

*Flying probe tester APT-9411 series*

**Coaxial Scanner Board  
COX-9500 Operator's Guide**



## **Preface**

The Coaxial Scanner Board COX-9500 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)






- 1) 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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# Safety symbols

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Here lists the Safety symbols used in this Operator's guide. The users should give much attention to the 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.

# General introduction

By integrating the Coaxial Scanner Board COX-9500 (hereinafter called "COX-9500") into the APT-9411 Series and the sister models, the user can hook external instruments (Function generator, Frequency counter, other measuring instruments, so on) up to the UUT in order to output the measuring signals and conduct various functional measurements

The COX-9500 is capable of outputting the measuring signals from Terminal 13~24 where are hooked to the external instruments to the Terminal 1~12. Because the relays on the COX-9500 are arranged in matrix state as shown in Fig.4, it's possible to output the measuring signals to any of the Terminal 1~12. The user should use the coaxial cables to hook the Terminal 1~12 up to the Tray in the tester. The wiring from the Tray to the UUT should be prepared by the user. (ex. Bottom probes, Connector)

## System configuration

### Hardware

The COX-9500 consists of following parts.

PCB TAKAYA TVX-12M	× 1 pc
Measuring cable TAKAYA LS-442-03	× 12 pcs
Measuring cable TAKAYA HS-623-1 ~ 12	× 12 pcs

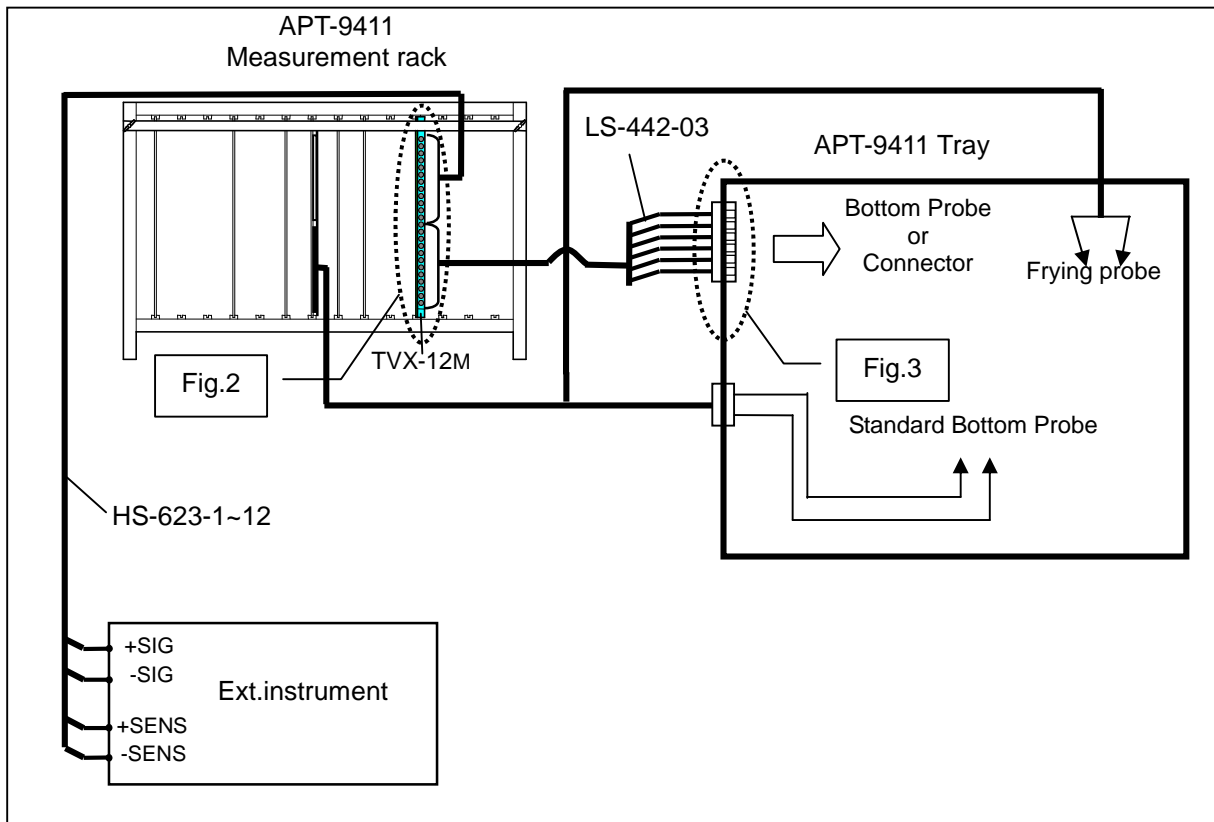


Fig.1 Overview of connection

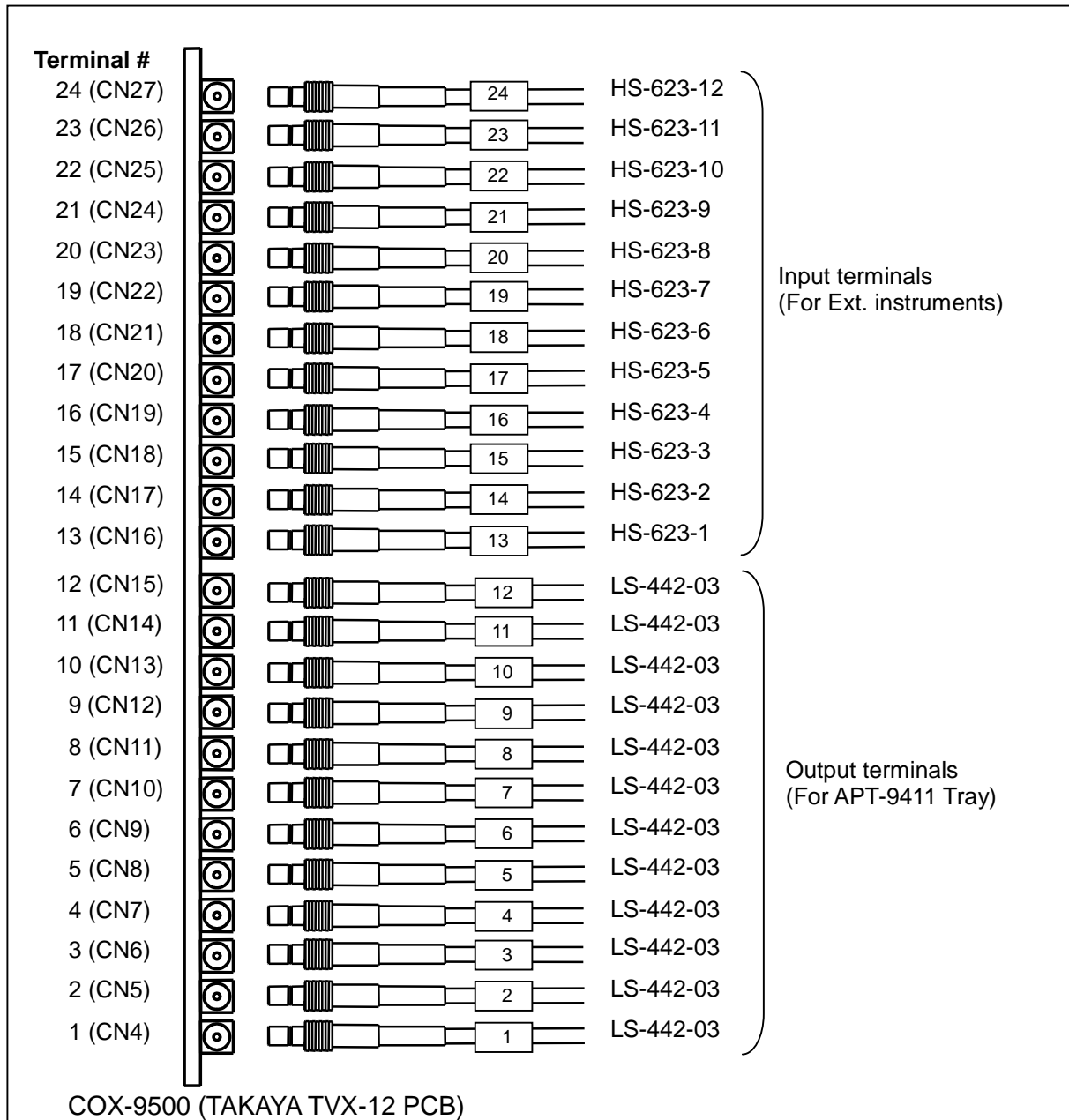


Fig.2

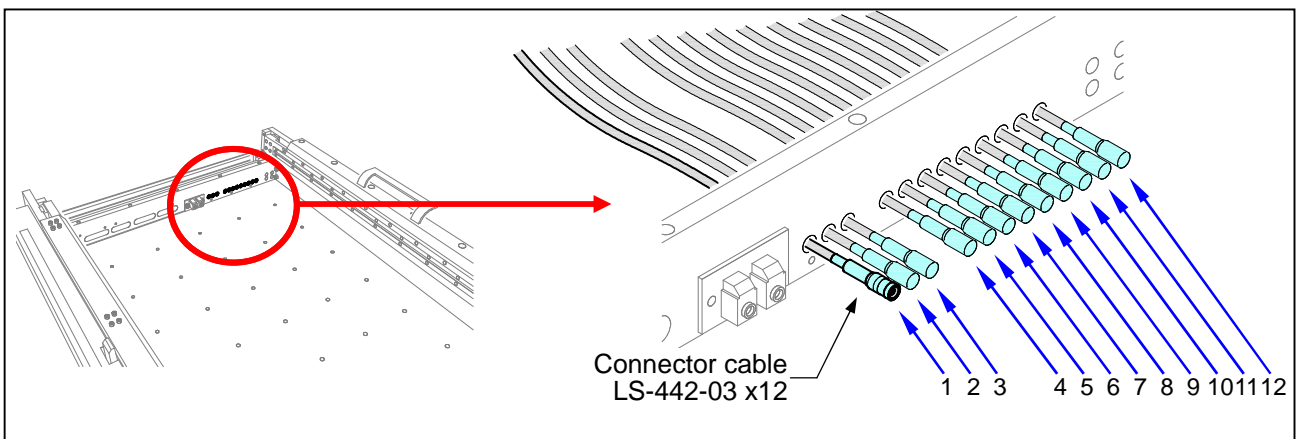


Fig.3

Scanner PCB  
(TAKAYA TVX-33)

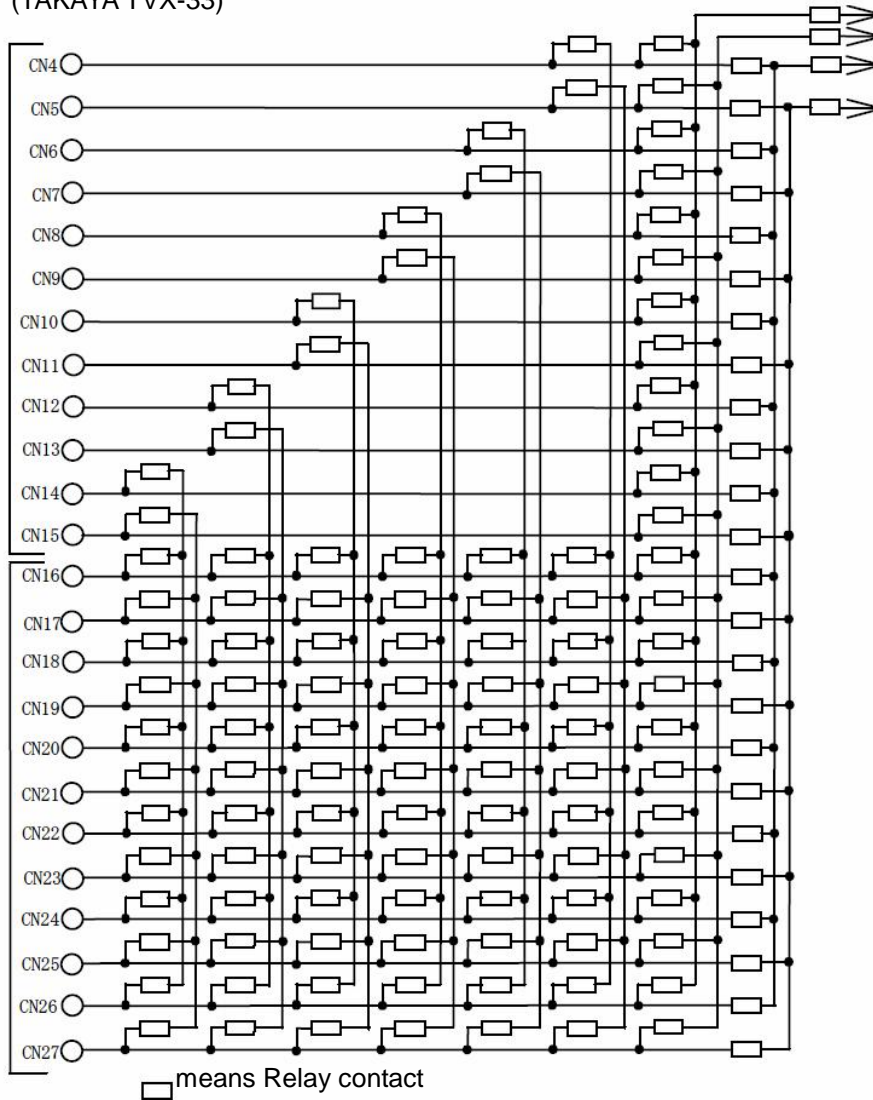


Fig.4 Relay matrix (TAKAYA TVX-12 PCB)

## Software

The APT-9411 system software supports the COX-9500 and the executive I/O command (IO/U) is available to use when it is installed in the tester. Prior to use the COX-9500, please configure the APT system software properly. (Refer to “Option mode setup” in Page 6).

## Specifications

The COX-9500 bases on our specifications below.

Input terminal (Terminal 13-24)	6 × 2ch (Sig. and Sens.) for External instruments
Output terminal (Terminal 1-12)	6 × 2ch (Sig. and Sens.) for Bottom probes or Connector
Max rated value/circuit	Voltage : DC80V / AC100Vrms with resistance load Current : 2A (DC30V / AC100Vrms), 0.3A (DC80V) with resistance load
Cable impedance	50 ohm

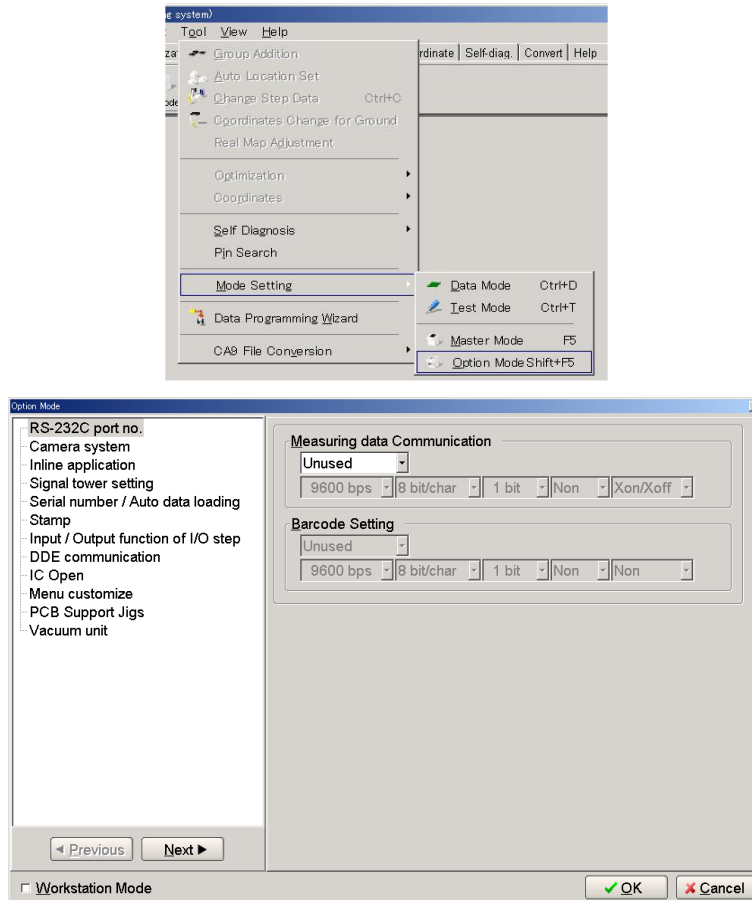
(NOTE) The wiring from the Tray to the UUT should be prepared by the user. (ex. Bottom probes, Connector)

# Option mode setup

When the COX-9500 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.

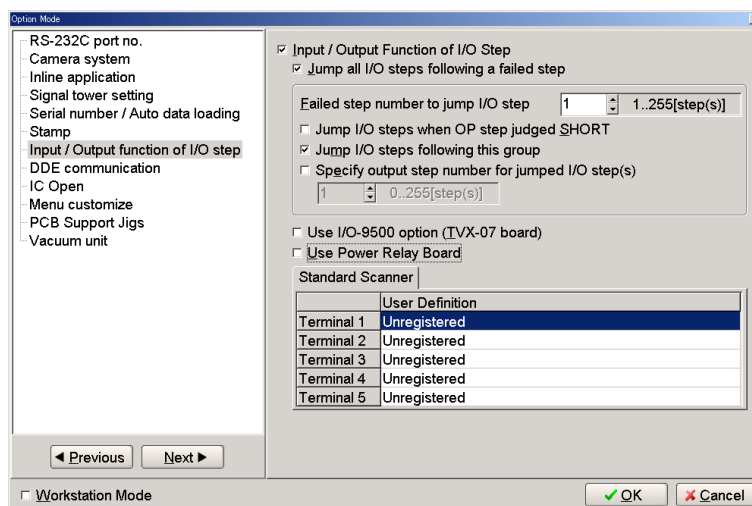
## Setup procedures

1. Choose [Tool] > [Mode Setting] > [Option mode] to open Option mode screen (Refer to Fig.5)



[Fig.5] Option mode

2. Click on Input / Output function of I/O step and select the box "Input / Output Function of I/O step". (Refer to Fig.6)



[Fig.6] 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.

4. Select the following boxes as needed.

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

Fill the box to use IO/O and IO/I command when the Takaya I/O board (TVX-07) is installed as well.

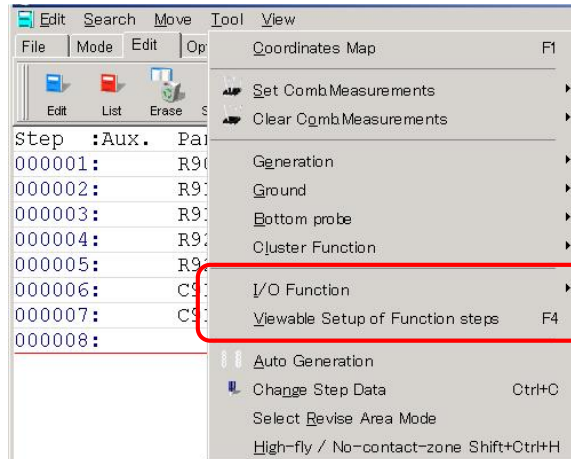
**Use Power Relay Board**

Fill the box when the Power Relay Board (PRL-9500G) is installed as well.

5. Click the OK button to close Option mode menu.

# Simple function test

To implement simple function test, you should select either “I/O Function” or “Viewable Setup of Function steps” from Tool menu to configure the I/O steps.



[Fig.7] Input / Output function of I/O step

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

You should use the IO/U command when he wants to perform a simple function test by using the COX-9500.


You can connect the signal from more than one external instrument plugged into the Input terminal 13-24 to the Terminal 1-12 and the Bottom probes (standard). But it's not possible to connect to the Flying probes.


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

You don'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. You can recognize the reality of whole connection with ease.

You can connect the signal from more than one external instrument plugged into the Input terminal 13-24 to the Terminal 1-12, the Bottom probes (standard) and the Flying probes.

## Basic precautions of I/O steps

 WARNING	<b>The I/O step may cause serious damage to the PC boards and/or the measuring unit if you misuse it (ex. wrong location, polarity so on). The use of the I/O commands must be carried out under your responsibility.</b>
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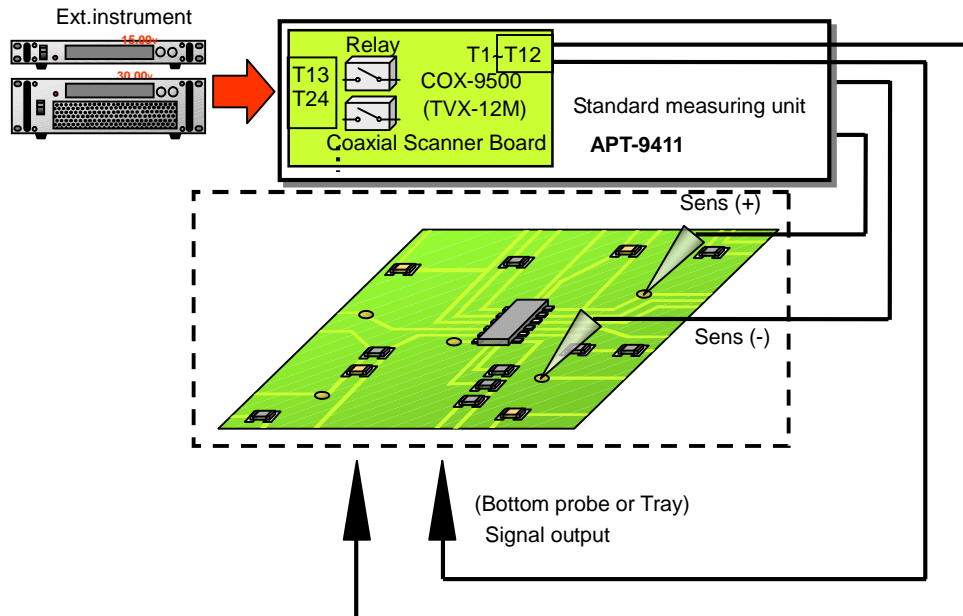
 CAUTION	<b>Mentioned below are very important things to know. Be sure to read through them to fully understand in advance.</b>
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1. If other than DC-VM mode is used while the PCB is applied with the specified voltage, from time to time it shows "The 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, you 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. You should input the reference value in the Step Review menu
10. The I/O steps will be not implemented at Data average function. As such, the reference value of the measurement step that uses the I/O command will be not average correctly. If you want to average the test program including the I/O steps, you are recommended to specify the rage of test steps to be averaged while excluding the I/O steps.
11. You are not allowed to change "Loc" in the IO/U steps on Change Step Data menu.
12. You are not allowed to change "Loc" in the IO/U steps on Group Addition menu.
13. You are not allowed to change "Loc" in the IO/U steps on Auto Location Set menu.
14. Any I/O step will be not implemented if normal step judged fail while retesting the board.
15. The signal input will be suspended under condition below;
  - \* when it came to the step where the IO/U command is terminated.
  - \* when the test completed.
  - \* when any command of IO/M, IO/T, IO/V, IO/C, IO/U or IO/X was implemented.
16. When a step using the Bottom probes is changed to IO/U step, the Bottom probes will be released.
17. The flying probes cannot apply any signal.
18. The wiring from the Tray to the UUT should be prepared by you. (ex. Bottom probes, Connector)

# I/O Function

This chapter describes the IO/U command that should be used in a simple function test using the COX-9500.

You can connect the signal from more than one external instrument plugged into the Input terminal 13-24 to the Terminal 1-12 and the Bottom probes (standard).



[Fig.8] I/O Function

## Basic knowledge of programming IO/U step

The programming method is no different between the Teaching system and the Point system.

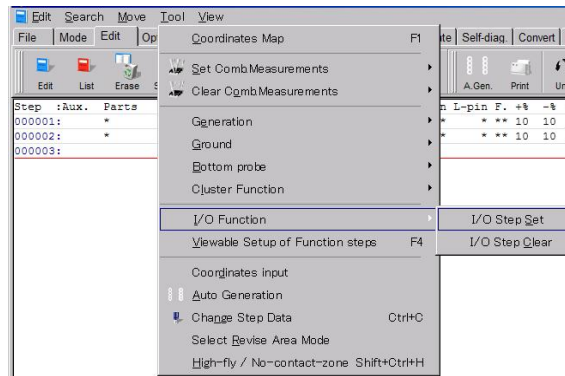
### Setup procedure to apply signal

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 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.9) In addition, specify the Parts field as needed. Otherwise there will be substituted by asterisk (default).

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:				

[Fig.9] Step Edit list

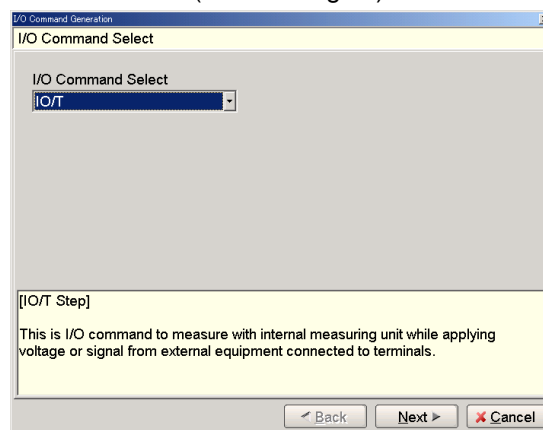
4. Move to Tool > I/O function and click on “I/O Step Set”. (Refer to Fig.10)



[Fig.10] I/O Step Set

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

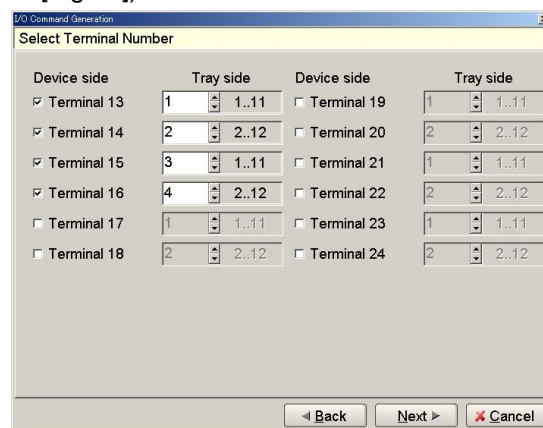
6. It displays I/O Command Select screen. (Refer to Fig.11)




[Fig.11] I/O Command Select

7. Select “IO/U” from the right pull-down menu and click the Next button.

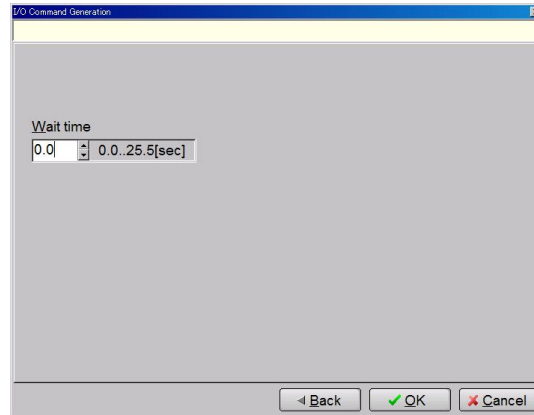
8. As Select Terminal Number screen appears, specify Input terminals (“Device side”) where you want to connect the external instrument and Output terminals (“Tray side”) that should be connected to the Tray in the tester. (Refer to [Fig.12]).



[Fig.12] Select Terminal Number

	<p>If the Input terminal (“Device side”) was specified by odd number, you are allowed to specify the Output terminals (“Tray side”) with odd number only. On the other hand, If the Input terminal (“Device side”) was specified by even number, you are allowed to specify the Output terminals (“Tray side”) with even number only.</p> <p>In addition, the Output terminals (“Tray side”) cannot be specified by the same number redundantly.</p>
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9. Click the Next button, so it shows the next screen. (Refer to [Fig.13])

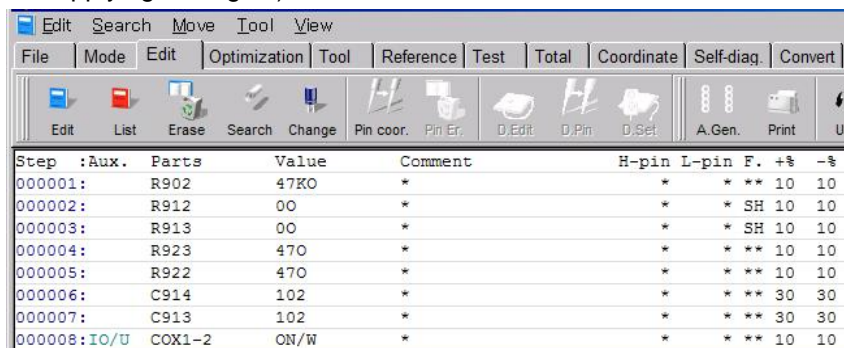


[Fig.13] Wait time set

10. Specify the wait time (0.0 sec ~ 25.5 sec) and click the OK button.

11. It goes back to the Step Edit list. (Refer to [Fig.14])

It indicates “IO/U” in both [AUX.] and [Loc.] field and “ON/W” in [Value] field. (the “ON/W” means the starting step for applying the signal)



[Fig.14] Step Edit list

The next step after the IO/U step (Step #00008) needs to be configure by an optional measurement that will be implemented while power up the UUT. The capital letter in Parts field should be specified according to the component categories listed below.

Component categories	Capital letter
Resistors	R
Capacitors	C
Inductors	L
VF measurement (Ex. Diode) and DC measurement	D

If the capital letter was mistaken, there is the possibility that an unintended reference value would be substituted in Step data review.  
(Refer to APT-9411 User’s guide for further information on the data programming)

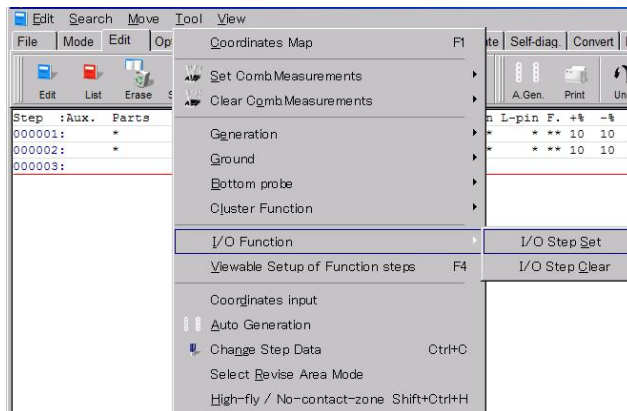
## How to terminate signal output

1. Click on Step Edit (or Step List) from Edit menu on the Menu bar.
2. It displays “Enter step number (1 ? x)”. Use the keyboard to specify the number of test step that terminates the signal output and click the OK button.
3. The cursor is flickering on the assigned step. Specify the Parts field as needed. Otherwise there will be substituted by asterisk (default).

Step	Aux.	Parts	Value	Comment	H-pin	L-pin	F.	+%	-%
000001:		R902	47KO	*	*	*	**	10	10
000002:		R912	00	*	*	*	SH	10	10
000003:		R913	00	*	*	*	SH	10	10
000004:		R923	470	*	*	*	**	10	10
000005:		R922	470	*	*	*	**	10	10
000006:		C914	102	*	*	*	**	30	30
000007:		C913	102	*	*	*	**	30	30
000008:	IO/U	COX1-2	ON/W	*	*	*	**	10	10
000009:		CHECK1	*	*	*	*	**	10	10
000010:		CHECK2	*	*	*	*	**	10	10
000011:		CCX1-2							

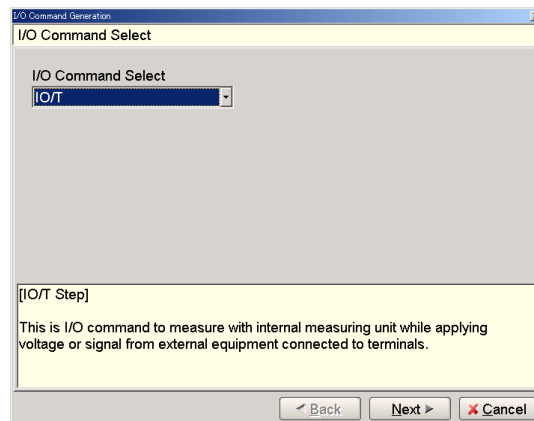
[Fig.15] Step Edit list

4. Move to Tool > I/O function and click on “I/O Step Set”. (Refer to Fig.16)



[Fig.16] Set IO Step

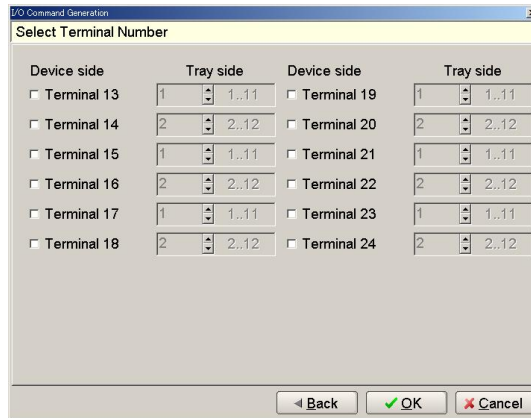
5. As “Use board ref. point and aux. ref. point for alignment?” window appear, select the No button.
6. It displays I/O Command Select screen. (Refer to Fig.17)



[Fig.17] I/O Command Select

7. Select “IO/U” from the right pull-down menu and click the Next button.

- It displays the Select Terminal Number screen. Uncheck all of Input terminals (“Device side”) and click the OK button. (Refer to [Fig.18]).



[Fig.18] Select Terminal Number

- It goes back to Step Edit list. Now you can see “OFF” in [Value] field. (Refer to [Fig.19]) (The “OFF” means that the step terminates the signal output)

Step	Aux.	Parts	Value	Comment	H-pin	L-pin	F.	+%	-%
000001:		R902	47K0	*	*	*	**	10	10
000002:		R912	00	*	*	*	SH	10	10
000003:		R913	00	*	*	*	SH	10	10
000004:		R923	470	*	*	*	**	10	10
000005:		R922	470	*	*	*	**	10	10
000006:		C914	102	*	*	*	**	30	30
000007:		C913	102	*	*	*	**	30	30
000008: IO/U		COX1-2	ON/W	*	*	*	**	10	10
000009:		CHECK1	*	*	*	*	**	10	10
000010:		CHECK2	*	*	*	*	**	10	10
000011: IO/U		COX1-2	OFF	*	*	*	**	10	10
000012:									

[Fig.19] Step Edit list



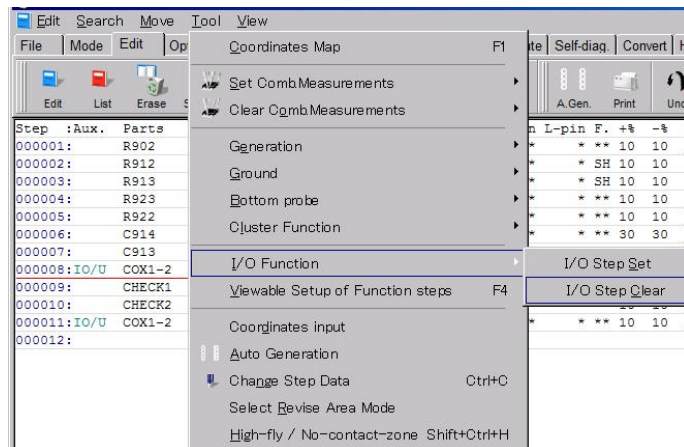
## Setup procedures to release IO/U command

1. Click on Step Edit (or Step List) from Edit menu on the Menu bar.
2. It displays “Enter step number (1 ? x)”. Use the keyboard to specify the number of IO/U step that should be released and click the OK button.
3. The cursor is flickering on the assigned step. (Refer to Fig.20)

Step	Aux.	Parts	Value	Comment	H-pin	L-pin	F.	+%	-%
000001:		R902	47KO	*	*	*	**	10	10
000002:		R912	00	*	*	*	SH	10	10
000003:		R913	00	*	*	*	SH	10	10
000004:		R923	470	*	*	*	**	10	10
000005:		R922	470	*	*	*	**	10	10
000006:		C914	102	*	*	*	**	30	30
000007:		C913	102	*	*	*	**	30	30
000008:	IO/U	COX1-2	ON/W	*	*	*	**	10	10

[Fig.20] Step Edit list

4. Move to Tool > I/O function and click on “I/O Step Clear”. (Refer to Fig.21)



[Fig.21] I/O Step Clear

5. It goes back to Step Edit list. (Refer to [Fig.22])

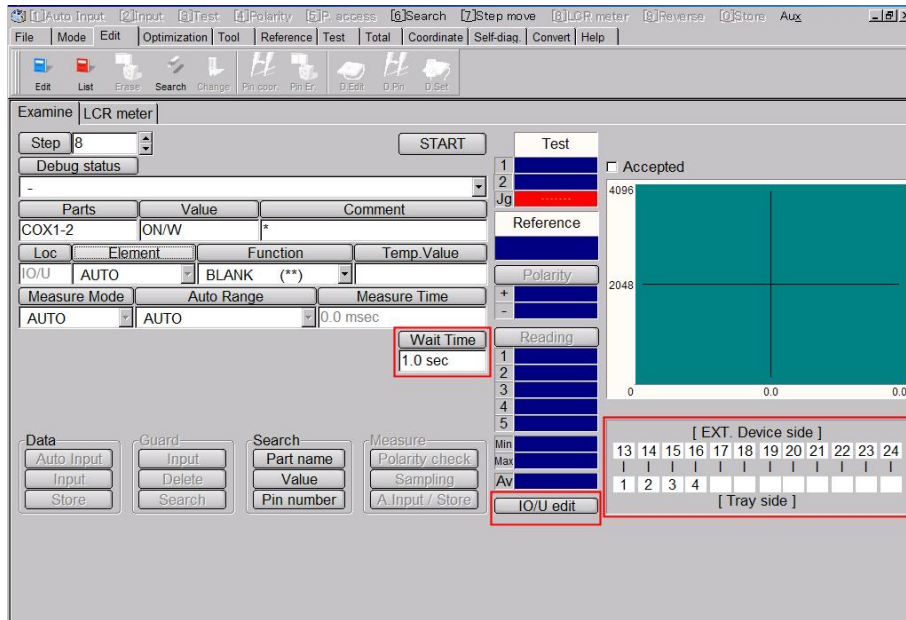
Step	Aux.	Parts	Value	Comment	H-pin	L-pin	F.	+%	-%
000001:		R902	47KO	*	*	*	**	10	10
000002:		R912	00	*	*	*	SH	10	10
000003:		R913	00	*	*	*	SH	10	10
000004:		R923	470	*	*	*	**	10	10
000005:		R922	470	*	*	*	**	10	10
000006:		C914	102	*	*	*	**	30	30
000007:		C913	102	*	*	*	**	30	30
000008:		COX1-2	ON/W	*	*	*	**	10	10

[Fig.22] Step Edit list

Now you can no longer see “IO/U” in both [AUX.] and [Loc.] field.

## IO/U step at Step data review

The IO/U command step on the Step data review is displayed as follows.



[Fig.23] Step data review

Followings are items displayed on the IO/U command step only.

### Wait Time

You can specify the Wait time (0 - 25.5s) from outputting the signal to shifting to the next step.

### IO/U edit

Click this button, and it shows [Fig.12] and [Fig.13] where you can change the terminal numbers and the Wait time as needed. But even if the terminal number at either Device side or Tray side was changed on the display, you won't change the terminal connection right away. The terminal connection will be not changed until you move to any other step and return to this step again.

### Terminal connecting status

Here indicates the terminal connecting status between Device side and Tray side.

## Reference input


As the IO/U step isn't performed at the time of Auto. reference input, any signal is output. Means, at the test step to measure while performing the IO/U step, the reference value will not be input correctly even if the Auto. reference input is performed. Therefore, the reference value has to be input in the Step data review.


### Reference value input method

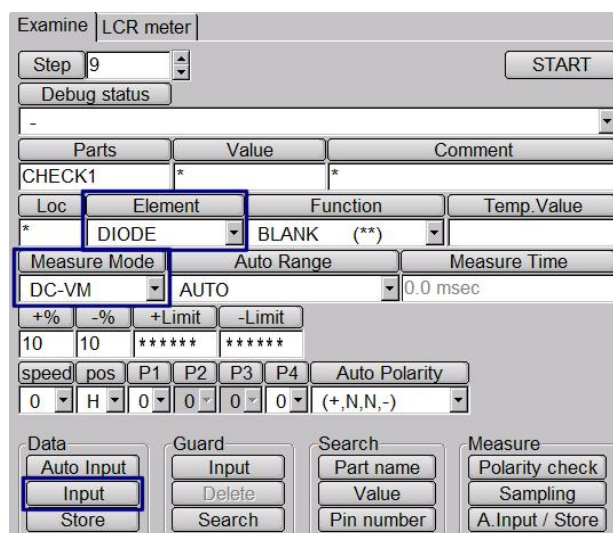
First open the IO/U step in the Step data review, so you can see Device side and Tray side are connected after the IO/U step was performed. Use [+] key on your keyboard to move to the step to measure while performing the IO/U step.

In prior to input the reference value, make sure that the capital letter of the Parts suits for the UUT. Then click the Auto Input button to input the reference value when you are going to measure other than the DC voltage. The Temp. Value column indicates the value. You can change "Function" and "Measure Time" as needed. Clicking the Store button can save the Temp. Value to the Reference value.

When you are going to measure the DC voltage, specify the Element to "Diode" and the Measure Mode to "DC-VM". Click the Input button when you want to input the reference value. (Refer to Fig.24) The Temp. Value column indicates the value. Clicking the Store button can save the Temp. Value to the Reference value.

 <b>WARNING</b>	<p><b>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 you misuse it (ex. wrong location, Output so on). The use of the I/O commands must be carried out under your responsibility.</b></p>
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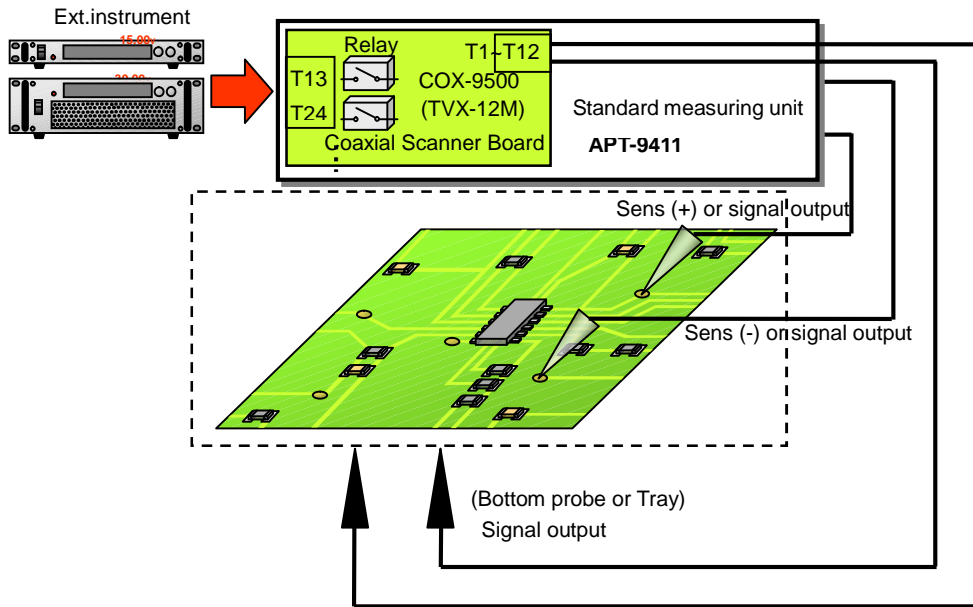
	<p>When you are going to measure DC voltage, be sure to click the Input button to input the reference value. If the Auto Input button is clicked without due care, the Measuring mode will be initialized and any unexpected Measuring mode will be used to input the reference value.</p> <p>When you try to 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.</p>
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[Fig.24] Step data review

# Viewable Setup of Function steps

You can connect the signals from more than one external instrument plugged into the Input terminal 13-24 to the Terminal 1-12, the Bottom probes (standard) and the Flying probes.



[Fig.25] Viewable Setup of Function steps

## Basic knowledge of programming IO/U step

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.

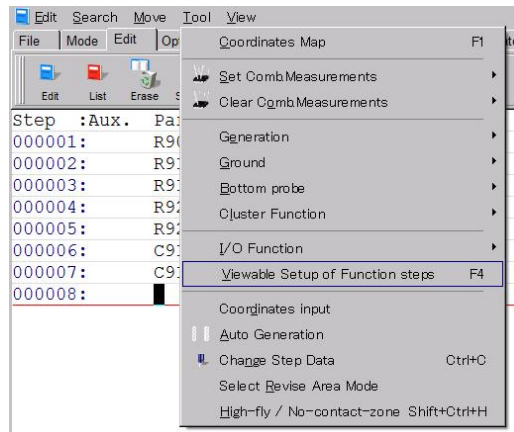
## Setup procedures to apply signal

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 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.26)

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:				

[Fig.26] Step Edit list

4. Click “Viewable setup of Function steps” on the Tool menu. (Refer to Fig.27)

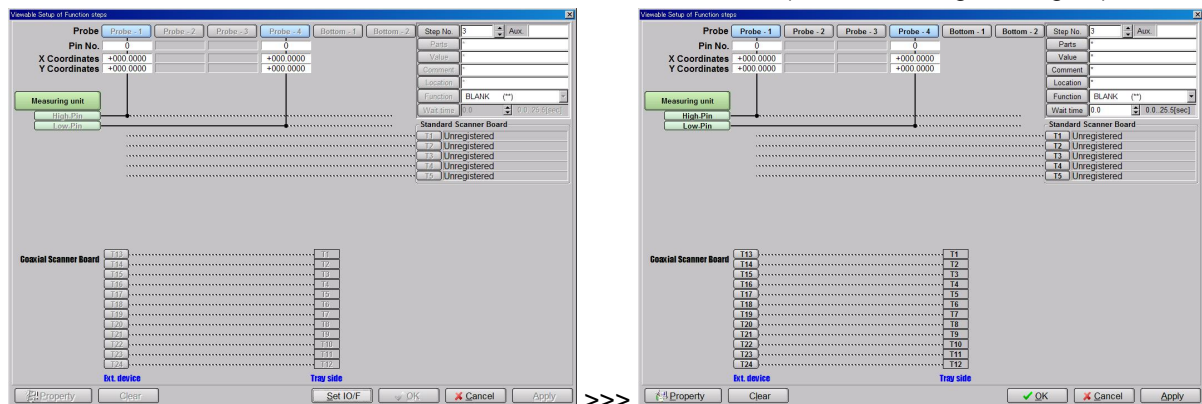


[Fig.27] Viewable setup of Function steps

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.28).

Click “Set IO/F” button to activate each function on the screen. (Refer to the right of Fig.28)

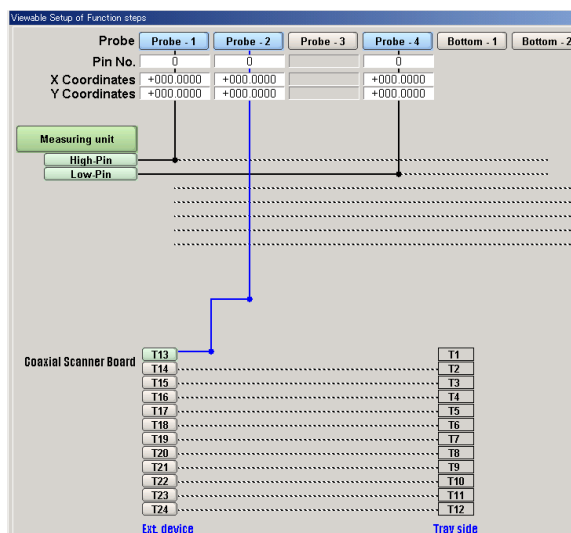


[Fig.28] Viewable setup of Function steps

7. Select the terminal to be used from [T13] ~ [T24] at Coaxial Scanner Board. Then the specified terminal is flashing in green.

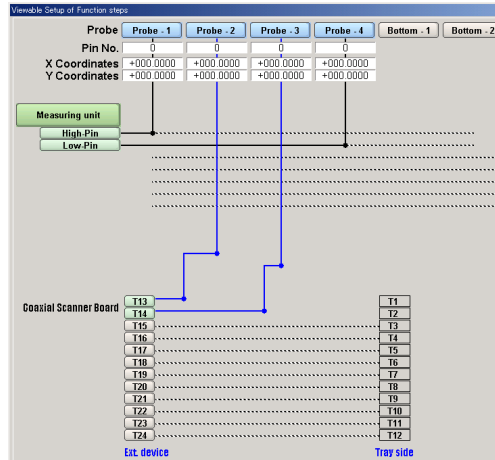
8. [T1] ~ [T12], [Probe-1] ~ [Probe-4] and [Bottom-1] ~ [Bottom-2] on the screen are flashing in yellow.

9. Click any of the output, and the terminal will be connected to the output with a blue line. (Refer to Fig.29)



[Fig.29] Viewable setup of Function steps

- Configure other connections between the terminals ([T13] ~ [T24]) and the output ([T1] ~ [T12], [Probe-1] ~ [Probe-4] and [Bottom-1] ~ [Bottom-2]) as needed. (Refer to Fig.30)



[Fig.30] Viewable setup of Function steps

When an odd number of the terminal at Ext. device (COX-9500) is selected, it will be the only odd number of terminal at Tray side that you can connect. The same goes for an even number of the terminal.

- Fig.30 indicates that [T13] and [T14] of the COX-9500 are connected to [Probe-2] and [Probe-3] and that the measurement is performed by [Probe-1] and [Probe-4].

How to change the destination of the Measuring unit:

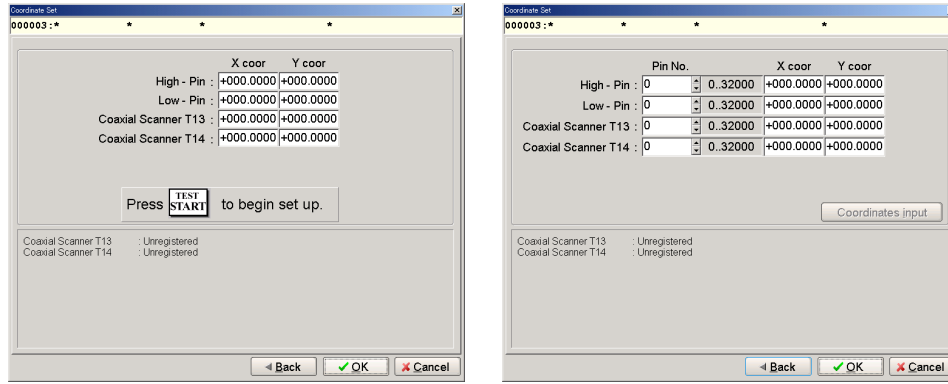
For example, if you want to change the destination of [High-Pin], click [High-Pin] of Measuring unit, and [Probe-1] ~ [Probe-3] and [Bottom-1] ~ [Bottom-2] are flashing in yellow. Then click the new destination, and [High-Pin] will be connected to there in a blue line.

- After the destination was specified, click the Property button, and it will display the Measuring unit screen. (Refer to Fig.31) Use your keyboard to fill in the Parts column. In addition, enter the Value, the Comment and the Location column as needed.

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

[Fig.31] Measuring unit

13. Click the Next button, and it will display the Coordinate set screen. (Refer to Fig.32)



(Teaching system)

(Point system)

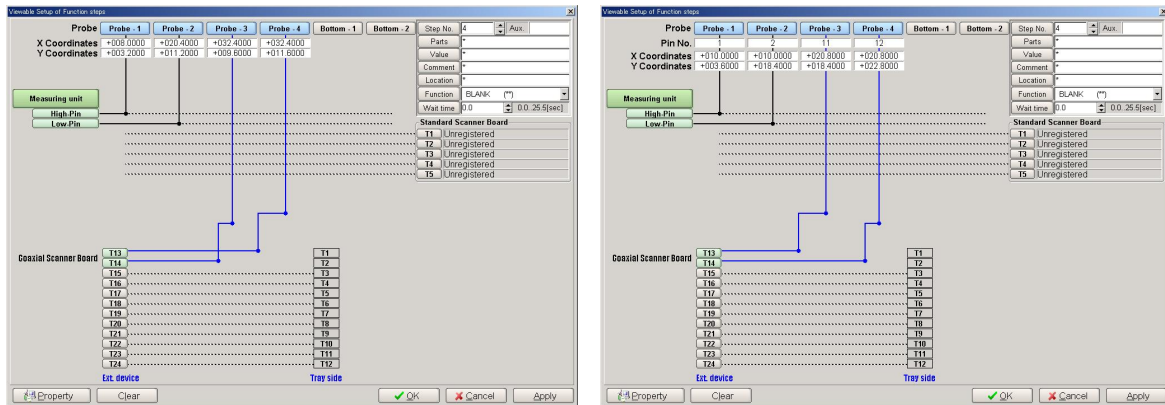
[Fig.32] Coordinate set

On the Coordinate set screen, enter the coordinates (In Teaching system) or the pin numbers (in Point system) for [High-Pin], [Low-Pin], [T13] and [T14] as requested by the menu.

In Point system, when any new pin number was added, click the Coordinates input button so that it displays Fig.33 where you can enter the coordinates.

[Fig.33] Coordinate input

14. Click the OK button, and it goes back to the Viewable setup of Function steps screen. (Refer to Fig.34)

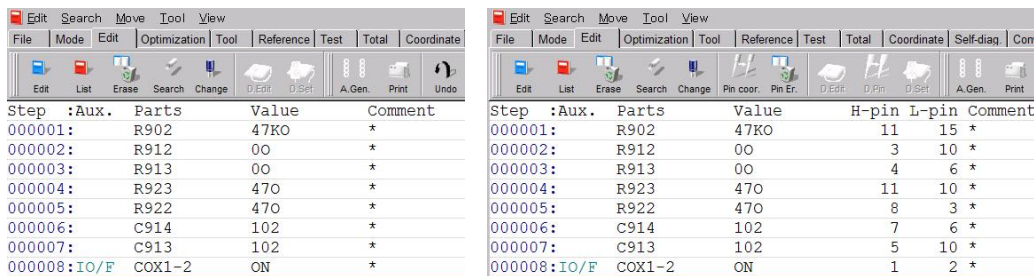


(Teaching system)

(Point system)

[Fig.34] 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".



(Teaching system)

(Point system)

[Fig.35] Step/Edit list

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

## Setup procedures to terminate signal

When the COX-9500 connects the external instruments to the Flying probes ([Probe-1] ~ [Probe-4]), the connection will be released automatically when step moved to the next one.

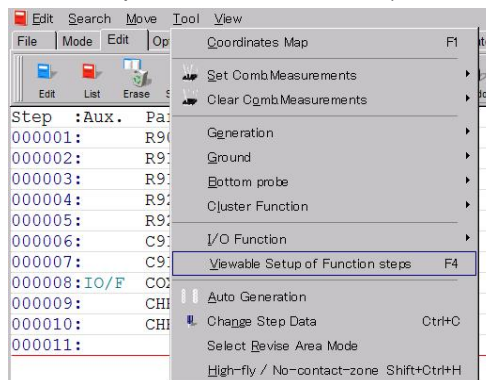
On the other hand, when the COX-9500 connects the external instruments to the bottom pins ([Bottom-1] ~ [Bottom-2]) and/or the Tray ([T1] ~ [T12]), the connection won't be released until "OFF Step" is performed.

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 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.36)

Step	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/F	COX1-2	ON	*
000009:	CHECK1	*	*
000010:	CHECK2	*	*
000011:			

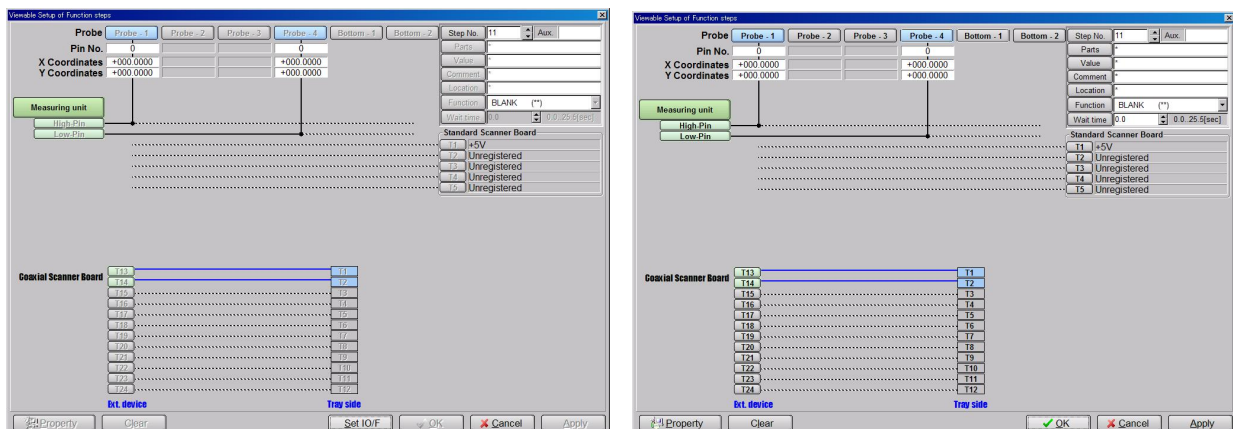
[Fig.36] Step/Edit list

4. Click "Viewable setup of Function steps" on the Tool menu. (Refer to Fig.37)



[Fig.37] Viewable setup of Function steps

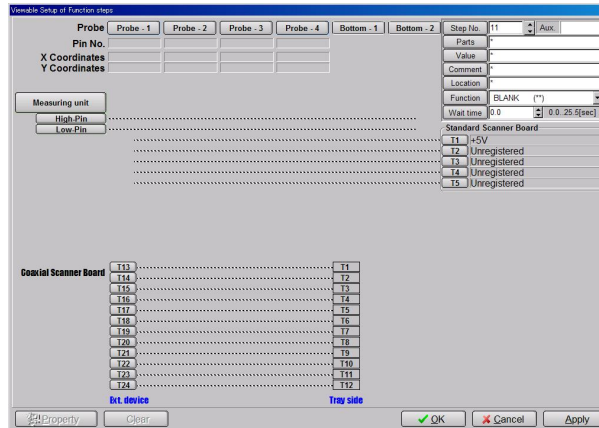
5. It displays "Use board ref.point and aux.ref.point for alignment?". Select Yes or No.
6. It displays the Viewable setup of Function steps screen. (Refer to the left of Fig.38).  
Click "Set IO/F" button to activate each function on the screen. (Refer to the right of Fig.38)



[Fig.38] Viewable setup of Function steps



- Click the Clear button to release the connection of the COX-9500 and the measuring unit. (Refer to Fig.39)



[Fig.39] Viewable setup of Function steps

- Click the OK button, and it goes back to the Step edit list (Refer to Fig.40)

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/F	COX1-2	ON	*
000009:		CHECK1	*	*
000010:		CHECK2	*	*
000011:	IO/F		*	*

[Fig.40] Step/Edit list

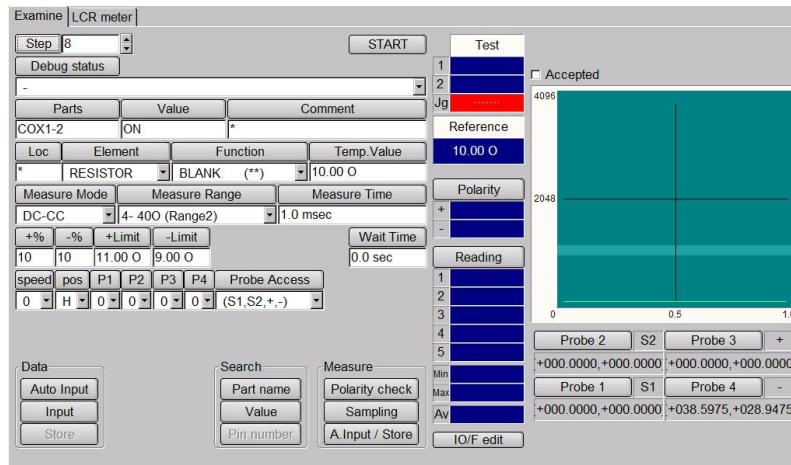
It will be useful to input any information on the test contents in the column "Parts" and "Value" as shown in Fig.41.

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/F	COX1-2	ON	*
000009:		CHECK1	*	*
000010:		CHECK2	*	*
000011:	IO/F	COX1-2	OFF	*

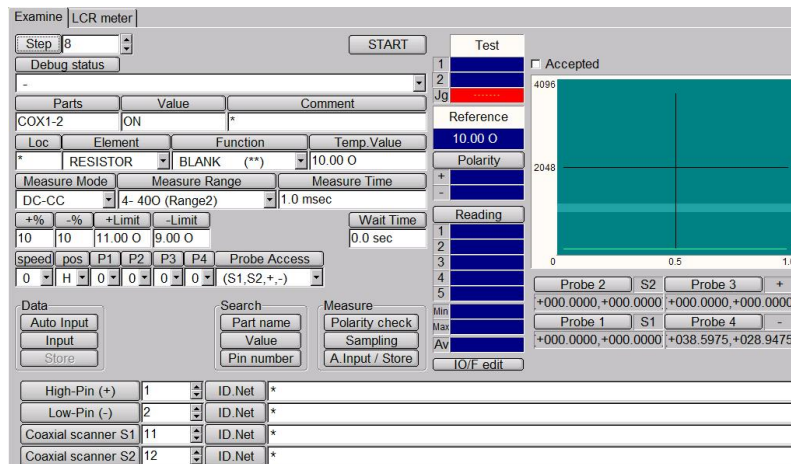
[Fig.41] Step/Edit list

## Step data review

You should input the reference value on the Step data review screen. It is also possible to modify the IO step as needed. A great deal of thought should be given to these operations.



[Fig.42] Step data review (Teaching system)



[Fig.43] Step data review (Point system)

Here lists the key functions available in the Step data review screen.

- (1) Element  
Element column is substituted by type of component to be measured.  
RESISTOR --> Resistors  
CAPACITOR --> Capacitors  
COIL --> Inductors  
DIODE --> VF measurement / DC voltage measurement
- (2) Function  
Function column is substituted by the Measuring function.
- (3) 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.
- (4) Measure Mode  
Measure Mode column is substituted by the measuring signal.
- (5) Measure Range  
Measure Range column is substituted by the Measuring range.

(6) Measure Time

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

(7) Wait Time

Wait Time indicates the time from applying the signal to start moving the next step. Click to change the Wait time as needed.

(8) 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 (-)

S1 --> Signal of T13 of the COX-9500

S2 --> Signal of T14 of the COX-9500

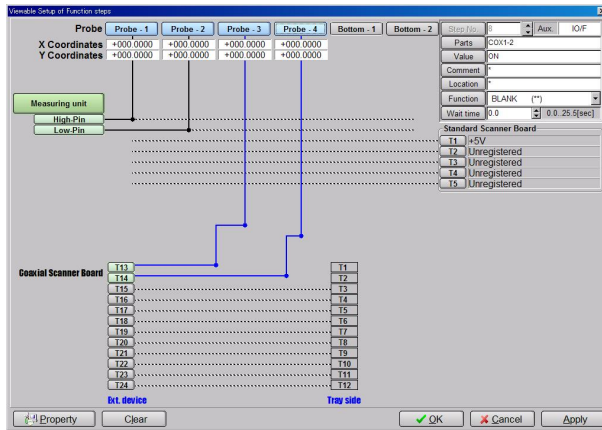
List 1 below indicates the Terminal numbers and the Probe access name.

Terminal number	Probe access name
T13	S1
T14	S2
T15	S3
T16	S4
T17	S5
T18	S6
T19	S7
T20	S8
T21	S9
T22	S10
T23	S11
T24	S12

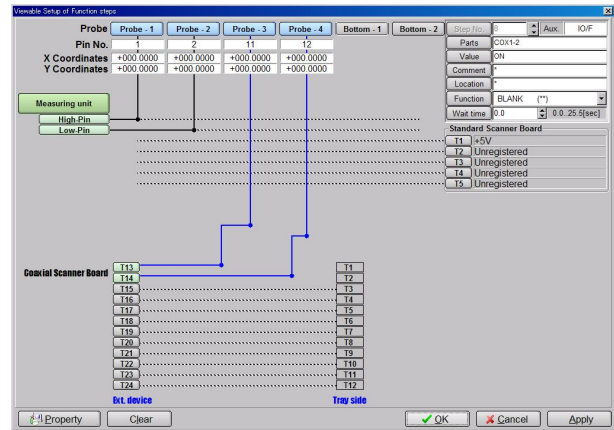
[ List 1 ]

(9) Set IO/F

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



(Teaching system)



(Point system)

[Fig.44] Viewable setup of Function steps

## Reference input


As the IO function step isn't performed at the time of Auto. reference input, any signal is output. Means, at the test step to measure while performing the IO function step, the reference value will not be input correctly even if the Auto. reference input is performed. Therefore, the reference value has to be input in the Step data review.


## Reference value input method

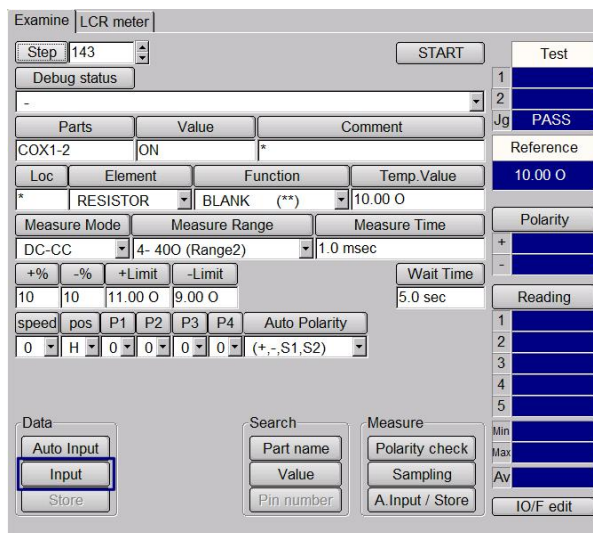
Open the IO function step in the Step data review, and you will see that Device side and Tray side are connected after the IO function step was performed.

In prior to input the reference value, make sure that the capital letter of the Parts suits for the UUT. Then click the Auto Input button to input the reference value when you are going to measure other than the DC voltage. The Temp. Value column indicates the value. You can change "Function" and "Measure Time" as needed. Clicking the Store button can save the Temp. Value to the Reference value.

When you are going to measure the DC voltage, specify the Element to "Diode" and the Measure Mode to "DC-VM". Click the Input button when you want to input the reference value. (Refer to Fig.45) The Temp. Value column indicates the value. Clicking the Store button can save the Temp. Value to the Reference value.

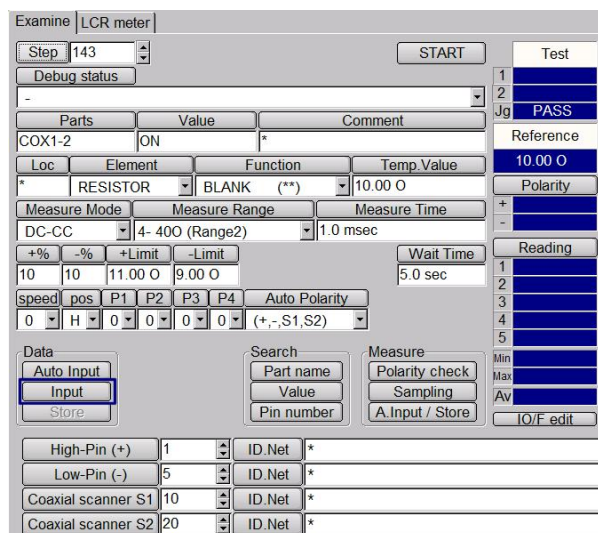
 <b>WARNING</b>	<p><b>This function is used to power up the board to test. And so it may cause serious damage to the PC boards and/or the measuring unit if you misuse it (ex. wrong location, Outport so on). The use of the I/O commands must be carried out under your responsibility.</b></p>
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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



The screenshot shows the 'Teaching system' interface for Step 143. The 'Data' section at the bottom left contains buttons for 'Auto Input', 'Input', and 'Store'. The 'Input' button is highlighted with a red box. The 'Measure' section contains buttons for 'Polarity check', 'Sampling', and 'A. Input / Store'. The 'IO/F edit' button is also visible.

(Teaching system)



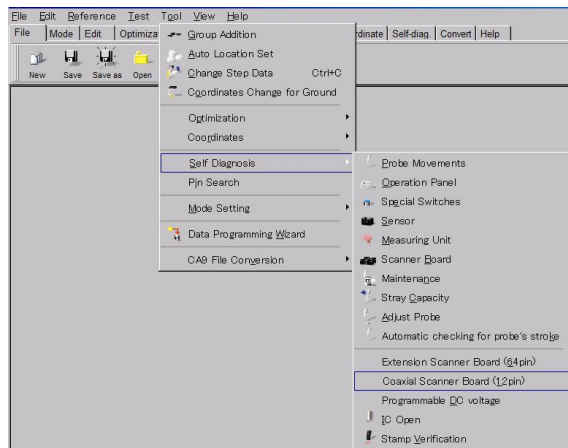
The screenshot shows the 'Point system' interface for Step 143. The 'Data' section at the bottom left contains buttons for 'Auto Input', 'Input', and 'Store'. The 'Input' button is highlighted with a red box. The 'Measure' section contains buttons for 'Polarity check', 'Sampling', and 'A. Input / Store'. The 'IO/F edit' button is also visible.

(Point system)

[Fig.45] Step data review

# Maintenance

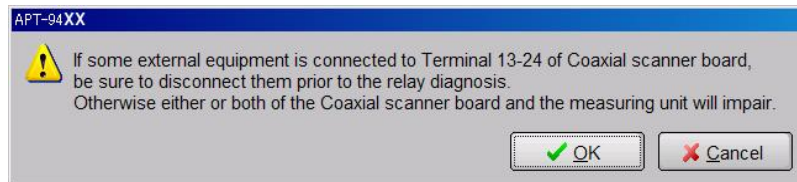
“Coaxial Scanner Board (12pin)” in Self-diagnosis menu makes the diagnosis of the relays on the TVX-12M PCB and the cable connection up to the Tray terminals.



[Fig.46] Self diagnosis

## Relay check

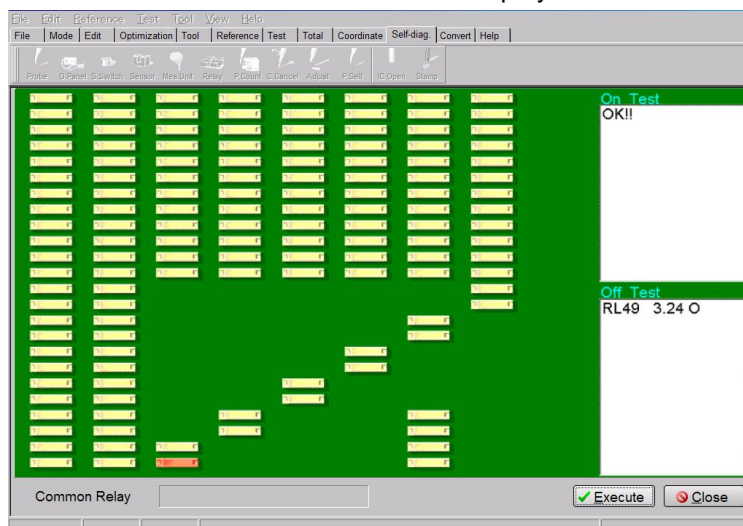
1. If you click “Coaxial Scanner Board (12pin)” (Tool > Self Diagnosis), it shows the message window below. As described, you are now allowed to connect any external instrument to the TVX-12M PCB when the relays are diagnosed. Otherwise the relay and/or the measuring unit may get serious damages.



[Fig.47]

2. Click the OK button, and it will display Fig.19.
3. Click the Execute button, and it starts diagnosing the relays on TVX-12M PCB.

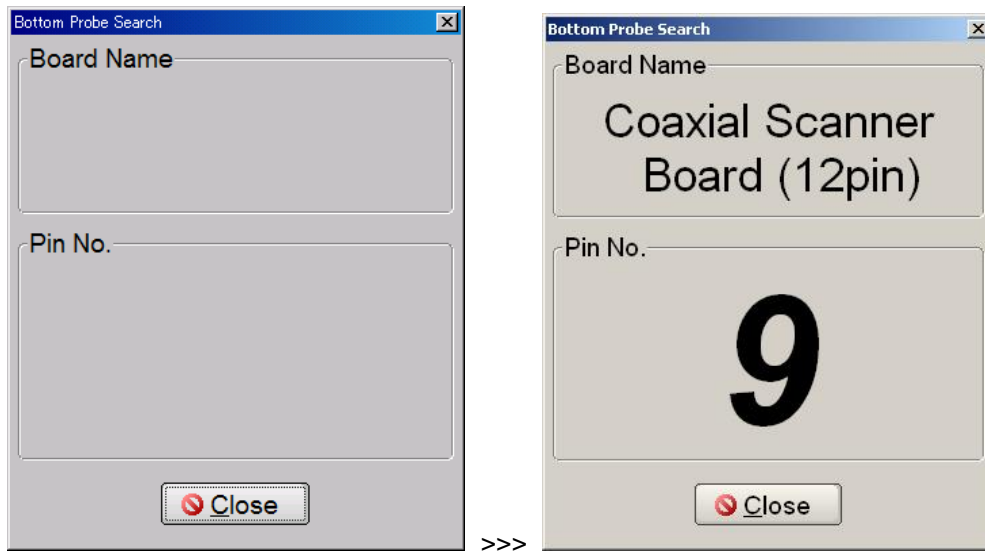
If some relays were judged fail during the ON test, they are highlighted in blue and the failure information is displayed in the “On test” window. If some relays were judged fail during the OFF test, they are highlighted in red and the failure information is displayed in the “Off test” window.



[Fig.48] Coaxial Scanner Board (12pin)

## Pin search

1. Click on Pin search on the Tool menu, and it will display the left screen in Fig.49.



[Fig.49] Pin serach

2. To ensure the cable connections up to the Tray terminals, plug a tester lead cable into the tester terminal (+ pin) provided on the APT-9411 and then connect another tip of the tester lead cable to the objective terminal. With this, the terminal number is displayed as shown in the right screen in Fig.49.



The Pin search screen will be closed automatically after it passed over 1 minute without displaying any pin number.

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APT-9411 Coaxial Scanner Board Operator's Guide (VOL.3)

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