, polarity so on). The use of the I/O commands must be carried out under the responsibility of the user.



Mentioned below are very important things to know. Be sure to read through them to fully understand in advance.

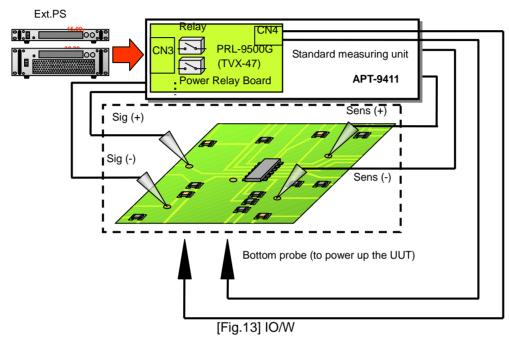
- 1. If other than DC-VM mode is used while the PCB is applied with the specified voltage, from time to time it shows "The PCB is charged with high voltage!" on the display. In this case, the use should change to DC-VM mode or set "JP".
- 2. The I/O steps must follow the normal RCLD measurement steps. In addition, be sure to select the box "Jump all I/O steps following a failed step" on the Select Input / Output function of I/O step screen in Option mode. With this, the user can prevent any I/O step following the fail step from execution.
- 3. In case of Point system, the maximum pin numbers is limited to 3,200.
- 4. The I/O command is not available in case of the following tests:
 - n Optical steps
 - **n** Combination test steps
 - **n** Special generation steps ("CM-x" in Aux. filed)
 - n IC Open test steps ("ICOP" in Aux. filed)
 - n Coordinates revision steps
 - n Kelvin measurement steps ("Kel." in Aux. filed)
 - n ZD (Zener diode) steps
 - n Digital transistor steps ("DGTR" in Aux. filed)
 - n FET steps ("FET" in Aux. filed)
 - n Pattern open check test ("PT-x" in Aux. filed)
 - n Photo coupler steps ("PC" in Aux. filed)
 - n Zone set steps ("ZONE" in Aux. filed)
- 5. The I/O steps aren't supported by Coordinates Sort function. If executed, it shows an error of "No execution possible due to I/O step existed!" on the display.
- 6. The I/O steps aren't supported by Combination measurements.
- 7. If the I/O step is released, all other than "Parts", "Value" and "Comment" column are initialized and put back to the normal step.
- 8. If the test program is converted to APT-8000 series, the I/O steps are released. Means, all other than "Parts", "Value" and "Comment" column are initialized and put back to the normal step.
- 9. The reference value of the I/O steps cannot be input automatically during the Reference Value Input function. The user should input the reference value in the Step Review menu.
- 10. The Data Average function is unable to apply the voltage at the I/O steps. In addition, neither the voltage nor the current is averaged.
- 11. The Reference Value Generation function does not create the reference value of the I/O steps.
- 12. Location name of the I/O steps is not changeable at Change Step Data function.
- 13. Location name of the I/O steps is not changeable at Group Addition function.
- 14. Location name of the I/O steps is not changeable at Auto Location Set function.
- 15. The Fail retry test isn't performed.

I/O Function

This chapter describes the procedures to generate I/O steps (basic data programming and reference input) using the I/O Function screen.

IO/W Command

The IO/W command enables to power up the UUT with the external power supplies to measure multiple steps in series.



Basic knowledge of IO/W step

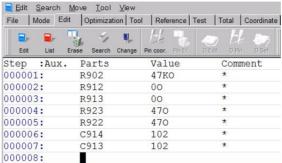
- 1. The user can select the bottom probes and some connectors at the PCB Tray to power up the UUT. (It's not possible to use the flying probes)
- 2. Listed below are conditions to halt the voltage output:
 - * It executed OFF step at the IO/W step.
 - * The test finished.
 - * It executed the step using the bottom probes. (Only Outport 1-4 halt the voltage output)
 - * It executed any of IO/M, IO/T, IO/V, IO/C, IO/U or IO/X step.
- 3. If the step using the bottom probes is changed to IO/W step, the original bottom probe settings will be initialized.
- 4. Listed below are the means to power up the UUT.
 - * Outport 1~4 use the bottom probe 1,2.
 - * Outport 5~16 are output to the connector (HS-644-02A) installed on the Tray. The wiring from the connector (HS-644-02A) to the UUT should be prepared by the user.

IO/W step generation

The way of programming IO/W steps is the same between Point system and Teaching system.

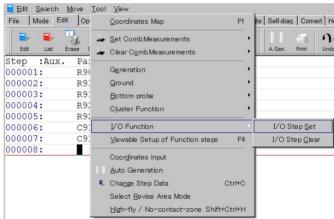
Howe to apply voltage

- 1. Click on Step Edit (or Step List) from Edit menu on the Menu bar.
- 2. It displays "Enter step number (1 x)". Let's put a new step on the last step. Use the keyboard to enter the last step number and click on the OK button.
- 3. The cursor is flickering on the last step. Use the down-arrow key to move the cursor to the next step. (Refer to Fig.14)



[Fig.14] Step edit list

4. Move to Tool > I/O function and click on "I/O Step Set". (Refer to Fig.15)



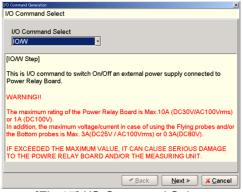
[Fig.15] I/O Function > I/O Step Set

- 5. It displays "Use board ref.point and aux.ref.point for alignment?". Select Yes or No.
- 6. It displays I/O Command Select screen. (Refer to Fig.16)

/O Command Generation	×
I/O Command Select	
I/O Command Select ГОЛ	
[IO/T Step]	-
This is I/O command to measure with internal measuring unit while applying voltage or signal from external equipment connected to terminals.	
[Fig. 4C] I/O Commond Colort	_

[Fig.16] I/O Command Select

7. Select "IO/W" from the right pull-down menu, and it will display Fig.17.



[Fig.17] I/O Command Select

8. Click on the Next button, and it will displays Fig.18

1/0 Command Generation Power Relay Board	
✓ Set every output port	
<u>Decevery output port</u>	
1 🗆 0V	9 ⊏ Unregistered
2 DC +5V	10 ⊏ Unregistered
3 □ Unregistered	11 ⊏ Unregistered
4 □ Unregistered	12 ⊏ Unregistered
5 □ 0∨	13 ⊏ Unregistered
6 □ DC +12V	14 ⊏ Unregistered
7 □ Unregistered	15 ⊏ Unregistered
8 🗆 Unregistered	16 ⊏ Unregistered
[[]:n 40] Davida	Deley Deevel

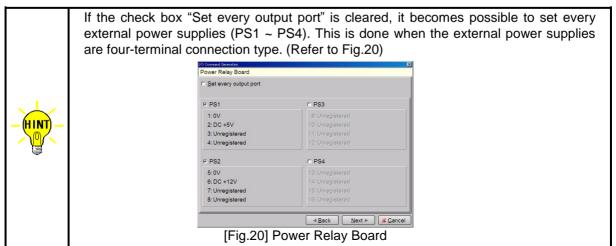
[Fig.18] Power Relay Board

Signal name (ex. DC +5V) on Fig.18 is assignable on Input / output function of I/O step in Option mode. (Refer to Page 6) "Unregistered" means that signal name is not registered yet.

Select the box of Signal name that you want to output and click on the Next button.

/0 Command Generation Power Relay Board	
☑ Set every output port	
1 🕫 0V	9 ⊏ Unregistered
2 🖻 DC +5V	10 ⊏ Unregistered
3 🗆 Unregistered	11 ⊏ Unregistered
4 □ Unregistered	12 ⊏ Unregistered
5 🖂 0V	13 ⊏ Unregistered
6 🖻 DC +12V	14 ⊏ Unregistered
7 Unregistered	15 ⊏ Unregistered
8 🗆 Unregistered	16 ⊏ Unregistered

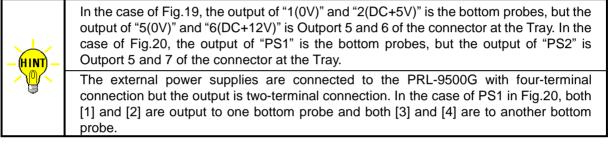
[Fig.19] Power Relay Board



9. It displays the selection screen (Fig.21) where the use can specify the output of the voltage. Fig.21 appears when any of 1 ~ 4 or PS1 was specified at Process (8) above. Specify the output of 0V and DC+5V from the bottom probes and click on the Next button.

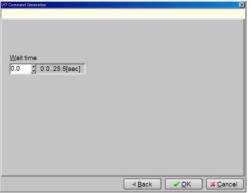
I/O Command Generation	1/0 Command Generation
Select output probe	Select output probe
Select output probe 0V 1 Bottom probe DC +5V 2 Bottom probe	Select output probe OV [Sig] DC +5V [Sens] Unregistered [Sig] Unregistered [Sens]
<u>dBack</u> <u>Next</u> ≥ <u>⊀Cancel</u>	M/bap the bay "Sat avery output part" is a

When the box "Set every output port" is selected When the box "Set every output port" is cleared [Fig.21] Select output probe



When other than 1 ~ 4 or PS1 was specified at Process (8) above, Fig.22 will be displayed.

10. It displays another screen for Wait time setting (0.0sec ~ 25.5sec). After specified the Wait time, click on the OK button.



[Fig.22] Wait time setting

11. It goes back to the Step Edit (or Step List). (Refer to Fig.23)

File Mode Edit	Optimization	Tool Reference Te	st Total Co	ordinate S	elf-diag. Con	vert Help	6					
Edit List Err	ise Search Chan		🔵 🛃 D.Edit D.Pin		.Gen. Print	f) Undo	Select					
Step :Aux.	Parts	Value	H-pin	L-pin	Comment			Loc	EL	F.	+%	- %
000001:	R902	47KO	11	15	*			*	R	**	10	10
000002:	R912	00	3	10	*			*	R	**	10	10
000003:	R913	00	4	6	*			*	R	**	10	10
000004:	R923	470	11	10	*			*	R	**	10	10
000005:	R922	470	8	3	*			*	R	**	10	10
00006:	C914	102	7	6	*			*	С	**	30	30
000007:	C913	102	5	10	*			*	С	**	30	30
W/01:80000	&h3300	ON/W	*	*	*			IO/W	*	**	10	10



[AUX.] column is substituted by IO/W and [Loc] column is also by IO/W. [Parts] column is substituted by the Outport number specified in Process (8). [Value] column is substituted by ON/W. (ON/W means the step to start applying voltage)

12. The use should configure the measurement step next to the IO/W step (Step 00008).

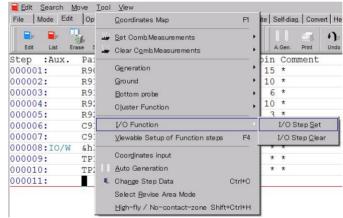
How to terminate voltage

- 1. Click on Step Edit (or Step List) from Edit menu on the Menu bar.
- 2. It displays "Enter step number (1 x)". Let's put a new step on the last step. Use the keyboard to enter the number of the step where you set the output to terminate and click on the OK button.
- 3. The cursor is flickering on the last step. Use the down-arrow key to move the cursor to the next step. (Refer to Fig.24)

Edit Search File Mode Edi	<u>M</u> ove <u>T</u> ool ⊻ik t Optimization		st Total Co	ordinate S	elf-dia	ig. Conve	ert Help	p		
	Erase Search Cha		O.Edit D.Pin	D.Set	.Gen.	ii (j. Print	n) Undo	Select	Gopy	
Step :Aux.	Parts	Value	H-pin	L-pin	Cor	nment			Loc	EL
000001:	R902	47KO	11	15	*				*	R
000002:	R912	00	3	10	×				*	R
000003:	R913	00	4	6	*				*	R
000004:	R923	470	11	10	*				*	R
000005:	R922	470	8	3	*				*	R
000006:	C914	102	7	6	*				*	С
000007:	C913	102	5	10	*				*	С
000008:IO/W	&h3300	ON/W	*	*	*				IO/W	*
000009:	TP1-GND	3.3V	*	*	*				*	*
000010:	TP2-GND	5.0V	*	*	*				*	*
000011:										

[Fig.24] Step edit list

4. Move to Tool > I/O function and click on "I/O Step Set". (Refer to Fig.25)



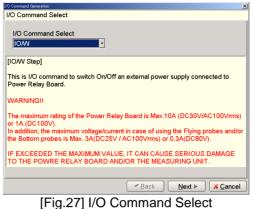
[Fig.25] I/O Function > I/O Step Set

- 5. It displays "Use board ref.point and aux.ref.point for alignment?". Select Yes or No.
- 6. It displays I/O Command Select screen. (Refer to Fig.26)

/O Command Generation	2
I/O Command Select	
I/O Command Select]
[IO/T Step]	
This is I/O command to measure voltage or signal from external eq	with internal measuring unit while applying uipment connected to terminals.
	✓ Back Next ► X Cancel

[Fig.26] I/O Command Select

7. Select "IO/W" from the right pull-down menu and click on the Next button. (Refer to Fig.27)



- 8. It displays Fig.28.

O Command Generation	
Power Relay Board	
☑ Set every output port	
1 □ 0V	9 🗆 Unregistered
2 E DC +5V	10 🗆 Unregistered
3 Unregistered	11 □ Unregistered
4 ☐ Unregistered	12 □ Unregistered
5 T OV	13 □ Unregistered
6 🗆 DC +12V	14 □ Unregistered
7 Unregistered	15 ⊏ Unregistered
8 🗆 Unregistered	16 □ Unregistered
	I Back ✓ OK X Cancel

[Fig.28] Power Relay Board

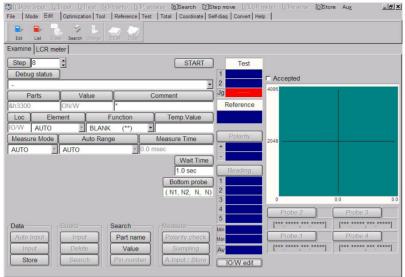
- 9. Do not select any check box for Outport and click on [OK] button.
- 10. It goes back to the Step edit list. It shows "OFF" in [Value] column on the list.

Edit	Search	n <u>M</u> or	ve <u>T</u> ool	⊻iew												
File N	Node	Edit	Optimiza	tion Too	I Refe	rence	Test	Total C	oordinat	eS	elf-dia	g. Conv	ert Hel	p		
Edit	List	Eras		Change	Pin coor.	Pin Er.	D.Edit	H. D.En	D.Set		Gen.	2 B Print	n Undo	Select	Copy	
Step	:Au:		Parts		Val			H-pin		100					 Loc	EL
000001	1:		R902		47K	0		11		15	*				*	R
000002	2:		R912		00			3		10	*				*	R
000003	3:		R913		00			4		6	*				*	R
000004	4:		R923		470			11		10	*				*	R
000005	5:		R922		470			8		3	*				*	R
000000	6:		C914		102			7		6	*				*	С
00000	7:		C913		102			5		10	*				*	С
000008	B:IO	/₩	&h330	0	ON/	W		*		*	*				IO/W	*
000009	9:		TP1-GI	D	3.3	V		*		*	*				*	*
000010):		TP2-GI	D	5.0	V		*		*	*				*	*
000011	1:10	/W	&h000	C	OFF			*		*	*				IO/W	*

[Fig.29] Step edit list

IO/W step at Step data review

The IO/W command step is displayed on the Step Review menu as follows. Here the user can change the Outport and Wait time as they want.



[Fig.30] Step data review

- Parts (Not editable) Parts column is substituted by "&h0C00" as an example. This display differs according to the specified Outport.
- 2) Value (Not editable)

Value column is substituted by "ON/W" when it is the step to power up the UUT and is substituted by "OFF" when it is the step to terminate.

- Comment Comment column is substituted by information on the contents of test.
- 4) Loc. (Not editable) Loc. Column is substituted by I/O command.
- 5) Element (Not editable)
- 6) Function Asterisk (*) indicates the step will be executed but JP indicates the step won't be executed.
- 7) Temp. value (Unused)
- 8) Measure Mode (Unused)
- 9) Measure Range (Unused)
- 10) Measure Time (Unused)
- 11) Wait Time

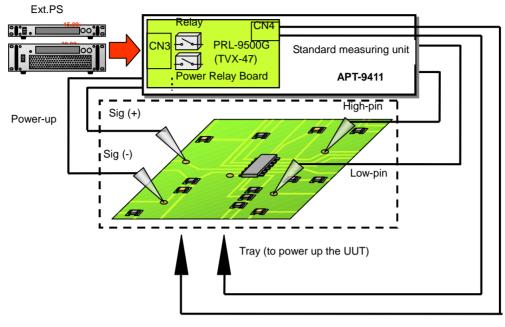
Wait Time indicates the time from applying voltage to start moving the next step.

- 12) Bottom Probe
 - Bottom probe to access the test;
 - N1 --> Bottom probe 1 is used
 - N2 --> Bottom probe 2 is used
 - N --> Unused
 - N --> Unused
- 13) IO/W edit

The user can change the Outport and the Wait time.

IO/X Command

The IO/X command enables to power up the UUT with the external power supplies to measure the specified two points by the flying probes at the same time.



[Fig.31] IO/X

Basic knowledge of IO/X step

- 1. The user can select the flying probes and the bottom probes to power up the UUT. (It's not allowed to use more than two flying probes in this case)
- 2. When more than one external power supply are applied to the UUT, it's not possible to use the flying probes and the bottom probes at the same time. So if the flying probes are used, the user has to select the connector at the Tray.
- 3. It's the flying probes that the user can select to measure the UUT.
- 4. No guard point is available to use.
- 5. Loc column at the IO/X step is substituted by "IO/X" automatically.

IO/X step generation

- 1. Click on Step Edit (or Step List) from Edit menu on the Menu bar.
- 2. It displays "Enter step number (1 x)". Let's put a new step on the last step. Use the keyboard to enter the last step number and click on the OK button.
- 3. The cursor is flickering on the last step. Use the down-arrow key to move the cursor to the next step. (Refer to Fig.32)

	-	n.	4		HL	1	H	
Edit	List	Erase	Search	Change	Pin coor.			
Step	:Aux.	Pa	arts		Val	1e	Comme	ent
000001	:	R	902		47K	C	*	
000002	:	R	912		00		×	
000003	:	R	913		00		*	
000004	:	R	923		470		*	
000005		R	922		470		*	
000006	:	C	914		102		×	
000007	:	C	913		102		*	
800000	:							

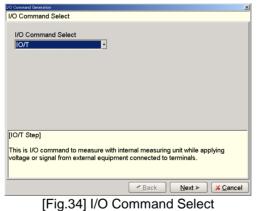
[Fig.32] Step edit list

4. Move to Tool > I/O function and click on "I/O Step Set". (Refer to Fig.33)

File Mode Edit	Op	<u>C</u> oordinates Map F1	te Self-diag. Convert H
Edit List E	rase 5	Set Comb Measurements	
Step :Aux. 000001: 000002:	Pa: R9(R9:	Generation	
000003: 000004:	R9: R9:	Bottom probe	
000005:	R92 C92	[/O Function	I/O Step <u>S</u> et
000007:	C9:	⊻lewable Setup of Function steps F4	I/O Step <u>C</u> lear
		Coorginates input Auto Generation Change Step Data Ctrl+C	
		Select <u>R</u> evise Area Mode <u>H</u> igh-fly / No-contact-zone Shift+Ctrl+H	

[Fig.33] I/O Function > I/O Step Set

- 5. It displays "Use board ref.point and aux.ref.point for alignment?". Select Yes or No.
- 6. It displays I/O Command Select screen. (Refer to Fig.34)



7. Select "IO/X" from the right pull-down menu, and it will displays Fig.35.

I/O Command Generation
I/O Command Select
I/O Command Select
[IO/X Step]
This is I/O command to measure with internal measuring unit while applying an external power supply connected to Power Relay Board.
WARNING!!
The maximum rating of the Power Relay Board is Max.10A (DC30V/AC100Vrms) or 1A (DC100V). In addition, the maximum voltage/current in case of using the Flying probes and/or the Bottom probes is Max. 3A(DC25V / AC100Vrms) or 0.3A(DC80V).
IF EXCEEDED THE MAXIMUM VALUE, IT CAN CAUSE SERIOUS DAMAGE TO THE POWRE RELAY BOARD AND/OR THE MEASURING UNIT.
Back Next ► X Cancel

[Fig.35] I/O Command Select

8. Click the Next button, and it will display Fig.36.

I/O Command Generation Power Relay Board	
☑ Set every output port	
1 T OV	9 🗆 Unregistered
2 □ Unregistered	10 ⊏ Unregistered
3 🗆 DC+5V	11 □ Unregistered
4 □ Unregistered	12 □ Unregistered
5 ⊏ Unregistered	13 □ Unregistered
6 ⊏ Unregistered	14 ⊏ Unregistered
7 🗆 Unregistered	15 ⊏ Unregistered
8 Unregistered	16 □ Unregistered
	Jalay Daard

[Fig.36] Power Relay Board

Signal name (ex. DC +5V) on Fig.36 is assignable on Input / output function of I/O step in Option mode. (Refer to Page 6) "Unregistered" means that signal name is not registered yet.

Select the box of Signal name that you want to output and click on the Next button.

1/O Command Generation	
Power Relay Board	
☑ Set every output port	
1 🖻 0V	9 🗆 Unregistered
2 Unregistered	10 □ Unregistered
3 ₽ DC+5V	11 ⊏ Unregistered
4 Unregistered	12 □ Unregistered
5 Unregistered	13 □ Unregistered
6 Gunregistered	14 □ Unregistered
7 Durregistered	15 ⊏ Unregistered
8 Unregistered	16 □ Unregistered
[Fig.37] Po	ower Relay Board



For Outport 1~4 above, more than three are not assignable at the same time.

	upplies (PS1 ~	PS4). This is done whe	ecomes possible to set every n the external power supplies
	V0 Command Generation Power Relay Board	X	
	☐ Set every output port		
	₽ PS1	r PS3	
	1:0V(SIG) 2:0V(SENS) 3:DC+5V(SIG) 4:DC+5V(SENS)	9: Unregistered 10: Unregistered 11: Unregistered 12: Unregistered	
Ŷ	□ PS2	⊏ PS4	
	5: Unregistered 6: Unregistered 7: Unregistered 8: Unregistered	13: Unregistered 14: Unregistered 15: Unregistered 18: Unregistered	
	<u> </u>	■ Back Next ► X Cancel	
	[Fig.38] F	Power Relay Board	

9. When 1 ~ 4 or PS1 was specified at Process 8 above, Fig.39 will be displayed. The user can select the output from the flying probes and the bottom probes. In the case of the flying probes, it7s not possible to assign which probe (Probe 1,2,3,4) are to use. The APT software determines it automatically when the coordinates are entered.

1/O Command Generation X	I/O Command Generation
Select output probe	Select output probe
0V Flying probe (1-4) DC+5V Flying probe (1-4)	0V(SIG) [Sig] Flying probe (1-4) 0V(SENS) [Sens] Flying probe (1-4) DC+5V(SENS) [Sens] Flying probe (1-4)
	■ Back Next ► X Cancel

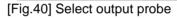
When "Set every output port" is selected

When "Set every output port" is cleared

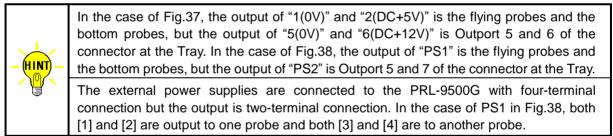
[Fig.39]

Click the right pull-down menu at Flying probe (1-4), and it will display another screen where the user can select the output. (Refer to Fig.40)

/O Command G	eneration	
Select ou	itput probe	
0V	Flying probe (1-4)	•
DC+5V	/	
	Flying probe (1-4)	-
	Flying probe (1 - 4)	
	Bottom probe	



When other than 1 ~ 4 or PS1 was specified at Process 8 above, Fig.41 will be displayed instead of Fig.39.



10. After the output was selected, click the Next button to move to the next screen.

I/O Command Generation	1/0 Command Generation
Input the XY coordinates	Input the Pin Number
X coor Y coor High-Pin : +000.0000 +000.0000 Low-Pin : +000.0000 +000.0000 0V : +000.0000 +000.0000 DC+5V : +000.0000 +000.0000 Press TEXT START to begin set up.	High-Pin 1
<u> </u>	
(Teaching system)	(Point system)

[Fig.41] When "Set every output port" is selected

1/0 Command Generation	1/0 Command Generation
Input the XY coordinates	Input the Pin Number
X coor Y coor High-Pin: +000.0000 +000.0000 Low-Pin: +000.0000 +000.0000 0V(SIG)[Sig] +000.0000 +000.0000 0V(SENS)[Sens] +000.0000 +000.0000 DC+5V(SENS)[Sens] +000.0000 +000.0000 Press TEN START to begin set up.	High-Pin 1 1 Low-Pin 2 1 0V(SIG) [Sig]/0V(SENS) [Sens] 3 0.32000 DC+5V(SIG) [Sig]/DC+5V(SENS) [Sens] 4 0.32000
	<u>⊲ B</u> ack <u>N</u> ext ≻ <u>≭ C</u> ancel
(Teaching system)	(Point system)

(Point system) (Point system) [Fig.42] When "Set every output port" is cleared

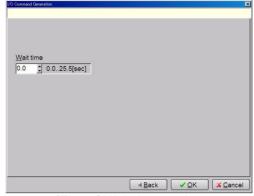
In the case of Teaching system (the left screens of Fig.41 and Fig.42), High-pin and Low-pin must be substituted by the coordinates where performs the measurement. "0V" and "DC+5V" must be substituted by the coordinates where +5V is applied to.

In the case of Point system (the right screens of Fig.41 and Fig.42), High-pin and Low-pin must be substituted by the pin numbers which performs the measurement. "0V" and "DC+5V" must be substituted by the pin numbers where +5V is applied to.

After the coordinates was entered, click the Next button.

	As far as Point system concerns;						
	※ When pin number was newly added, click on the	Coordinate Input" button on the					
	screen to get another screen (see Fig.43) which all	ows you to input the coordinates					
	for the new pin number added.						
	Coordinates input 000008: * * * *	×					
	Press [ENTER] SW to set the coordinates.						
	Pin No. Net Name High-Pin 1 *	X coor Y coor [+000.0000,+000.0000]					
	Low-Pin 2 *	[+000.0000,+000.0000]					
	0V(SIG) [Sig] / 0V(SENS) [Sens] 3 * DC+5V(SIG) [Sig] / DC+5V(SENS) [Sens] 4 *	[+000.0000,+000.0000] [+000.0000,+000.0000]					
		✓ QK X Cancel					
	[Fig.43]						
	※ In Fig.41 above, enter "0" as the pin number and click the Next button, and it will						
	display the Coordinate input screen for the pin number "0". In this case, the user can						
X _M X	enter the coordinates just like the case of Point sys						
D	20 Command Demonstries	×					
	X coor Y coor High-Pin : +000.0000 +000.0000						
	Press TEST to begin set up.						
	riess start to begin set up.						
	■ Back Next ► X Qar	cel					
	[Fig.44]						

11. It displays another screen for Wait time setting (0.0sec ~ 25.5sec). After specified the Wait time, click on the OK button.



[Fig.45] Wait time setting

It goes back to the Step edit list. (Refer to Fig.46)
 [AUX.] column is substituted by IO/X and [Loc] column is also by IO/X.
 [Comment] column is substituted by the specified Outport number.

-	-								
📃 Edit Search 📐	<u>A</u> ove <u>⊺</u> ool ⊻iew			📃 <u>E</u> dit <u>S</u> earch <u>N</u>	<u>A</u> ove <u>T</u> ool <u>V</u> iew				
File Mode Edit	Optimization Too	I Reference Test	Total Coord	File Mode Edit	Optimization Too	DI Reference Tes	st Total Coordinate Self-dia	ag. Convert Help	
Edit List Er	ase Search Change	D.Edit D.Set	n. Print	Edit List Er	ase Search Change	Pin coor. Pin Er.	O.Edit D.Pin D.Set	Print Undo Select	
Step :Aux.	Parts	Value	Comment	Step :Aux.	Parts	Value	Comment	H-pin L	-pin
000001:	R902	47KO	*	000001:	R902	47KO	*	11	15
000002:	R912	00	*	000002:	R912	00	*	3	10
000003:	R913	00	*	000003:	R913	00	*	4	6
000004:	R923	470	*	000004:	R923	470	*	11	10
000005:	R922	470	*	000005:	R922	470	*	8	3
000006:	C914	102	*	000006:	C914	102	*	7	6
000007:	C913	102	*	000007:	C913	102	*	5	10
X/01:800000	*	*	&h3FC0	000008:IO/X	*	*	&h3FC0	2	3
				E	/ -				

(Teaching system)

(Point system) [Fig.46] Step edit list

As shown in Fig.47, it will be useful to input any information on the test contents in the column "Parts" and "Value".

📃 Edit Search !	<u>M</u> ove <u>T</u> ool <u>V</u> iew			Edit :	<u>S</u> earch	Move Tool	⊻iew					
File Mode Edit	Optimization Tool	I Reference Test	Total Coord	File N	lode Ed	lit Optimiza	ion Too	Reference	Test Total Coordinat	e Self-diag. Conv	ert Help	
Edit List E	rase Search Change	D.Edit D.Set	n. Print	Edit	List	Erase Search	Change	Pin coor. Pin Er.	🔵 🏄 🧑 D.Edit D.Fin D.Set	A.Gen. Print	N Select	8 Cut
Step :Aux.	Parts	Value	Comment	Step	:Aux.	Parts		Value	Comment		H-pin L	-pin
000001:	R902	47KO	*	000001		R902		47KO	*		11	15
000002:	R912	00	*	000002	2:	R912		00	*		3	10
000003:	R913	00	*	000003	3:	R913		00	*		4	6
000004:	R923	470	*	000004	:	R923		470	*		11	10
000005:	R922	470	*	000005	:	R922		470	*		8	3
000006:	C914	102	*	000006	:	C914		102	*		7	6
000007:	C913	102	*	000007	:	C913		102	*		5	10
000008:IO/X	POWER	IN	&h3FC0	000008	:IO/2	POWER		IN	&h3FC0		2	3
	(Teachii	ng system)					•	Point sy	rstem)			

[Fig.47] Step edit list

IO/X step at Step data review

The IO/X command step is displayed on the Step Review menu as follows. Here the user should input the reference value or change Wait time and Outport number with extreme care.

Examine LCR meter							
Step 8		START] Test				
Debug status			1	C Accepted			
-			2	4096			_
Parts Value		comment] <mark>Jg</mark>				
POWER IN	&h3FC0	-	Reference				
Loc Element	Function	Temp.Value	3.300V				
		3.300 V	Delection	1			
	ure Range	Measure Time	Polarity	2048			
DC-VM 0.4- 4V (Ra							
+% -% +Limit -Lir		Wait Time					
10 10 3.630 V 2.970		5.0 sec	Reading	J			
speed pos P1 P2 P3	P4 Probe Access		2	-			
	0 <u>▼</u> (+,M3,-,M1)	<u> </u>	3	0	:	2.5	5.0
			4	Probe 2	M3 [Probe 3	- [
Data Guard	Search	Measure	5	+000.0000,+000	<u> </u>		0,0000
Auto Input	Part name	Polarity check	Min	Probe 1] + [Probe 4	M1
	Value		Max	+000.0000,+000	<u> </u>		
Input Delete Store Search		Sampling	Av	000.0000,7000		000.0000, 000	0.0000
Store	Pin number	A.Input / Store	IO/X edit	J			

[Fig.48] Step data review (Teaching system)

Examine LCR meter	
Step 8	START Test
Debug status	
	4096
Power IN &h3C0	Comment Reference
Loc Element Function	
IO/X DIODE BLANK (**)	
Measure Mode Measure Range	Measure Time
	▼ 5.0 msec
+% -% +Limit -Limit	Wait Time Reading
10 10 3.630 V 2.970 V	5.0 sec 2
	3 0 2.5 5.0 M3-)
0 • H • 0 • 0 • 0 • 0 • (M1,+,	5 Probe 2 + Probe 3 M3
Data Guard Search	
Auto Input Input Part n	
Input Delete Val	
Store Search Pin nu	umber A.Input / Store IO/X edit
High-Pin (+) 1 JD.Net	*
Low-Pin (-) 2 JD.Net	*
Outport 1 (M1) 3 ID.Net	
Outport 3 (M3) 4 ID.Net	*

[Fig.49] Step data review (Point system)

1) Parts

Parts column is substituted by information on the contents of test.

2) Value

Value column is substituted by information on the contents of test.

- 3) Comment Comment column is substituted by "&h0C00" as an example. This display differs according to the specified Outport.
- 4) Loc. (Not editable)

Loc. Column is substituted by I/O command.

5) Element

Element column is substituted by type of component to be measured.

RESISTOR --> Resistors

CAPACITOR --> Capacitors --> Inductors

COIL

DIODE --> VF measurement / DC voltage measurement

6) Function

Function column is substituted by the Measuring function.

7) Temp. value

Temp. value column is substituted by the value obtained by pressing Input and Auto Input key and is changeable within the same Measuring mode and Measuring range. The Save button can register it as the Reference value.

- 8) Measure Mode Measure Mode column is substituted by the measuring signal.
- 9) Measure Range Measure Range column is substituted by the Measuring range.
- 10) Measure Time

Measure Time column is substituted by the Measuring time (1~999msec).

11) [+%][-%]

Upper and lower tolerance ratio to the Reference value are shown there. In addition, [+Limit][-Limit] will be increased or decreased in sync with the change of these value.

12) [+Limit][-Limit]

Upper and lower tolerance to the Reference value are shown there.

In addition, [+%][-%] will be increased or decreased in sync with the change of these value.

13) Wait Time

Wait Time indicates the time from applying voltage to start moving the next step.

14) Probe access (Auto Polarity)

Probe access information. Probe 1.2.3.4 is meant from the left.

- + --> Probe to apply the measuring signal (+)
- --> Probe to apply the measuring signal (-)
- M1 --> Outport number assigned in Fig.37
- M3 --> Outport number assigned in Fig.37

In the case of Fig.38, it will be shown as follows.

Auto Polarity (M1,+,M3,-) [Fig.50]

15) IO/X edit

The user can change the Outport and the Wait time.

16) Pin number (Point system only. Refer to Fig.49) Here displays the Pin number of H-pin(High Pin, L-pin(Low Pin), G-P1(Guard Pin1) or G-P2(Guard Pin2). Information on the net name is also displays.

Reference input

When the user is going to measure the UUT while applying voltage, they should specify both Element and Measuring mode. When RESISTOR, CAPACITOR or COIL is set to the Element, the user should specify the Measuring mode to "AUTO" and click the Auto Input button to input the reference value. The Temp. Value column displays the measured value. The user should change Function and/or Measure Time as needed. Clicking the Store button can save the Temp. Value to the Reference value.

When the user is going to specify DIODE to the Element to perform the VF measurement, the Measuring mode should be set to DC-CC. In addition, when the DC voltage is measured, the Measuring mode should be set to DC-VM. The user should click the Input button to input the Reference value. The Temp. Value column displays the measured value. Clicking the Store button can save the Temp. Value to the Reference value.



This function is used to power up the board to test. And so it may cause serious damage to the PC boards and/or the measuring unit if the user misuses it (ex. wrong location, Outport so on). The use of the I/O commands must be carried out under the responsibility of the user.



When you are going to measure DC voltage, be sure to click the Input button to input the reference value. If the Auto Input button is clicked without due care, the Measuring mode will be initialized and any unexpected Measuring mode will be used to input the reference value.

When you try to use other than DC-VM mode while applying voltage to the UUT, sometimes it shows the error "The PCB is charged with high voltage!" on the display. It means, you cannot use other than DC-VM mode.

Change to Bottom probes

The user should assign the bottom probes to access the test before the reference input is performed. When Outport 1~4 are selected in Fig.18, Bottom probe 1,2 are assigned to use in the test.

1. Select "Bottom. Set" from the right pull-down menu of Probe Access. (Refer to Fig.51)

Examine LCR me	ter		
Step 80	-		START
Debug status)		
			•
Parts	Value	Cor	nment
POWER	*	&h0C00	
Loc Elen	nent	Function	Temp.Value
IO/X AUTO	BLAN	K (**) 🔽	
Measure Mode	Auto Ran	ige M	easure Time
AUTO	AUTO	▼ 0.0 ms	ЭC
+% -% +1	<u>imit Limit</u>		Wait Time
10 10			5.0 sec
speed pos P1	P2 P3 P4	Auto Polarity]
0 • H • 0 •		(+,-,M3,M4)	
Data	-Guard	AUTO	Measure
Auto Input		(+,-,M3,M4) (-,+,M3,M4)R	Polarity check
Input	Delete	Bottom.Set	Sampling
Store	Search	Pin number	A.Input / Store

[Fig.51] Probe Access

2. It displays the Bottom probe setting screen. (Refer to Fig.52)

Step no	b. : 8		
□ Polarity +	Bottom probe	- 1	€ 12
⊏ Polarity -	Bottom probe	- 1	12
Polarity M3	Bottom probe	- 1	\$ 12
Polarity M4	Bottom probe	- 2	12
		<u>✓ 0</u> K	<u>× C</u> ar

Polarity +--> Probe to apply the measuring signal (+)Polarity ---> Probe to apply the measuring signal (-)Polarity M3--> Apply voltage connected to Outport 3Polarity M4--> Apply voltage connected to Outport 4

Check the box of probe you want to change to the bottom probe and select he bottom probe number and click the OK button.

3. The display goes back to the Step data review where newly indicates "Bottom probe" at the right of the Probe Access. (Refer to Fig.53)

Examine LCR me	ter		
Step 80 Debug status			START
-			-
Parts	Value	Con	nment
POWER	*	&h0C00	
Loc Elen	nent F	unction	Temp.Value
IO/X AUTO	BLANK	(**)	
Measure Mode	Auto Rang	e M	easure Time
AUTO	AUTO	▼ 0.0 mse	ЭC
+% -% +[_imitLimit		Wait Time
10 10			5.0 sec
speed pos P1	P2 P3 P4	Probe Access	Bottom probe
0 • H • 0 •	0-0-0-	(+,-,M3,M4) ▼	(N, N, N1, N2)
Data Auto Input Input Store	Guard Input Delete Search	Search Part name Value Pin number	Measure Polarity check Sampling A.Input / Store

[Fig.53] Bottom probe setting

[Bottom probe]

N --> unused

N --> unused

N1 --> use Bottom probe 1

N2 --> use Bottom probe 2

Fig.53 indicates that the bottom probe 1,2 will be used to apply the voltage connected to Outport 3,4 and the flying probe 1,2 will be used to measure the output. (The flying probe 3,4 will be unused)

IO/G command

The IO/G command enables to control the external power supplies (Voltage / Current / Output ON/OFF) via GPIB and connect the specified voltage and current to the PRL-9500G to output to the flying probes or the bottom probes.

The GPIB controllable external power supply is Max 5.

For instance, the IO/G command is used for the following examples:

1. It's used to just control the external power supplies (Voltage / Current / Output ON/OFF) without using the PRL-9500G. (The user must think of the way of applying voltage to the UUT)

For example, it's possible to apply voltage from the external power supply via GPIB and apply another voltage through the PRL-9500G at the next step. (This is the case the user wants to apply more than one power supply to the UUT at the interval of time.)

- It's used to control the external power supplies (Voltage / Current / Output ON/OFF) while using the PRL-9500G. The voltage is applied to the UUT through the bottom probes or the connector at the Tray. Therefore, more than one step will be measured until the step to terminate the output is executed.
- 3. It's used to control the external power supplies (Voltage / Current / Output ON/OFF) while using the PRL-9500G. The voltage is applied to the UUT through the flying probes. The measurement is performed by the APT-9411. After the step finished applying voltage through the flying probes, the output to the UUT will be terminated automatically. For instance, the user can perform On/Off check of the 3-terminal regulators and the relay components.

IO/G step generation

This section describes the programming process of the IO/G steps on the basis of the three (3) examples listed above.

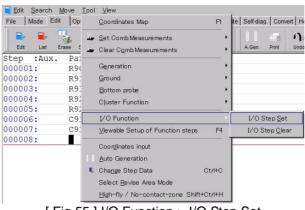
How to program IO/G steps

- 1. Click on Step Edit (or Step List) from Edit menu on the Menu bar.
- 2. It displays "Enter step number (1 x)". Let's put a new step on the last step. Use the keyboard to enter the last step number and click on the OK button.
- 3. The cursor is flickering on the last step. Use the down-arrow key to move the cursor to the next step. (Refer to Fig.14)

E			21	ų	HL		40	H	1000
Edit	List	Erase	Search	Change	Pin coor.	Pin Er.	D.Edit		D.Set
Step	:Aux.	Pa	rts		Val	ue	(Comme	ent
000001	:	R9	02		47K	0	1	t	
000002	:	R9	12		00		ŝ	t	
000003	:	R9	13		00			t	
000004	:	R9	23		470		5	t	
000005		R9	22		470		7	۲	
000006	:	C9	14		102		8	t	
000007	:	C9	13		102		-	t	
000008	:								

[Fig.54] Step edit list

4. Move to Tool > I/O function and click on "I/O Step Set". (Refer to Fig.55)



[Fig.55] I/O Function > I/O Step Set

- 5. It displays "Use board ref.point and aux.ref.point for alignment?". Select Yes or No.
- 6. It displays I/O Command Select screen. (Refer to Fig.56)

1/O Command Generation	×
I/O Command Select	
I/O Command Select [О/Т	
[IO/T Step]	
This is I/O command to measure with internal measuring unit while applying voltage or signal from external equipment connected to terminals.	
Back Next ► X Cancel X]

[Fig.56] I/O Command Select

7. Select "IO/G" from the right pull-down menu, and it will display Fig.58.

	1/O Command Generation
	I/O Command Select
	I/O Command Select
I/O Command Select	[IO/G Step]
I/O Command Select	This command enables to turn on and off the control (GPIB) of the voltage and the current applied from the power supplies, and measure with the internal measuring unit at the same time. WARNINGII
ю/т ю/м ю/v ю/р	The maximum rating of the Power Relay Board is Max.10A (DC30V/AC100Vrms) or 1A (DC100V). In addition, the maximum voltage/current in case of using the Flying probes and/or the Bottom probes is Max. 3A(DC25V / AC100Vrms) or 0.3A(DC80V).
IO/C IO/W	IF EXCEEDED THE MAXIMUM VALUE, IT CAN CAUSE SERIOUS DAMAGE TO THE POWRE RELAY BOARD AND/OR THE MEASURING UNIT.
10/X	
IO/G	>> <u> </u>

[Fig.57] I/O Command Select

8. Click the Next button, and it will display Fig.58.

I/O Command Generation			x
Setup Power Supplies			
PS1 PS2 PS3 PS4			
Agilent E3640A [8V/3A 2	20V/1.5A]		
⊙ OUTPUT <u>O</u> N O	OUTPUT O	EF	
Setting value of voltage	0.00 ‡	0.0020.00[V]	
Limit value of current	0.000 🗘	0.0003.000[A]	
Stop testing with current	ent measurem	nent	
	1 0 0 05		1
Wait time 0.0	0.025	.5[sec]	
		▲ <u>B</u> ack <u>N</u> ext > <u>× C</u> ancel]

[Fig.58] Setup Power Supplies

PS-1 ~ PS-Aux

The user should select the external power supplies from PS1 ~ PS-Aux.

Use Power supply

Check the box when the external power supply (i.e. Agilent E3640A) is used.

OUTPUT ON / OUTPUT OFF

Only when OUTPUT ON is selected, the user is allowed to configure "Setting value of voltage", "Limit value of current" and "Stop testing with current measurement". But when OUTPUT OFF is selected, the voltage to the UUT will be terminated.

Output

This appears only when the dual-out type of the Agilent external power supply is selected. Select either OUTPUT1 or OUTPUT2 from the right pull-down menu.





Setting value of voltage

This can specify the voltage to output by 10mV. The output range at the right will be set automatically according to the external power supply specified by the user.

Limit value of current

This can specify the current to output by 1mA. The output range at the right will be set automatically according to the external power supply specified by the user. When IO/G step is performed, if it exceeds this value, the error message will appear. At the same time, the output from the external power supply will be terminated automatically to suspend the test accordingly.

Stop testing with current measurement

When the box is selected, the test will be suspended if it goes off the preset current on the IO/G step.

Reference current value

This is the standard current value and must be set smaller than "Limit value of current". Max. current value differs according to the external power supply models and is configurable by 1mA.

Judgment +% tolerance

This is the upper limit of the current value shown by %.

Judgment -% tolerance

This is the lower limit of the current value shown by %.

Wait time

Wait time should be set within $0.0 \sim 25.5$ sec. During this period, the tester turns on the external power supplies and the PRL-9500G and wait until it moves to the next step.

9. After every configuration was completed, click the Next button. On the next screen (Fig.60), click the OK button without selecting the box "Use Power relay board" if you just want to control the external power supplies (Voltage / Current / Output ON/OFF) without using the PRL-9500G to apply voltage to the UUT. (In this case, the user must think of the way of applying voltage to the UUT) It goes back to the Step edit list.

1/O Command Generation	x
Configure test using power supplies	
□ Use Power relay board	
4 <u>B</u> a	ick <u>✓ O</u> K <u>× C</u> ancel
Fig.60] Configure test us	sing power suppli



The user must think of the way of applying voltage to the UUT. After this step, the user has to program a step to measure the output while applying the voltage to the UUT. In addition, another step to terminate the voltage is necessary to program later.

10. When the PRL-9500G is used, select the box "Use Power relay board", and it displays Fig.61.

O Command Generatio	h			2
onfigure test	using power supplies	s		
✓ Use Power	relay board			
Test meth				
	od ower relay board only			
○ <u>M</u> easure	ement by Internal mea	asuring unit		
			Next►	<mark>≼ <u>C</u>ancel</mark>

[Fig.61] Configure test using power supplies

Setup Power relay board only

Select the box when you want to control the external power supplies (Voltage / Current / Output ON/OFF) and use the PRL-9500G to apply voltage to the UUT. In this case, read from paragraph 9.

Measurement by Internal measuring unit

Select the box when you want to control the external power supplies (Voltage / Current / Output ON/OFF) and use the PRL-9500G to apply voltage to the UUT and then use the APT-9411 measuring unit to measure the output. In this case, read from paragraph 10.



The probes to apply the voltage are configurable to the bottom probes and the flying probes. It is necessary to add another step to measure the output later.

If the box "Setup Power relay board only" was selected and clicked the Next button, it will display Fig.62 where the user can configure the PRL-9500G.

VO Command Generation		×
Power Relay Board		
1 ☞ DC+5V(SIG)	9 🗆 Unregistered	
2 🖻 DC+5V(SENS)	10 ⊏ Unregistered	
3 ☞ 0V(SIG)	11 Unregistered	
4 ₪ 0V(SENS)	12 Unregistered	
5 T Unregistered	13 □ Unregistered	
6 □ Unregistered	14 Unregistered	
7 Unregistered	15 Unregistered	
8 Unregistered	16 Unregistered	
	■ Back Next I X C	ancel

[Fig.62] Power Relay Board

Set every output port

Select the box "Set every output port" when the setting is required every output port. And select the Outport that should be turned on. In addition, select the box "Remote sensing connection" when the remote sensing connection (4-terminal measurement) is used. (In this case, the external power supply must correspond to the remote sensing.)

Uncheck the box "Remote sensing connection" when the remote sensing connection is not used. In this case, the user cannot select more than two (2) Outports unlike Fig.62. Be sure to select just two (+SIG and -SIG).

Click the Next button, and it will displays Fig.64.

Uncheck the box "Set every output port" when the setting is not required every output port. In this case, it will display Fig.63.

© Command Generation Power Relay Board		
☐ Set every output port		
₽ PS1	r PS3	
1: DC+5V(SIG)	9: Unregistered	
2: DC+5V(SENS)	10: Unregistered	
3:0V(SIG)	11: Unregistered	
4:0V(SENS)	12: Unregistered	
F PS2	□ PS4	
5: Unregistered	13: Unregistered	
6: Unregistered	14: Unregistered	
7: Unregistered	15: Unregistered	
8: Unregistered	16: Unregistered	
	▲ Back Next ► X Cancel	

[Fig.63] Power Relay Board

Only when PS1 was selected, it will display Fig.65. Make sure you set PS1 for 4-terminal connection. (Outport 1:Sig, Outport 2:Sens, Outport 3:Sig, Outport 4:Sens)

When other than PS1 was selected, it goes back to the Ste edit list, instead of Fig.65.

I/O Command Generation	×	VO Command Generation	×
Select output probe		Select output probe	
DC+5V(SIG) 0V(SENS)	1 1 Bottom probe	DC+5V(S(G)[Sig] DC+5V(SENS)[Sens] 0V(S(G)[Sig] 0V(SENS)[Sens]	1 Bottom probe 2
	▲Back ✓ OK ¥ Cancel		▲ Back ✓ OK X Cancel
	alaat autaut araba		last sutput proba

[Fig.64] Select output probe

[Fig.65] Select output probe

Specify the output to either Bottom probe 1 or Bottom probe 2 and click the OK button. Then it will display the Step edit list (Fig.66).

	1 3	📜 H. 🖫	A HAN
Edit List Er	ase Search	Change Pin coor. Pin Er	D.Edit D.Pn D.Set
Step :Aux.	Parts	Value	Comment
000001:	R902	47KO	*
000002:	R912	00	*
000003:	R913	00	*
000004:	R923	470	*
000005:	R922	470	*
000006:	C914	102	*
000007:	C913	102	*
000008:IO/G	POWER	*	&h3C00

[Fig.66] Step edit list

11. Select the box "Measurement by Internal measuring unit" and click the Next button, and it will display Fig.67.

/O Command Generation	2	
Power Relay Board		
☑ Set every output port		
1	9 🗆 Unregistered	
2 🖻 DC+5V(SENS)	10 ⊏ Unregistered	
3 ☞ 0V(SIG)	11 □ Unregistered	
4 ⋈ 0V(SENS)	12 ⊏ Unregistered	
5 🗆 Unregistered	13 □ Unregistered	
6 ⊏ Unregistered	14 □ Unregistered	
7 🗆 Unregistered	15 ⊏ Unregistered	
8 🗆 Unregistered	16 □ Unregistered	
Remote sensing connection		
	▲ Back Next ► X Cancel	

[Fig.67] Power Relay Board

Set every output port

Select the box "Set every output port" when the setting is required every output port. And select the Outport that should be turned on. In addition, select the box "Remote sensing connection" when the remote sensing connection is used. (In this case, the external power supply must correspond to the remote sensing.)

Uncheck the box "Remote sensing connection" when the remote sensing connection is not used. In this case, the user cannot select more than two (2) Outports unlike Fig.67. Be sure to select just two (+SIG and -SIG).

Click the Next button, and it will displays Fig.69.

Uncheck the box "Set every output port" when the setting is not required every output port. In this case, it will display Fig.63. The user should set every PS.

Power Relay Board	
☐ Set every output port	
₽ PS1	□ PS3
1: DC+5V(SIG)	9: Unregistered
2: DC+5V(SENS)	10: Unregistered
3:0V(SIG)	11: Unregistered
4:0V(SENS)	12: Unregistered
□ PS2	E PS4
5: Unregistered	13: Unregistered
6: Unregistered	14: Unregistered
7: Unregistered	15: Unregistered
8: Unregistered	16: Unregistered

[Fig.68] Power Relay Board

Only when PS1 was selected, the user can select the output from Bottom probe 1 and Bottom probe 2. (Refer to Fig.70) Make sure you set PS1 for 4-terminal connection. (Outport 1:Sig, Outport 2:Sens, Outport 3:Sig, Outport 4:Sens)

When other than PS1 was selected, it will display another screen where the user can specify High-pin and Low-pin which are used to measure after the voltage from the external power supply was applied to the UUT. The bottom probes etc are used to apply the voltage from the external power supply to the UUT.

1/O Command Generation		×	I/O Command Generation	× X
Select output probe			Select output probe	
DC+5V(SIG) 0V(SENS)	1 SBottom probe		DC+5V(SIG) [Sig] DC+5V(SENS) [Sens] 0V(SIG) [Sig] 0V(SENS) [Sens]	1 Bottom probe
	▲ <u>B</u> ack ✓ <u>O</u> K ✓ Cancel			▲ <u>B</u> ack ✓ <u>O</u> K X Cancel
[Fig.69] Se	elect output probe		[Fig.70] Se	elect output probe

Specify the output to either Flying probe (1-4) or Bottom probe 1,2.

(The explanation below is made assuming that Flying probe (1-4) was selected here.)

Select Flying probe (1-4) and click the Next button, it will display another screen (Fig.71) where the user can specify the coordinates where the voltage from the external power supply is applied and the coordinates (High-pin and Low-pin) where should be measured.

1/0 Command Generation	I/O Command Generation
Input the XY coordinates	Input the Pin Number
X coor Y coor High-Pin : +000.0000 (+000.0000 Low-Pin : +000.0000 (+000.0000 DC+5V(SIG) [Sig] +000.0000 (+000.0000 OV(SIG) [Sig] +000.0000 (+000.0000 OV(SENS) [Sens] +000.0000 (+000.0000 Press TEST STARE to begin set up.	High-Pin 1
Image: A Back Next ► Image: A Back Next ► Image: A Back Mext ► Image	
(Teaching system)	(Point system)

[Fig.71]

Depress the TEST START SW on the operation panel and input the coordinates for High-pin, Low-pin, +5V and 0V according to the menu guidance.

After the coordinates input was completed, click the OK button on the display. Then it goes back the Step edit list.

File Mode Edit	Optimizat	ion Tool Reference	e Test Total Coordinate
Edit List Er	ase Search	Change Pin coor. Pin E	r. D.Edit D.Fn D.Set
Step :Aux.	Parts	Value	Comment
000001:	R902	47KO	*
000002:	R912	00	*
000003:	R913	00	*
000004:	R923	470	*
000005:	R922	470	*
000006:	C914	102	*
000007:	C913	102	*
000008:IO/G	POWER	*	&h3C00

[Fig.72] Step edit list

Example 1

Let's assume the case that just controls the external power supplies (Voltage / Current / Output ON/OFF). (The user must think of the way of applying voltage to the UUT) After that, next step that controls the PRL-9500G applies another voltage from the external power supply to the UUT. The measurement is performed by the APT-9411.

How to program

- 1. Click on Step Edit (or Step List) from Edit menu on the Menu bar.
- 2. It displays "Enter step number (1 x)". Let's put a new step on the last step. Use the keyboard to enter the last step number and click on the OK button.
- 3. The cursor is flickering on the last step. Use the down-arrow key to move the cursor to the next step. (Refer to Fig.73)

	22 A	38 P	Move		100	1	1	- 1	1	
Fil	e M	ode E	dit C	ptimizat	tion Too	Refe	rence	Test T	otal (Coordinate
				4	U_	HL	II.	100	H	5.00
	Edit	List	Erase	Search	Change	Pin coor.	Pin Er.			
st	ер	:Aux	. Pa	arts		Val	ue		Comm	ent
00	0001	:	R	902		47K	0		*	
00	0002	:	R	912		00			*	
00	0003	:	R	913		00			*	
00	0004	:	R	923		470			*	
00	0005		R	922		470			*	
00	0006	:	C	914		102			*	
00	0007	:	C	913		102			*	
00	0008									

[Fig.73] Step edit list

4. Move to Tool > I/O function and click on "I/O Step Set". (Refer to Fig.74)

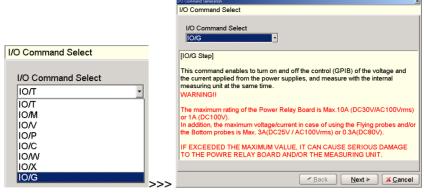
File Mode Edit	t Op	Coordinates Map F1	te Self-diag. Convert H
	irase 5	Set Comb Measurements Clear Comb Measurements	A.Gen. Print Under
<pre>Step :Aux. 0000001: 0000002: 0000003:</pre>	Pa: R9(R9: R9:	Generation Ground Bottom probe	×
000004: 000005: 000006:	R92 R92 C92	Cluster Function I/O Function	I/O Step <u>S</u> et
000007: 000008:	C9:	Viewable Setup of Function steps F4 Coorglinates input	I/O Step <u>O</u> lear
	ų	Auto Generation Change Step Data Ctrl+C Select Revise Area Mode High-fly / No-contact-zone Shift+Ctrl+H	

[Fig.74] I/O Function > I/O Step Set

- 5. It displays "Use board ref.point and aux.ref.point for alignment?". Select Yes or No.
- 6. It displays I/O Command Select screen. (Refer to Fig.75)

I/O Command Select
I/O Command Select Толт •
[IO/T Step] This is I/O command to measure with internal measuring unit while applying voltage or signal from external equipment connected to terminals.
[Fig.75] I/O Command Select

7. Select "IO/G" from the right pull-down menu. (Refer to Fig.76)



[Fig.76] I/O Command Select

8. Click the Next button, and it will display Fig.77.

I/O Command Generation		×
Setup Power Supplies		
PS1 PS2 PS3 PS4 PS-Au	x.	
Agilent E3649A [35V/1.4A 60V/0	0.8A]	
• OUTPUT <u>O</u> N • OUTPU	T OEF Output OUTPUT 1	
Setting value of voltage 0.00	- 0.0060.00[√]	
Limit value of current 0.000	↓ 0.0001.400[A]	
Stop testing with current measure	urement	
Setup measuring conditions		
Reference current value	0.000 0.0001.400[A]	
Judgment ±% tolerance	0 0100[%]	
Judgment -% tolerance	0 0100[%]	
		J
<u>W</u> ait time 0.0)25.5[sec]	
	<u> ⊲ B</u> ack <u>N</u> ext ► X <u>C</u> ance	əl

[Fig.77] Setup Power Supplies

PS-1 ~ PS-Aux

Select the external power supplies from PS1 ~ PS-Aux. Let's select PS1 in this example.

□ Use Power supply

Select the box in this case

OUTPUT ON / OUTPUT OFF

Select OUTPUT ON in this case

Setting value of voltage

Specify the voltage to output.

Limit value of current

Specify the current to output.

Given Stop testing with current measurement

When the box is selected, the test will be suspended if it goes off the preset current on the IO/G step. (Select between two)

Reference current value Specify the standard current value to be smaller than the Limit value of current.

Judgment +% tolerance Specify the upper limit of the current value by %.

opeany the upper limit of the current value by 70.

Judgment -% tolerance

Specify the lower limit of the current value by %.

Wait time

Specify Wait time by 0.0 ~ 25.5 sec.

9. After every configuration was completed, click the Next button, and it will display Fig.78. Click the OK button without selecting the box "Use Power relay board".



[Fig.78] Configure test using power supplies

10. It goes back to the Step edit list.

Edit Searcl		<u>T</u> ool <u>V</u> timization		rence Test	Total C	oordinate S	elf-dia	ia. Ì Conv	ert Ì Hela			
Edit List	Erase S		ange Pin coor.	Pin Er. D.E	, H	477	Gen.	n (i Print	f) Undo	Select	Сору	Pasto
Step :Au	x. Pai	rts	Val	ue	H-pin	L-pin	Cor	nment			Loc	EL
000001:	R90	02	47K	0	11	15	*				*	R
000002:	R91	12	00		3	10	*				*	R
000003:	R91	13	00		4	6	*				*	R
000004:	R92	23	470		11	10	*				*	R
000005:	R92	22	470		8	3	*				*	R
000006:	C91	14	102		7	6	*				*	С
000007:	C91	13	102		5	10	*				*	С
000008:10	/G POW	VER	IN		*	*	*				IO/G	*

[Fig.79] Step edit list

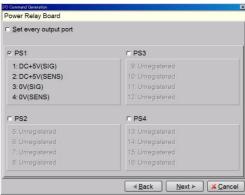
11. This stage, the external power supply outputs the voltage, but it's not possible to apply the voltage to the UUT through the flying probes and the bottom probes yet. The user must think of the way of applying voltage to the UUT.

The output of the voltage will be kept until the next IO/G step to suspend the output is executed.

- 12. Program the next step to have the PRL-9500G apply the voltage to the UUT and measure the output by the APT-9411. This will be attained by using the IO/X command. (For details, refer to IO/X command explained earlier.)
- 13. Use the down-arrow key to move the cursor to the next step.
- 14. Move to Tool > I/O function and click on "I/O Step Set".
- 15. It displays "Use board ref.point and aux.ref.point for alignment?". Select Yes or No.
- 16. It displays I/O Command Select screen. Select "IO/X" from the right pull-down menu.

I/O Command Generation	×
I/O Command Select	
I/O Command Select	
[IO/X Step]	
This is I/O command to measure with internal measuring unit while applying an external power supply connected to Power Relay Board.	
WARNING!!	
The maximum rating of the Power Relay Board is Max.10A (DC30V/AC100Vrms) or 1A (DC100V). In addition, the maximum voltage/current in case of using the Flying probes and/o the Bottom probes is Max. 3A(DC25V / AC100Vrms) or 0.3A(DC80V).	
IF EXCEEDED THE MAXIMUM VALUE, IT CAN CAUSE SERIOUS DAMAGE TO THE POWRE RELAY BOARD AND/OR THE MEASURING UNIT.	
<u> ≺ Back</u> Next ► X Cancel	
[Fig.80] I/O Command Select	

17. Click the Next button, and it will display Fig.81. Specify "PS1".



[Fig.81] Power Relay Board

18. Click the Next button, and it will display Fig.82. Specify "Flying probe (1 - 4)".

	×
Select output probe	
DC+24V(SIG) [Sig] DC+24V(SENS) [Sens] DV(SIG) [Sig]	; probe (1 - 4) •
	ext ► X Cancel

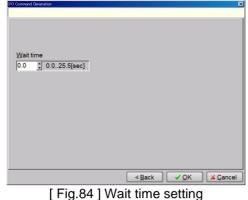
[Fig.82] Select output probe

19. Click the Next button, and it will display Fig.83. Specify the XY coordinate or the pin numbers as requested.

I/O Command Generation	1/O Command Generation
Input the XY coordinates	Input the Pin Number
X coor Y coor High-Pin: +000 0000 +000 0000 Low-Pin: +000 0000 +000 0000 DC+24V(SIG) [Sig] +000 0000 +000 0000 0V(SIG) [Sig] +000 0000 +000 0000 0V(SIG) [Sig] +000 0000 +000 0000 Press TTAT to begin set up.	High-Pin 1 1 032000 Low-Pin 2 1 032000 DC+24V(SIG) [Sig] / DC+24V(SENS) [Sens] 3 1 032000 0V(SIG) [Sig] / 0V(SENS) [Sens] 4 1 032000 Coordinates input
▲ Back Next ▶ X Cancel	
(Teaching system)	(Point system)

[Fig.83] Input the XY coordinates

20. Click the Next button, and it will display Fig.84. After specified Wait time by 0.0 ~ 25.5 sec, click the OK button.



21. It goes back to the Step edit list (the left screen of Fig.85). It will be useful to input any information on the test contents in the column "Parts" and "Value" as shown in the right screen of Fig.85.

Edit Search M File Mode Edit	ove <u>T</u> ool ⊻iew Optimization Too	I Reference T	est Total Coo	rdinate Self	diag. Conv	ert Help	1		Edit Search J File Mode Edit	_ove <u>⊺</u> ool Optimizatio	-	Total Cod	ordinate S	elf-diag. Conv	ert Help]	
Edit List Era	sse Search Change	Pin coor. Pin Er.		LSct A.Ge	n. Print		Select or		Edit List E	rase Search C	thange Pin coor. Pin Er. D) H	D.Set	Gen. Print	n) Undo	Select	
Step :Aux.	Parts	Value	H-pin	L-pin C	omment			Loc	Step :Aux.	Parts	Value	H-pin	L-pin	Comment			Loc
000001:	R902	47KO	11	15 *				*	000001:	R902	47KO	11	15	*			*
000002:	R912	00	3	10 *				*	000002:	R912	00	3	10	*			*
000003:	R913	00	4	6 *				*	000003:	R913	00	4	6	*			*
000004:	R923	470	11	10 *				*	000004:	R923	470	11	10	*			*
000005:	R922	470	8	3 *				*	000005:	R922	470	8	3	*			*
000006:	C914	102	7	6 *				*	000006:	C914	102	7	6	*			*
000007:	C913	102	5	10 *				*	000007:	C913	102	5	10	*			*
000008:IO/G	POWER	IN	*	* *				IO/G	000008:IO/G	POWER	IN	*	*	*			IO/G
000009:IO/X	*	*	*	* &	h3C00			IO/X	000009:IO/X	POWER	IN	*	*	&h3C00			IO/X
/000003120/11						r =:			and a dit lie		221			anoooo			20/11

[Fig.85] Step edit list

How to terminate voltage

1. Use the down-arrow key to move the cursor to the step where to terminate the output.

Edit Search	Move Tool V	jew						
File Mode E	dit Optimization	Tool Reference Te	st Total Coor	rdinate Self-	diag. Conv	ert Help		
Edit List		ange Pin coor. Pin Er.	🔵 🛃 🛔	Set A.Ge	n. Print	Np Undo	Select	бору
Step :Aux	. Parts	Value	H-pin 3	L-pin C	omment			Loc
000001:	R902	47KO	11	15 *				*
000002:	R912	00	3	10 *				*
000003:	R913	00	4	6 *				*
000004:	R923	470	11	10 *				*
000005:	R922	470	8	3 *				*
000006:	C914	102	7	6 *				*
000007:	C913	102	5	10 *				*
000008:10/0	POWER	IN	*	* *				IO/G
000009:10/2	V POWER	IN	*	* &	n3C00			IO/X
000010:								

[Fig.86] Step edit list

- 2. Move to Tool > I/O function and click on "I/O Step Set".
- 3. It displays "Use board ref.point and aux.ref.point for alignment?". Select Yes or No.
- 4. It displays I/O Command Select screen.
- 5. Select "IO/G" from the right pull-down menu. (Refer to Fig.87)

10 Command Generation
I/O Command Select
I/O Command Select
[IO/G Step]
This command enables to turn on and off the control (GPIB) of the voltage and the current applied from the power supplies, and measure with the internal measuring unit at the same time. WARNINGI!
The maximum rating of the Power Relay Board is Max.10A (DC30V/AC100Vrms) or 1A (DC100V). In addition, the maximum voltage/current in case of using the Flying probes and/or the Bottom probes is Max. 3A(DC25V / AC100Vrms) or 0.3A(DC80V).
IF EXCEEDED THE MAXIMUM VALUE, IT CAN CAUSE SERIOUS DAMAGE TO THE POWRE RELAY BOARD AND/OR THE MEASURING UNIT.
<u> </u>

[Fig.87] I/O Command Select

Click the Next button, and it will display Fig.88.

© OUTPUT	DN C	OUTPUT	OEF		Output	OUTP	UT 1 🔤
Setting value	of <u>v</u> oltage	0.00	-	0.00.	.60.00[V]		
Limit value of	current	0.000	-	0.000	1.400[A]		
☐ <u>S</u> top testing							

[Fig.88] Setup Power Supplies

PS-1 ~ PS-Aux

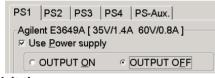
Select the external power supplies PS1 ~ PS-Aux which output should be terminated.

Use Power supply

Select the box in this case

OUTPUT ON / OUTPUT OFF

Select OUTPUT OFF in this case



Wait time

Specify nothing.

6. Click the Next button, and it will display Fig.90. Click the OK button without selecting the box "Use Power relay board".



[Fig.89] Configure test using power supplies

7. It goes back to the Step edit list (the left screen of Fig.90). Now you can see Step 000010 was added on the list to terminate the output. It will be useful to input any information on the test contents in the column "Parts" and "Value" as shown in the right screen of Fig.90.

Eair Search M	iove Tool view								Enir 2	earch I	Mode Tool	<u>v</u> ew						
File Mode Edit	Optimization Tool	Reference Te	est Total Co	ordinate	Self-diag. Cor	wert Help			File Mo	de Edit	Optimizati	on Tool Reference T	est Total Co	ordinate S	elf-diag. Cor	wert Help		
Edit List Er	ase Search Change	Pin coor. Pin Er.	O.Edit D.Ph	D.Set	A.Gen. Print	n) Undo		Gut Copy	Edit	List E	ase Search	Change Pin coor. Pin Er.	O.Edi: D.Pn	D.Set	Gen. Print	f) Undo	Select	
Step :Aux.	Parts	Value	H-pin	L-pin	Commen	t		Loc	Step :	Aux.	Parts	Value	H-pin	L-pin	Comment	5		Loc
000001:	R902	47KO	11	15	*			*	000001:		R902	47KO	11	15	*			*
000002:	R912	00	3	10	*			*	000002:		R912	00	3	10	*			*
000003:	R913	00	4	6	*			*	000003:		R913	00	4	6	*			*
000004:	R923	470	11	10	*			*	000004:		R923	470	11	10	*			*
000005:	R922	470	8	3	*			*	000005:		R922	470	8	3	*			*
000006:	C914	102	7	6	*			*	000006:		C914	102	7	6	*			*
000007:	C913	102	5	10	*			*	000007:		C913	102	5	10	*			*
000008:IO/G	POWER	IN	*	*	*			IO/G	000008:	IO/G	POWER	IN	*	*	*			10/0
000009:IO/X	POWER	IN	*	*	&h3C00			IO/X	000009:	IO/X	POWER	IN	*	*	&h3C00			10/2
000010:IO/G	*	*	*	*	*			IO/G	000010:	IO/G	POWER	OFF	*	*	*			10/0
00010.10/6							,	10/6		10/6		OFF						10/0

[Fig.90] Step edit list

Example 2

Let's assume the case that controls the external power supplies (Voltage / Current / Output ON/OFF) while using the PRL-9500G. The voltage is applied to the UUT through the bottom probes or the connector at the Tray. Therefore, more than one step will be measured until the step to terminate the output is executed.

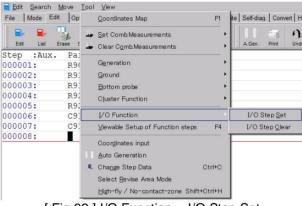
How to program

- 1. Click on Step Edit (or Step List) from Edit menu on the Menu bar.
- 2. It displays "Enter step number (1 x)". Let's put a new step on the last step. Use the keyboard to enter the last step number and click on the OK button.
- 3. The cursor is flickering on the last step. Use the down-arrow key to move the cursor to the next step. (Refer to Fig.91)

B , B ,	n 4		. n H m
Edit List	Erase Search	Change Pin coor. Pin Er.	
Step :Aux	K. Parts	Value	Comment
000001:	R902	47KO	*
000002:	R912	00	*
000003:	R913	00	*
000004:	R923	470	*
000005:	R922	470	*
000006:	C914	102	*
000007:	C913	102	*
000008:	1		

[Fig.91] Step edit list

4. Move to Tool > I/O function and click on "I/O Step Set". (Refer to Fig.92)

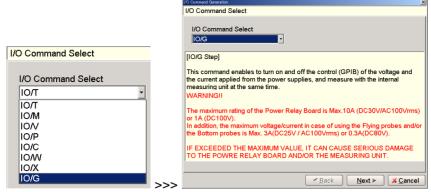


[Fig.92] I/O Function > I/O Step Set

- 5. It displays "Use board ref.point and aux.ref.point for alignment?". Select Yes or No.
- 6. It displays I/O Command Select screen. (Refer to Fig.93)

[Fig.93] I/O Command Select

7. Select "IO/G" from the right pull-down menu. (Refer to Fig.94)



[Fig.94] I/O Command Select

8. Click the Next button, and it will display Fig.95.

1/0 Command Generation				×
Setup Power Supplies				
PS1 PS2 PS3 PS4 PS	Aux.			
Agilent E3649A [35V/1.4A 60	V/0.8A]			
• OUTPUT <u>O</u> N • OUT	PUT O <u>F</u> F	Output	OUTPUT 1	•
Setting value of voltage 0.00	÷ 0.00	60.00[\/]		
Limit value of current 0.00	0.00	01.400[A]		
Stop testing with current me	easurement			
Setup measuring condition	s			
Reference current value	0.000	0.0001.40	0[A]	
Judgment ±% tolerance	0 ;	0100[%]		
Judgment -% tolerance	0	0100[%]	_	
Wait time 0.0	0.025.5[sec]			
	<u>B</u> ;	ack <u>N</u>	ext 🕨 🙀	<u>C</u> ancel
		-		

[Fig.95] Setup Power Supplies

PS-1 ~ PS-Aux

Select the external power supplies from PS1 ~ PS-Aux.

Use Power supply

Select the box in this case

OUTPUT ON / OUTPUT OFF

Select OUTPUT ON in this case

Setting value of voltage

Specify the voltage to output.

Limit value of current

Specify the current to output.

□ Stop testing with current measurement

When the box is selected, the test will be suspended if it goes off the preset current on the IO/G step. (Select between two)

Reference current value

Specify the standard current value to be smaller than the Limit value of current.

Judgment +% tolerance

Specify the upper limit of the current value by %.

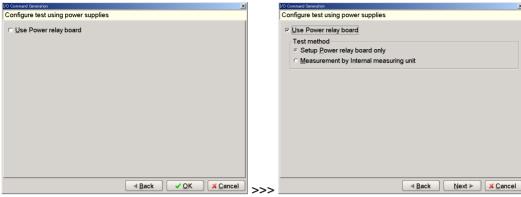
Judgment -% tolerance

Specify the lower limit of the current value by %.

Wait time

Specify Wait time by 0.0 ~ 25.5 sec.

9. After every configuration was completed, click the Next button, and it will display Fig.96.Select the box "Use Power relay board".



[Fig.96] Configure test using power supplies

Test method

Select the box "Setup Power relay board only" because you are going to control the external power supplies (Voltage / Current / Output ON/OFF) and use the PRL-9500G to apply voltage to the UUT.

10. Click the Next button, and it will display Fig.97. Specify "PS1" in this case.

Command Generation		I/O Command Generation	
ower Relay Board		Power Relay Board	
Set every output port		□ Set every output port	
PS1	□ PS3	r PS1	⊏ PS3
1:DC+5V(SIG)	9: Unregistered	1: DC+5V(SIG)	9: Unregistered
2: DC+5V(SENS)	10: Unregistered	2: DC+5V(SENS)	10: Unregistered
3:0V(SIG)	11: Unregistered	3: 0V(SIG)	11: Unregistered
4:0V(SENS)	12: Unregistered	4: 0V(SENS)	12: Unregistered
PS2	□ PS4	□ PS2	□ PS4
5: Unregistered	13: Unregistered	5: Unregistered	13: Unregistered
6: Unregistered	14: Unregistered	6: Unregistered	14: Unregistered
7: Unregistered	15: Unregistered	7: Unregistered	15: Unregistered
8: Unregistered	16: Unregistered	8: Unregistered	16: Unregistered

[Fig.97] Power Relay Board

11. Click the Next button, and it will display Fig.98.

It is only when you specified PS1 that Fig.98 is displayed. In the case of PS2 ~PS4, it goes back directly to the Step edit list (Fig.99).

Specify between Bottom probe 1 and Bottom probe 2.

When PS1 was specified, the Bottom probes are available to use. As for PS2 ~ PS4, the output will be the connector at the Tray.

Select output probe	
DC+5V(SIG) [Sig] DC+5V(SENS) [Sens] 0V(SIG) [Sig] 0V(SENS) [Sens]	1 Bottom probe 2 Bottom probe
	ABack ✓ QK X Cancel

[Fig.98] Select output probe

12. Click the OK button, and it goes back to the Step edit list (the left screen of Fig.99).

otimization Tool							📕 <u>E</u> dit <u>S</u> earch <u>N</u>	tove <u>T</u> ool ⊻		1 1	1 1		
	Reference Test To	otal Coo	rdinate Se	If-diag. Conv	ert Help		File Mode Edit	Optimization	Tool Reference Te	est Total Coordin	ate Self-diag. Con	vert Help	
Search Change Pin	Coor. Pin Er. D.Edt		Set A.C	i 📰	N Select	Gut Copy	Edit List Er	5		🔵 💾 🧑	A.Gen. Print	D Jundo Select	Gut Copy
rts	Value H	H-pin	L-pin	Comment		Loc	Step :Aux.	Parts	Value	H-pin L-	pin Comment	21	Loc
02	47KO	11	15	*		*	000001:	R902	47KO	11	15 *		*
12	00	3	10	*		*	000002:	R912	00	3	10 *		*
13	00	4	6	*		*	000003:	R913	00	4	6 *		*
23	470	11	10	*		*	000004:	R923	470	11	10 *		*
22	470	8	3	*		*	000005:	R922	470	8	3 *		*
14	102	7	6	*		*	000006:	C914	102	7	6 *		*
13	102	5	10	×		*	000007:	C913	102	5	10 *		*
	*	*	*	ah3C00		IO/G	000008:IO/G	POWER	IN	*	* &h3C00		IO/0
1011221	rts 02 12 13 23 22 14	Change Piecosr. Pierr Dirf ctts Value I D2 47KO I L2 00 I L3 00 I L2 470 I L2 470 I	Description Process Prefix Other Open of the print ctts Value H-pin 11 12 47K0 11 13 00 4 23 470 11 22 470 8 41 102 7	Descent Descent Descent Descent Descent Precent Prefix Descent DescentDescen Descent Descent Descent Descent Descent Descent DescentD	Jacon Proces Price Disf Disf Disf Disf Disf Print Lege Print Comment 22 47KO 11 15 * 12 00 3 10 * 13 00 4 6 * 22 47O 11 10 * 22 47O 8 3 * 14 102 7 6 * 13 102 5 10 *	Conserve Proces Pric Dirat Construction Access Print L-pin Comment 22 47K0 11 15 * 12 00 3 10 * 13 00 4 6 * 22 470 11 10 * 23 470 11 10 * 24 470 8 3 * 14 102 7 6 * 13 102 5 10 * * * * \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	By room Price Print L-pin L-pin Comment Loc 2 47K0 11 15 * * 12 00 3 10 * * 13 00 4 6 * * 22 470 11 10 * * 23 00 3 6 * * 23 00 4 6 * * 24 70 8 3 * * 10 10.2 7 6 * * 13 102 7 6 * * 13 102 5 10 * * * * * * *	State Course Process Price Dist Access Price State Eat Lat Eff ctts Value H-pin L-pin Comment Locy Step Alux. 2 47K0 11 15 * * 0000021 0000021 12 00 3 10 * * 00000021 0000021 13 00 4 6 * * 0000041 0000041 22 470 11 10 * * 0000041 0000041 22 470 8 3 * * 00000051 13 102 7 6 * * 0000071 13 102 5 10 * * 0000071 * * * \$	Based Dange Proce Price Diff Diff <thdiff< th=""> Diff Diff<td>Charge Procer PHEr DEF <thdef< th=""> DEF DEF <thde< td=""><td>Based Dange Proce Prif Design Price Prif Design Price Prif Loss Step Fat Et Et<td>Based Dange Proce Pier Ord Diff A Gen Pei trs Value H-pin L-pin Comment Loc Step Fats Value H-pin L-pin Comment Step Fats Value H-pin L-pin Comment Loc Step Fats Value H Tats Value H Step Fats Value H Tats Value H N X Value</td><td>Based Dange Proces Priz Diag <thdiag< th=""> Diag Diag</thdiag<></td></td></thde<></thdef<></td></thdiff<>	Charge Procer PHEr DEF DEF <thdef< th=""> DEF DEF <thde< td=""><td>Based Dange Proce Prif Design Price Prif Design Price Prif Loss Step Fat Et Et<td>Based Dange Proce Pier Ord Diff A Gen Pei trs Value H-pin L-pin Comment Loc Step Fats Value H-pin L-pin Comment Step Fats Value H-pin L-pin Comment Loc Step Fats Value H Tats Value H Step Fats Value H Tats Value H N X Value</td><td>Based Dange Proces Priz Diag <thdiag< th=""> Diag Diag</thdiag<></td></td></thde<></thdef<>	Based Dange Proce Prif Design Price Prif Design Price Prif Loss Step Fat Et Et <td>Based Dange Proce Pier Ord Diff A Gen Pei trs Value H-pin L-pin Comment Loc Step Fats Value H-pin L-pin Comment Step Fats Value H-pin L-pin Comment Loc Step Fats Value H Tats Value H Step Fats Value H Tats Value H N X Value</td> <td>Based Dange Proces Priz Diag <thdiag< th=""> Diag Diag</thdiag<></td>	Based Dange Proce Pier Ord Diff A Gen Pei trs Value H-pin L-pin Comment Loc Step Fats Value H-pin L-pin Comment Step Fats Value H-pin L-pin Comment Loc Step Fats Value H Tats Value H Step Fats Value H Tats Value H N X Value	Based Dange Proces Priz Diag Diag <thdiag< th=""> Diag Diag</thdiag<>

[Fig.99] Step edit list

13. Program the next step to measure the output after powered up the UUT.

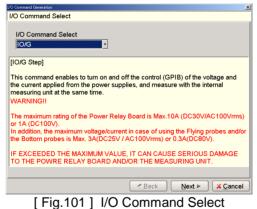
How to terminate voltage

1. Use the down-arrow key to move the cursor to the step where to terminate the output.

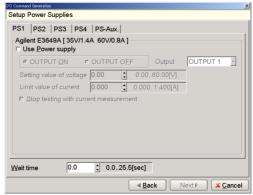
File Mode Edit	Optimizat	ion Tool Reference Te	est Total Co	ordinate S	elf-diag. Conv	ert Help		
Edit List E	rase Search	Change Pin coor. Pin Er.		D.Set	.Gen. Print	Dundo Selec		Б ору
Step :Aux.	Parts	Value	H-pin	L-pin	Comment	l.	I	loc
000001:	R902	47KO	11	15	*		*	ŧ
000002:	R912	00	3	10	*		*	¢.
000003:	R913	00	4	6	*		*	e e
000004:	R923	470	11	10	*		*	¢
000005:	R922	470	8	3	*		*	¢
000006:	C914	102	7	6	*		*	•
000007:	C913	102	5	10	*		*	e
000008:IO/G	POWER	IN	*	*	&h3C00		I	0/0
000009:								

[Fig.100] Step edit list

- 2. Move to Tool > I/O function and click on "I/O Step Set".
- 3. It displays "Use board ref.point and aux.ref.point for alignment?". Select Yes or No.
- 4. It displays I/O Command Select screen.
- 5. Select "IO/G" from the right pull-down menu. (Refer to Fig.101)



6. Click the Next button, and it will display Fig.102.



[Fig.102] Setup Power Supplies

PS-1 ~ PS-Aux

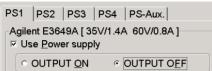
Select the external power supplies PS1 ~ PS-Aux which output should be terminated.

Use Power supply

Select the box in this case

OUTPUT ON / OUTPUT OFF

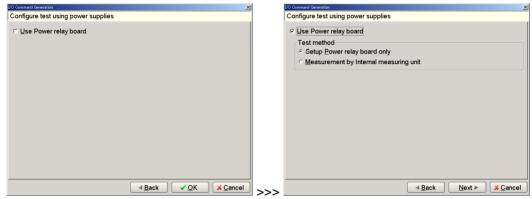
Select OUTPUT OFF in this case



Wait time

Specify nothing.

7. After every configuration was completed, click the Next button, and it will display Fig.103.Select the box "Use Power relay board".



[Fig.103] Configure test using power supplies

Test method

Select the box "Setup Power relay board only".

8. Click the Next button, and it will display Fig.104. Click the OK button without selecting anything.

Power Relay Board	
☐ Set every output port	
□ PS1	E PS3
1:DC+5V(SIG)	9: Unregistered
2: DC+5V(SENS)	10: Unregistered
3:0V(SIG)	11: Unregistered
4:0V(SENS)	12: Unregistered
F PS2	⊏ PS4
5: Unregistered	13: Unregistered
6: Unregistered	14: Unregistered
7: Unregistered	15: Unregistered
8: Unregistered	16: Unregistered
	▲ Back ✓ OK X Cancel

[Fig.104] Power Relay Board

9. It goes back to the Step edit list (the left screen of Fig.105). Now you can see Step 000010 was added on the list to terminate the output. It will be useful to input any information on the test contents in the column "Parts" and "Value" as shown in the right screen of Fig.105.

🗎 Edit Search M	love <u>T</u> ool <u>V</u> ie	ew				📃 Edit	Search	Move Tool V	(lew				
File Mode Edit	Optimization	Tool Reference Te	st Total Coordin	nate Self-diag. Conve	ert Help	File	Mode Edi	t Optimization	Tool Reference Te	st Total Coordi	nate Self-diag. Conve	ert Help	
Edit List Er	ase Search Cha	nge Pin coor. Pin Er.	🥏 🛃 🐢 D.Bak D.Pn D.Se	A.Gen. Print		Copy		90 -	ange Pin coor. Pin Er.	o the o	A.Gen. Print	N Select	Sut Copy
Step :Aux.	Parts	Value	H-pin L-	-pin Comment	I	Loc Step	:Aux.	Parts	Value	H-pin L	-pin Comment		Loc
000001:	R902	47KO	11	15 *	1	00000	1:	R902	47KO	11	15 *		*
000002:	R912	00	3	10 *	1	• 00000	2:	R912	00	3	10 *		*
000003:	R913	00	4	6 *	1	00000	3:	R913	00	4	6 *		*
000004:	R923	470	11	10 *	,	• 00000	4:	R923	470	11	10 *		*
000005:	R922	470	8	3 *	*	00000	5:	R922	470	8	3 *		*
000006:	C914	102	7	6 *	7	• 00000	6:	C914	102	7	6 *		*
000007:	C913	102	5	10 *	1	00000	7:	C913	102	5	10 *		*
000008:IO/G	POWER	IN	*	* &h3C00	1	CO/G 00000	8:10/G	POWER	IN	*	* &h3C00		IO/G
000009:	REG-1	5.0V	*	* *	,	00000	9:	REG-1	5.0V	*	* *		*
000010:IO/G	*	*	*	* &h0000	1	CO/G 00001	0:I0/G	POWER	OFF	*	* &h0000		IO/G

[Fig.105] Step edit list

Example 3

Let's assume the case that controls the external power supplies (Voltage / Current / Output ON/OFF) while using the PRL-9500G. The voltage is applied to the UUT through the flying probes. The measurement is performed by the APT-9411. After the step finished applying voltage through the flying probes, the output to the UUT will be terminated automatically.

How to program

- 1. Click on Step Edit (or Step List) from Edit menu on the Menu bar.
- 2. It displays "Enter step number (1 x)". Let's put a new step on the last step. Use the keyboard to enter the last step number and click on the OK button.
- 3. The cursor is flickering on the last step. Use the down-arrow key to move the cursor to the next step. (Refer to Fig.106)

E	<u>E</u> dit §			<u>T</u> ool	100					
F	ile M	ode E	dit C	ptimizat	tion Too	Refe	rence	Test T	otal	Coordinate
1	=		1	4	U_	HL	1	100	H	Ars.
	Edit	List	Erase	Search	Change	Pin coor.	Pin Er.			
st	cep	:Aux	. Pa	arts		Val	ue		Comn	lent
00	00001	:	R	902		47K	0		*	
00	00002	:	R	912		00			*	
00	00003	:	R	913		00			*	
00	00004	:	R	923		470			*	
00	00005	:	R	922		470			*	
00	00006	1	C	914		102			*	
00	00007	:	C	913		102			*	
00	80000									

[Fig.106] Step edit list

4. Move to Tool > I/O function and click on "I/O Step Set". (Refer to Fig.107)

File Mode Ed	it Op	<u>C</u> oordinates Map F	F1	te Self-diag. Convert H
Edit List	Erase 5	 Set Comb Measurements Clear Comb Measurements 		A.Gen. Print Under
<pre>Step :Aux. 000001: 000002: 000003: 000004:</pre>	R9(R9: R9: R9:	Ggneration Ground Bottom probe Cluster Function	- + + + +	
000005:	R9:	I/O Function		I/O Step <u>S</u> et
000007:	C9:	⊻lewable Setup of Function steps F	F4	I/O Step <u>C</u> lear
000008:		Coorginates input Auto Generation Change Step Data Ctrl+ Select <u>R</u> evise Area Mode High-fly / No-contact-zone Shift+Ctrl+	-	

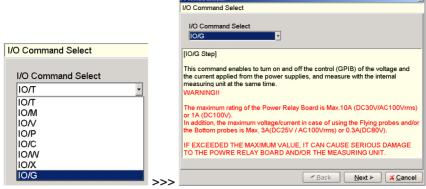
[Fig.107] I/O Function > I/O Step Set

- 5. It displays "Use board ref.point and aux.ref.point for alignment?". Select Yes or No.
- 6. It displays I/O Command Select screen. (Refer to Fig.108)

I/O Command Select I/O Command Select I/O Command Select I/O T I/O T Step] This is I/O command to measure with internal measuring unit while applying voltage or signal from external equipment connected to terminals.	VO Command Generation	2
олт	I/O Command Select	
This is I/O command to measure with internal measuring unit while applying		
		re with internal measuring unit while applying
		<u>≺ Back</u> <u>N</u> ext ► <mark>X C</mark> ancel

[Fig.108] I/O Command Select

7. Select "IO/G" from the right pull-down menu. (Refer to Fig.109)



[Fig.109] I/O Command Select

8. Click the Next button, and it will display Fig.110.

1/0 Command Generation		×
Setup Power Supplies		
PS1 PS2 PS3 PS4 PS-Aux	х.	
Agilent E3649A [35V/1.4A 60V/0.	.8A]	
• OUTPUT <u>O</u> N • OUTPUT	T OEF Output OUTPUT 1	
Setting value of voltage 0.00	↓ 0.0060.00[V]	
Limit value of current 0.000		
Stop testing with current measu	urement	
Setup measuring conditions		
Reference currenţ value	0.000 🗘 0.0001.400[A]	
Judgment ±% tolerance	0 0100[%]	
Judgment -% tolerance	0 0100[%]	
<u>W</u> ait time 0.0 ‡ 0.0.	025.5[sec]	
	■ <u>B</u> ack <u>N</u> ext ► <u>× C</u> anc	el

[Fig.110] Setup Power Supplies

PS-1 ~ PS-Aux

Select the external power supplies from PS1 ~ PS-Aux.

Use Power supply

Select the box in this case

OUTPUT ON / OUTPUT OFF

Select OUTPUT ON in this case

Setting value of voltage

Specify the voltage to output.

Limit value of current

Specify the current to output.

Stop testing with current measurement

When the box is selected, the test will be suspended if it goes off the preset current on the IO/G step. (Select between two)

Reference current value

Specify the standard current value to be smaller than the Limit value of current.

Judgment +% tolerance

Specify the upper limit of the current value by %.

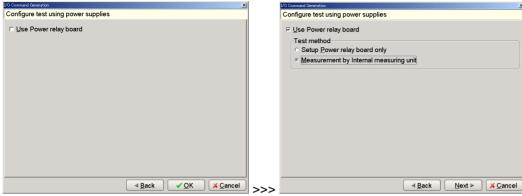
Judgment -% tolerance

Specify the lower limit of the current value by %.

Wait time

Specify Wait time by 0.0 ~ 25.5 sec.

9. After every configuration was completed, click the Next button, and it will display Fig.111.Select the box "Use Power relay board".



[Fig.111] Configure test using power supplies

Test method

Select the box "Measurement by Internal measuring unit" because you are going to use the APT-9411 measuring unit to measure the output after powered up the UUT.

10. Click the Next button, and it will display Fig.112. Specify "PS1" in this case.

ower Relay Board		V0 Command Generation Power Relay Board	
Set every output port		□ Set every output port	
PS1	□ PS3	₽ PS1	⊏ PS3
1:DC+5V(SIG)	9: Unregistered	1: DC+5V(SIG)	9: Unregistered
2: DC+5V(SENS)	10: Unregistered	2: DC+5V(SENS)	10: Unregistered
	11: Unregistered	3: 0V(SIG)	11: Unregistered
4:0V(SENS)	12: Unregistered	4:0V(SENS)	12: Unregistered
PS2	□ PS4	□ PS2	□ PS4
5: Unregistered	13: Unregistered	5: Unregistered	13: Unregistered
6: Unregistered	14: Unregistered	6: Unregistered	14: Unregistered
7: Unregistered	15: Unregistered	7: Unregistered	15: Unregistered
8: Unregistered	16: Unregistered	8: Unregistered	16: Unregistered

[Fig.112] Power Relay Board

 Click the Next button, and it will display Fig.113. It is only when you specified PS1 that Fig.113 is displayed. In the case of PS2 ~PS4, it goes to Fig.115 where the user can input the XY coordinates for High-pin and Low-pin.

1/0 Command Generation	×
Select output probe	
Select output probe DC+5V(SIG) [Sig] DC+5V(SENS) [Sens] 0V(SIG) [Sig] 0V(SENS) [Sens]	Flying probe (1 - 4)
	✓ Back Next > X Cancel

[Fig.113] Select output probe

When PS1 was specified, the flying probes and the bottom probes are available to use. As for PS2 ~ PS4, the output will be the connector at the Tray.

Let's select Flying probe (1 - 4) this time.

12. Click the Next button, and it will display Fig.114.

Input the XY coordinates
X coor Y coor High-Pin : [+000.0000 +000.0000
Low-Pin : +000.0000 +000.0000
DC+5V(SIG) [Sig] DC+5V(SENS) [Sens]
0V(SIG) [Sig] 0V(SENS) [Sens]
Press TEST to begin set up.

[Fig.114] Input the XY coordinates

Press the TEST START SW on the operation panel to start inputting the XY coordinates according to the menu guidance.

High-pin and Low-pin are used to measure the output. And +5V SIG, +5V SENS, 0V SIG and 0V SENS are used to apply the voltage to the UUT.

13. After the XY coordinates input was completed, click the OK button, and it goes back to the Step edit list (the left screen of Fig.115). It will be useful to input any information on the test contents in the column "Parts" and "Value" as shown in the right screen of Fig.115.

love <u>T</u> ool ⊻iew							Edit Search	<u>M</u> ove <u>T</u> ool	View						
Optimization Too	Reference Test	Total Coord	inate Self-diag.	Convert H	lelp		File Mode Edit	Optimizat	ion Tool Reference Test	Total Coon	dinate Se	If-diag. Com	ert Help		
ase Search Change	Pin coor. Pin Er. D.E.	D H +	A.Gen.				Edt List E	rase Search	Change Pin coor. Pin Er.) H (Set A	i 👘	n Undo	J Select	
Parts	Value	H-pin L	-pin Comr	ent		Loc	Step :Aux.	Parts	Value	H-pin I	-pin	Comment			Loc
R902	47KO	*	* *			*	000001:	R902	47KO	*	*	*			*
R912	00	*	* *			*	000002:	R912	00	*	*	*			*
R913	00	*	* *			*	000003:	R913	00	*	*	*			*
R923	470	*	* *			*	000004:	R923	470	*	*	*			*
R922	470	*	* *			*	000005:	R922	470	*	*	*			*
C914	102	*	* *			*	000006:	C914	102	*	*	*			*
C913	102	*	* *			*	000007:	C913	102	*	*	*			*
*	*	*	* &h30	00		IO/	G 000008:IO/G	POWER	IN	*	*	&h3C00			IO/G
	Optimization Too See Search Change Parts R902 R912 R913 R923 R922 C914	Optimization Tool Reference Test see 6 secto Charge Ph corr Ph Zr Fe Zr R902 47KO R912 00 R913 00 R913 00 R923 470 R922 470 C914 102 C913 102 C914 102	Optimization Total Reference Test Total Coord ws Seach France France	Optimization Total Reference Test Total Coordinate Self-digg Secto Charge Price Price<	Optimization Total Coordinate Selfding Convert H ws Search Description Total Coordinate Selfding Convert H ws Search Description Total Coordinate Selfding Convert H Parts Value H-pin L-pin Convert H Dis Dis	Optimization Total Reference Test Total Coordinate Self-diag Connect Height ws Search Coordinate Self-diag Connect Height Intervention Interve	Optimization Total Coordinate Seldian Connent Heip Search Coordinate Seldian Connent Heip Image: Search Total Coordinate Seldian Connent Heip Search Coordinate Seldian Connent Heip Image: Search Total Coordinate Seldian Connent Heip Image: Search Coordinate Search <	Optimization Total Coordinate Seldian Connent Heip File Mode End we Search Coordinate Seldian Connent Heip File Mode End End End End File Mode End End	Optimization Total Coordinate Seldian Convert Heip File Mode Edit Optimization we Search Name Name <td>Optimization Total Rederence Test Total Coordinate Safe diag Connect Height No No</td> <td>Optimization Total Coordinate Self Sage Self Sage Self Sage Coordinate Self Sage <</td> <td>Optimization Total Coordinate Safety Coordinate Safety</td> <td>Optimization Total Considerate Self-diag Considerat Self-diag Considerat<</td> <td>Optimization Total Coordinate Selfding Connent Heip 0 File Mode File Mode<</td> <td>Optimization Total Coordinate Self-diag Connect Heip 0xx file fi</td>	Optimization Total Rederence Test Total Coordinate Safe diag Connect Height No No	Optimization Total Coordinate Self Sage Self Sage Self Sage Coordinate Self Sage <	Optimization Total Coordinate Safety Coordinate Safety	Optimization Total Considerate Self-diag Considerat Self-diag Considerat<	Optimization Total Coordinate Selfding Connent Heip 0 File Mode File Mode<	Optimization Total Coordinate Self-diag Connect Heip 0xx file fi

[Fig.115] Step edit list

How to terminate voltage

The output from the external power supplies will be terminated automatically after the IO/G step was performed.

Viewable Setup of Function steps

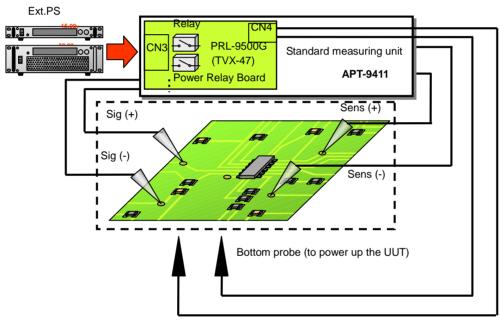
This chapter describes the procedures to generate I/O steps (basic data programming and reference input) using the Viewable Setup of Function steps screen.

We demonstrate three concrete examples (Case1~3) of the way of generating I/O steps are used. In addition, the explanation is made to the case that the external power supplies are connected to the APT-9411 via GPIB.

The Aux. column of the I/O steps will be substituted by "IO/F" automatically only when they were generated by making use of the Viewable Setup of Function steps screen

CASE 1

When the external power supplies are used to power up the UUT through the bottom probes and the connectors at the Tray and the flying probes measure multiple steps in series.



[Fig.116]CASE 1

(Remarks)

- 1. The voltage output will terminate automatically in any of the following cases:
 - * when the IO/F step to terminate the output was performed.
 - * when test finished.
 - * when the step using the bottom probes was performed. (Only PS1~PS4 are terminated)
- 2. If the step using the bottom probes is changed to IO/F step, the original bottom probe settings will be initialized.
- 3. The way of applying voltage to the UUT are as follows;
 - * PS1 ~ PS4 use Bottom probe 1,2.
 - * PS3 ~ PS14 are output to the connector (HS-644-02A) installed on the Tray. The user must think of the way of applying voltage from the connector to the UUT. (Ex. Bottom probe option, direct linkage with some connector)

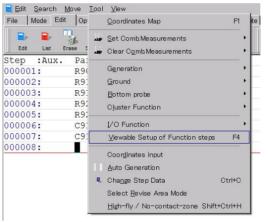
Programming procedure How to apply voltage

- 1. Click on Step Edit (or Step List) from Edit menu on the Menu bar.
- 2. It displays "Enter step number (1 x)". Let's put a new step on the last step. Use the keyboard to enter the last step number and click on the OK button.
- 3. The cursor is flickering on the last step. Use the down-arrow key to move the cursor to the next step. (Refer to Fig.117)

Edit	<u>S</u> earch	<u>M</u> ove	<u>T</u> ool	⊻iew					
File	Mode E	idit O	ptimizat	ion Too	Refe	rence 1	Fest T	otal 0	Coordinate
		T.	4	ų	1-12	П.	100	H	5.75
Edit	List	Erase	Search	Change	Pin coor.	Pin Er.	D.Edit		D.Set
Step	:Aux	. Pa	arts		Val	ue	(Comme	ent
00000	1:	R	902		47K	C		*	
00000	2:	R	912		00		1	*	
00000	3:	R	913		00			*	
00000	4:	R	923		470		1	*	
00000	5:	R	922		470		7	*	
00000	6:	C	914		102		1	*	
00000	7:	C	913		102		-	t	
00000	8:	1							

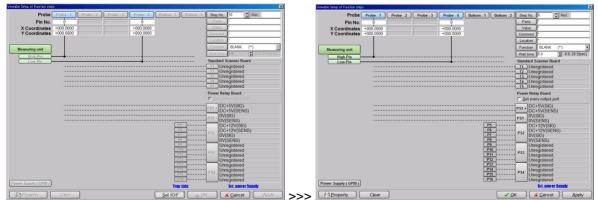
[Fig.117] Step edit list

4. Click "Viewable setup of Function steps" on the Tool menu. (Refer to Fig.118)



[Fig.118] Viewable setup of Function steps

5. It displays the Viewable setup of Function steps screen. (Refer to the left of Fig.119). Click "Set IO/F" button to activate each function on the screen. (Refer to the right of Fig.119)



[Fig.119] Viewable setup of Function steps

6. Select "Set every output port" at Power Relay Board.

When the box is unchecked, you will get to 4-terminal connection. (Refer to the left of Fig.122) When the box is checked, you will get to 2-terminal connection. (Refer to the right of Fig.122) Configure it on the basis of the specification of your external power supplies.

The explanation here is made assuming that the box is unchecked.

Powe	r Relay Board	Power Relay Board
□ <u>S</u> e	et every output port	☑ Set every output port
PS1 +	DC+5V(SIG)	P1 DC+5V
	JDC+5V(SENS)	P2_0V
PS1 -	0V(SIG)	P3 Unregistered
1 91 -	JOV(SENS)	P4 Unregistered
	DC+12V(SIG)	P5 DC+12V
PS2	DC+12V(SENS)	P6 0V
P 32	0V(SIG)	P7 Unregistered
	OV(SENS)	P8 Unregistered
	Unregistered	P9 Unregistered
PS3	Unregistered	P10 Unregistered
P53	Unregistered	P11 Unregistered
	Unregistered	P12 Unregistered
	Unregistered	P13 Unregistered
PS4	Unregistered	P14 Unregistered
P54	Unregistered	P15 Unregistered
	Unregistered	P16 Unregistered
	Ext. power Supply	Ext. power Supply

when Set every output port is unchecked when Set every output port is selected [Fig.120] Viewable setup of Function steps



Signal name (ex. 0V, DC +5V) on Fig.120 is assignable on Input / output function of I/O step in Option mode. (Refer to Page 6) "Unregistered" means that signal name is not registered yet.

7. Click [PS1+] to specify the output of the external power supplies connected to the PRL-9500G. Then [Probe-1] to [Bottom-2] buttons are flashing in yellow.

ble Setup of Function step	9									
Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2	Step	No. 8	2 Aux	
Pin No.	ò			ò	-		Par	ts P		
X Coordinates	+000,0000			+000.0000			Val	10. ×		
Y Coordinates				+000.0000			Comn	ent l*		
							Loca			
Measuring unit							Func	tion BL	ANK (**)	
(High-Pin)							Wait 1	ime_0.0	0	
Low Pin	-						Stand	ard Scann	er Board	
							TI	Unregist	ered	
							T2	Unregist	ered	
			•••••					Unregist		
			••••••					Unregist		
			••••••					Unregist		
								Relay Bo		
							(not	DC+5V	SIG)	
			•••••	•••••				DC+3V(SENS)	
			•••••	••••••				0V(SIG)		
								OV(SEN		
						2 <u>6</u>		DC+12		
						17		DC+12\ 0V(SIG)	(SENS)	
						18		0V(SIG)	(2	
				-		_		OLU	01	

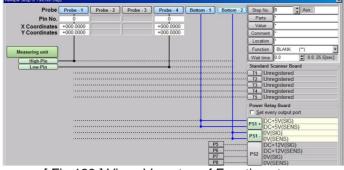
[Fig.121] Viewable setup of Function steps

8. Specify [Bottom-1] as the output of [PS1+], and they will be connected with a blue line. (Refer to Fig.122)

le Setup of Function steps									
Probe	Probe - 1 Probe	- 2 Probe - 3	Probe - 4	Bottom - 1	Bottom - 2	Step No.	8	Aux.	
Pin No.	0		Ö			Parts	×		
X Coordinates	000.0000		+000.0000			Value	Î.		
	000.0000		+000.0000			Comment	1.		
						Location	1		
						Function	BLANK	(**)	
Measuring unit						Wait time	0.0		25.5[se
High-Pin -				•••••				-	
Low-Pin -			•				Scanner Bo		
							egistered		
							registered registered		
							registered		
							egistered		
						Power Re	-		
							ery output p	out	
						PS1 + DC	+5V(SIG)	0)	
							+5V(SEN (SIG)	5)	
							(SENS)		
				P	5		+12V(SIG	0	
				P	6	DC	+12V(SE		
				P	7		(SIG)	(10)	
				P	8		SENS)		

[Fig.122] Viewable setup of Function steps

9. Click [PS1-] to specify the output, and [Probe1] to [Bottom-2] are flashing in yellow. Specify [Bottom-2] as the output of [PS1-], and they will be connected with a blue line. (Refer to Fig.123)

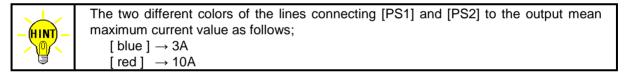


[Fig.123] Viewable setup of Function steps

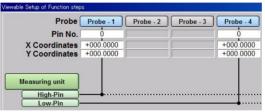
10. Click [PS2] to specify the output, and [PS2] will be connected to [P5] to [P8] with red lines. (Refer to Fig.124)

Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2	Step No	. 8 🗘 Aux.
Pin No.	ò		1	ò			Parts	•
X Coordinates	+000.0000			+000.0000			Value	
Y Coordinates	+000.0000			+000.0000			Commen	nt *
							Location	n ^
							Functio	n BLANK (**)
Measuring unit							Wait tim	
High-Pin -	.	••••••	•••••		••••••			
Low-Pin -				••••••				d Scanner Board
								Inregistered Inregistered
								Inregistered
								Inregistered
		•••••			•••••	•••••	T5 U	Inregistered
							Power R	elay Board
							□ Set e	every output port
							PS1 +	IC+5V(SIG)
							PS1 + D	IC+5V(SENS)
								V(SIG)
		••••••	••••••					V(SENS)
					P			IC+12V(SIG)
					P		PS2	IC+12V(SENS) V(SIG)
					- P			V(SENS)

[Fig.124] Viewable setup of Function steps



11. The two probes used to measure after powered up the UUT are already set to [Probe-1] and [Probe-4]. If you want to change them, click [High-pin] / [Low-pin] to select other probes.



[Fig.125] Viewable setup of Function steps

12. Click the Property button, and it will display the Measuring unit screen. (Refer to Fig.126) Use your keyboard to fill in the Parts column. In addition, enter the Value, Comment and Location column as needed.

Fill in the Function, Element and Measure Mode column if the measurement content is already determined as they will assist in inputting the reference value.

	tion				_	
	Parts :				(11 char	
	<u>V</u> alue :				(11 char	
	Comment :				 (20 char	
	Location :	*			(4 chara	cters)
	Eunction :	BLANK	(**)	•		
	Element :	AUTO		÷		
Meas	ure Mode :	AUTO		Ψ.		

[Fig.126] Measuring unit

13. Click the OK button and it will displays the Coordinate set screen. (Refer to Fig.127)

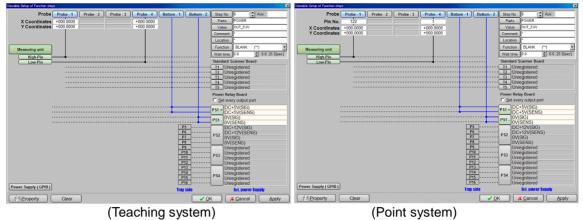
Coordinate Set				×	Coordinate Set						×
000008:*	*	*	*		000008:*	*		•	*		
			oor Y coor 0000 +000.0000 0000 +000.0000			High - Pin : Low - Pin :		032000			ID.Net ID.Net
	Press	START to be	gin set up.							Coordinates	s input
			 ▲ Back 	Cancel							<mark>≭ <u>C</u>ancel</mark>
	(Tea	aching s	system)				(F	Point s	system))	

(Teaching system) [Fig.127] Coordinate set

On the Coordinate set screen, enter the coordinates of High-pin and Low-pin (in Teaching system) or the pin numbers (in Point system).

	In Point system button so that it					e Coordinates input rdinates.
	Coordinates input				×	
	000008: *	* *	*			
<u>— (HINT) — </u>	Press [EN	ITER] SW to set	t the coordinates.			
		Pin No. Net Nam	ie	X coor	Y coor	
	High - Pin	122 *		[+000.000	0,+000.0000]	
Ŷ	Low - Pin	1 *		[+000.000	0,+000.0000]	
				<u>✓ 0</u> K	X Cancel	
		[F	ig.128] Coordin	ate input		

14. Click the OK button, and it goes back to the Viewable setup of Function steps screen.



[Fig.129] Viewable setup of Function steps

15. Click the OK button, and it goes back to the Step edit list. Now you can see the AUX. column is substituted by "IO/F".

📃 Edit Search M	<u>t</u> ove <u>T</u> ool <u>V</u> iew			📃 Edit Search M	<u>t</u> ove <u>T</u> ool <u>V</u> iew				
File Mode Edit	Optimization Tool	Reference Test	Total Coordinate	File Mode Edit	Optimization T	ool Reference Test	Total Coordinate Self-diag.	Convert Help	
Edit List Er	ase Search Change		Gen. Print Undo	Edit List Er	ase Search Change	Pin coor. Ph.En. D.	D. H. C.Sei A.Gen. Pr	int Undo Select	Sut.
Step :Aux.	Parts	Value	Comment	Step :Aux.	Parts	Value	Comment	H-pin L	-pin
000001:	R902	47KO	*	000001:	R902	47KO	*	11	15
000002:	R912	00	*	000002:	R912	00	*	3	10
000003:	R913	00	*	000003:	R913	00	*	4	6
000004:	R923	470	*	000004:	R923	470	*	11	10
000005:	R922	470	*	000005:	R922	470	*	8	3
000006:	C914	102	*	000006:	C914	102	*	7	6
000007:	C913	102	*	000007:	C913	102	*	5	10
000008:IO/F	POWER	OUT_5.0V	*	000008:IO/F	POWER	OUT_5.0V	*	1	2

(Teaching system)

(Point system)

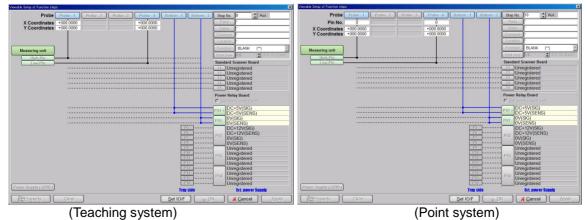
16. Press the Esc key on the keyboard if you don't have to measure any more. But when there are some other points to measure, use the down-arrow key to move the cursor to the next step. (In case of Fig.130, the cursor should be moved to the step 000009.

[Fig.130] Step edit list

Edit Search Mr. File Mode Edit	<u>A</u> ove <u>T</u> ool ⊻lew Optimization To	ol Reference Te	est Total Coord	dinate Self-dia	q. Convert He
Edit List Et	ase Search Change	D.Edit D.Sei	A.Gen. Print	D Select	
Step :Aux.	Parts	Value	Comment	5	F.
000001:	R902	47KO	*		* *
000002:	R912	00	*		* *
000003:	R913	00	*		* *
000004:	R923	470	*		* *
000005:	R922	470	*		* *
000006:	C914	102	*		* *
000007:	C913	102	*		* *
000008:IO/F	POWER	OUT 5.0V	*		**
000009:					

[Fig.131] Step edit list

17. Select Viewable setup of Function steps from the Menu bar, and it will display Fig.132.



[Fig.132] Viewable setup of Function steps

- Click "Set IO/F" button to activate each function on the screen. (You will no longer need to configure the Power relay board because the configuration from the step 000008 is held.)
- 19. Click the Property button, and it will display the Measuring unit screen.

Refer to Process 12 and later to complete this step as shown in Fig.133.

		-			Refe	L.			
	-	36	4	ų,		47		<u></u> ß	n
Edit	List	Erase	Search	Change			A.Gen.	Print	Undo
Step	:Aux	. Pa	arts		Val	ue	C	omme	nt
000001	:	R	902		47K	0	*		
000002	:	R	912		00		*		
000003	:	R	913		00		*		
000004	:	R	923		470		*		
000005	:	R	922		470		*		
000006	:	C	914		102		*		
000007	:	C	913		102		*		
000008	:10/	F PO	OWER		OUT	5.0V	*		
000009	:10/	F PO	OWER		OUT	3.0V	*		

File Mode Edit	Optimization To	Reference Te	st Total Coordinate	Self-diag. Com	vert Help	
Edit List Ere	sse Search Change	Pin coor. Pin Er.	🔵 🖾 🤛 D.Edt. D.Pn D.Set	A.Gen. Print	N J Undo Select	
Step :Aux.	Parts	Value	Comment		H-pin L	-pin
000001:	R902	47KO	*		11	15
000002:	R912	00	*		3	10
000003:	R913	00	*		4	6
000004:	R923	470	*		11	10
000005:	R922	470	*		8	3
000006:	C914	102	*		7	6
000007:	C913	102	*		5	10
000008:IO/F	POWER	OUT 5.0V	*		122	1
000009:IO/F	POWER	OUT 3.0V	*		5	6

(Teaching system)

[Fig.133] Step edit list

How to terminate voltage

- 1. Click on Step Edit (or Step List) from Edit menu on the Menu bar.
- 2. It displays "Enter step number (1 x)". Let's put a new step on the last step. Use the keyboard to specify the step which should be terminated and click on the OK button.
- 3. The cursor is flickering on the last step. Use the down-arrow key to move the cursor to the next step. (Refer to Fig.134)

📃 <u>E</u> dit <u>S</u> earch	Move <u>T</u> ool	⊻iew	
File Mode Ed	lit Optimizat	ion Tool Reference	e Test Total Coordinat
₽ ₽			s 🧶 🕂 🦣
Edit List Step :Aux.	Erase Search Parts	Change Pin coor. Pin E	r D.Edit D.Pin D.Set
000001:	R902	47KO	*
000002:	R912	00	*
000003:	R913	00	*
000004:	R923	470	*
000005:	R922	470	*
000006:	C914	102	*
000007:	C913	102	*
000008:IO/H	POWER	OUT 5.	* V0
000009:IO/E	POWER	OUT 3.	3V *
000010:		_	

[Fig.134] Step edit list

4. Click "Viewable setup of Function steps" on the Tool menu. (Refer to Fig.135)

File Mode Edit	Op	<u>C</u> oordinates Map	F1
Edd List Er Step :Aux. 000001: 000002: 000003: 000004: 000005: 000006:	Pa: Pa: R9(R9; R9; R9; R9; R9; C9;	Set Comb.Measurements Clear Comb.Measurements Generation Ground Bottom probe Cluster Function	
000007:	C9:	Viewable Setup of Function steps	F4
000008:IO/F 000009:IO/F 000010:		Coorginates input Auto Generation Change Step Data Ct Select Revise Area Mode High-Fi/ / No-contact-zone Shift+Ct	rl+C rl+H

[Fig.135] Viewable setup of Function steps

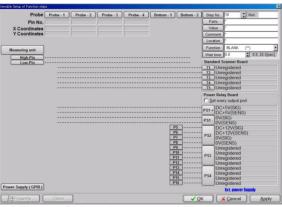
5. It displays "Use board ref.point and aux.ref.point for alignment?". Select Yes or No.

6. It displays the Viewable setup of Function steps screen. (Refer to the left of Fig.136) Click "Set IO/F" button to activate each function on the screen. (Refer to the right of Fig.136) Now you can see the existing configuration that [PS1+] is connected to [Bottom-1] and [PS1-] is to [Bottom-2].

Viewable Setup of Function steps	×	Viewable Setup of Function steps	×
Probe Probe -1 Probe -2 Probe -3 Probe -4 Bottom -1 Bottom -2	Step No. 10 🗘 Aux.	Probe Probe - 1 Probe - 2 Probe - 3 Probe - 4 Bottom - 1	Bottom - 2 Step No. 10 Aux IO/F
Pin No. 0 0	Parts *	Pin No. 0	Parts *
X Coordinates +000.0000 +000.0000	Value *	X Coordinates +000.0000 +000.0000	Value
Y Coordinates +000.0000 +000.0000	Comment.	Y Coordinates +000.0000 +000.0000	Comment
	Location		Location
Measuring unit	Function BLANK (**)	Measuring unit	Function BLANK (**)
High-Pin	Wat time 0.0 C 0.025.5[sec]	High-Pin	
Low.Pin	Standard Scanner Board		Standard Scanner Board
	T1 Unregistered T2 Unregistered		Cityonegratered
	· [13] Unregistered		T3 Unregistered
······			
	Construction		
	Power Relay Board Det every output port		Power Relay Board
	DC+5V(SIG)		
	PS1 + DC+5V(SENS)		PS1+ DC+5V(SIG) DC+5V(SENS)
	PS1 OV(SIG)		
P5	- PST 0V(SENS) - DC+12V(SIG)		P5
PE	DC+12V(SENS)	Ē	P6
P7			P7 P52 0V(SIG) P8
13			P9 Unregistered
P10	Unregistered		P10 Unregistered
P11 P12			P11 PS3 Unregistered P12 Unregistered
P17			P13 Unregistered
PH	·· Dra Unregistered		P14 Unregistered
P15			P15P54 Unregistered P16
Power Supply (GPIB)	Unregistered	Pauser Supply (CDID)	ay side Bxt, power Supply
Set IO/F Set IO/F	K Kancel Apply	121 Property Clear	✓ QK X Cancel Apply

[Fig.136] Viewable setup of Function steps

7. Click the Clear button to release the connection of [PS1+], [PS1-] and [PS2] to the bottom probes. With this, you are able to turn off the relays used in the Power relay board so that the voltage applied to the bottom probes is terminated.



[Fig.137] Viewable setup of Function steps

8. Click the OK button, and it goes back to the Step edit list. (the left screen of Fig.138). It will be useful to input any information on the test contents in the column "Parts" and "Value" as shown in the right screen of Fig.138.

📃 Edit Search M	love <u>T</u> ool ⊻ie	9W		📃 Edit Search 🖪	<u>1</u> ove <u>⊺</u> ool <u>V</u> iew	8	
File Mode Edit	Optimization	Tool Reference Test	Total Coordinate	File Mode Edit	Optimization To	ol Reference Te	st Total Coordinate
	ase Search Char			Edit List Er	ase Search Change	Pin coor. Pin Er.	🔵 📙 🧑 D.Edit D.Pin D.Set
Step :Aux.	Parts	Value	Comment	Step :Aux.	Parts	Value	Comment
000001:	R902	47KO	*	000001:	R902	47KO	*
000002:	R912	00	*	000002:	R912	00	*
000003:	R913	00	*	000003:	R913	00	*
000004:	R923	470	*	000004:	R923	470	*
000005:	R922	470	*	000005:	R922	470	*
000006:	C914	102	*	000006:	C914	102	*
000007:	C913	102	*	000007:	C913	102	*
000008:IO/F	POWER	OUT 5.0V	*	000008:IO/F	POWER	OUT 5.0V	*
000009:IO/F	POWER	OUT 3.3V	*	000009:IO/F	POWER	OUT 3.3V	*
000010:IO/F	*	*	*	000010:IO/F	POWER	OFF	*

[Fig.138] Step edit list

Step data review

The user should input the reference value on the Step data review screen.

Examine LCR meter				
Step 8	START	Test		
Debug status		1	Accepted	
-	•	2	4096	
Parts Value	Comment	Jg PASS		
POWER OUT_5.0V	*	Reference		
Loc Element F	unction Temp.Value	5.00 V		
* DIODE • BLANK	(**) 5 .00 V	Polarity		
Measure Mode Measure Ran		+	2048	
DC-VM 4- 40V (Range3)	▼ 1.0 msec			
+% -% +Limit -Limit	Wait Time	Deading		
10 10 5.50 V 4.50 V	0.0 sec	Reading		
speed pos P1 P2 P3 P4	Probe Access Bottom probe	2		
	(+,N,N,-) (M1,M3)	3	0	0.5 1.0
		4	Probe 2	Probe 3
Data	Search Measure	5	[***. ***** *** ****]	[****,*****,****
Auto Input	Part name Polarity check	Min	Probe 1 +	Probe 4 -
	Value Sampling	Max		0 +000.0000,+000.0000
Store	Pin number A.Input / Store	Av	1	
		IO/F edit)	

[Fig.139] Step data review (Teaching system)

Examine LCR meter	
	est
Debug status	C Accepted
	4096
Parts Value Comment	ance
POWER 001_3.0V	
Loc Element Function Temp.Value	
* DIODE Y BLANK (**) S.00 V Polar Measure Mode Measure Range Measure Time +	2048
DC-VM • 4- 40V (Range3) • 1.0 msec	
+% -% +Limit -Limit Wait Time Read	ling
10 10 5 50 V 4 50 V	
speed pos P1 P2 P3 P4 Probe Access Bottom probe	0 0.5 1.0
0 • H • 0 • 0 • 0 • (+,N,N,-) • (M1,M3) 4	Probe 2 Probe 3
5	Piobe 2 Piobe 3 [*** *********************************
Data Search Measure Min Auto Input Part name Polarity check Max	Probe 1 + Probe 4 -
Input Value Sampling Av	+000.0000,+000.0000 +000.0000,+000.0000
Store Pin number A.Input / Store IO/F	edit
Unused 0 🖨 ID.Net	
Unused 0 ID.Net	

[Fig.140] Step data review (Point system)

(1) Comment

Comment column is substituted by information on the contents of test.

- (2) Element
 - Element column is substituted by type of component to be measured. RESISTOR --> Resistors CAPACITOR --> Capacitors COIL --> Inductors DIODE --> VF measurement / DC voltage measurement
- (3) Function

Function column is substituted by the Measuring function.

(4) Temp. value

Temp. value column is substituted by the value obtained by pressing Input and Auto Input key and is changeable within the same Measuring mode and Measuring range. The Save button can register it as the Reference value.

- (5) Measure Mode Measure Mode column is substituted by the measuring signal.
- Measure Range Measure Range column is substituted by the Measuring range.
- (7) Measure Time Measure Time column is substituted by the Measuring time (1~999msec).
- (8) [+%][-%]

Upper and lower tolerance ratio to the Reference value are shown there. In addition, [+Limit][-Limit] will be increased or decreased in sync with the change of these value.

(9) [+Limit][-Limit]

Upper and lower tolerance to the Reference value are shown there. In addition, [+%][-%] will be increased or decreased in sync with the change of these value.

(10) Wait Time

Wait Time indicates the time from applying voltage to start moving the next step.

(11) Probe Access (Auto Polarity)

Probe access information. Probe 1,2,3,4 is meant from the left.

- + --> Probe to apply the measuring signal (+)
- --> Probe to apply the measuring signal (-)
- N --> Unused

(12) Bottom probe

This displays the destination of Bottom probes. (Ex.) PS1+ \rightarrow "M1", PS1 - \rightarrow "M3".

Power	PS3 Unregistered Unregistered Unregistered Unregistered Unregistered Unregistered Unregistered Unregistered Unregistered Unregistered				
□ <u>S</u> e	t every output port				
DC1 +	DC+5V(SIG)				
FJIT					
DS1					
PS2					
DS2					
P 52	0V(SIG)				
	0V(SENS)				
PS3	Unregistered				
	Unregistered				
DCA	Unregistered				
F 34	Unregistered				
	Unregistered				
	Ext. power Supply				
	[Fig.141]				
	[[[]].141]				

(13) Set IO/F

This enables to activate each function on the Viewable setup of Function steps screen.

Reference input

When the user is going to measure the UUT while applying voltage, they should specify both Element and Measuring mode. When RESISTOR, CAPACITOR or COIL is set to the Element, the user should specify the Measuring mode to "AUTO" and click the Auto Input button to input the reference value. The Temp. Value column displays the measured value. The user should change Function and/or Measure Time as needed. Clicking the Store button can save the Temp. Value to the Reference value.

When the user is going to specify DIODE to the Element to perform the VF measurement, the Measuring mode should be set to DC-CC. In addition, when the DC voltage is measured, the Measuring mode should be set to DC-VM. The user should click the Input button to input the Reference value. The Temp. Value column displays the measured value. Clicking the Store button can save the Temp. Value to the Reference value.



This function is used to power up the board to test. And so it may cause serious damage to the PC boards and/or the measuring unit if the user misuses it (ex. wrong location, Outport so on). The use of the I/O commands must be carried out under the responsibility of the user.

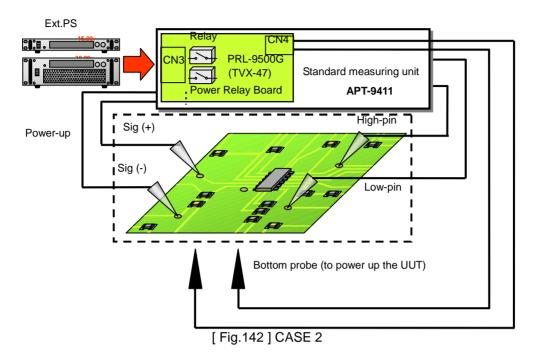


When you are going to measure DC voltage, be sure to click the Input button to input the reference value. If the Auto Input button is clicked without due care, the Measuring mode will be initialized and any unexpected Measuring mode will be used to input the reference value.

When you try to use other than DC-VM mode while applying voltage to the UUT, sometimes it shows the error "The PCB is charged with high voltage!" on the display. It means, you cannot use other than DC-VM mode.

CASE 2

When the external power supplies are used to power up the UUT and the flying probes measure the specified two points at the same time.



(Remarks)

- 1. It's the flying probes that the user can select to measure the UUT.
- 2. When the external power supplies apply the voltage to the UUT through the bottom probes or the connector at the Tray, the voltage output won't be terminated automatically even if it moves to the next step. Therefore, the user should program a step to terminate the voltage to the UUT.
- 3. The user is able to apply the voltage through both the flying probes and the bottom probes. (Means, it's possible to connect more than one external power supply to the UUT)

Programming procedure

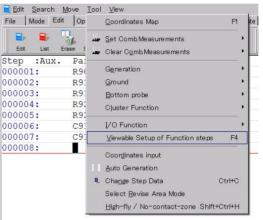
How to apply voltage

- 1. Click on Step Edit (or Step List) from Edit menu on the Menu bar.
- 2. It displays "Enter step number (1 x)". Let's put a new step on the last step. Use the keyboard to enter the last step number and click on the OK button.
- 3. The cursor is flickering on the last step. Use the down-arrow key to move the cursor to the next step. (Refer to Fig.143)

Edi	t <u>S</u> ea		Move		⊻iew					
File	Mod	e Ed	it O	ptimizat	ion Too	I Refe	rence	Test T	otal	Coordinate
	- 1			21	ų	1-12		100	H	1.5
Ed	it I	_ist	Erase	Search	Change	Pin coor.	Pin Er.	D.Edit		D.Set
Step	:1	Aux.	Pa	arts		Val	ue		Comm	lent
0000	01:		R	902		47K	0		*	
0000	02:		R	912		00			*	
0000	03:		R	913		00			*	
0000	04:		R	923		470			*	
0000	05:		R	922		470		1	*	
0000	06:		C	914		102			*	
0000	07:		C	913		102			*	
0000	08:									

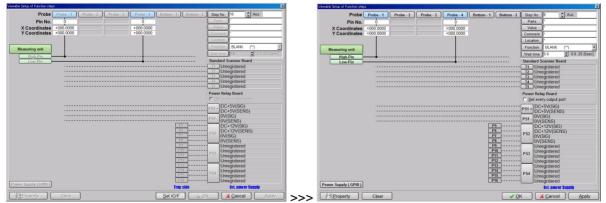
[Fig.143] Step edit list

4. Click "Viewable setup of Function steps" on the Tool menu. (Refer to Fig.144)



[Fig.144] Viewable setup of Function steps

5. It displays the Viewable setup of Function steps screen. (Refer to the left of Fig.145). Click "Set IO/F" button to activate each function on the screen. (Refer to the right of Fig.145)



[Fig.145] Viewable setup of Function steps

6. Select "Set every output port" at Power Relay Board.

Be sure to select the box when you want to apply voltage through the flying probes and the bottom probes. (Refer to the left of Fig.146)

Unless the box is selected, you will get to 4-terminal connection so that you cannot apply voltage through the flying probes and the bottom probes. (Refer to the right of Fig.146)

•••		•	v v ,
Powe	r Relay Board		Power Relay Board
□ <u>S</u> e	et every output port		Set every output port
PS1 +	DC+5V(SIG)		P1 DC+5V
FJIT	DC+5V(SENS)		P2 0V
PS1 -	0V(SIG)		P3 Unregistered
F 31 -	0V(SENS)		P4 Unregistered
	DC+12V(SIG)		P5 DC+12V
PS2	DC+12V(SENS)		P6 0V
P 52	0V(SIG)		P7 Unregistered
	OV(SENS)		P8 Unregistered
	Unregistered		P9 Unregistered
PS3	Unregistered		P10 Unregistered
F 33	Unregistered		P11 Unregistered
	Unregistered		P12 Unregistered
	Unregistered		P13 Unregistered
PS4	Unregistered		P14 Unregistered
F 54	Unregistered		P15 Unregistered
	Unregistered		P16 Unregistered
	Ext. power Supply		Ext. power Supply

when Set every output port is unchecked when Set every output port is selected [Fig.146] Viewable setup of Function steps



Signal name (ex. 0V, DC +5V) on Fig.146 is assignable on Input / output function of I/O step in Option mode. (Refer to Page 6) "Unregistered" means that signal name is not registered yet.

7. Click [P1] to specify the output of the external power supplies connected to the PRL-9500G. Then [Probe-1] to [Bottom-2] buttons are flashing in yellow.

Viewable Setup of Function step:	8								×
Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2	Step No.	8	Aux.
Pin No.	0			0			Parts	^	
X Coordinates	+000.0000			+000.0000			Value	ŀ	
Y Coordinates	+000.0000			+000.0000			Comment	*	
							Location	^	
Measuring unit							Function	BLANK	(**)
High-Pin							Wait time	0.0	\$ 0.025.5[sec]
Low-Pin -	•						Standard S	canner Boa	ard
								egistered	
								egistered	
								egistered	
							T5 Unr	egistered	
								-	
							Power Rela		
							E Set eve	ry output p	ort
					••••••			+5V	
		••••••			••••••	•••••	P2 0V		
								+12V	
							P4 0V		

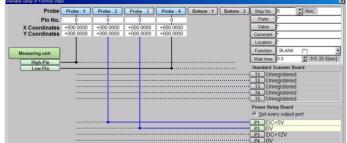
[Fig.147] Viewable setup of Function steps

8. [High-Pin] and [Low-Pin] of Measuring unit are already connected to [Probe-1] and [Probe-4]. Specify [Probe-2] as the output of [P1], and they will be connected with a blue line. (Refer to Fig.148)

Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2	Step No.	8 🗘 A	ux.
Pin No.	6	0		0			Parts		
X Coordinates	+000.0000	+000.0000		+000.0000			Value	<u>i</u> .	
Y Coordinates		+000.0000		+000.0000			Comment	Ĩ.	
							Location		
							<u> </u>		
Measuring unit							Function	BLANK (**)	
High-Pin -							Wait time	0.0	0.025.5[se
Low-Pin -							Standard St	Scanner Board	
							T1 Unr	registered	
								registered	
								registered	
								egistered	
					••••••		T5 Unr	registered	
							Power Rel	ay Board	
							₽ Set eve	ery output port	
							P1 DC	+5V	
							P2 OV		

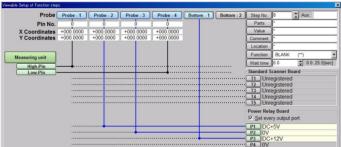
[Fig.148] Viewable setup of Function steps

9. Click [P2] to specify the output, and [Probe-1] to [Bottom-2] buttons are flashing in yellow. Specify [Probe-3] as the output of [P2], and they will be connected with a blue line. (Refer to Fig.149)



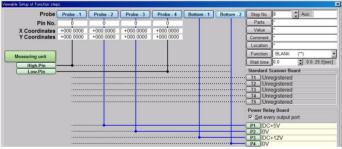
[Fig.149] Viewable setup of Function steps

10. Click [P3] to specify the output, and [Probe-1] to [Bottom-2] buttons are flashing in yellow. Specify [Bottom-1] as the output of [P3], and they will be connected with a blue line. (Refer to Fig.150)

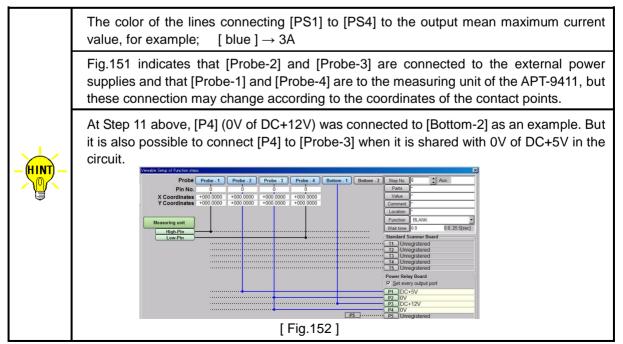


[Fig.150] Viewable setup of Function steps

11. Click [P4] to specify the output, and [Probe-1] to [Bottom-2] buttons are flashing in yellow. Specify [Bottom-2] as the output of [P4], and they will be connected with a blue line. (Refer to Fig.151)



[Fig.151] Viewable setup of Function steps



12. Click the Property button, and it will display the Measuring unit screen. (Refer to Fig.153) Use your keyboard to fill in the Parts column. In addition, enter the Value, Comment and Location column as needed.

Fill in the Function, Element and Measure Mode column if the measurement content is already determined as they will assist in inputting the reference value.

Parts inform	ation					
	Parts :					(11 characters)
	Value : *					(11 characters)
	Comment : *					(20 characters)
	Location :					(4 characters)
	Eunction :	BLANK	(**)	•		
	Element :	AUTO		*		
Mea	sure Mode : 🗍	OTUA		Ψ.		
				 <u>Back</u> 	Ne	xt ⊳ XCance

[Fig.153] Viewable setup of Function steps

13. Click the Next button, and it will displays the Coordinate set screen. (Refer to Fig.154)

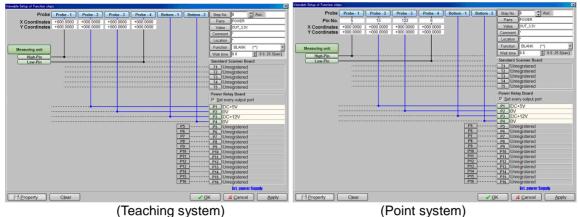
conditiante cont			<u>A</u>	Coordinate Set					
00008:*	* *	*		000008:*	*	•			
		X coor Y coor ; +000.0000 +000.0000			Pin I		X coor	Y coor	
		+000.0000 +000.0000		High -	- Pin : 5	€ 032000		+000.0000	ID.Net
		+000.0000 +000.0000		Low	- Pin : 6	€ 032000	+000.0000		ID.Net
		+000.0000 +000.0000		Power Rela	y P1 : 15	032000	+000.0000	+000.0000	ID.Net
	Power Relay P2	: +000.0000 +000.0000		Power Rela	y P2 : 122	\$ 032000	+000.0000	+000.0000	ID.Net
Power Relay P1 Power Relay P2	: DC+5V : 0V			Power Relay P1 Power Relay P2	: DC+5V : 0V				
		Back	K X Cancel	<u> </u>			<u>⊲ B</u> ack	<u>✓ 0</u> K	<mark>≭ <u>C</u>ance</mark>
	(Teach	ing system)				(Point s	system	ו)	

[Fig.154] Coordinate set

On the Coordinate set screen, enter the coordinates (in Teaching system) or the pin numbers (in Point system) as requested by the menu.

	-	-	new pin number was adde 155 where the user can ent		
	00	ardinates input 000008: * * ress [ENTER] SW t	* * o set the coordinates.	×	
— (H INT) —		Pin N	o. Net Name	X coor Y coor	
	Hi	ligh - Pin 5	*	[+000.0000,+000.0000]	
	Lc	.ow - Pin 6	*	[+000.0000,+000.0000]	
Ŷ		ower Relay P1 15	*	[+000.0000,+000.0000]	
	Po	Power Relay P2 122	*	[+000.0000,+000.0000]	
				✓ <u>O</u> K X Cancel	
			[Fig.155] Coordinate inpu	ıt	

14. Click the OK button, and it goes back to the Viewable setup of Function steps screen.



[Fig.156] Viewable setup of Function steps

15. Click the OK button, and it goes back to the Step edit list. Now you can see the AUX. column is substituted by "IO/F".

📃 Edit Search M	<u>E</u> dit <u>S</u> earch <u>M</u> ove <u>T</u> ool <u>V</u> iew				<u>t</u> ove <u>T</u> ool <u>V</u> iew				
File Mode Edit	Optimization Tool	Reference Test	Total Coordinate	File Mode Edit	Optimization Too	I Reference Test	Total Coordinate Self-diag. Con	vert Help	
Edit List En	ase Search Change	D.Edit D.Set	en. Print Undo	Edit List Er	ase Search Change	Pin coor. Pin Er. D.Er	n D.Pin D.Set	N J Undo Select	<u>Br</u>
Step :Aux.	Parts	Value	Comment	Step :Aux.	Parts	Value	Comment	H-pin L-	-pin
000001:	R902	47KO	*	000001:	R902	47KO	*	11	15
000002:	R912	00	*	000002:	R912	00	*	3	10
000003:	R913	00	*	000003:	R913	00	*	4	6
000004:	R923	470	*	000004:	R923	470	*	11	10
000005:	R922	470	*	000005:	R922	470	*	8	3
000006:	C914	102	*	000006:	C914	102	*	7	6
000007:	C913	102	*	000007:	C913	102	*	5	10
000008:IO/F	POWER	OUT_3.3V	*	000008:IO/F	POWER	OUT_3.3V	*	5	6
(Teaching system)						(Point	system)		

[Fig.157] Step edit list

How to terminate voltage

- 1. Click on Step Edit (or Step List) from Edit menu on the Menu bar.
- 2. It displays "Enter step number (1 x)". Let's put a new step on the last step. Use the keyboard to specify the step which should be terminated and click on the OK button.
- 3. The cursor is flickering on the last step. Use the down-arrow key to move the cursor to the next step.

and the second sec	5 C	Move			1			1	
File M	Node E	Edit 0	ptimizat	ion Too	I Refe	erence	Test T	otal (Coordinat
•	-	3	4	.	H	-		14	47
Edit	List	Erase	Search	Change	Pin coor.		D.Edit	D.Pin	D.Set
Step	:Aux	. Pa	rts		Val	ue	(Comm	ent
00000	1:	R	02		47K	0	1	×	
000002	2:	R	12		00		3	*	
00000	3:	R	13		00			t	
000004	4:	R	23		470			*	
00000	5:	R	22		470			*	
00000	5:	CS	14		102		1	*	
00000	7:	CS	13		102		-	*	
000008	3:10/	F PC	WER		OUT	3.3	7	*	
00000	9:								

[Fig.158] Step edit list

4. Click "Viewable setup of Function steps" on the Tool menu. (Refer to Fig.159)

	irch <u>M</u> ∋ Edit	jove Op	Iool View Coordinates Map F1	
Edit L	ist Er	ase :	Jet Comb Measurements	, ,
Step :7 000001:	lux.	Pa: R9(Generation	•
000002: 000003: 000004:		R9: R9: R9:	Bottom probe	• •
000005:		R9: C9:		•
000007: 000008:1	10/F	C9: POI	Viewable Setup of Function steps F4	
000009:			Coordinates input	
			Change Step Data Ctrl+C Select <u>Revise Area Mode</u>	
			High-fly / No-contact-zone Shift+Ctrl+H	

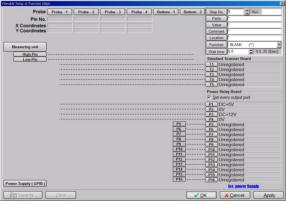
[Fig.159] Viewable setup of Function steps

- 5. It displays "Use board ref.point and aux.ref.point for alignment?". Select Yes or No.
- 6. It displays the Viewable setup of Function steps screen. (Refer to the left of Fig.160) Click "Set IO/F" button to activate each function on the screen. (Refer to the right of Fig.160) Now you can see the existing configuration that [PS3] is connected to [Bottom-1] and [P4] is to Bottom-2.

Viewable Setup of Function steps	x	Versible Setup of Function steps
Probe Probe 1 Probe 2 Probe 3 Probe 4 Bottom 1 Bottom	Step No. 9 Aux.	Probe Probe -1 Probe -2 Probe -3 Probe -4 Bottom -1 Bottom -2 Step No. 9 🛣 Aux.
Pin No. 0	Parts *	Pin No. 0 0 0 Parts 1
X Coordinates +000.0000 +000.0000	Value	X Coordinates +000.0000 +000.0000 Value *
Y Coordinates +000.0000 +000.0000	Comment	Y Coordinates +000,0000 +000,0000 Comment *
	Location .	Location 1
Measuring unit	Function BLANK (**)	Measuring unit
High Pin	Wait time 0.0 20.0.25.5(sec)	High-Pin Vak time 0.0 2 5 (sec]
Low.Pin	Standard Scanner Board	Low-Pin
		11 Unregistered
	TA Unregistered To Unregistered	T4 Urregistered T5 Urregistered
	Power Relay Board	Power Relay Board
	E Set every output port	□ Set every output port
· · · · · · · · · · · · · · · · · · ·		PI DC+5V
	P3 DC+12V	P2 0V P3 DC+12V
	- P4 0V	P4 0V
	P5 Unregistered	P5 Unregistered
P7	PE Unregistered P7 Unregistered	P6 Unregistered P7 Unregistered
P8	··· P8 Unregistered	P8 P8 Unregistered
2	P9 Unregistered	P9 Unregistered P10 Unregistered
111	P11 Unregistered	P11
	P12 Unregistered	P12 Unregistered P13 Unregistered
P10	P14 Unregistered	P14 Unregistered
PID	P15 Unregistered	P15 Unregistered
Power Supply (GPIB)	P15 Unregistered Ext. power Supply	Power Supply (GPIB) Ext. power Supply (GPIB) Ext. power Supply (GPIB)
All Broperty Clear Set IO/F	OK K Cancel Apply	>>> Clear QK K Cancel Apply

[Fig.160] Viewable setup of Function steps

7. Click the Clear button to release the connection of [P3] and [P4] to the bottom probes. With this, you are able to turn off the relays used in the Power relay board so that the voltage applied to the bottom probes is terminated.



[Fig.161] Viewable setup of Function steps

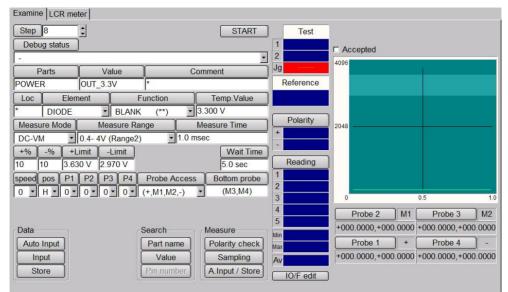
8. Click the OK button, and it goes back to the Step edit list. (the left screen of Fig.162). It will be useful to input any information on the test contents in the column "Parts" and "Value" as shown in the right screen of Fig.162.

📃 Edit Search M	<u>f</u> ove <u>T</u> ool <u>V</u> iew			📃 <u>E</u> dit <u>S</u> earch <u>N</u>	<u>t</u> ove <u>T</u> ool <u>V</u> iew		
File Mode Edit	Optimization Too	ol Reference Test	Total Coordinate	File Mode Edit	Optimization Too	I Reference Tes	t Total Coordinat
Edit List Er	ase Search Change	Pin coor. Pin Er. D.E	o LL Con dit D.Pin D.Set	Edit List Er	ase Search Change	Pin coor. Pin Er.	O.Edit D.Pin D.Set
Step :Aux.	Parts	Value	Comment	Step :Aux.	Parts	Value	Comment
000001:	R902	47KO	*	000001:	R902	47KO	*
000002:	R912	00	*	000002:	R912	00	*
000003:	R913	00	*	000003:	R913	00	*
000004:	R923	470	*	000004:	R923	470	*
000005:	R922	470	*	000005:	R922	470	*
000006:	C914	102	*	000006:	C914	102	*
000007:	C913	102	*	000007:	C913	102	*
000008:IO/F	POWER	OUT 3.3V	*	000008:IO/F	POWER	OUT 3.3V	*
000009:IO/F	*	*	* >>>	000009:IO/F	POWER	OFF	*

[Fig.162] Step edit list

Step data review

The user should input the reference value on the Step data review screen.



[Fig.163] Step data review (Teaching system)

Step 8 START Test Debug status 1 - Parts Value Comment POWER OUT_3.3V Reference Loc Element Function Temp Value Reference 2048 2048 Measure Mode Measure Range DC-VM 0.4-4V (Range2) 1.0 msec 10 10 3.630 V 2.970 V 5.0 sec 1 2 speed pos P1 P2 P3 P4 Probe Access Bottom probe 3 0 0 H 0 0 Part name Polarity check Max Auto Input Part name Polarity check Store ID.Net * 10/F edit High-Pin (+) 5 ID.Net * Outport 1 (M1) 12 ID.Net * Outport 1 (M1) 12 ID.Net *	Examine LCR meter	
- Y 2 4096 Power OUT_3.3V * Reference Loc Element Function Temp Value * DIODE BLANK *3.300 V Polarity 2048 2048 2048 2048 DC-VM 9.4-4V (Range2) 1.0 msec - +% -% +Limit Wait Time Reading 10 10 3630 V 2.970 V 5.0 sec 2 speed pos P1 P2 P3 P4 Probe Access Bottom probe 3 0 0.5 10 0 H 0 0 0 Y You obox obox You obox<	Step 8	START Test
Parts Value Comment Jg 40% POWER OUT_3.3V * Reference 2048 * DIODE BLANK (**) 3.300 V Polarity 2048 * DIODE * BLANK (**) * 3.300 V Polarity 2048 DC-VM * 0.4-4V (Range2) * 1.0 msec - - - DC-VM * 0.4-4V (Range2) * 1.0 msec - - - 10 10 3.630 V 2.970 V 5.0 sec 1 - - 0 0.5 1.0 0 + 0 0 0 (+,M1,M2,-) (M3,M4) - Probe 2 M1 Probe 3 M2 0 • 0 • 0 • 0 0.0000, +000.0000, +000.0000 +000.0000, +000.0000, +000.0000 +000.0000, +000.0000, +000.0000 +000.0000, +000.0000, +000.0000, +000.0000 +000.0000, +000	Debug status	
Parts Value Comment POWER OUT_3.3V * Loc Element Function Temp Value * DIODE * BLANK (**) 3.300 V Measure Mode Measure Range Measure Time + DC-VM • 0.4-4V (Range2) • 1.0 msec POWER 0.4-4V (Range2) • 1.0 msec - 10 10 3.630 V 2.970 V 5.0 sec 2 speed pos P1 P2 P3 P4 Probe Access Bottom probe 0 • H • 0 • 0 • 0 • 0.5 1.0 Data Patn name Polarity check Min + +000.0000, +000.0000 +000.0000, +000.0000 Auto Input Patn name Polarity check Sampling Av + +000.0000, +000.0000 +000.0000, +000.0000 +000.0000, +000.0000, +000.0000, +000.0000 +000.0000, +000.00	-	4096
POWER [001_3.3V] Loc Element Function Temp Value * DIODE * BLANK (**) Jacob Measure Range Measure Time DC-VM 0.4-4V (Range2) * 1.0 msec Probe - - - 10 10 3.630 V 2.970 V 5.0 sec 1 - - 2049 0 0.5 1.0 10 10 3.630 V 2.970 V 5.0 sec 2 - - - - 0 + + 0.10 * - - 0 + H 0 * 0 * 0 * - 10 10 3.630 V 2.970 V 5 - - Speed pos P1 P2 P3 P4 Probe Access Bottom probe 3 0 0.5 1.0 Data Measure Measure Min - + + + + + + + +		
* DIODE Image: Blank (**) 3.300 V Polarity Measure Mode Measure Range Measure Time + - DC-VM 0.4-4V (Range2) 1.0 msec - - +% -% +Limit -Limit Wait Time Reading 10 10 3.630 V 2.970 V 5.0 sec 1 - speed pos P1 P2 P3 P4 Probe Access Bottom probe 3 0 0.5 1.0 0 H 0 0 0 (+,M1,M2,-) (M3,M4) 4 Probe 2 M1 Probe 3 M2 Data Search Measure Min Hax Probe 1 + Probe 4 - Input Value Pin number Av Av +000.0000,+000.0000 +000.0000,+000.0000 +000.0000,+000.0000 +000.0000,+000.0000 +000.0000,+000.0000 +000.0000,+000.0000 +000.0000,+000.0000 +000.0000,+000.0000 +000.0000,+000.0000 +000.0000,+000.0000 +000.0000,+000.0000 +000.0000,+000.0000 +000.0000,+000.0000 +000.0000,+000.0000 +000.0000,+000.0000,+000.0000 +000.0000,+00		
Measure Mode Measure Range Measure Time + 2048 DC-VM © 0.4-4V (Range2) © 1.0 msec - - 10 10 3.630 V 2.970 V 5.0 sec 2 speed pos P1 P2 P3 P4 Probe Access Bottom probe 0 + 0 0 0 - 1.0 0 + 0 0 0 - 1.0 0 + 0 0 0 - 1.0 0 + 0 0 0 - 1.0 0 + 0 0 0 - 1.0 0 + 0 0 0 - 1.0 0 + 0 0 0 - 1.0 Data Measure Max Probe 1 + Probe 4 - Input Value Sampling Av + +000.0000, +000.0000, +000.0000, +000.0000 +000.0000, +000.0000, +000.0000, +000.0000, +000.0000, +000.00000, +000.00000, +000.0000, +000.0000, +000.0000, +000.0000, +000.		
DC-VM I 0.4-4V (Range2) 1.0 msec +% -% +Limit -Limit 10 10 3.630 V 2.970 V 5.0 sec 1 2 0 0.5 speed pos P1 P2 P3 P4 Probe Access Bottom probe 3 0 0.5 1.0 Probe 2 M1 O V O V O V O V O V (+,M1,M2,-) V (M3,M4) 5 +000.0000,+000.0000 +000.0000,+000.0000 Data Patr name Polarity check Max +000.0000,+000.0000 +000.0000,+000.0000 Auto Input Patr name Polarity check Max +000.0000,+000.0000 +000.0000,+000.0000 Store Pin number A.Input / Store IO/F edit +000.0000,+000.0000 +000.0000,+000.0000 High-Pin (+) 5 ID.Net * U.Net * - Outport 1 (M1) 12 ID.Net * -		2048
+% -% +Limit -Limit Wait Time Reading 10 10 3.630 V 2.970 V 5.0 sec 1 2 2 0 0.5 1.0 0 +H 0 0 0 0 0.5 1.0 0 +H 0 0 0 0 1.0 Probe 2 M1 Probe 3 M2 0 0 0 0 0 0 0 0.0000,+000.0000 +000.0000,+000.0000,+000.0000 +000.0000,+000.0000		
Ib Ib <td< td=""><td></td><td>Wait Time Reading</td></td<>		Wait Time Reading
speed pos P1 P2 P3 P4 Probe Access Bottom probe 3 0 0.5 10 0 H 0 0 0 0 0 0.5 10 Data Search Measure Min Probe 2 M1 Probe 3 M2 Auto Input Pat name Polarity check Min Probe 1 + Probe 4 - Store Pin number Av Av +000.0000,+000.0000,+000.0000 </td <td>10 10 3.630 V 2.970 V</td> <td>5.0 sec 1</td>	10 10 3.630 V 2.970 V	5.0 sec 1
Data 5 Probe 2 Mil Probe 3 M2 Auto Input Part name Polarity check Min +000.0000, +000.0000, +000.0000 +000.0000, +000.0000 +000.	speed pos P1 P2 P3 P4 Probe Access Bo	tom probo
Data Search Measure Min +000.0000,+000.0000 +000.00	0 • H • 0 • 0 • 0 • 0 • (+,M1,M2,-) •	
Auto Input Part name Polarity check Max Probe 1 + Probe 4 - Input Value Sampling Av +000.0000,+000.0000,+000.0000 +000	Data Meas	
Store Pin number A Input / Store IO/F edit High-Pin (+) 5 \$ ID.Net * IO/F edit Low-Pin (-) 6 \$ ID.Net * IO/F edit Outport 1 (M1) 12 \$ ID.Net *		
High-Pin (+) 5 ID.Net * Low-Pin (-) 6 ID.Net * Outport 1 (M1) 12 ID.Net *	Input Value S	ampling Av +000.0000,+000.0000 +000.0000,+000.0000
Low-Pin (-) 6 ID.Net * Outport 1 (M1) 12 ID.Net *	Store Pin number A.In	put / Store IO/F edit
Outport 1 (M1) 12 CID.Net *	High-Pin (+) 5 1D.Net *	
	Low-Pin (-) 6 1D.Net *	
	Outport 1 (M1) 12 D.Net *	
	Outport 2 (M2) 122 D.Net *	

[Fig.164] Step data review (Point system)

(1) Comment

Comment column is substituted by information on the contents of test.

- (2) Element
 - Element column is substituted by type of component to be measured. RESISTOR --> Resistors CAPACITOR --> Capacitors COIL --> Inductors DIODE --> VF measurement / DC voltage measurement
- (3) Function

Function column is substituted by the Measuring function.

(4) Temp. value

Temp. value column is substituted by the value obtained by pressing Input and Auto Input key and is changeable within the same Measuring mode and Measuring range. The Save button can register it as the Reference value.

- (5) Measure Mode Measure Mode column is substituted by the measuring signal.
- Measure Range Measure Range column is substituted by the Measuring range.
- (7) Measure Time Measure Time column is substituted by the Measuring time (1~999msec).
- (8) [+%][-%]

Upper and lower tolerance ratio to the Reference value are shown there. In addition, [+Limit][-Limit] will be increased or decreased in sync with the change of these value.

(9) [+Limit][-Limit]

Upper and lower tolerance to the Reference value are shown there. In addition, [+%][-%] will be increased or decreased in sync with the change of these value.

(10) Wait Time

Wait Time indicates the time from applying voltage to start moving the next step.

(11) Probe Access (Auto Polarity)

Probe access information. Probe 1,2,3,4 is meant from the left.

- + --> Probe to apply the measuring signal (+)
- --> Probe to apply the measuring signal (-)
- M? --> This indicates the Outport number on Fig.165. For example, M1 means [P1].

(12) Bottom probe

Bottom probe access information. Like Fig.165, this indicates the Outport number. For example, M3 means [P3].

Powe	r Relay Board		
⊽ <u>S</u> e	t every output port		
P1	DC+5V		
P2)0V		
P3	Unregistered		
P4	Unregistered		
P5	DC+12V		
P6)0V		
P7	Unregistered		
P8	Unregistered		
P9	Unregistered		
P10	Unregistered		
	Unregistered		
P12	Unregistered		
P13	Unregistered		
	Unregistered		
	Unregistered		
P16	Unregistered		
Ext. power Supply			
	[Fig.165]		

(13) Set IO/F

This enables to activate each function on the Viewable setup of Function steps screen.

Reference input

When the user is going to measure the UUT while applying voltage, they should specify both Element and Measuring mode. When RESISTOR, CAPACITOR or COIL is set to the Element, the user should specify the Measuring mode to "AUTO" and click the Auto Input button to input the reference value. The Temp. Value column displays the measured value. The user should change Function and/or Measure Time as needed. Clicking the Store button can save the Temp. Value to the Reference value.

When the user is going to specify DIODE to the Element to perform the VF measurement, the Measuring mode should be set to DC-CC. In addition, when the DC voltage is measured, the Measuring mode should be set to DC-VM. The user should click the Input button to input the Reference value. The Temp. Value column displays the measured value. Clicking the Store button can save the Temp. Value to the Reference value.



This function is used to power up the board to test. And so it may cause serious damage to the PC boards and/or the measuring unit if the user misuses it (ex. wrong location, Outport so on). The use of the I/O commands must be carried out under the responsibility of the user.



When you are going to measure DC voltage, be sure to click the Input button to input the reference value. If the Auto Input button is clicked without due care, the Measuring mode will be initialized and any unexpected Measuring mode will be used to input the reference value.

When you try to use other than DC-VM mode while applying voltage to the UUT, sometimes it shows the error "The PCB is charged with high voltage!" on the display. It means, you cannot use other than DC-VM mode.

Control External power supplies via GPIB

The user is able to control the external power supplies (Voltage / Current / Output ON/OFF) via GPIB and connect the specified voltage and current to the PRL-9500G to output to the flying probes or the bottom probes. The GPIB controllable external power supply is Max 5.

Appearing below are typical cases:

1. CASE 1

It's used to just control the external power supplies (Voltage / Current / Output ON/OFF) without using the PRL-9500G. (The user must think of the way of applying voltage to the UUT)

2. CASE 2

It's used to control the external power supplies (Voltage / Current / Output ON/OFF) while using the PRL-9500G. The voltage is applied to the UUT through the bottom probes or the connector at the Tray. Therefore, more than one step will be measured until the step to terminate the output is executed.

3. CASE 3

It's used to control the external power supplies (Voltage / Current / Output ON/OFF) while using the PRL-9500G. The voltage is applied to the UUT through the flying probes. The measurement is performed by the APT-9411. After the step finished applying voltage through the flying probes, the output to the UUT will be terminated automatically. For instance, the user can perform On/Off check of the 3-terminal regulators and the relay components.

4. CASE 4

It's used to control the external power supplies to measure the Zener diodes. Usually, the APT-9411 is able to measure the Zener diodes up to 40V but the measuring range differs according to the specifications of the external power supplies.

Programming procedure

This section describes the way of controlling the output voltage etc of the external power supplies using the Viewable setup of Function steps screen.

wable Setup of Function step:	5									2
Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2	Step 1	Vo. 1	C Aux.	
Pin No.	ò			Ó			Part	s (*		
X Coordinates	+000.0000			+000.0000			Valu	e 1		_
Y Coordinates	+000.0000			+000.0000			Comm	ent *		_
							Locat	ion 1		
Measuring unit							Funct	ion BLANK		•
High-Pin -							Wait t	me 0.0	\$ 0.0.25.6[s	ec]
Low-Pin -							Standa	rd Scanner E	Board	
(<u></u>)								Unregistere		
							T2	Unregistere	d	
				••••••		••••••	13	Unregistere	d	
				••••••		••••••	14	Unregistere	d	
								Unregistere		
								Relay Board		
							□ Set	every output	t port	
							PS1+	DC+24V(SI	G)	
				••••••	••••••	••••••		DC+24V(SI	ENS)	
								0V(SIG)		
					P			OV(SENS)		
					P			Unregistere		
					P			Unregistere Unregistere		
					P			Unregistere		
					P			Unregistere		
					P1	0		Unregistere		
					P1	1		Unregistere		
					P1			Unregistere		
					P1		\square	Unregistere	d	
					P1			Unregistere		
					P1			Unregistere		
ower Supply (GPIB)					P1	6		Unregistere	d	
ower suppry (GPIB)								Ext. pow	rer Supply	
Property	Clear					V QI		X Cance	Appl	v

[Fig.166] Viewable setup of Function steps

Click [Set IO/F] button and then [Power Supply (GPIB)] button on the Viewable setup of Function steps screen. And it will display Fig.167.

ower Supply						×
00001:*	*	*		*		
PS1 PS2	PS3 PS4 PS-	Aux.				
	49A [35V/1.4A 60	V/0.8A 1				
OUTPUT ON(1)	· OFF (0)				
	· Off (<u>v</u>)			_	_
Se	tting value of <u>v</u> oltag	e: 0.00	÷	0.0060.00[V]		
	imit value of curre	nt : 0.000	-	0.0001.400[A]		
		ut : OUTPUT	Г 1		¥	
E Check for	current limit over	E Che	eck ci	urrent limit over te	stop the te	st
	ng with current mea	Gurernent				
□ Zener mea	surement by power	supply				
				2	к 🛛 🔀	ancel
	[Fig.16	7] Po	we	r Suppl	y	

PS-1 ~ PS-Aux

Select the external power supplies from PS1 ~ PS-Aux.

OUTPUT

If ON is selected, the external power supplies turn on. After the box was selected, it displays Fig.168. If OFF is selected, the voltage to the UUT will be terminated.

Power Supply				×
000001:*	*	*	*	
Agilent E3649 OUTPUT	⊂ C ng value of ⊻ mit value of c	0. 60V/0.8A] 0FF (0_) 0ltage : 0.00 0.urrent : 0.000		
	(Dutput : OUTP	VUT 1	
Check for a	urrent limit o	ver 🗆 C	Check current limit over to stop th	e test
⊏ <u>S</u> top testin	g with current	measurement		
□ <u>Z</u> ener measu	rement by po	ower supply	Г✓ОК	K Cancel

[Fig.168] Power Supply

Setting value of voltage

This can specify the voltage to output by 10mV. The output range at the right will be set automatically according to the external power supply specified by the user.

Limit value of current

This can specify the current to output by 1mA. The output range at the right will be set automatically according to the external power supply specified by the user. When the step is performed, if it exceeds this value, the error message will appear. At the same time, the output from the external power supply will be terminated automatically to suspend the test accordingly.

Output

This appears only when the dual-out type of the Agilent external power supply is selected. Select either OUTPUT1 or OUTPUT2 from the right pull-down menu.



Check for current limit over

When the box is selected, the test will be suspended if it exceeds the current limit.

Stop testing with current measurement

When the box is selected, the test will be suspended if it goes off the preset current on the step.

Reference current value

This is the standard current value and must be set smaller than "Limit value of current". Max. current value differs according to the external power supply models and is configurable by 1mA.

Judgment +% tolerance

This is the upper limit of the current value shown by %.

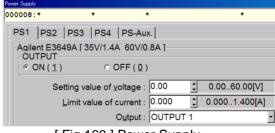
Judgment -% tolerance

This is the lower limit of the current value shown by %.

Zener measurement by power supply

When the box is selected, the user can use the external power supplies to measure the Zener voltage. After the box was selected, it displays Fig.169.

The APT-9411 is able to measure the Zener diodes up to 40V as standard, but the measuring range differs according to the specifications of the external power supplies. For instance, the Agilent E3649A model enables to measure the Zener voltage up to 60V.



[Fig.169] Power Supply

CASE 1 ~ 4 are programmable in the way herein after prescribed.

CASE 1

This is the case you want to control the external power supplies (Voltage / Current / Output ON/OFF) without using the PRL-9500G.

How to apply voltage

- 1. Click on Step Edit (or Step List) from Edit menu on the Menu bar.
- 2. It displays "Enter step number (1 ? x)". Let's put a new step on the last step. Use the keyboard to enter the last step number and click on the OK button.
- 3. The cursor is flickering on the last step. Use the down-arrow key to move the cursor to the next step. (Refer to Fig.170)

	ode Ed	TI,	4,	ų	Reference		H	1.77
Edit	List	Erase	Search	Change	Pin coor. Pin E	n. D.Edit		D.Set
step	:Aux	. Pa	rts		Value		Comm	ent
000001	:	R	02		47KO		*	
000002	:	R	12		00		*	
000003	:	R	13		00		*	
000004	:	RS	23		470		*	
000005	:	R	22		470		*	
000006	:	CS	14		102		*	
000007		C	13		102		*	
800000								

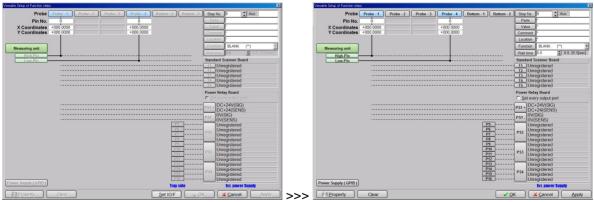
[Fig.170] Step edit list

4. Click "Viewable setup of Function steps" on the Tool menu. (Refer to Fig.171)

📃 <u>E</u> dit <u>S</u> earc	h <u>M</u> ove	<u>T</u> ool <u>V</u> iew	2
File Mode	Edit Op	O <u>O</u> oordinates Map F1	te
Edit List	Erase	Set Comb Measurements Clear Comb Measurements	
Step :Au 000001:	x. Pa R9	On a section .	Г
000002:	R9	Ground	
000003:	R9	Dettern proce	L
000004:	R9	Gluster Function *	L
000005:	R9		L
000006:	C9		
000007:	C9		
000008:		Coor <u>d</u> inates input	⊢
		Auto Generation	
		👢 Cha <u>ng</u> e Step Data Ctrl+C	
		Select <u>R</u> evise Area Mode	
		High-fly / No-contact-zone Shift+Ctrl+H	L

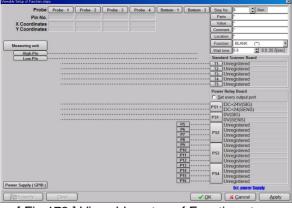
[Fig.171] Viewable setup of Function steps

- 5. It displays "Use board ref.point and aux.ref.point for alignment?". Select Yes or No.
- 6. It displays the Viewable setup of Function steps screen. (Refer to the left of Fig.172). Click "Set IO/F" button to activate each function on the screen. (Refer to the right of Fig.172)



[Fig.172] Viewable setup of Function steps

7. Click [Clear] button to release the connection of High-pin/Low-pin of the Measuring unit. (Refer to Fig.173.)



[Fig.173] Viewable setup of Function steps

8. Click [Power Supply (GPIB)] button, and it will display Fig.174.

Supply 001:*			*		
	PS3 P				
OUTPUT	649A [35V/	1.4A 60V/0	J.8A		
CON(1)	• OFF (0)		
S	etting value	of <u>v</u> oltage :	0.00	0.0060.00[\	/]
	Limit value	of current :	0.000	0.0001.400[A]
		Output :	OUTPUT 1		-
d Check f	or current lin	nit over	Check ci	urrent limit over	to stop the test
- Stop tor	sting with cur	ront monou	ramant		
_ stop tes	ang wan cur		rement		
Zaparma	a surament k		malu		
Zener me	asurement k	by power su	рріу		
				V	OK X Can

[Fig.174] Power Supply

PS-1 ~ PS-Aux

Select the external power supplies from PS1 ~ PS-Aux.

OUTPUT

Select ON, and it will display Fig.175.

00008:*		*	*		*	
PS1	PS2 PS3	B PS4	PS-Aux.			
		35V/1.4A	60V/0.8A1			
OUTI © OI	V(1)	° C	DFF(<u>0</u>)			
	Setting	value of <u>v</u>	oltage : 0.00	0.00.6	0.00[V]	
	Limit	value of c	urrent : 0.000	€ 0.000	1.400[A]	
		(Dutput : OUTPUT	1	-	
P Che	ck for curr	ent limit o	ver Che	ck current lim	it over to stop	the <u>t</u> est
□ <u>S</u> to	o testing w	ith current	measurement			
	measurer	ment by p	ower supply			

[Fig.175] Power Supply

Setting value of voltage

This can specify the voltage to output by 10mV. The output range at the right will be set automatically according to the external power supply specified by the user.

Limit value of current

This can specify the current to output by 1mA. The output range at the right will be set automatically according to the external power supply specified by the user. When the step is performed, if it exceeds this value, the error message will appear. At the same time, the output from the external power supply will be terminated automatically to suspend the test accordingly.

Output

This appears only when the dual-out type of the Agilent external power supply is selected. Select either OUTPUT1 or OUTPUT2 from the right pull-down menu.

Check for current limit over

When the box is selected, the test will be suspended if it exceeds the current limit. Select the box as needed.

Stop testing with current measurement

When the box is selected, the test will be suspended if it goes off the preset current on the step.

Reference current value

This is the standard current value and must be set smaller than "Limit value of current". Max. current value differs according to the external power supply models and is configurable by 1mA.

Judgment +% tolerance

This is the upper limit of the current value shown by %.

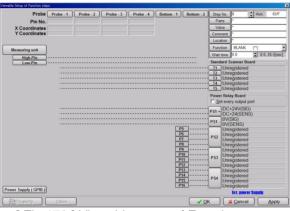
Judgment -% tolerance

This is the lower limit of the current value shown by %.

Zener measurement by power supply

Uncheck the box.

9. Click the OK button, and it will go back to the Viewable setup of Function steps screen.



[Fig.176] Viewable setup of Function steps

10. Click the OK button, and it goes back to the Step edit list. (the left screen of Fig.177). It will be useful to input any information on the test contents in the column "Parts" and "Value" as shown in the right screen of Fig.177.

📃 Edit Search M	<u>l</u> ove <u>T</u> ool <u>V</u> iew			📃 Edit Search M	ove <u>T</u> ool <u>V</u> iew		
File Mode Edit	Optimization To	ol Reference Test	Total Coordinate	File Mode Edit	Optimization Too	I Reference Test	Total Coordinat
Edit List Er	ase Search Change	Pin coor. Pin Er. D.E.		Edit List Er	ase Search Change		D He too Edit D.Fin D.Set
Step :Aux.	Parts	Value	Comment	Step :Aux.	Parts	Value	Comment
000001:	R902	47KO	*	000001:	R902	47KO	*
000002:	R912	00	*	000002:	R912	00	*
000003:	R913	00	*	000003:	R913	00	*
000004:	R923	470	*	000004:	R923	470	*
000005:	R922	470	*	000005:	R922	470	*
000006:	C914	102	*	000006:	C914	102	*
000007:	C913	102	*	000007:	C913	102	*
000008:IO/F	*	*	* >>>	000008:IO/F	POWER	IN 12V	*

[Fig.177] Step edit list

- 11. Now the external power supplies start outputting the voltage. It's not possible to apply the voltage to the UUT through the flying probes and the bottom probes. The user must think of the way of applying voltage to the UUT. The output of the voltage will be kept until the step to suspend the output is executed.
- 12. Program the step to measure the output at the next step.

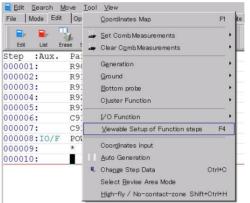
How to terminate voltage

- 1. Click on Step Edit (or Step List) from Edit menu on the Menu bar.
- 2. It displays "Enter step number (1 x)". Let's put a new step on the last step. Use the keyboard to specify the step which should be terminated and click on the OK button.
- 3. The cursor is flickering on the last step. Use the down-arrow key to move the cursor to the next step. (Refer to Fig.178)

📃 Edit 🛛	<u>earch</u>	Move	<u>T</u> ool	⊻iew					
File M	ode E	dit 0	ptimizat	tion Too	I Refe	rence 1	Test T	otal (Coordinat
	-	1	4	ų,	1 <u>H</u>	Ч.		H	
Edit	List	Erase	Search	Change	Pin coor.				
Step	:Aux	. Pa	arts		Val	ue		Comm	ent
000001	:	R	902		47K	0		*	
000002	:	R	912		00			*	
000003	:	R	913		00			*	
000004	:	R	923		470			*	
000005	:	R	922		470			*	
000006	:	C	914		102			*	
000007	:	C	913		102			*	
000008	:10/	F PC	OWER		IN	12V		*	
000009	:	*			OUT	5.01	7	*	
000010	:					-			

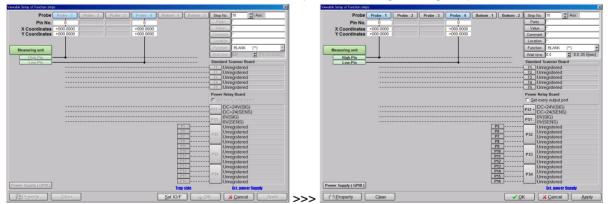
[Fig.178] Step edit list

4. Click "Viewable setup of Function steps" on the Tool menu. (Refer to Fig.179)



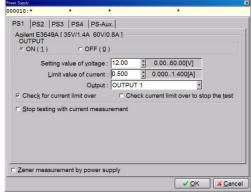
[Fig.179] Viewable setup of Function steps

- 5. It displays "Use board ref.point and aux.ref.point for alignment?". Select Yes or No.
- 6. It displays the Viewable setup of Function steps screen. (Refer to the left of Fig.180) Click "Set IO/F" button to activate each function on the screen. (Refer to the right of Fig.180)



[Fig.180] Viewable setup of Function steps

7. Click [Power Supply] button, and it will display Fig.181.



[Fig.181] Power Supply

- 8. Select OFF at OUTPUT column and click the OK button.
- 9. It goes back to the Viewable setup of Function steps screen (Fig.182).

Prob Pode: 3 Pode: 4 Betern: 3 Betern: 2 State 10 0 Aki: Pinit No: 0 0 0 0 0 Aki: Peter V Coordinate: 0:000 0:000 0:000 Count	ewable Setup of Function step	3									×
Vaccurinates	Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2	Step I	Vo. 10	Aux	
V Coordinate -00.000 Maxwing with backeting -00.000 Maxwing with backeting <th>Pin No.</th> <th>ò</th> <th></th> <th></th> <th>i i</th> <th></th> <th></th> <th>Part</th> <th>s '</th> <th></th> <th></th>	Pin No.	ò			i i			Part	s '		
V Coordinate -00.000 Maxwing with backeting -00.000 Maxwing with backeting <th></th> <th>+000 0000</th> <th></th> <th></th> <th>+000 0000</th> <th></th> <th></th> <th>Vak</th> <th>ie 1</th> <th></th> <th></th>		+000 0000			+000 0000			Vak	ie 1		
Measuring unt High Pin Low Pin High Pin Low Pin Prover Reverse Value of the Pin Sector Supply (CPID) Prover Supply (CPID) Pr								Comm	ent '		
Maximum 1 0 </th <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>Locat</th> <th>ion 1</th> <th></th> <th></th>								Locat	ion 1		
Ida Die Lon-Pin 0								Funct	ION BLANK	(**)	
Vigit ID Sander Samer Barl Line / Dim 1											0.25 Sinocl
Turngstered To Unregistered Unreg		.	••••••			••••••					o soland
Prever Supply (CPIB)	Low-Pin	1210000			••••••	••••••					
Prever Supply (CPU)											
Prever Supply (CPIB)								T3			
Prover Relay Good Prover Supply (CPUB) Prover Supply (CPUB) Prover Relay Good Prover			•••••		••••••	•••••	•••••				
Prever Supply (CPIB) Prever Supply (CPIB)											
Past Processing Past Procest Past Pro											
Power Supply (CPB) Power Supply (CPB)								□ <u>S</u> et	every output	t port	
Pewer Supply (CPIB) Pewer			••••••		••••••	••••••	•••••	PS1+	DC+24V(SI	(G)	
Perer Supply (CPB)								_	DC+24(SE	NS)	
Ps Unregistered PZ Unregistered PZ Unregistered P3 Unregistered P4 P3 P4 P4 P2 Unregistered P4 P4 P5 Unregistered P4 P4 P5 Unregistered Unregistered Unregistered P4 P4 P5 Unregistered Unregistered Unregistered P4 P4 P5 Unregistered Unregistered Un											
Prever Supply (CPIB)										d	
Pa Unsighted Pa Unsighted Pa Unsighted Pa Pa Pa Pa Pa Unsighted Pa Pa Pa Unsighted								052	Unregistere	d	
Page Supply (CPB)											
PB Imregistered P21 Umregistered P22 Umregistered P23 Umregistered P24 Umregistered P25 Umregistered P24 Umregistered P25 Umregistered P34 Umregistered P45 Umregistered P46 Umregistered P47 Umregistered P48 Umregistered P49 Umregistered P40 Et. Beert Stapby								_	Unregistere	d	
Press Supply (CPIB) Press									Unregistere	d	
Peter Supply (GPB) Power Supply (GPB) Pressure Supply (GPB) Kengstered Kengst								P55	Unregistere	d	
Press Supply (GPB) Press Unregistered Unregistered Unregistered Unregistered Unregistered Unregistered Unregistered Supply (GPB) bit aver disturble Comparison of the Comparis											
Power Supply (GPIB) Ext. power Supply (GPIB) Ext. power Supply (GPIB)											
Power Supply (GPIB) Prover Supply (GPIB) Ext. power Supply Ext. power Supply											
Power Supply (GPIB) Bit, power Supply											
Property Clear Apply	Power Supply (GPIB)										
	Property	Clear]				Q V		X Canc		Apply

[Fig.182] Viewable setup of Function steps

10. Click the OK button, and it goes back to the Step edit list. (the left screen of Fig.183). It will be useful to input any information on the test contents in the column "Parts" and "Value" as shown in the right screen of Fig.183.

📃 Edit Search M	<u>l</u> ove <u>T</u> ool <u>V</u> iew			📃 <u>E</u> dit S	<u>S</u> earch <u>M</u> ove <u>T</u> o	ool <u>V</u> iew	
File Mode Edit	Optimization Too	I Reference Te:	st Total Coordinat	File M	ode Edit Optim	ization Tool Referen	ce Test Total Coordinat
Edit List Era	ase Search Change	Pin coor. Pin Er.	🔵 🛃 🧑 D.Eat D.Pin D.Set	Edit	List Erase Sea	rch Change Pin coor. Pin	Er. D.Edt D.Pm D.Set
Step :Aux.	Parts	Value	Comment	Step	:Aux. Part	s Value	Comment
000001:	R902	47KO	*	000001	: R902	47KO	*
000002:	R912	00	*	000002	: R912	00	*
000003:	R913	00	*	000003	: R913	00	*
000004:	R923	470	*	000004	: R923	470	*
000005:	R922	470	*	000005	: R922	470	*
000006:	C914	102	*	000006	: C914	102	*
000007:	C913	102	*	000007	: C913	102	*
000008:IO/F	POWER	IN 12V	*	000008	:IO/F POWE	R IN 12	V *
000009:	*	OUT 5.0V	*	000009	: *	OUT 5	.0V *
000010:IO/F	*	* -	*	>>> 000010	:IO/F POWE	R OFF	*

[Fig.183] Step edit list

CASE 2

This is the case you want to control the external power supplies (Voltage / Current / Output ON/OFF) while using the PRL-9500G. The voltage is applied to the UUT through the bottom probes or the connector at the Tray. Therefore, more than one step will be measured until the step to terminate the output is executed.

How to apply voltage

- 1. Click on Step Edit (or Step List) from Edit menu on the Menu bar.
- 2. It displays "Enter step number (1 ? x)". Let's put a new step on the last step. Use the keyboard to enter the last step number and click on the OK button.
- 3. The cursor is flickering on the last step. Use the down-arrow key to move the cursor to the next step. (Refer to Fig.184)

Edit	<u>S</u> earch	Move	<u>T</u> ool	⊻iew					
File M	Node E	dit 0	ptimizat	ion Too	I Refe	rence	Test T	otal	Coordinate
B		Π	de	U_	HL	1	100	H	1.00
Edit	List	Erase	Search	Change	Pin coor.	Pin Er.			
Step	:Aux	. Pa	rts		Val	ue		Comm	ent
00000	1:	RS	02		47K	0		*	
000002	2:	R	12		00			*	
00000	3:	RS	13		00			*	
000004	4:	RS	23		470			*	
00000	5:	RS	22		470			*	
00000	6:	CS	14		102			*	
00000	7:	CS	13		102			*	
000008	3:	-							

[Fig.184] Step edit list

4. Click "Viewable setup of Function steps" on the Tool menu. (Refer to Fig.185)

	Move <u>T</u> o		
File Mode Ed	it Op	Coordinates Map F1	
Edit List	Error C	 Set Comb Measurements Clear Comb Measurements 	+ +
Step :Aux. 000001:	Pa:	Generation	Þ
000002:	R9:	Ground	Þ
000003:	R9:	Bottom probe	۲
000004:	R9:	Cluster Function	۲
000005:	R9:		
000006:	C9:	[/O Function	•
000007:	C9:	⊻iewable Setup of Function steps F4	
000008:	-	Coordinates input	
		Change Step Data Ctrl+C	
		Select <u>R</u> evise Area Mode	
		High-fly / No-contact-zone Shift+Ctrl+H	

[Fig.185] Viewable setup of Function steps

- 5. It displays "Use board ref.point and aux.ref.point for alignment?". Select Yes or No.
- 6. It displays the Viewable setup of Function steps screen. (Refer to the left of Fig.186). Click "Set IO/F" button to activate each function on the screen. (Refer to the right of Fig.186)

Viewable Setup of Function steps	×	Vewable Setup of Function steps
Probe Probe - 1 Probe - 2 Probe - 3 Probe - 4 Bottom - 1 Bottom -	2 Step No. 8 C Aux	Probe Probe - 1 Probe - 2 Probe - 3 Probe - 4 Bottom - 1 Bottom - 2 Step No. 8 C Aux
Pin No. 0	Parts	Pin No. 0 Parts
X Coordinates +000.0000 +000.0000	Value	X Coordinates +000.0000 +000.0000 Value *
Y Coordinates +000.0000 +000.0000	Comment	Y Coordinates +000.0000 +000.0000 Comment *
	Location	Location
Measuring unit	Eurotion BLANK (**)	Measuring unit BLANK (")
High Pig	Wait time 0.0 25.6[sec]	High Pin
Low.Pin	Standard Scanner Board	Low-Pin Standard Scanner Board
		T1 Unregistered
	Conceptored	12 Unregistered
	··· 14 Unregistered	T4 Unregistered
	jonregistered	
	Power Relay Board Set eveny output port	Power Relay Board
		Set every output port
		P51 + DC+24V(SIG) DC+24(SENS)
	***[000] 0V(SIG)	OV(SIG)
		PS1 - 0V(SEŃS)
P0		De long data
P7		P7 P52 Unregistered Unregistered
P3		P8 Unregistered
P10	··· Des Unregistered	P10 Unregistered
211		Unregistered
1933		P12 Unregistered
PM	··· Unregistered	P14 Unregistered
P10		P15 ·········P54 Unregistered P16 ········· Unregistered
Power Supply (GPIB) Tray side	Ext. power Supply	Power Supply (GPIB) Rt, power Supply
All Property Clear Set IO/F	OK X Cancel Apply	Property Clear Apply
Zerion Zerion		

[Fig.186] Viewable setup of Function steps

7. Click [Power Supply (GPIB)] button, and it will display Fig.187.

<pre>C ON (1)</pre>	• OFF (<u>0</u>)	
Setting	value of voltage : 0.0	00 0.0060.00[V]
Limit	value of current : 0.0	000 🕄 0.0001.400[A]
	Output : OU	JTPUT 1
E Check for curr	ent limit over 🛛 🕯	Check current limit over to stop the tes
Stop testing w	ith current measurem	ent

[Fig.187] Power Supply

PS-1 ~ PS-Aux

Select the external power supplies from PS1 ~ PS-Aux.

OUTPUT

Select ON, and it will display Fig.188.

000008:*		*	*		*	
PS1 PS	2 PS3	PS4	PS-Aux.			
Agilent E		35V/1.4A	60V/0.8A1			
• ON (c 0	FF (<u>0</u>)			
	Setting v	alue of <u>v</u> e	oltage : 0.00		0.0060.00[V]	
	<u>L</u> imit v	alue of c	urrent : 0.000	\$	0.0001.400[A]	
		C	Dutput : OUTF	UT 1	•	
Check	for curre	nt limit ov	/er ⊏ C	Check c	urrent limit over to s	top the test
⊑ <u>S</u> top t	esting wit	h current	measurement			
□ Zener m	easurem	ent by po	ower supply			
					∠ OK	Cance

[Fig.188] Power Supply

Setting value of voltage

This can specify the voltage to output by 10mV. The output range at the right will be set automatically according to the external power supply specified by the user.

Limit value of current

This can specify the current to output by 1mA. The output range at the right will be set automatically according to the external power supply specified by the user. When the step is performed, if it exceeds this value, the error message will appear. At the same time, the output from the external power supply will be terminated automatically to suspend the test accordingly.

Output

This appears only when the dual-out type of the Agilent external power supply is selected. Select either OUTPUT1 or OUTPUT2 from the right pull-down menu.

Check for current limit over

When the box is selected, the test will be suspended if it exceeds the current limit. Select the box as needed.

Stop testing with current measurement

When the box is selected, the test will be suspended if it goes off the preset current on the step.

◄	Stop testing with current measure	ment		
	Setup measuring conditions			
	<u>R</u> eference current value : 0	0.000	0.0001.400	[A]
	Judgment <u>+</u> % tolerance : 0)	0100[%]	
	Judgment <u>-</u> % tolerance : 0)	0100[%]	

[Fig.189] Power Supply

Reference current value

This is the standard current value and must be set smaller than "Limit value of current". Max. current value differs according to the external power supply models and is configurable by 1mA.

Judgment +% tolerance

This is the upper limit of the current value shown by %.

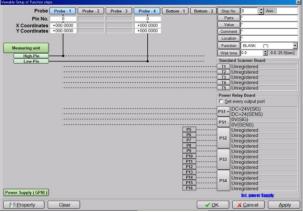
Judgment -% tolerance

This is the lower limit of the current value shown by %.

Zener measurement by power supply

Uncheck the box.

8. Click the OK button, and it will go back to the Viewable setup of Function steps screen.



[Fig.190] Viewable setup of Function steps

9. Here you can specify the output from the external power supplies. Because you are going to measure more than one step while applying the voltage, [Bottom-1], [Bottom-2] or [Connector at the Tray] must be specified. Let's specify [Bottom-1] and [Bottom-2] as an example. (When [Connector at the Tray] is specified, the user must think of the way of applying voltage to the UUT)

Select "Set every output port" at Power Relay Board.

When the box is unchecked, you will get to 4-terminal connection. (Refer to the left of Fig.191) When the box is checked, you will get to 2-terminal connection. (Refer to the right of Fig.191)

Configure it on the basis of the specification of your external power supplies. We will hereinafter explain the process while assuming that the box is unchecked.

Powe	er Relay Board	Power Relay Board
□ <u>S</u> e	et every output port	Set every output port
PS1 +	DC+24V(SIG) DC+24(SENS)	P1 DC+24V(SIG) P2 DC+24(SENS)
PS1 -	ໄດ້ແຕ່ດັ່	P3 0V(SIG) P4 0V(SENS)
PS2	Unregistered Unregistered Unregistered Unregistered	P5 Unregistered P6 Unregistered P7 Unregistered P8 Unregistered
PS3	Unregistered Unregistered Unregistered Unregistered	P9 Unregistered P10 Unregistered P11 Unregistered P12 Unregistered
PS4	Unregistered Unregistered Unregistered Unregistered	P13 Unregistered P14 Unregistered P15 Unregistered P16 Unregistered
	Ext. power Supply	Ext. power Supply

when Set every output port is unchecked when Set every output port is selected [Fig.191] Viewable setup of Function steps



Signal name (ex. DC+24V, 0V) on Fig.191 is assignable on Input / output function of I/O step in Option mode. (Refer to Page 6) "Unregistered" means that signal name is not registered yet.

10. Click [PS1+], and [Probe-1] to [Bottom-2] buttons are flashing in yellow. (Refer to Fig.192)

e Setup of Function step	18									
Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2	Step No.	8	Aux.	
Pin No.	0			0			Parts	<u>Jr</u>		
X Coordinates	+000.0000			+000.0000			Value)•		
Y Coordinates	+000.0000			+000.0000			Comment			
							Location	1.		
leasuring unit							Function	BLANK	(**)	4
High Pin							Wait time	0.0	\$ 0.0.2	5 5[sec]
Low-Pin							Standard	Scanner B	oard	
							T1 Un	registered	ł	
					•••••	••••••		registered		
			••••••			••••••		registered		
			••••••			••••••		registered		
						••••••	[]Un	registered	1	
							Power Re	lay Board		
							E Set ev			
							PS1 + DC	+24V(SIC	G)	
							PS1 + DC	+24V(SE	NS)	
							PS1 OV	(SIG)		
							PST- OV	(SENS)		

[Fig.192] Viewable setup of Function steps

Specify [Bottom-1] as the output of [PS1+], and they will be connected with a blue line. (Refer to Fig.193)

wable Setup of Function step	8								
Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2	Step No.	8 🗘 Aux.	
Pin No.	ò			Ö			Parts)•	
X Coordinates	+000.0000			+000.0000			Value)·	
Y Coordinates	+000.0000			+000.0000			Comment	•	
							Location	•	
Measuring unit							Function	BLANK (**)	•
High-Pin							Wait time	0.0 25.5[s	sec]
Low-Pin -	•						Standard	Scanner Board	
			•••••		•••••			registered	
			••••••		••••••			registered	
			•••••		•••••			registered	
			••••••		•••••			registered	
			•••••		•••••		<u>T5</u> Un	registered	
							Power Rei	lay Board	
							□ Set ev	ery output port	
							PS1 + DC	C+24V(SIG)	_
							DC	C+24V(SENS)	
•	••••••	•••••		•••••				(SIG)	
							0V	(SENS)	

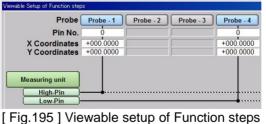
[Fig.193] Viewable setup of Function steps

11. Click [PS1-] to specify the output, and [Probe1] to [Bottom-2] are flashing in yellow. Specify [Bottom-2] as the output of [PS1-], and they will be connected with a blue line. (Refer to Fig.194)

iewable Setup of Function step	8									×
Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2	Step No	8	Aux.	
Pin No.	0			0			Parts			
X Coordinates	+000.0000			+000.0000			Value	<u>.</u>		
Y Coordinates	+000.0000			+000.0000			Commen	rt i		
							Location			
Measuring unit							Function	BLANK	(**)	*
High-Pin							Wait time	e 0.0	\$ 0.0.	25.5[sec]
Low-Pin							Standard	Scanner Bo	ard	
					•••••	•••••		nregistered		
		••••••		•••••	•••••	•••••		nregistered		
						•••••		nregistered		
								nregistered		
								and the second se		
								elay Board		
							□ <u>S</u> et er	very output p	ort	
							PS1 +	C+24V(SIG)	
	•••••			••••••				C+24V(SEI	VS)	
	•••••		••••••	••••••				/(SIG)		
						•••••	- 01	/(SENS)		

[Fig.194] Viewable setup of Function steps

12. The two probes used to measure after powered up the UUT are already set to [Probe-1] and [Probe-4]. If you want to change them, click [High-pin] / [Low-pin] to select other probes.





The color of the lines connecting [PS1+] [PS1-] to the output mean maximum current value, for example; [blue] \rightarrow 3A

13. Click the Property button, and it will display the Measuring unit screen. (Refer to Fig.196) Use your keyboard to fill in the Parts column. In addition, enter the Value, Comment and Location column as needed.

Fill in the Function, Element and Measure Mode column if the measurement content is already determined as they will assist in inputting the reference value.

Parts :				(11 characters)
Value :	* a			(11 characters)
Comment : Location :	*			(20 characters) (4 characters)
Location :	1			(+ characters)
Eunction :	BLANK	(**)	*	
Element :	AUTO		-	
Measure Mode :	AUTO		*	

[Fig.196] Measuring unit

14. Click the Next button, and it will displays the Coordinate set screen. (Refer to Fig.197) This is the same screen as Fig.188. It's possible to change the contents.

Power Supply	×
000008:POWET IN_24V * *	
PS1 PS2 PS3 PS4 PS-Aux.	
Agilent E3649A [35V/1.4A 60V/0.8A]	
• ON (1) • OFF (0)	
Setting value of voltage : 12.00 2 0.0060.00[V]	
Limit value of current : 0.500 🗘 0.0001.400[A]	
Output : OUTPUT 1	
Check for current limit over	top the <u>t</u> est
✓ Stop testing with current measurement ⊘Setup measuring conditions	
Reference current value : 0.400 0.0001.400[A]	
Judgment <u>±</u> % tolerance : 10 <u></u>	
Judgment <u>-</u> % tolerance : 10 🗘 0100[%]	
□ Zener measurement by power supply	
	X Cancel

[Fig.197] Power Supply

15. Click the Next button, and it will displays the Coordinate set screen. (Refer to Fig.198)

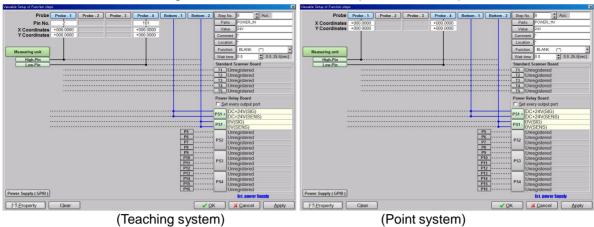
Coordinate Set	X	Coordinate Set
000008: POWER	IN_24V * *	000008:POWET IN_24V * *
	X coor Y coor High - Pin : +000.0000 +000.0000 Low - Pin : +000.0000 +000.0000	Pin No. X coor Y coor High - Pin : 2 5 032000 +000.0000 +000.0000 Low - Pin : 101 5 032000 +000.0000 +000.0000
	Press TEST to begin set up.	Coordinates input
<u></u>	ABack ✓ QK X Cancel	
	(Teaching system)	(Point system)

[Fig.198] Coordinate set

On the Coordinate set screen, enter the coordinates of High-pin and Low-pin (in Teaching system) or the pin numbers (in Point system).

	In Point system, when any new pin number was so that it displays Fig.199 where the user can en	•
	Coordinates input	×
	000008: POWER IN_24V * *	
— (HINT) —	Press [ENTER] SW to set the coordinates.	
	Pin No. Net Name	X coor Y coor
V	High - Pin 2 *	[+000.0000,+000.0000]
Ð	Low - Pin 101 *	[+000.0000,+000.0000]
		✓ <u>O</u> K X Cancel
	[Fig.199] Coordinate i	nput

16. Click the OK button, and it goes back to the Viewable setup of Function steps screen.



[Fig.200] Viewable setup of Function steps

17. Click the OK button, and it goes back to the Step edit list. Now you can see the AUX. column is substituted by "IO/F".

lie <u>E</u> dit <u>S</u> earch <u>№</u> File Mode Edit	<u>1</u> ove <u>T</u> ool ⊻ie Optimization	ew Tool Reference Te	st Total Coord	ि <u>E</u> dit <u>S</u> earch <u>N</u> File Mode Edit	<u>/</u> ove <u>T</u> ool Optimizatio	<u>V</u> iew on Tool Reference T	est Total Co	ordinate S
	ase Search Cha		A.Gen. Print		rase Search	Change Pin coor. Pin Er.	O.Edit D.Pm	D.Set
Step :Aux.	Parts	Value	Comment	Step :Aux.	Parts	Value	H-pin	L-pin
000001:	R902	47KO	*	000001:	R902	47KO	11	15
000002:	R912	00	*	000002:	R912	00	3	10
000003:	R913	00	*	000003:	R913	00	4	6
000004:	R923	470	*	000004:	R923	470	11	10
000005:	R922	470	*	000005:	R922	470	8	3
000006:	C914	102	*	000006:	C914	102	7	6
000007:	C913	102	*	000007:	C913	102	5	10
000008:IO/F	POWER	IN 24V	*	000008:IO/F	POWER	IN 24V	2	101
	(Tea	aching syste	m)	1	(Pc	pint system)		
		- •	[Fig.201] Step edit lis	st			

18. Program the step to measure the output at the next step.

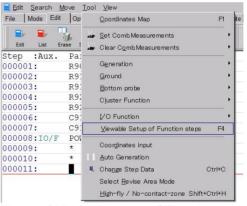
How to terminate voltage

- 1. Click on Step Edit (or Step List) from Edit menu on the Menu bar.
- 2. It displays "Enter step number (1 x)". Let's put a new step on the last step. Use the keyboard to specify the step which should be terminated and click on the OK button.
- 3. The cursor is flickering on the last step. Use the down-arrow key to move the cursor to the next step. (Refer to Fig.202)

	h <u>M</u> ove <u>T</u> ool	View ion Tool Reference	<u> </u>
File Mode		Change D.Edit D.Set	A.Gen. Print
Step :Au	x. Parts	Value	Comment
000001:	R902	47KO	*
000002:	R912	00	*
000003:	R913	00	*
000004:	R923	470	*
000005:	R922	470	*
000006:	C914	102	*
000007:	C913	102	*
000008:10	F POWER	IN 24V	*
000009:	*	OUT 12V	*
000010:	*	OUT 5.0	v *
000011:		_	

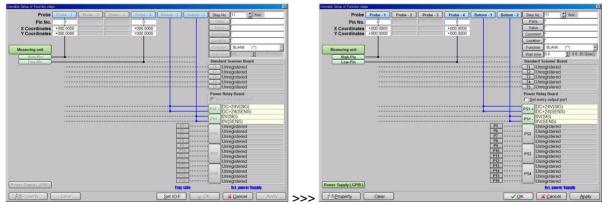
[Fig.202] Step edit list

4. Click "Viewable setup of Function steps" on the Tool menu. (Refer to Fig.203)



[Fig.203] Viewable setup of Function steps

- 5. It displays "Use board ref.point and aux.ref.point for alignment?". Select Yes or No.
- 6. It displays the Viewable setup of Function steps screen. (Refer to the left of Fig.204) Click "Set IO/F" button to activate each function on the screen. (Refer to the right of Fig.204)



[Fig.204] Viewable setup of Function steps

7. Click [Clear] button, and the connecting lines from [PS+], [PS-] and [Measuring unit] will be released.

8. Click [Power Supply] button, and it will display Fig.205.

00011:*	*	*	*
PS1 PS2	PS3 PS4 P	S-Aux	
	9A [35V/1.4A 6	and the second	
OUTPUT	5A1 55 VII.4A	0070.0A [
• ON(1)	OFF	- (Q)	
Sett	ing value of <u>vol</u> ta	age : 24.00 📫	0.0060.00[V]
L	imit value of curr	rent : 0.500	0.0001.400[A]
	Out	tput : OUTPUT 1	•
Check for	current limit over	Check	current limit over to stop the test
□ Stop testin	g with current m	easurement	

[Fig.205] Power Supply

- 9. Select OFF at OUTPUT column and click the OK button.
- 10. It goes back to the Viewable setup of Function steps screen (Fig.206).

femable Setup of Function step	\$								1
Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2	Step I	No. 11	Aux.
Pin No.							Part	s)*	
X Coordinates							Valu	ie ⁴	
Y Coordinates							Comm	ent *	
							Locat	ion *	
							Funct	ion BLANK	(**)
Measuring unit							Wait ti		\$ 0.025.5[sec]
High-Pin				••••••			<u></u>		
Low-Pin	••••••							ard Scanner Boa	rd
				••••••				Unregistered	
								Unregistered Unregistered	
								Unregistered	
								Unregistered	
								Relay Board	
								every output po	vrt
								DC+24V(SIG) DC+24V(SEN	C)
								OV(SIG)	3)
								OV(SENS)	
						5		Unregistered	
						26		Unregistered	
								Unregistered	
								Unregistered	
						10		Unregistered	
						11	PS3	Unregistered	
						12		Unregistered	
						13		Unregistered Unregistered	
						14		Unregistered	
						15		Unregistered	
						16		Unregistered	
Power Supply (GPIB)								Ext. nower	Supply
C C		٦ ٢				6		-	2.0
但Eroperty	Clear					✓ QI	<	X Cancel	Apply

[Fig.206] Viewable setup of Function steps

11. Click the OK button, and it goes back to the Step edit list. (the left screen of Fig.207). It will be useful to input any information on the test contents in the column "Parts" and "Value" as shown in the right screen of Fig.207.

📃 Edit Search I	<u>vl</u> ove <u>T</u> ool <u>V</u> iew	r		📃 <u>E</u> dit <u>S</u> earch <u>N</u>	<u>A</u> ove <u>T</u> ool <u>V</u> ie	9W	
File Mode Edit	Optimization T	ool Reference Test	Total Coordinate	File Mode Edit	Optimization	Tool Reference Te	st Total Coordinate
	nase Search Change	e Pin coor. Pin Ér. Di	o 🛃 🧑		ase Search Char		🔵 🛃 🦣
Step :Aux.	Parts	Value	Comment	Step :Aux.	Parts	Value	Comment
000001:	R902	47KO	*	000001:	R902	47KO	*
000002:	R912	00	*	000002:	R912	00	*
000003:	R913	00	*	000003:	R913	00	*
000004:	R923	470	*	000004:	R923	470	*
000005:	R922	470	*	000005:	R922	470	*
000006:	C914	102	*	000006:	C914	102	*
000007:	C913	102	*	000007:	C913	102	*
000008:IO/F	POWER	IN 24V	*	000008:IO/F	POWER	IN 24V	*
000009:	*	OUT 12V	*	000009:	*	OUT 12V	*
000010:	*	OUT 5.0V	*	000010:	*	OUT 5.0V	*
000011:IO/F	*	* _	*	000011:IO/F	POWER	OFF	*

[Fig.207] Step edit list

CASE 3

This is the case you want to control the external power supplies (Voltage / Current / Output ON/OFF) while using the PRL-9500G. The voltage is applied to the UUT through the flying probes. The measurement is performed by the APT-9411. After the step finished applying voltage through the flying probes, the output to the UUT will be terminated automatically.

How to apply voltage

- 1. Click on Step Edit (or Step List) from Edit menu on the Menu bar.
- 2. It displays "Enter step number (1 ? x)". Let's put a new step on the last step. Use the keyboard to enter the last step number and click on the OK button.
- 3. The cursor is flickering on the last step. Use the down-arrow key to move the cursor to the next step. (Refer to Fig.208)

		Move		_					
File Mo	de Ed	dit O	ptimizat	ion Too	I Refe	rence	Fest T	otal	Coordinate
E		-	4	ų	H	- 1	400	H	100
Edit	List	Erase	Search	Change	Pin coor.	Pin Er.			
Step :	Aux	. Pa	rts		Val	ue		Comm	ent
000001	1	RS	02		47K	0		*	
000002:	1	R	12		00			*	
000003		RS	13		00			*	
000004:	1	RS	23		470			*	
000005		RS	22		470			*	
000006:	1	CS	914		102			*	
000007:		CS	13		102			*	
000008:									

[Fig.208] Step edit list

4. Click "Viewable setup of Function steps" on the Tool menu. (Refer to Fig.209)

📃 <u>E</u> dit <u>S</u> e	arch	Move	<u>T</u> ool	⊻iew	
File Mod	le Eo	dit Op		<u>C</u> oordinates Map i	=1
Edit	List	Erase S		Set Comb Measurements	•
				Clear Comb Measurements	•
Step : 000001:	Aux	. Pa: R90		Generation	×
000002:		R9:		Ground	- •
000003:		R93		Bottom probe	•
000004:		R9:		Cluster Function	•
000005:		R93			-
000006:		C9:		I∕O Function	- F.
000007:		C9:		⊻lewable Setup of Function steps F	-4
000008:		_		Coordinates input	7
				Auto Generation	
			R.	Change Step Data Ctrl+	-c
				Select <u>R</u> evise Area Mode	
				High-fly / No-contact-zone Shift+Ctrl+	н

[Fig.209] Viewable setup of Function steps

- 5. It displays "Use board ref.point and aux.ref.point for alignment?". Select Yes or No.
- 6. It displays the Viewable setup of Function steps screen. (Refer to the left of Fig.210). Click "Set IO/F" button to activate each function on the screen. (Refer to the right of Fig.210)

Vewable Setup of Function steps			×	1	Viewable Setup of Function step	0								
Probe Probe - 1 Probe - 2 Probe - 3	Probe - 4 Bottom - 1 Bottom - 2	Step No. 8	C Aux		Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2	Step No.	8	Aux.
Pin No. 0	0	Parts			Pin No.	Ö			i			Parts	•	
	+000.0000	Value.			X Coordinates	+000.0000			+000.0000			Value	۰.	
Y Coordinates +000.0000	+000.0000	Comment *			Y Coordinates	+000.0000			+000.0000			Comment	N	
		Location										Location	•	
Measuring unit		Function BLAN	((**) E		Measuring unit							Function	BLANK	(**)
		Wat time 0.0	0.0.25.5[sec]									Wait time	0.0	\$ 0.0.25.5[sec]
High-Pin Low-Pin		Standard Scanner	Board		High-Pin Low-Pin				second second			Standard S	canner Boar	d
	-	11 Unregistere	d									T1 Unre	aistered	
		12 Unregistere	bd									T2 Unre	gistered	
		13 Unregistere	bd											
												Power Rela		
		Power Relay Board										E Set ever		
		PS1 + DC+24V(S DC+24(SE	IG) NS)									PS1+ DC4	24V(SIG) 24(SENS)	
		OV(SIG)	110)									101/19		
		OV(SENS)										PST . 0V(S	SENS)	
	P5	Unregistere								P	5		gistered	
	P5	PSZ Unregistere								P			gistered	
	P8	Unregistere	eu ad							P			gistered	
	PS	Unregistere								P		Unre	gistered	
	P10	PS3 Unregistere									10	PS1 Unre	gistered	
	P11 P12	Unregistere								P		Unre	gistered	
	P13	Unregistere Unregistere									13		gistered aistered	
	F16	Unregistere	ed							P		Line	gistered	
	P49	Unregistere	ed							P		Unre Unre	gistered	
Power Supply (GPIB)	P16	Unregistere			Power Supply (GPIB)					P	16		gistered	
Concession and a second	Tray side	Ext. nov	ver Supply	1	(one sapply (Grib)								Ext nowers	upply vique
Clear Clear	Set IO/F	Canc	el Apply	>>>	Property	Clear					✓ QF		<u>C</u> ancel	Apply

[Fig.210] Viewable setup of Function steps

7. Click [Power Supply (GPIB)] button, and it will display Fig.211.

C ON (1)	• OFF (0) g value of voltage : 0.	00 🗘	0.0060.00[V	1
	it value of current : 0. Output : 0	000	0.0001.400[4	-
	rrrent limit over with current measuren		rrent limit over	to stop the test

[Fig.211] Power Supply

PS-1 ~ PS-Aux

Select the external power supplies from PS1 ~ PS-Aux.

OUTPUT

Select ON, and it will display Fig.212.

Power Supply					2
000008:*	*	*		*	
Agilent E3649A OUTPUT © ON (1) Setting Im	c O g value of ve it value of c c rrent limit ov	and the second	0.000. T 1	60.00[V] .1.400[A] mit over to stop	o the test
□ Zener measure	ement by po	ower supply			
				✓ OK	X Cancel

[Fig.212] Power Supply

Setting value of voltage

This can specify the voltage to output by 10mV. The output range at the right will be set automatically according to the external power supply specified by the user.

Limit value of current

This can specify the current to output by 1mA. The output range at the right will be set automatically according to the external power supply specified by the user. When the step is performed, if it exceeds this value, the error message will appear. At the same time, the output from the external power supply will be terminated automatically to suspend the test accordingly.

Output

This appears only when the dual-out type of the Agilent external power supply is selected. Select either OUTPUT1 or OUTPUT2 from the right pull-down menu.

Check for current limit over

When the box is selected, the test will be suspended if it exceeds the current limit. Select the box as needed.

□ Stop testing with current measurement

When the box is selected, the test will be suspended if it goes off the preset current on the step.

F	Stop testing with current measurement
	Setup measuring conditions
I	Reference current value : 0.000 🔹 0.0001.400[A]
I	Judgment <u>+</u> % tolerance : 0
I	Judgment <u>-</u> % tolerance : 0 + 0100[%]
	[Fig.213] Power Supply

Reference current value

This is the standard current value and must be set smaller than "Limit value of current". Max. current value differs according to the external power supply models and is configurable by 1mA.

Judgment +% tolerance

This is the upper limit of the current value shown by %.

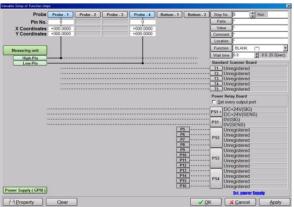
Judgment -% tolerance

This is the lower limit of the current value shown by %.

Zener measurement by power supply

Uncheck the box.

8. Click the OK button, and it will go back to the Viewable setup of Function steps screen.



[Fig.214] Viewable setup of Function steps

9. Here you can specify the output from the external power supplies. Let's specify the flying probe as an example.

Select "Set every output port" at Power Relay Board. When the box is unchecked, you will get to 4-terminal connection. (Refer to the left of Fig.215) When the box is checked, you will get to 2-terminal connection. (Refer to the right of Fig.215)

Configure it on the basis of the specification of your external power supplies. We will hereinafter explain the process while assuming that the box is unchecked.

	0			
Powe	r Relay Board	(Powe	r Relay Board
□ <u>S</u> e	et every output port		⊠ <u>S</u> e	t every output port
PS1 +	DC+24V(SIG)	ļ		DC+24V(SIG)
	DC+24(SENS)			DC+24(SENS)
PS1 -	0V(SIG)			0V(SIG)
F 31 -	0V(SENS)			0V(SENS)
	Unregistered		P5	Unregistered
PS2	Unregistered		P6	Unregistered
F 32	Unregistered		P7	Unregistered
	Unregistered		P8	Unregistered
	Unregistered		P9	Unregistered
PS3	Unregistered		P10	Unregistered
F 33	Unregistered		P11	Unregistered
	Unregistered			Unregistered
	Unregistered		P13	Unregistered
PS4	Unregistered		P14	Unregistered
P 54	Unregistered		P15	Unregistered
	Unregistered		P16	Unregistered
	Ext. power Supply	l l		Ext. power Supply

when Set every output port is unchecked when Set every output port is selected [Fig.215] Viewable setup of Function steps



Signal name (ex. DC+24V, 0V) on Fig.215 is assignable on Input / output function of I/O step in Option mode. (Refer to Page 6) "Unregistered" means that signal name is not registered yet.

10. Click [PS1+], and [Probe-1] to [Bottom-2] buttons are flashing in yellow. (Refer to Fig.216)

able Setup of Function step	8								
Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2	Step No.	8	Aux.
Pin No.	0		1	0			Parts) - · · · · · · · · · · · · · · · · · ·	
X Coordinates	+000.0000			+000.0000			Value) (* 1	
Y Coordinates	+000.0000		J	+000.0000			Comment) •	
							Location		
Measuring unit							Function	BLANK	(**)
High Pin							Wait time	0.0	2 0.0.25 5[sec]
Low-Pin							Standard S	canner Boa	brd
								egistered	
			••••••		••••••	••••••		egistered	
								egistered	
								egistered	
								egistered	
							Power Rela	ay Board	
							🗖 Set eve		
							PS1 + DC	+24V(SIG)	
			••••••	•••••			DC	+24V(SEN	IS)
				••••••			PS1 OV(SIG)	
							0V(SENS)	

[Fig.216] Viewable setup of Function steps

Specify [Probe-2] as the output of [PS1+], and they will be connected with a blue line. (Refer to Fig.217)

Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2	Step No.	8	Aux.
Pin No.	0	0		Ó			Parts).	
X Coordinates	+000.0000	+000.0000		+000.0000			Value	ŀ	
Y Coordinates	+000.0000	+000.0000		+000.0000			Comment	Ĩ.	
							Location	ĵ.	
Measuring unit							Function	BLANK	(**)
High-Pin							Wait time	0.0	0.0.25.5[
Low-Pin -							Standard S	Scanner Boa	rd
							T1 Unr	eaistered	
		••••••			•••••			egistered	
		••••••	••••••					egistered	
		••••••	••••••				T4 Unr	egistered	
		••••••	••••••				T5 Unr	egistered	
							Power Rel	ay Board	
								ery output po	
							DC DC	+24V(SIG)	
								+24V(SEN	S)
							PS1 - 0V(SIG)	
								SENS)	

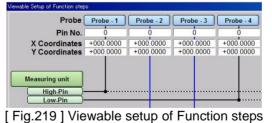
[Fig.217] Viewable setup of Function steps

11. Click [PS1-] to specify the output, and [Probe1] to [Bottom-2] are flashing in yellow. Specify [Probe-3] as the output of [PS1-], and they will be connected with a blue line. (Refer to Fig.218)

Nearung unt Wat Imm 00 High Pin Standard Same Low Pin 10 Urregis 10 Urregis 11 Urregis 13 Urregis 14 Urregis	nt * n * n BLANK (**)
Ŷ Coordinates *000 0000 *000 0000	nt * in * in BLANK (**)
Measuring unit Measuring unit	n * n BLANK (**)
Messuring unit High: Prin Low Pin Standard Sean 12 Urrepis 13 Urrepis 14 Urrepis 14 Urrepis	BLANK (**)
Messuring unt Wat time 00 High Pin Standard Stand Low Pin TI Urregis TI Urregis TI Urregis TI Urregis TI Urregis TI Urregis	
High Pin	
Low Pin Standard Stand T Urregis T Urregis T Urregis T Urregis	ne 0.0 🗘 0.0.25.5[s
12 Jurejis 13 Jurejis 4 Jurejis	d Scanner Board
T3 Unregis	
T4 Unregis	Inregistered
	Inregistered
Power Relay Bo	Relay Board
□ Set every or	
PS1 + DC+24	every output port

[Fig.218] Viewable setup of Function steps

12. The two probes used to measure after powered up the UUT are already set to [Probe-1] and [Probe-4]. If you want to change them, click [High-pin] / [Low-pin] to select other probes.



 The color of the lines connecting [Probe-2] [Probe-3] to the output mean maximum current value, for example; [blue] → 3A

 Fig.218 indicates that [Probe-2] and [Probe-3] are connected to the external power supplies and that [Probe-1] and [Probe-4] are to the measuring unit of the APT-9411, but these connection may change according to the coordinates of the contact points.

13. Click the Property button, and it will display the Measuring unit screen. (Refer to Fig.220) Use your keyboard to fill in the Parts column. In addition, enter the Value, Comment and Location column as needed.

Fill in the Function, Element and Measure Mode column if the measurement content is already determined as they will assist in inputting the reference value.

Parts inform	ation				
	Parts : *				 (11 characters)
	Value : *				 (11 characters)
	Comment :				 (20 characters)
	Location : *				(4 characters)
	Eunction : B	ANK	(**)	-	
	Element : A			-	
Mea	sure Mode : A	JTO		Y	
		1	1	 Back 	ext ⊳ 🛛 🗡 Canc

[Fig.220] Measuring unit

14. Click the Next button, and it will displays the Coordinate set screen. (Refer to Fig.221) This is the same screen as Fig.212. It's possible to change the contents.

Power Supply		þ
000008:POWER_IN AL_ON_TEST *	*	
PS1 PS2 PS3 PS4 PS-Aux. Agilent E3649A [35V/1.4A 60V/0.8, OUTPUT	Norman Andrews	
• ON(1) • OFF(Q)		
Setting value of voltage : 2 Limit value of current : 0		
Output : C		
	Check current limit over to stop the test	
Setup measuring conditions	ment	
Reference current value : 0	0.400 0.0001.400[A]	
Judgment ±% tolerance : 1	0 0100[%]	
Judgment <u>-</u> % tolerance : 1	0 0100[%]	
Zener measurement by power supp	bly	
	d Back Next ► X Cance	el

[Fig.221] Power Supply

15. Click the Next button, and it will displays the Coordinate set screen. (Refer to Fig.222)

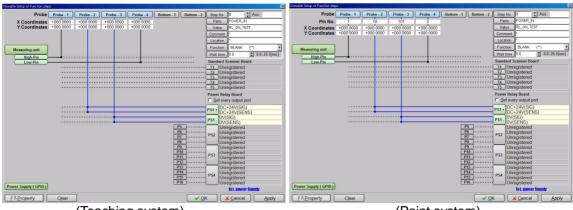
Coordinate Set	Coordinate Set	<u>×</u>
000008:POWER_IN AL_ON_TEST * *	000008:POWER_IN AL_ON_TEST *	*
X coor Y coor	Pin No.	X coor Y coor
High - Pin : +000.0000 +000.0000	High - Pin : 1 🗘 032000	+000.0000 +000.0000 ID.Net
Low - Pin : +000.0000 +000.0000	Low - Pin : 2 032000	+000.0000 +000.0000 ID.Net
Power Relay PS1 + : +000.0000 +000.0000	Power Relay PS1 + : 10 032000	+000.0000 +000.0000 ID.Net
Power Relay PS1 - : +000.0000 +000.0000	Power Relay PS1 - : 101 2 032000	+000.0000 +000.0000 ID.Net
Power Relay PS1 + : DC+24V(SIG) [Sig] : DC+24(SENS) [Sens] Power Relay PS1 - : :0V(SIG) [Sig] : :0V(SIG) [Sig]	Power Relay PS1 + DC+24V(SIG) [Sig] DC+24(SENS) [Sens] DC+24(SENS) [Sens] Power Relay PS1 - 0V(SIG) [Sig] 0V(SIG) [Sig] 0V(SIC) [Sig]	
· · · · · · · · · · · · · · · · · · ·	: 0V(SENŠ) [Sens]	
Back VOK Kancel		▲ <u>Back</u> ✓ <u>OK</u> X <u>Cancel</u>
(Teaching system)	(Point sys	tem)

[Fig.222] Coordinate set

On the Coordinate set screen, enter the coordinates of High-pin and Low-pin (in Teaching system) or the pin numbers (in Point system).

-	•	new pin number wa 9.223 where the user o		ck the Coordinates input coordinates.
D P H L P	High - Pin 1 Low - Pin 2 Power Relay PS1 + 10 Power Relay PS1 - 101		xi [+000.000.0000] [+000.0000.0000] [+000.0000.0000] [+000.0000.0000] ✓ QK	

16. Click the OK button, and it goes back to the Viewable setup of Function steps screen.



(Teaching system)

(Point system)

[Fig.224] Viewable setup of Function steps

17. Click the OK button, and it goes back to the Step edit list. Now you can see the AUX. column is substituted by "IO/F".

📒 Edit Search M	<u>l</u> ove <u>T</u> ool <u>V</u> iew			📕 Edit Search <u>N</u>	<u>M</u> ove <u>T</u> ool <u>V</u> iew			
File Mode Edit	Optimization Tool	Reference Test	Total Coord	File Mode Edit	Optimization Too	I Reference Test	Total Cod	ordinate Se
Edit List En	ase Search Change	D.Edit D.Set	en. Print		ase Search Change	Die State Diede	t D.Pin	
Step :Aux.	Parts	Value	Comment	Step :Aux.	Parts	Value	H-pin	L-pin
000001:	R902	47KO	*	000001:	R902	47KO	11	15
000002:	R912	00	*	000002:	R912	00	3	10
000003:	R913	00	*	000003:	R913	00	4	6
000004:	R923	470	*	000004:	R923	470	11	10
000005:	R922	470	*	000005:	R922	470	8	3
000006:	C914	102	*	000006:	C914	102	7	6
000007:	C913	102	*	000007:	C913	102	5	10
000008:IO/F	POWER_IN	AL_ON_TEST	*	000008:IO/F	POWER_IN	AL_ON_TEST	1	2
	(Teac	hing system	າ)		(Point s	system)		

[Fig.225] Step edit list

18. Move to Step data review to input the reference value.

CASE 4

This is the case you want to control the external power supplies to measure the Zener diodes. Usually, the APT-9411 is able to measure the Zener diodes up to 40V but the measuring range differs according to the specifications of the external power supplies.

To measure the Zener diodes, the user should connect the external power supply to "PS1" of the PRL-9500G. Otherwise you cannot measure the Zener diodes.

How to apply voltage

- 1. Click on Step Edit (or Step List) from Edit menu on the Menu bar.
- 2. It displays "Enter step number (1 ? x)". Let's put a new step on the last step. Use the keyboard to enter the last step number and click on the OK button.
- 3. The cursor is flickering on the last step. Use the down-arrow key to move the cursor to the next step. (Refer to Fig.226)

Edit S	earch	<u>M</u> ove	<u>T</u> ool	⊻iew					
File M	ode E	dit Opti	mizati	on Too	Refer	ence T	est T	otal	Coordinate
	-		4	ų	14	H.		H	
Edit	List	Erase Se	arch	Change	Pin coor.	Pin Er.			
Step	:Aux	. Par	ts		Valu	ıe		Comm	lent
000001	:	R90	2		47K0	C		*	
000002	:	R91	2		00			*	
000003	:	R91	3		00			*	
000004	:	R92	3		470			*	
000005		R92	2		470			*	
000006	:	C91	4		102			*	
000007	:	C91	3		102			*	
800000	:								

[Fig.226] Step edit list

4. Click "Viewable setup of Function steps" on the Tool menu. (Refer to Fig.227)

File M	ode E	dit	Dp	<u>C</u> oordinates Map	F1	t
Edit	List	Erase		Set Comb Measurements Clear Comb Measurements		
step	:Aux	. P	ai	-		Γ
000001	:	R	9(Generation		
000002	:	R	9:	Ground		
000003	:	R	9:	Bottom probe		
000004	:	R	9:	Cluster Function		
000005	:	R	9:			
000006	:	C	9:	I/O Function		
000007	:	C	9:	⊻iewable Setup of Function steps	F4	
000008	:		_	Coorginates input	0	
			88	Auto Generation		L
			Q,	Cha <u>ng</u> e Step Data	Ctrl+C	
				Select <u>R</u> evise Area Mode		
				High-fly / No-contact-zone Shift-	+Ctrl+H	

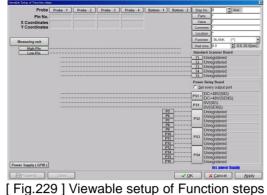
[Fig.227] Viewable setup of Function steps

- 5. It displays "Use board ref.point and aux.ref.point for alignment?". Select Yes or No.
- 6. It displays the Viewable setup of Function steps screen. (Refer to the left of Fig.228). Click "Set IO/F" button to activate each function on the screen. (Refer to the right of Fig.228)

Viewable Setup of Function steps	×	Viewable Setup of Function steps	×
Probe Probe - 1 Probe - 2 Probe - 3 Probe - 4 Bottom - 1 Bottom - 2	Step No. 8 C Aux	Probe Probe - 1 Probe - 2 Probe - 3 Probe - 4 Bot	ttom - 1 Bottom - 2 Step No. 8 C Aux
Pin No. 0	Parts	Pin No. 0	Parts *
X Coordinates +000.0000 +000.0000	Value	X Coordinates +000.0000 +000.0000	Value *
Y Coordinates +000.0000 +000.0000	Comment *	Y Coordinates +000.0000 +000.0000	Comment
	Location *		Location *
Measuring unit	Eustion BLANK (**)	Measuring unit	Function BLANK ("")
	Wat time 0.0 0 0.0.25 Street		Wait time 0.0 \$ 0.0.25.5[sec]
High-Pin	Standard Scanner Board	High-Pin Low-Pin	Standard Scanner Board
		Low-rin	
	T2 Unregistered		T2 Unregistered
	T3 Unregistered		
	T4_Unregistered		
	Power Relay Board		Power Relay Board
	E Set every output port		Set every output port
	PS1 + DC+48V(SIG) DC+48V(SENS)		PS1 + DC+48V(SIG) DC+48V(SENS)
	UC+46V(SENS)		10\/(SIG)
	PS1 - OV(SENS)		
15			P5 Unregistered
P6 P7	PS2 Unregistered		P52 Unregistered
			P8 Unregistered
P9	Unregistered		P9 Unregistered
P10	Unregistered		P10 Unregistered
P11			P11PS3 Unregistered P12PS3 Unregistered
P12	Unregistered Unregistered		P12 Unregistered
P10			P14 Unregistered
P15			P15 Unregistered
Power Supply (GPIB)	Unregistered	Power Supply (GPIB)	P16Unregistered
Tray side	Ext. nower Supply	(rower supply (seto))	Ext, power Supply
Property Clear.	K KCancel Apply >>>	Clear	VQK X Cancel Apply

[Fig.228] Viewable setup of Function steps

7. Click [Clear] button to release the connection of High-pin/Low-pin of the Measuring unit.





8. Click [Power Supply (GPIB)] button, and it will display Fig.231.

ON (OFF (_
		alue of <u>voltag</u>			[V]00.0000	_
		alue of currer	nt : 0.000	÷ 0	.0001.400[A]	
			it : OUTPUT	Г 1		v.
Check	for currer	nt limit over	🗉 Che	eck cun	ent limit over to	o stop the test
	ssung win	n current mea	surennenn			

[Fig.231] Power Supply

9. Select the box "Zener measurement by power supply", and it will specify [PS1] automatically. (To measure the Zener diodes, the user should connect the external power supply to "PS1" of the PRL-9500G. Otherwise you cannot measure the Zener diodes.)

wer Supply				
*:80000	*	*		
PS1				
Agilent E364	9A [35V/1.4A	60V/0.8A]		
	Zener vo	Itage : 0.00	0.0060.00[V	1
1	_imit value of cu	rrent : 0.000	0.0001.400	4]
	0	utput : OUTPUT	1	-
				_
Zener meas	surement by po	wer supply		
				OK X Canc

[Fig.232] Power Supply

Zener measurement by power supply

This can specify the Zener voltage to be measured.

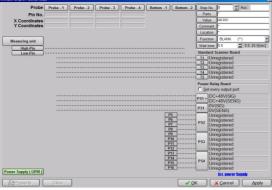
Limit value of current

This can specify the current to output by 1mA. The output range at the right will be set automatically according to the external power supply specified by the user. When the step is performed, if it exceeds this value, the error message will appear. At the same time, the output from the external power supply will be terminated automatically to suspend the test accordingly.

Output

This appears only when the dual-out type of the Agilent external power supply is selected. Select either OUTPUT1 or OUTPUT2 from the right pull-down menu.

10. Click the OK button, and it will go back to the Viewable setup of Function steps screen.



[Fig.233] Viewable setup of Function steps

 Here you can specify the output from the external power supplies. Let's specify [Probe-1] and [Probe-4] as an example.

Don't select "Set every output port" at Power Relay Board. (Refer to Fig.234)

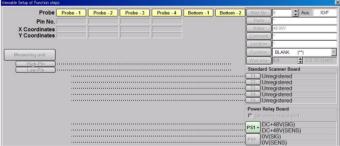
Powe	r Relay Board
□ <u>S</u> e	t every output port
DC4 .	DC+48V(SIG)
P51+	DC+48V(SENS)
PS1 -	0V(SIG)
P31-	0V(SENS)
	Unregistered
PS2	Unregistered
F 32	Unregistered
	Unregistered
	Unregistered
PS3	Unregistered
F 33	Unregistered
	Unregistered
	Unregistered
PS4	Unregistered
1 34	Unregistered
	Unregistered
	Ext, power Supply

[Fig.234] Viewable setup of Function steps



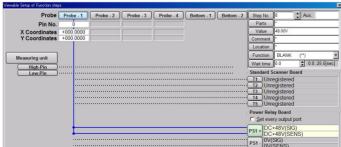
Signal name (ex. DC+48V, 0V) on Fig.234 is assignable on Input / output function of I/O step in Option mode. (Refer to Page 6) "Unregistered" means that signal name is not registered yet.

12. Click [PS1+], and [Probe-1] to [Bottom-2] buttons are flashing in yellow. (Refer to Fig.235)



[Fig.235] Viewable setup of Function steps

Specify [Probe-1] as the output of [PS1+], and they will be connected with a blue line. (Refer to Fig.236)_____



[Fig.236] Viewable setup of Function steps

13. Click [PS1-] to specify the output, and [Probe1] to [Bottom-2] are flashing in yellow. Specify [Probe-4] as the output of [PS1-], and they will be connected with a blue line. (Refer to Fig.237)



[Fig.237] Viewable setup of Function steps



The color of the lines connecting [Probe-1] [Probe-4] to the output mean maximum current value, for example; [blue] \rightarrow 3A

14. Click the Property button, and it will display the Measuring unit screen. (Refer to Fig.238) This is the same screen as Fig.232. It's possible to change the contents.

Power Supply					
000008:*	48.00V	*	*		
PS1					
Agilent E364	9A [35V/1.4A 60	0V/0.8A]			
	Zener volta	ge : 48.00	\$ 0.0060.0	[V]00	
L	_imit value of curre	ent : 0.500	\$ 0.0001.4	00[A]	
	Outr	out : OUTP	UT 1	•	
		1			
₽ Zener meas	surement by powe	r supply			
			Back	<u>N</u> ext ►	<u>K</u> ancel

[Fig.238] Measuring unit

15. Click the Next button, and it will displays the Coordinate set screen. (Refer to Fig.239)

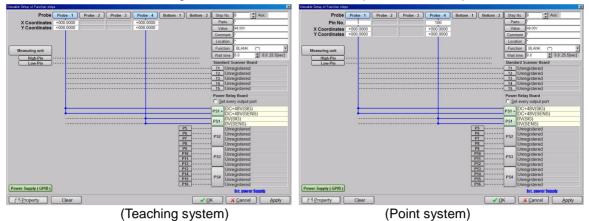
Coordinate Set	Loordinate Set
000008:* 48.00V * *	000008:* 48.00V * *
X coor Y coor Power Relay PS1 + : +000.0000 +000.0000 Power Relay PS1 - : +000.0000 +000.0000	Pin No. X coor Y coor Power Relay PS1 + : 1 2 0.32000 +000.0000 +000.0000 ID.Net Power Relay PS1 - : 100 2 0.32000 +000.0000 +000.0000 ID.Net
Press TEST TART to begin set up. Power Relay PS1 + DC +48V(SIG) [Sig] DC -48V(SENS) [Sens] DC +48V(SENS) [Sens] Power Relay PS1 - 0V(SENS) [Sens] 0V(SENS) [Sens]	Coordinates input Power Relay PS1 + : DC-48V(SIC) [Sig] .: DC-48V(SENS) [Sens] Power Relay PS1 - :: 0V(SENS) [Sens] :: 0V(SENS) [Sens] :: 0V(SENS) [Sens]
(Teaching system)	(Point system)

[Fig.239] Coordinate set

On the Coordinate set screen, enter the coordinates of High-pin and Low-pin (in Teaching system) or the pin numbers (in Point system).

	In Point system, when any n button so that it displays Fig.2	•		
	Coordinates input			×
	000008: * 24.00V	* *		
	Press [ENTER] SW to set	the coordinates.		
	Pin No.	Net Name	X coor Y coo	or
Y	Power Relay PS1 + 1	*	[+000.0000,+000	.0000]
1 1 1	Power Relay PS1 - 100	*	[+000.0000,+000	.0000]
			<u>✓ 0</u> K	ancel
		[Fig.240] Coordinate input		

16. Click the OK button, and it goes back to the Viewable setup of Function steps screen.



[Fig.241] Viewable setup of Function steps

17. Click the OK button, and it goes back to the Step edit list. Now you can see the AUX. column is substituted by "IO/F" and the Value column is by the Zener voltage.

📔 Edit Search 🖪	<u>M</u> ove <u>T</u> ool <u>V</u>	<u>/</u> iew		📜 Edit Search <u>N</u>	<u>A</u> ove <u>T</u> ool	⊻iew		
File Mode Edit	Optimization	Tool Reference Tes	t Total Coord	File Mode Edit	Optimizatio	n Tool Reference Test	Total Coo	ordinate Se
Edit List Er		nange D.Edit D.Set	A.Gen. Print	Edit List Er	ase Search	Change Pin coor. Pin Er.	Edit D.Pin).Set
Step :Aux.	Parts	Value	Comment	Step :Aux.	Parts	Value	H-pin	L-pin
000001:	R902	47KO	*	000001:	R902	47KO	11	15
000002:	R912	00	*	000002:	R912	00	3	10
000003:	R913	00	*	000003:	R913	00	4	6
000004:	R923	470	*	000004:	R923	470	11	10
000005:	R922	470	*	000005:	R922	470	8	3
000006:	C914	102	*	000006:	C914	102	7	6
000007:	C913	102	*	000007:	C913	102	5	10
000008:IO/F	*	48.00V	*	000008:IO/F	*	48.00V	1	100
	(Te	eaching syster	n)		(Pc	oint system)		

[Fig.242] Step edit list

As shown in Fig.243, it will be useful to input any information on the test contents in the column "Parts".

🗎 Edit Search M	<u>l</u> ove <u>T</u> ool ⊻iew			📕 Edit Search !	<u>M</u> ove <u>T</u> ool <u>V</u> ie	W		
File Mode Edit	Optimization Too	Reference Test	Total Coord	File Mode Edit	Optimization	Tool Reference Te	est Total Coo	ordinate Se
	ase Search Change	D.Edit D.Set	Gen. Print	Edit List E	rase Search Chan).Set
Step :Aux.	Parts	Value	Comment	Step :Aux.	Parts	Value	H-pin	L-pin
000001:	R902	47KO	*	000001:	R902	47KO	11	15
000002:	R912	00	*	000002:	R912	00	3	10
000003:	R913	00	*	000003:	R913	00	4	6
000004:	R923	470	*	000004:	R923	470	11	10
000005:	R922	470	*	000005:	R922	470	8	3
000006:	C914	102	*	000006:	C914	102	7	6
000007:	C913	102	*	000007:	C913	102	5	10
000008:IO/F	D120	48.00V	*	000008:IO/F	D120	48.00V	1	100
1	(Teaching system) (Point system)							
[Fig.243] Step edit list								

18. Move to Step data review to input the reference value.

Reference input

Move the Step data review to input the reference value.

(1) Auto Input (2) Input (3) Test (4) Polarity (5) P. access (6) Search (7) Step move (8) LCR meter (9) Reverse (0) Store	Au <u>x</u> _ = = ×
File Mode Edit Optimization Tool Reference Test Total Coordinate Self-diag. Convert Help	
Ent List Erste Search Change Pin coor, Pin Er, DEdt D.Pin D.Set	
Examine LCR meter	
Step 1 P.Center START Test	
La PASS	
Parts Value Comment Parts Reference D120 12V * Reference Image: Comment in the second s	
Loc Element Function Temp.Value 12.000 V	
* DIODE BLANK (**) V12.000 V Polarity 2048	
Measure Mode Measure Range Current +	
PS-ZD V AUTO 10.0000 mA	
+% -% +Limit Wait Time Reading 10 10 13.200 V 0.0 sec 1	
	1.0
speed pos P1 P2 P3 P4 Probe Access 3 0 <td>Probe 3</td>	Probe 3
	**** ****** **** *****
Auto Input	Probe 4 Lo
Input Value Sampling Av	08.8000,+008.0000
Store Pin number A.Input / Store IO/F edit	
GS610 Hi 1 STROBE	
GS610 L0 2 STROBE_IN+	
Unused 0	
Unused 0	

[Fig.244] Step data review

[Measure mode] indicates "PSZD" which is an executive mode for the Zener measurement that uses the external power supply.

Click the Input button to input the reference value. In addition, following functions are useless on the Step data review.

< Menu bar >

- [1] Auto Input
- [4] Polarity
- [9] Reverse

[Etc]

[F1] Graphic Guard Search
[D] Look Value
[I] Image Point Set
[K] Combination clear
[N] Copy measuring condition
[Q] Pin double search
[R] +%,-% Range
[W] Discharge

< Buttons >

Data > Auto Input Guard > Input, Delete, Search Measure > Polarity check



When the Value is changed on the Step edit list or the Step data review, the Zener voltage will change accordingly. In addition, if you want to change the Value on the Step edit list or the Step data review, be sure to add "V" next to the value. Otherwise "0V" will be substituted automatically.

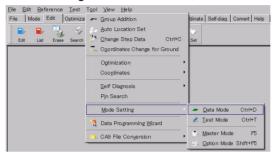
Bottom probes setting

This chapter describes the method for utilization of the bottom probes in case they are used to apply the voltages to the UUT and measure the output.

It will be rather simple to install the bottom probes when the contact point is large and near to the edge of the PC board. On the other hand, this will be quite difficult when the contact point is small and near to the center of the PC board. If such is the case, you should go through the following process to install the bottom probes.

Coordinates Input

1. Click on Data Mode from Mode Setting on the Tool menu, and it will display the Data mode screen.



[Fig.245] Data mode

2. Select Bottom tools. (Refer to Fig.246)

ata mode	×
Conveyor set up Camera / Probe offset Board reference point Coordinates management Fail map Probe's lowest position Barcode no. Top position of probe DDE communication Index Variant management Battols Statistic function	Support Pin (0) Bottom Probe (0) Bottom Sensor (0) Use Support pins Number of Support pins: 5 1.20 Support pins restricted area: 30 3 8.50[mm] Configure the positions for Bottom toole
▲ Previous Next ▲	Verify the positions for Bottom tools
Section PCB Image	QK <mark>≭ ⊆</mark> ancel

[Fig.246] Bottom tools

Select [Bottom Probe]. (Refer to the left screen in Fig.247) Then select the box "Use Bottom probes". (Refer to the right screen in Fig.247)

Support Pin (5) Bottom Probe (0) Bottom Sensor (0)	Support Pin (5) Bottom Probe (2) Bottom Sensor (0)
□ Use Bottom probes Number of Bottom probes : 2 2	1:20 Number of Bottom probes : 2 1.20 Bottom probes restricted area : 9 6.50[mm] Description(20 characters) 1 1 1 * 2 *
Configure the positions for Bottom tools	Configure the positions for Bottom tools
⊻erify the positions for Bottom tools	⊻erify the positions for Bottom tools

[Fig.247] Bottom Probe

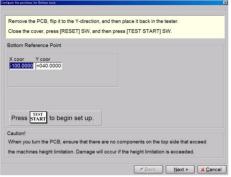
3. Specify [Number of Bottom probes] and [Bottom probe's restricted area] and fill in the Description column as needed.

After all the settings were completed, click the Configure the positions for Bottom tools button to input the coordinates of the bottom probes.

Support Pin (5)	Bo <u>t</u> tom Probe (2) Botto <u>m</u> Sense	or (0)
☑ Use Bottom pro	bes	
	Number of Bottom probes :	2 🔹 120
B	Bottom probes restricted <u>a</u> rea :	9 🗘 650[mm]
Description	(20 characters)	
1 *		
2 *		

[Fig.248] Bottom probe

4. It displays Fig. 249.



[Fig.249] Configure the positions for Bottom tools

To start with inputting of the reference point for the bottom probes, turn the PC board in Y-direction so that the probing side faces downward.



The camera and the probe hit the tall components! Be sure to use the bare board (with no components loaded)

5. Depress the TEST START SW on the operation panel, and it will display Fig.250 and Probe-4 moves to the Board reference point.

JOG Pro	be-4					
	the keypa ottom refer			s, driv	re probe 4	l to
		ļ				
X	-100.00	00	Y:	+04	0.0000	
	[EN	TER]S	W = (Coord	linate Set	
	Г		25	0 1		



The reference point for the bottom probes must be set on the point which is identifiable from both the top side and the bottom side. (ex. Through holes)

Use the keypad arrow keys to set the cross-hair pointer on the reference point for the bottom probes and depress the ENTER SW on the operation panel. The Probe-4 goes back to the home position and it displays Fig.249.

6. Click the Next button, and it will display Fig.251.

rtigure the positions for Bottom tools					
Support Pin (5) Bottom Probe (2)					
	X coor	Y coor	_		
XY coordinates for Support Pin 1	A COOI	1 0001	_		
XY coordinates for Support Pin 2					
XY coordinates for Support Pin 3					
XY coordinates for Support Pin 4					
XY coordinates for Support Pin 5					
Press [ENTER] SW to set the coor	diantes				
Press [ENTER] SW to set the coor	dinates.				
				<u>N</u> ext ≻	X Cancel
[5] . 054	10	P		• • • •	

[Fig.251] Coordinates input

Click [Bottom probe], and it will display Fig.252.

Description	X coor Y coor
1 *	[+000.0000,+000.0000]
2 *	[+000.0000,+000.0000]

[Fig.252] Coordinates input

Depress the ENTER SW on the operation panel, and Probe-4 moves to the reference point for the bottom probes. Use the keypad arrow keys to move to the coordinates for Bottom probe 1. Depress the ENTER SW to determine the coordinates.

Depress the ENTER SW, and it will display the coordinates input screen for Bottom probe 2. Use the keypad arrow keys to move to the coordinates for Bottom probe 2. Depress the ENTER SW to determine the coordinates. It goes back to Fig.252. Then click the Next button.

7. It displays Fig. 253.

	Y-direction, and then place it back in the tester.	
Close the cover, press [RESE	ET] SW, and then press [TEST START] SW.	
ottom Reference Point		
Coor Y coor		
100.0000 +040.0000		
	eference point following the Y-axis turn.	
his step resets the Bottom re		
his step resets the Bottom re Press TEST START to begin :	set up.	
	set up.	
	set up.	

[Fig.253] Configure the positions for Bottom tools

Specify again the reference point for the bottom probes from the probing side. Open the lid and turn the PC board in Y-direction so that the probing side faces upward. Then close the lid and depress the RESET SW on the operation panel.

8. Depress the START SW on the operation panel, and Probe-4 moves to the reference point for the bottom probes. And it displays Fig.254.

JUG Probe-	-4					
	he keypa tom refe			s, driv	ve probe 4	l to
	•	ļ		•	,	
X:	-100.0	000	Y :	+04	0.0000	
	[EN	TER]S	/V = 0	Coord	linate Set	
		[Fig	.2!	54]		

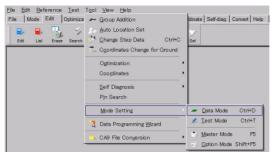
Use the keypad arrow keys to move to the reference point for the bottom probes. Depress the ENTER SW to determine the reference point for the bottom probes.

It goes back to Fig.253. Click the OK button, and it will go back to Fig.246.

Installation

Go through the following steps to put your PC board on the tester.

1. Click on Data Mode from Mode Setting on the Tool menu, and it will display the Data mode screen.



[Fig.255] Data mode

2. Select Bottom tools > [Bottom Probe]. (Refer to Fig.256)

Data mode			
Conveyor set up Camera / Probe offset Baard reference point Coordinates management Fail map Auxiliary reference point(s) Real Map Probe's lowest position Barcode no. Top position of probe DDE communication Index Variant management Statistic function Statistic function	Support Pin (0) Bottom Probe (2) Botton P Use Bottom probes Nymber of Bottom pro Bottom probes restricted, Description(20 characters) 1 + 2 + Configure the positions for Bottom tools Verify the positions for Bottom tools	bes: 2 🗘	120 50[mm]
PCB Image		✓QK	X Cancel

[Fig.256] Bottom Probe

3. Click the Verify the positions for Bottom tools button to specify the reference point for the bottom probes. (Refer to Fig.257) After verified that the PC board is set on the tester, depress the TEST START SW.

Ensure that the PCB is on the Press [TEST START] SW to set the E	
Bottom Reference Point Coordinates	
X coor Y coor -100.0000 +040.0000	
Press TART to begin set up.	
	✓ <u>O</u> K Xancel

[Fig.257] Bottom set check

4. It displays Fig.258 and Probe-4 moves to the front side. Use the keypad arrow keys to set the cross-hair pointer on the reference point for the bottom probes and depress the ENTER SW on the operation panel.

ocarriooc					
	he keypa tom refere			ve probe 4	4 to
	1	ļ	,	t.	1
X:	-100.00	00	Y: +04	40.0000	
	[EN	TER]SV	V = Coor	dinate Set	
		[Fig.	258]		

5. It displays Fig.259. Open the lid and take the PC board out of the tester. Close the lid and depress the RESET SW. Then depress the TEST START SW.

X

Ensure that the PCB is not on the t Close the cover, press [RESET] S		position.
Then press [TEST START] SW.		
		X coor Y coor
XY coordinates for Bottom Probe	1	[+008.4000,-010.4000]
	2	[+075.2000,-060.8000]

[Fig.259] Verify the positions for Bottom tools

6. It displays Fig.260.

Buttom Check	×
Open the cover. Place the Bottom Probe-1 in position below the CCD camera. After set, close the cover. Then press [RESET]. #1:*	
Press START to continue.	<u>Q</u> lose

[Fig.260] Bottom check

Open the lid and place the bottom probe 1 under the cross-hair pointer displayed on the monitor. And close the lid and depress the RESET SW. Then depress the TEST START SW.

Next you can set the bottom probe 2. Open the lid and place the bottom probe 2 under the cross-hair pointer displayed on the monitor. And close the lid and depress the RESET SW. Then depress the TEST START SW.

Now the bottom probe 1,2 were installed properly.

dia Ve



Particular care should be paid to the keen-edged head of the bottom probes to be installed. Otherwise it may be an injury to your body.



When the box "Use Bottom probes" was selected and the test program was saved in the disk, it will display Fig. 260 automatically after the test program was loaded and the Board reference point was set.

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