How to use the I-87028UW/CW, I-87024UW/CW modules on ISaGRAF PAC?

Introduction:

The ICP DAS ISaGRAF PACs has added support for the I-87028UW/CW and I-87024 UW/CW voltage or current output modules. Users can plug it in the PAC as the local I/O or plug it in the remote I/O expansion unit (e.g. I-87K4/5/8/9 or RU-87P4/8) as the RS-485 remote I/O modules.

- **I-87028UW**

  8-channel 16-bit Isolated Source Type Voltage or Current Output Module

- **I-87028CW**

  8-channel 12-bit Channel-to-Channel Isolated Current Output Module

- **I-87024UW**

  4-channel 16-bit Isolated Source Type Voltage or Current Output Module

- **I-87024CW**

  4-channel 12-bit Channel-to-Channel Isolated Current Output Module

Please visit to the websites for more information,
http://www.icpdas.com/root/product/solutions/remote_io/rs-485/i-8k_i-87k/i-87028uw.html
http://www.icpdas.com/root/product/solutions/remote_io/rs-485/i-8k_i-87k/i-87024cw.html

1.1. Download the Driver, Demo Programs and Documents

The following ISaGRAF driver versions support the I-87028UW/CW, I-87024 UW/CW modules.

ISaGRAF PAC / ISaGRAF Driver Version			
XP-8xx7-CE6 XP-8xx6-CE6	Ver. 1.44 or later	XP-8xx7-Atom-CE6 XP-8xx6-Atom-CE6	Ver. 1.03 or later
VP-25W7/23W7 VP-25W6/23W6	Ver. 1.56 or later	WP-8xx7/WP-8xx6	Ver. 1.64 or later
iP-8x17/8x47	Ver. 1.20 or later		
ISaGRAF Palm-size PAC			
WP-5147/5146	Ver. 1.10 or later	µPAC-7186EG	Ver. 1.22 or later

Notice:

The WP-5147 and µPAC-7186EG are the Palm-size PAC (without slot). Thus, users can use the I-87028UW/CW and I-87024 UW/CW as remote I/O modules through the RS-485 port (COM2).

Download the ISaGRAF Driver:

If your driver version is the earlier one, you may download the new ISaGRAF Driver from the website www.icpdas.com > Soft PLC ISaGRAF... > Driver and then follow the attached document to update it to your ISaGRAF PAC.

Download the ISaGRAF Demo Project:

This paper is the ISaGRAF FAQ-169. User can download the document and related files (**Projects:** faq169_1.pia, faq169_2.pia, faq169_3.pia, faq169_4.pia, **C function blocks:** i_87024c.fia, i_87028c.fia, **I/O boards:** i_87024u.bia, i_87028c.bia, i_87028u.bia) from www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC **> 169**

1.2. Restore the ISaGRAF Files

Users can download the ISaGRAF projects and libraries into the "C:\ISAWIN" folder, and then restore it to the PC/ISaGRAF. Please follow the instructions as below:

Restore the ISaGRAF Projects:

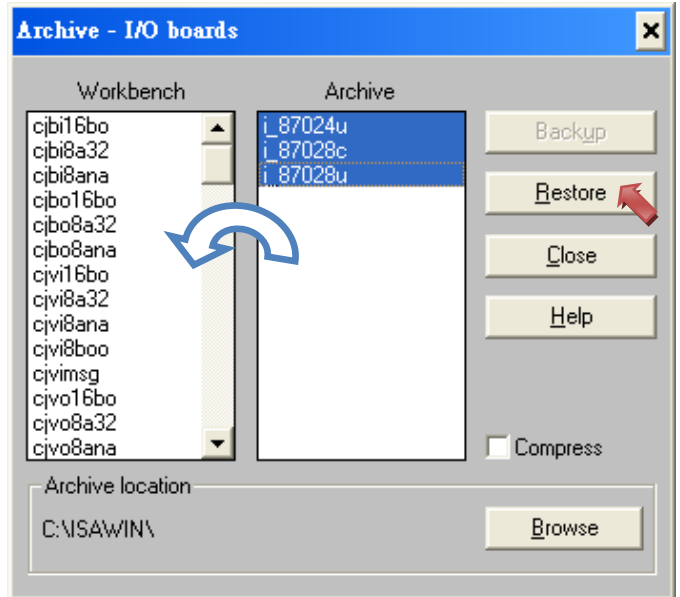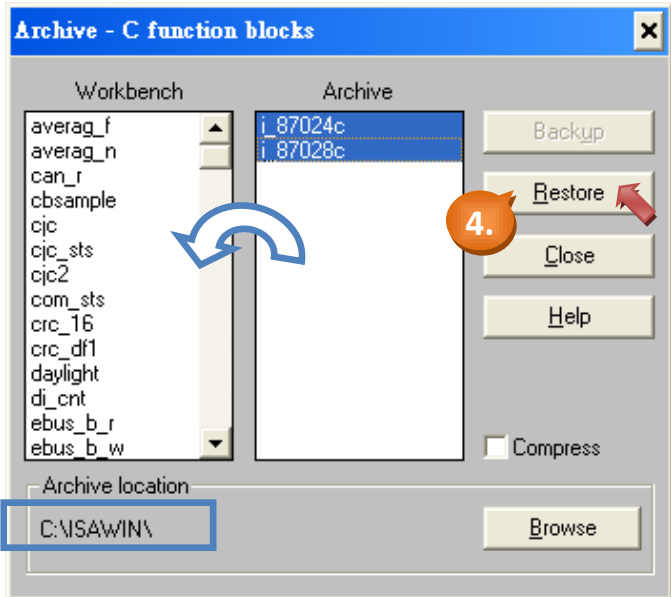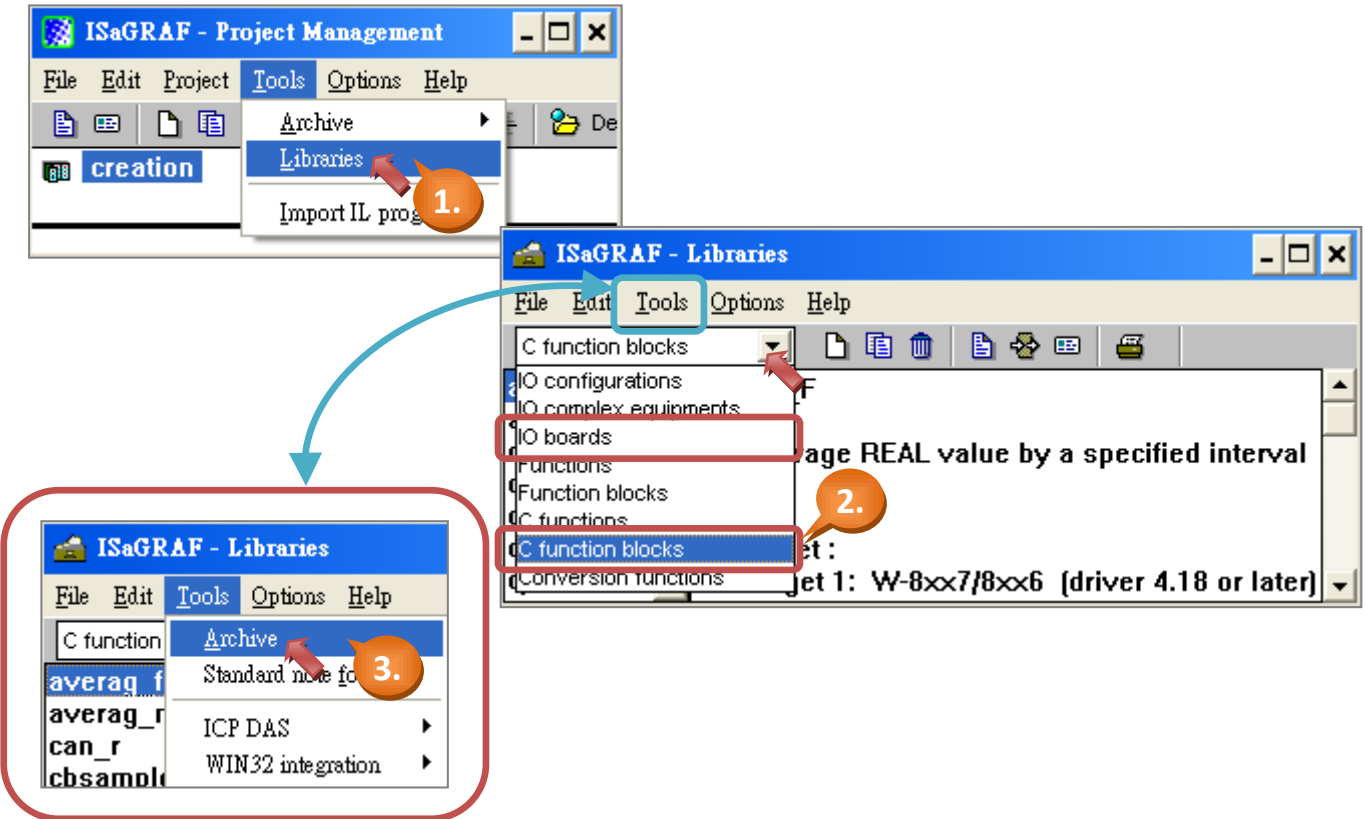*Projects:* faq169_1.pia, faq169_2.pia, faq169_3.pia, faq169_4.pia
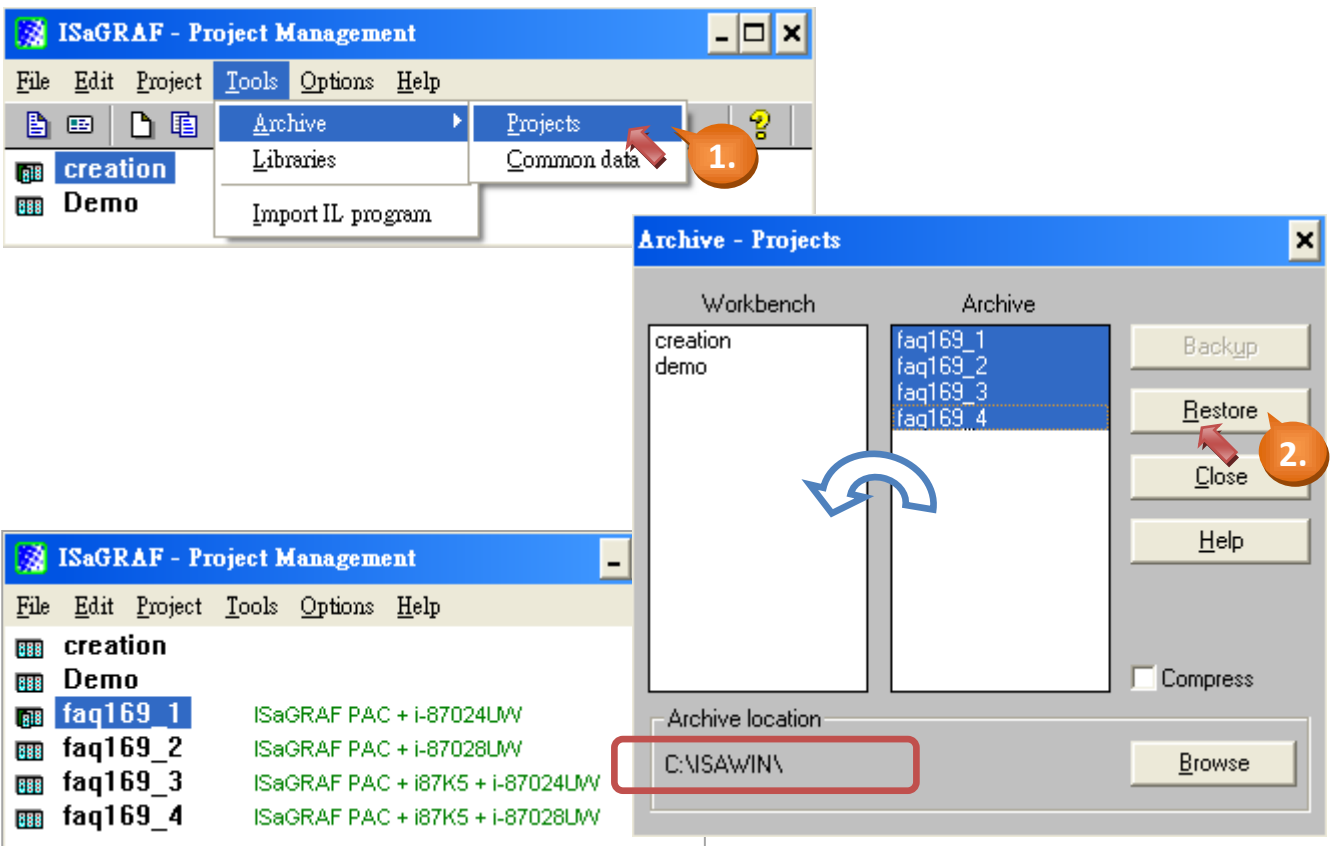
Restore the ISaGRAF Libraries:

*C function blocks***:** i_87024c.fia, i_87028c.fia,
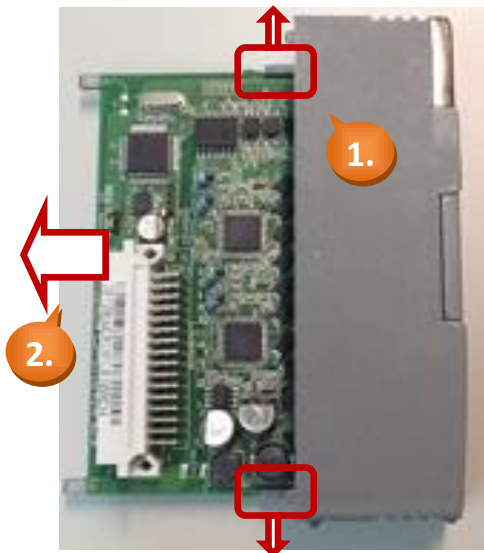
I/O boards: i_87024u.bia, i_87028c.bia, i_87028u.bia

1.3. Using Notes on the I/O Module

1.3.1. Hardware Setup

Before using the **I-87028UW**, users must adjust the jumpers on the I/O board to select the voltage or current output.

1. Push the tenon on both sides of the module outward slightly and then take out the I/O board.

Please take out the screw terminal block first.

2. In the upper left corner, it marked the location of the jumper. Users can adjust the jumper for each channel to select the voltage or current output.

Notice: The settings for software ("DCON Utility" and "ISaGRAF") must be the same with hardware setup (I/O board).

J1 ~ J8

Current

Voltage

1.3.2. Configuring the Remote I/O Modules by "DCON Utility"

Before using the I-87028UW/CW and I-87024 UW/CW as RS-485 remote I/O modules, users must setup related parameters by using "DCON Utility". **(Note: If these modules are plugged in the slot 0 – 7 of the PAC, users do not need the following setting.)**

Download the "DCON Utility": http://ftp.icpdas.com/pub/cd/8000cd/napdos/driver/dcon_utility/
User Manual: http://ftp.icpdas.com/pub/cd/8000cd/napdos/driver/dcon_utility/manual/

Please follow the instructions as below:
1. Set "Address" to a unique No. (e.g. 1 ~ 255)
2. Set "Data format" as "Engineering Unit", and the "Baud Rate" (e.g. 9600)
3. Set "Checksum" as "Disable", and "Parity Options" as "None Parity [8,N,1]"
4. Set output range for each channel (e.g. Channel 0: [02] 0 ~ +10 V)

Notice:
The settings for "ISaGRAF" and "DCON Utility" must be the same (e.g. "Address", "Baud Rate"). If users need to change the output range/type for any channel, it required to modify the "DCON Utility" settings. Do not forget to adjust the jumpers to select the voltage or current output.
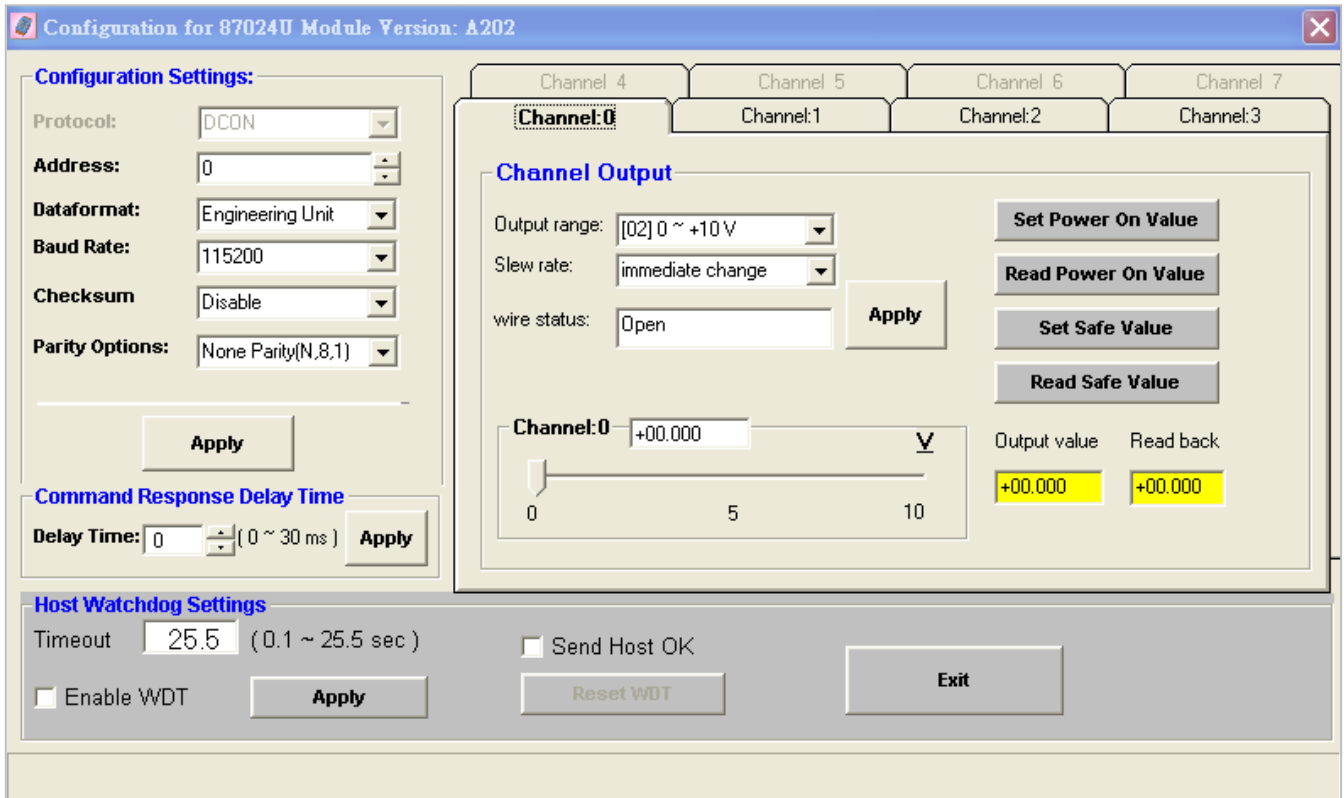
Note: The "Wire Status" field of each channel:
       Open (it means open wire) ; Close (it means close wire: Normal).

1.4. I-87028UW/CW User Guide

The I-87028**U**W is a **voltage or current output module** that includes 8 single-ended analog output channels, and provides options for setting power-on and safe value (when it be used as RS-485 remote I/O modules). It also provides a programmable output range on all analog outputs (0 ~ 5 V, -5 ~ +5 V, 0 ~ 10 V, -10 ~ +10 V, +4 ~ +20 mA or 0 ~ +20 mA), and each analog output can be configured for an individual range. **Voltage and current outputs are jumper selectable**, and provide 4 KV ESD protection as well as 2500 VDC intra-module isolation.

The I-87028**C**W is an 8-channel **current output module** that features channel-to-channel isolation. It also provides a programmable output range on all analog outputs (+4 ~ +20 mA or 0 ~ +20 mA), and each analog output can be configured for an individual range, and also has qualification for 4 KV ESD protection and 1000 VDC intra-module isolation.

Please visit to the websites for more information,
http://www.icpdas.com/root/product/solutions/remote_io/rs-485/i-8k_i-87k/i-87028uw.html

Notice: The ISaGRAF will support per-channel open wire detection for +4 ~ +20 mA output.

1.4.1. Using the I-87028UW/CW in the Slot 0 - 7 of the PAC

In the "I/O connection" window, connect the "i_87028u" module with the corresponding I/O slot (e.g. Slot 1 : i_87028u) and then to assign the output range (e.g. 2 : 0 ~ 10 V) and the corresponding I/O tag (e.g. AO1).
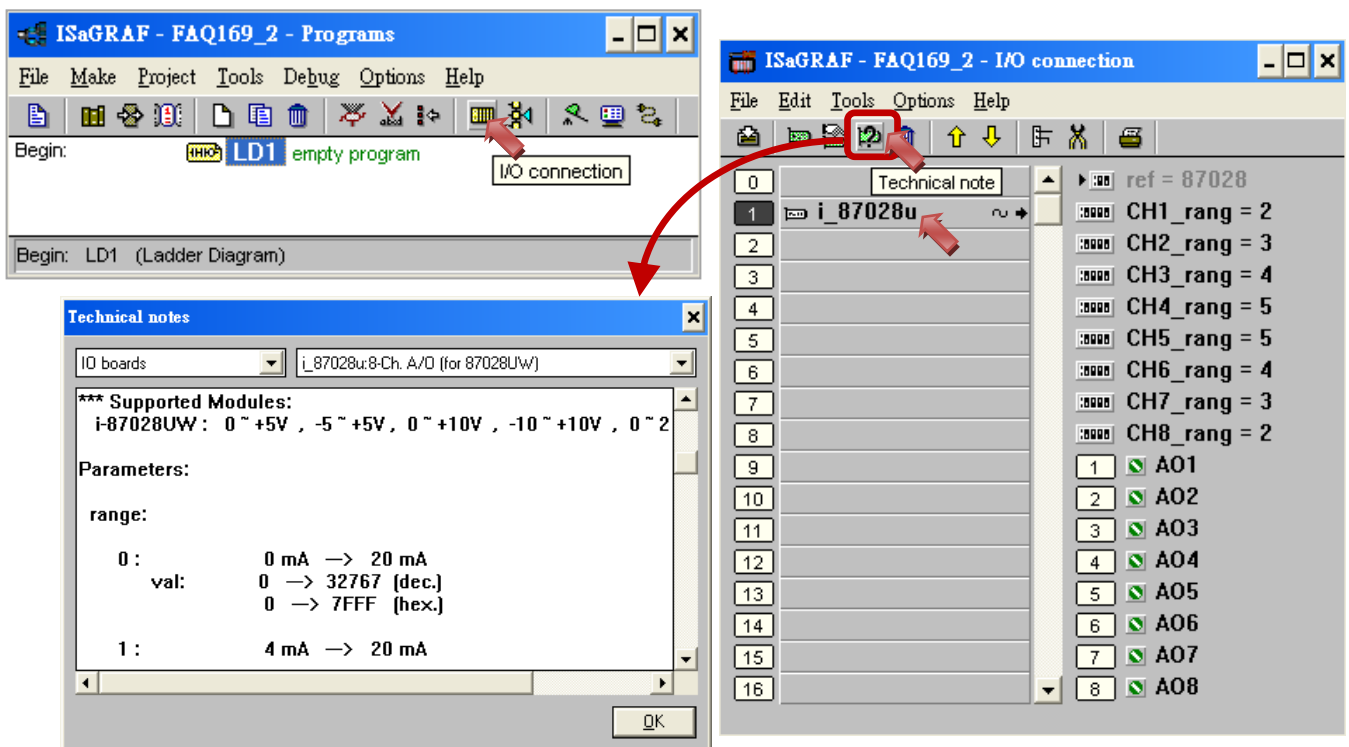
As the figure above, users can click on "Slot 1 - i_87028u" and then click "Technical note" icon to see the usage notes for this module.

**The following are the output range for each channel:**
I-87028CW: (Current output) 0, 1 selectable
I-87028UW: (Current output) 0, 1 selectable ; (Voltage output) 2, 3, 4, 5 selectable
Notice: The output type (Current / Voltage) must be the same with the hardware setup.

ISaGRAF Settings	Output Range		
	Type	Decimal	Hex.
0	0 ~ +20 mA	0 ~ 32767	0 ~ 7FFF
1	+4 ~ +20 mA	0 ~ 32767	0 ~ 7FFF
2	0 ~ 10 V	0 ~ 32767	0 ~ 7FFF
3	-10 ~ +10 V	-32768 ~ 32767	8000 ~ 7FFF
4	0 ~ 5 V	0 ~ 32767	0 ~ 7FFF
5	-5 ~ +5 V	-32768 ~ 32767	8000 ~ 7FFF

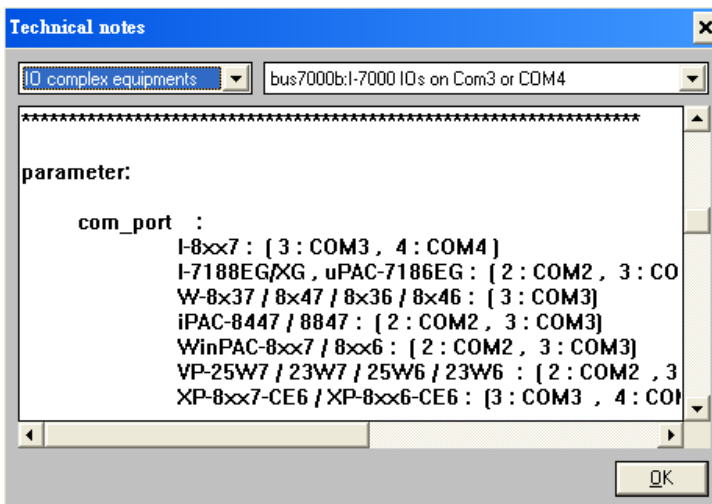The operation steps for the I-87028CW and I-87028UW are similar, you can try it.
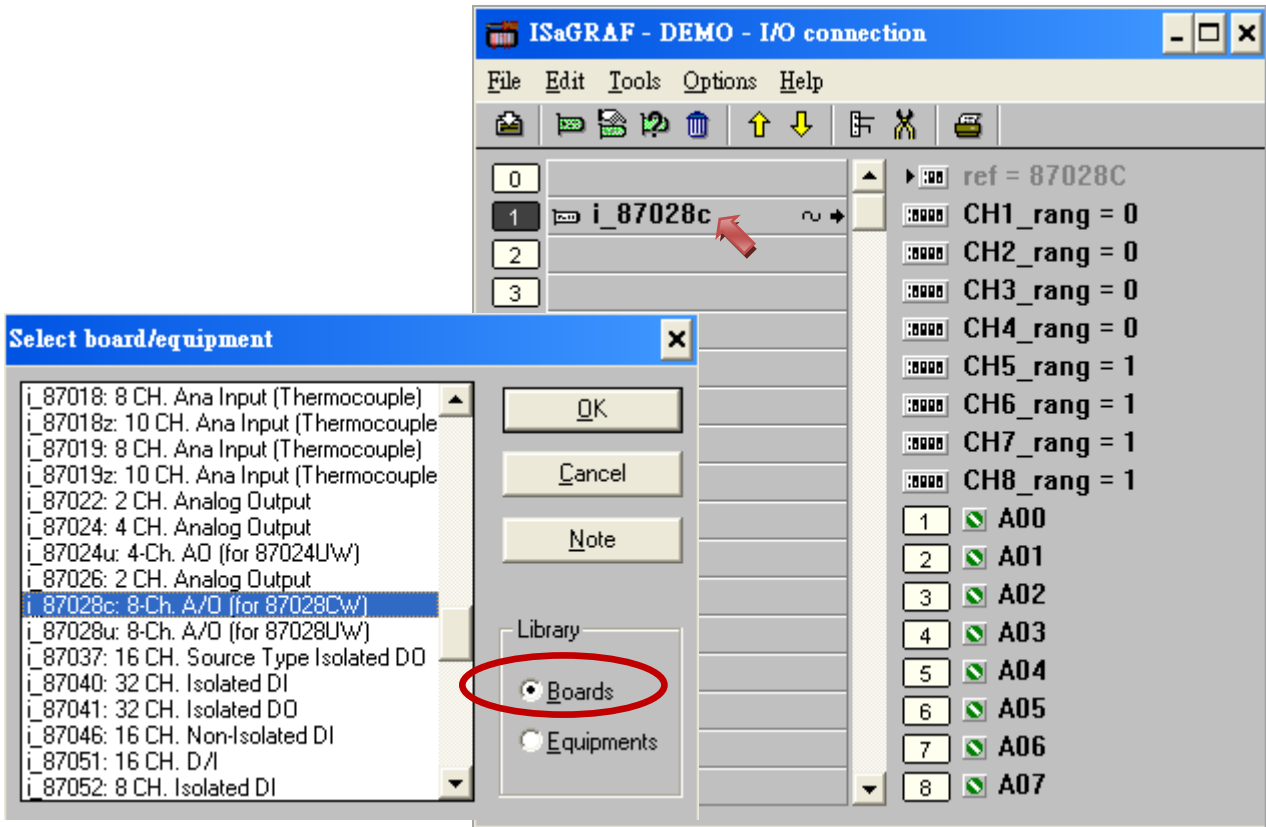
1.4.2. Using the I-87028UW/CW as RS-485 Remote I/O Modules

The I-87028UW/CW can be plugged in the I-87K4/5/8/9 or RU-87P4/8 to use it as the RS-485 remote I/O modules. First, run the "DCON Utility" on a PC to configure the I-87028UW/CW (refer to section 1.3.2). In the ISaGRAF "I/O connection" window, connect the I/O complex equipment - "bus7000b" and set up the correct values for "com_port", "com_baud", etc.

As the figure above, users can click on "Slot 9 – bus7000b" and then click "Technical note" icon to see the usage notes for this module.
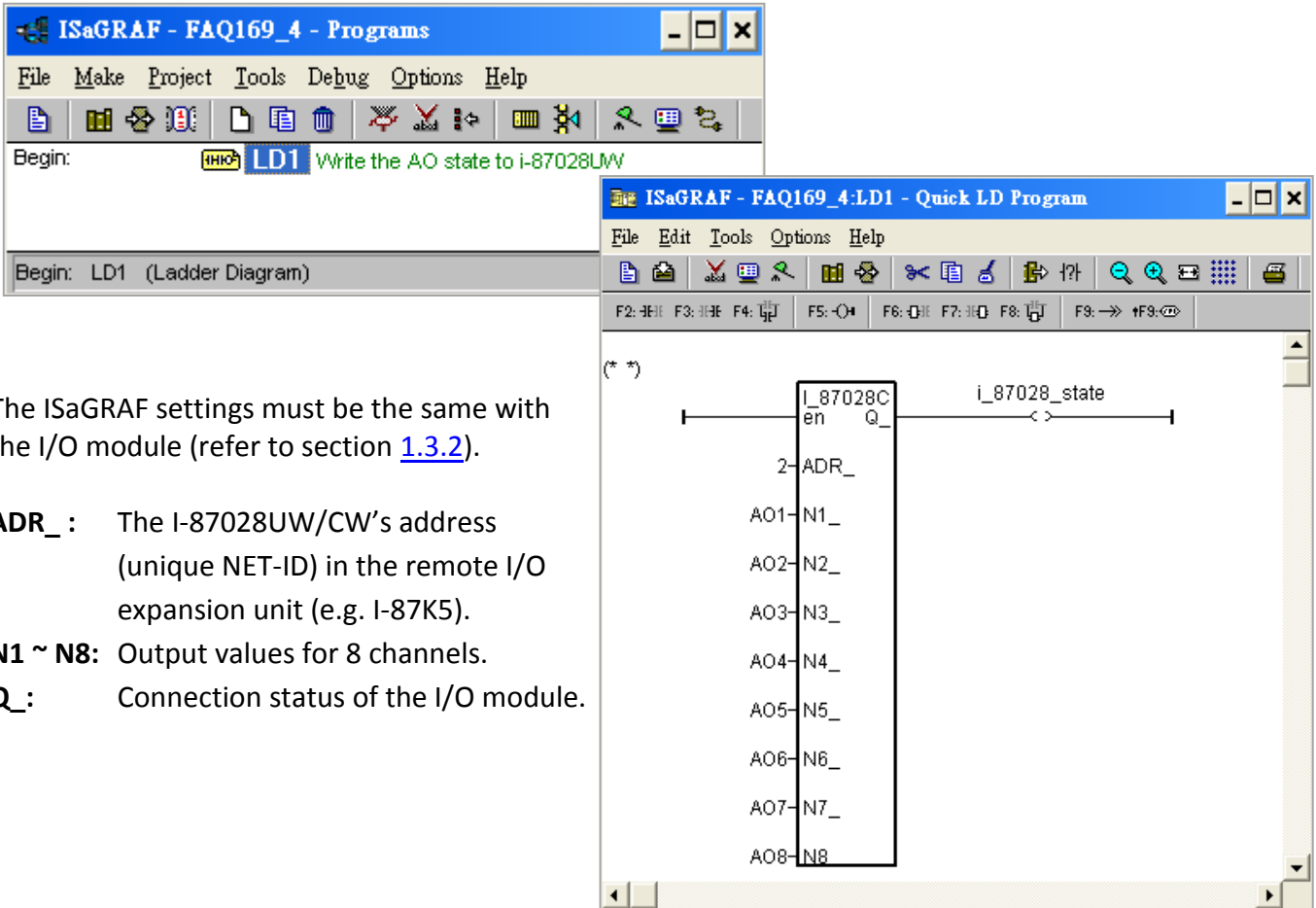
As the figure above, the "com_baud" and "checksum" must equal to the setting of I/O module (refer to section 1.3.2).

Host_watchdog, checksum
0: Disable   1: Enable

Watchdog_timer: (Hex.)
Default: 3 s,   Unit: 0.1 s
For example: $1E_{(16)} = 30_{(10)} = 3$ s

Then, write an ISaGRAF Ladder program as below to use it.

The ISaGRAF settings must be the same with the I/O module (refer to section 1.3.2).

ADR_ : The I-87028UW/CW's address (unique NET-ID) in the remote I/O expansion unit (e.g. I-87K5).

N1 ~ N8: Output values for 8 channels.

Q_: Connection status of the I/O module.

1.5. I-87024UW/CW User Guide

The I-87024**U**W is an **voltage or current output module** that includes 4 single-ended analog output channels, and provides options for setting power-on and safe value (when it be used as RS-485 remote I/O modules). It also provides a programmable output range on all analog outputs (0 ~ 5 V, -5 ~ +5 V, 0 ~ 10 V, -10 ~ +10 V, +4 ~ +20 mA or 0 ~ +20 mA), and each analog output can be configured for an individual range, and provide 4 KV ESD protection as well as 2500 VDC intra-module isolation.

The I-87024**C**W is a 4-channel **current output module** that features channel-to-channel isolation. It also provides a programmable output range on all analog outputs (+4 ~ +20 mA or 0 ~ +20 mA), and each analog output can be configured for an individual range, and also has qualification for 4 KV ESD protection and 1000 VDC intra-module isolation.

Please visit to the websites for more information,
http://www.icpdas.com/root/product/solutions/remote_io/rs-485/i-8k_i-87k/i-87024cw.html

Notice: The ISaGRAF will support per-channel open wire detection for +4 ~ +20 mA output.

1.5.1. Using the I-87024UW/CW in the Slot 0 - 7 of the PAC

In the "I/O connection" window, connect the "i_87024u" module with the corresponding I/O slot (e.g. Slot 2 : i_87024u) and then to assign the output range (e.g. 2: 0 ~ 10 V) and the corresponding I/O tag (e.g. AO1).
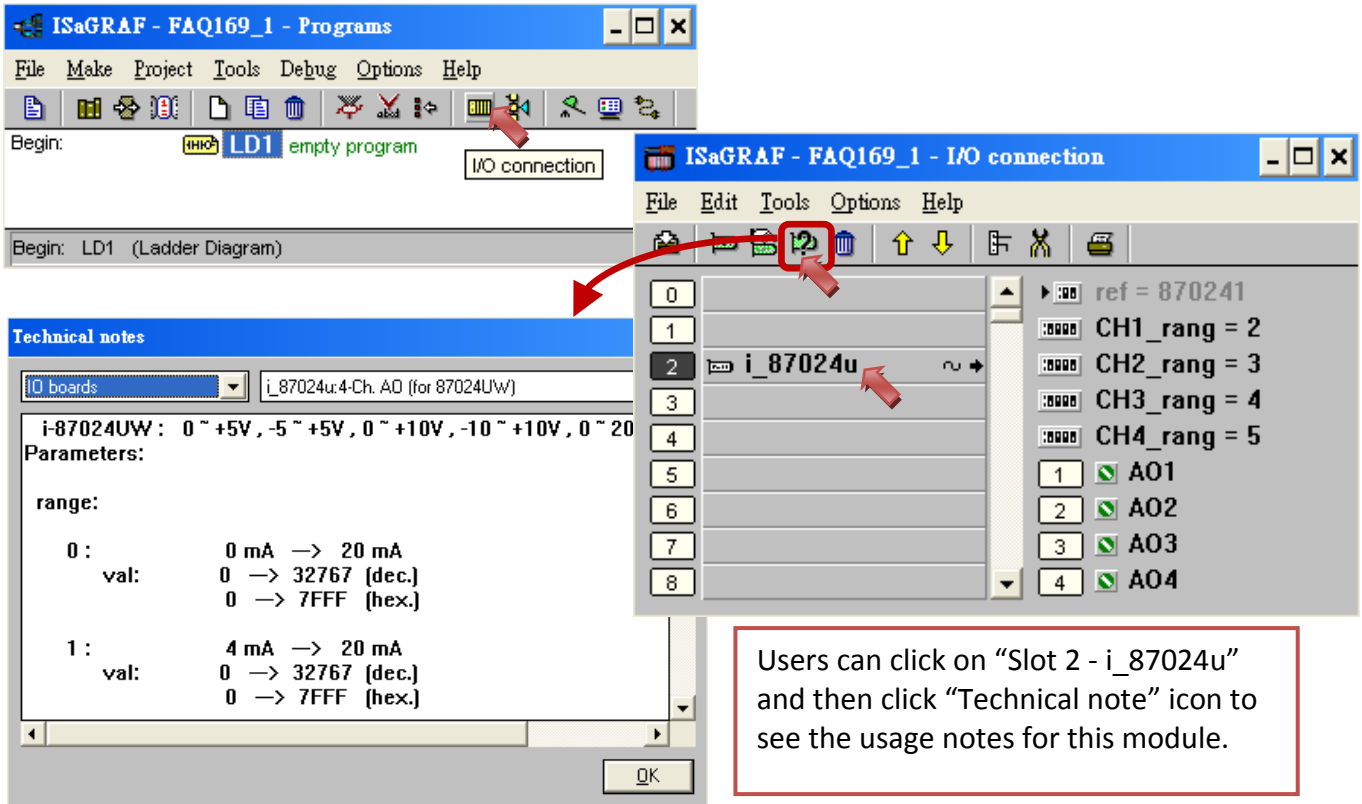
Users can click on "Slot 2 - i_87024u" and then click "Technical note" icon to see the usage notes for this module.

The following are the output range for each channel:

I-87024CW: (Current output) 0, 1 selectable
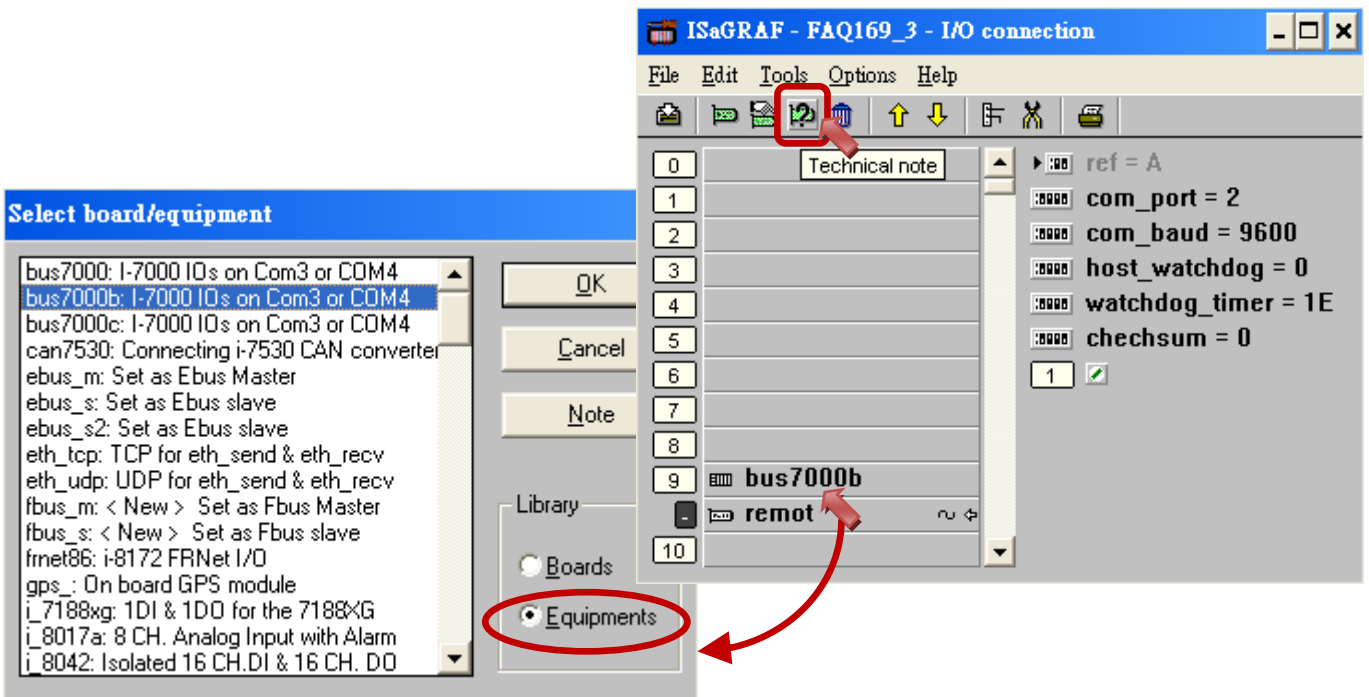**I-87024UW:** (Current output) 0, 1 selectable ; (Voltage output) 2, 3, 4, 5 selectable

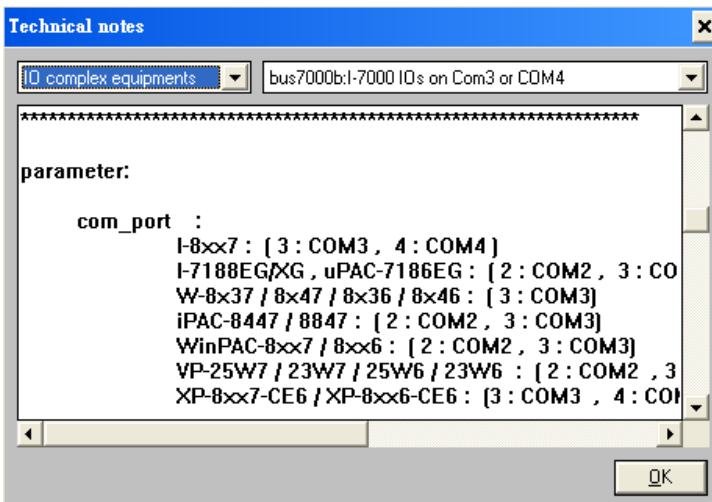| ISaGRAF Settings	Output Range		
	Type	Decimal	Hex.
0	0 ~ +20 mA	0 ~ 32767	0 ~ 7FFF
1	+4 ~ +20 mA	0 ~ 32767	0 ~ 7FFF
2	0 ~ 10 V	0 ~ 32767	0 ~ 7FFF
3	-10 ~ +10 V	-32768 ~ 32767	8000 ~ 7FFF
4	0 ~ 5 V	0 ~ 32767	0 ~ 7FFF
5	-5 ~ +5 V	-32768 ~ 32767	8000 ~ 7FFF

The operation steps for the I-87024CW and I-87024UW are similar, please refer to the I-87028CW (P7). (The I-87024CW is not yet supported! Sep. 2013)

1.5.2. Using the I-87024UW/CW as RS-485 Remote I/O Modules

The I-87024UW/CW can be plugged in the I-87K4/5/8/9 or RU-87P4/8 to use it as the RS-485 remote I/O modules. First, run the "DCON Utility" on a PC to configure the I-87028UW/CW (refer to section 1.3.2). In the ISaGRAF "I/O connection" window, connect the I/O complex equipment - "bus7000b" and set up the correct values for "com_port", "com_baud", etc.

As the figure above, users can click on "Slot 9 – bus7000b" and then click "Technical note" icon to see the usage notes for this module.
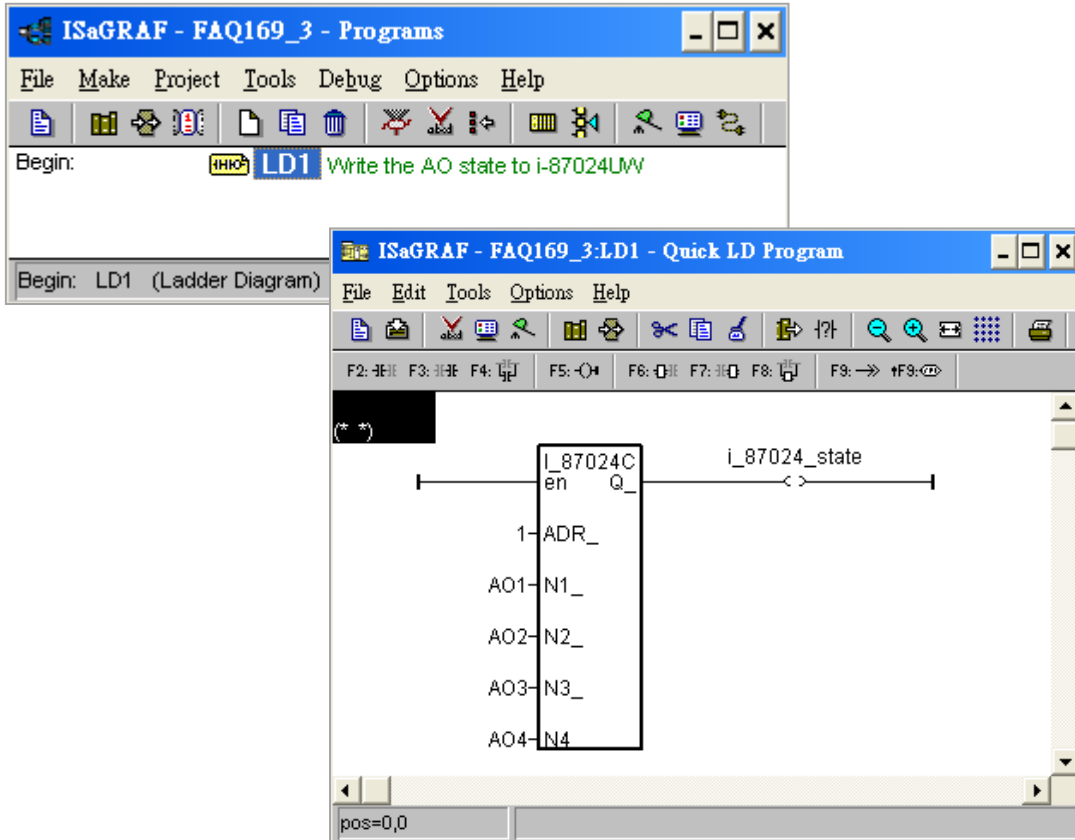

As the figure above, the "com_baud" and "checksum" must equal to the setting of I/O module (refer to section 1.3.2).

Host_watchdog, checksum
0: Disable   1: Enable

Watchdog_timer: (Hex.)
Default: 3 s,   Unit: 0.1 s
For example: $1E_{(16)} = 30_{(10)} = 3$ s

Then, write an ISaGRAF Ladder program as below to use it.

The ISaGRAF settings must be the same with the I/O module (refer to section 1.3.2).

ADR_ : The I-87024UW/CW's address (unique NET-ID) in the remote I/O expansion unit (e.g. I-87K5).

N1 ~ N4: Output values for 4 channels.

Q_: Connection status of the I/O module.