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

Introduction:

The ICP DAS http://www.icpdas.com/en/product/guide+Software+Development__Tools+ISaGRAF#442 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 http://www.icpdas.com/en/product/guide+Remote__I_O__Module__and__Unit+RS-485__I_O__Modules+IO__Expansion__Unit#807 (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/en/product/I-87028UW-G
http://www.icpdas.com/en/product/I-87024CW-G

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

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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 http://www.icpdas.com/en/download/show.php?num=368&nation=US&kind1=&model=&kw=isagraf and then follow the attached document to update it to your ISaGRAF PAC.

Download the ISaGRAF Demo Project:

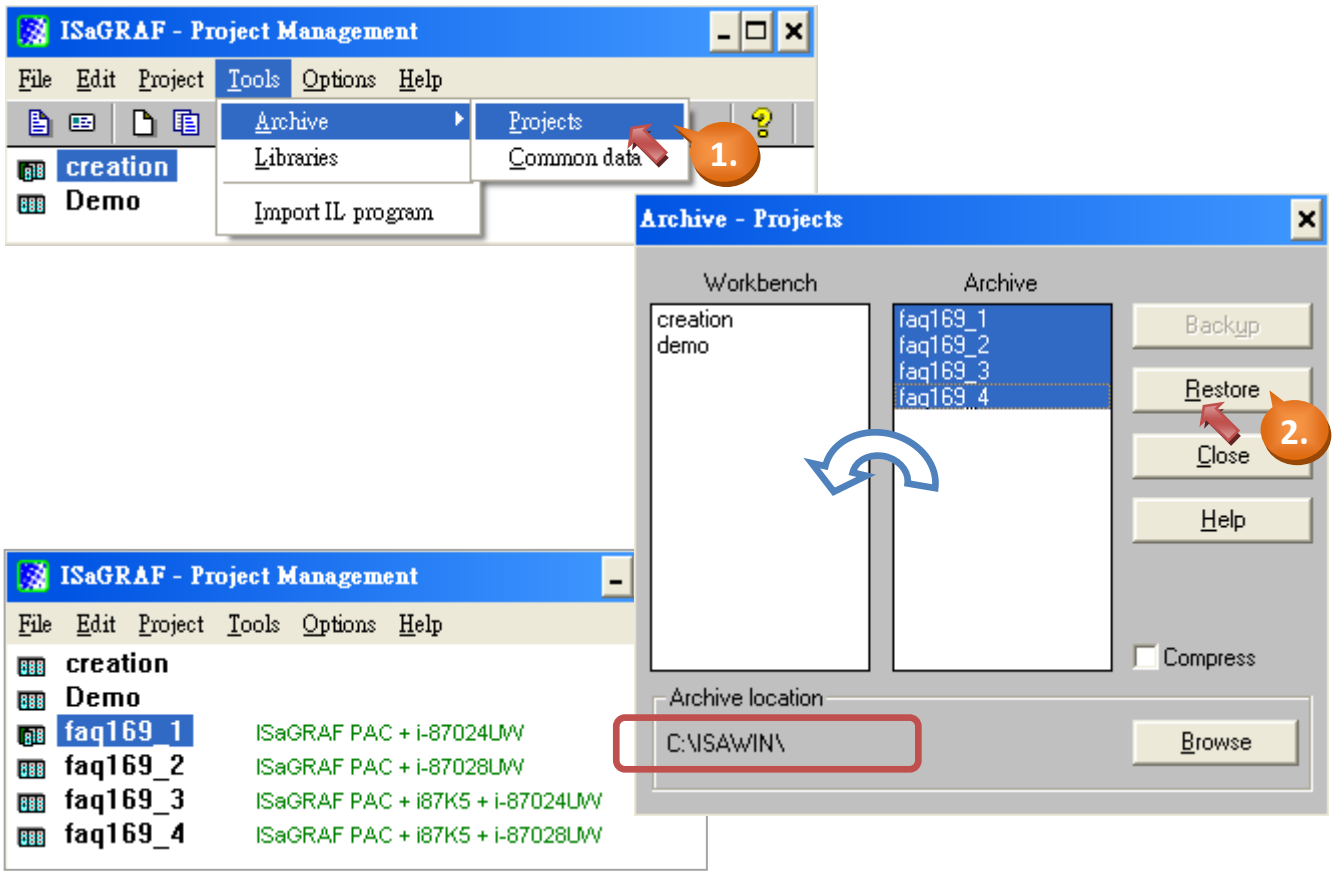
This paper is the ISaGRAF FAQ-169. User can download the document and related files (**Projects:** faq169_1.pia, faq169_2.pia, faq169_3.pia, faq169_4.pia, **C function blocks:** i_87024c.fia, i_87028c.fia, **I/O boards:** i_87024u.bia, i_87028c.bia, i_87028u.bia) from https://www.icpdas.com/en/faq/index.php?kind=280#751 **> 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

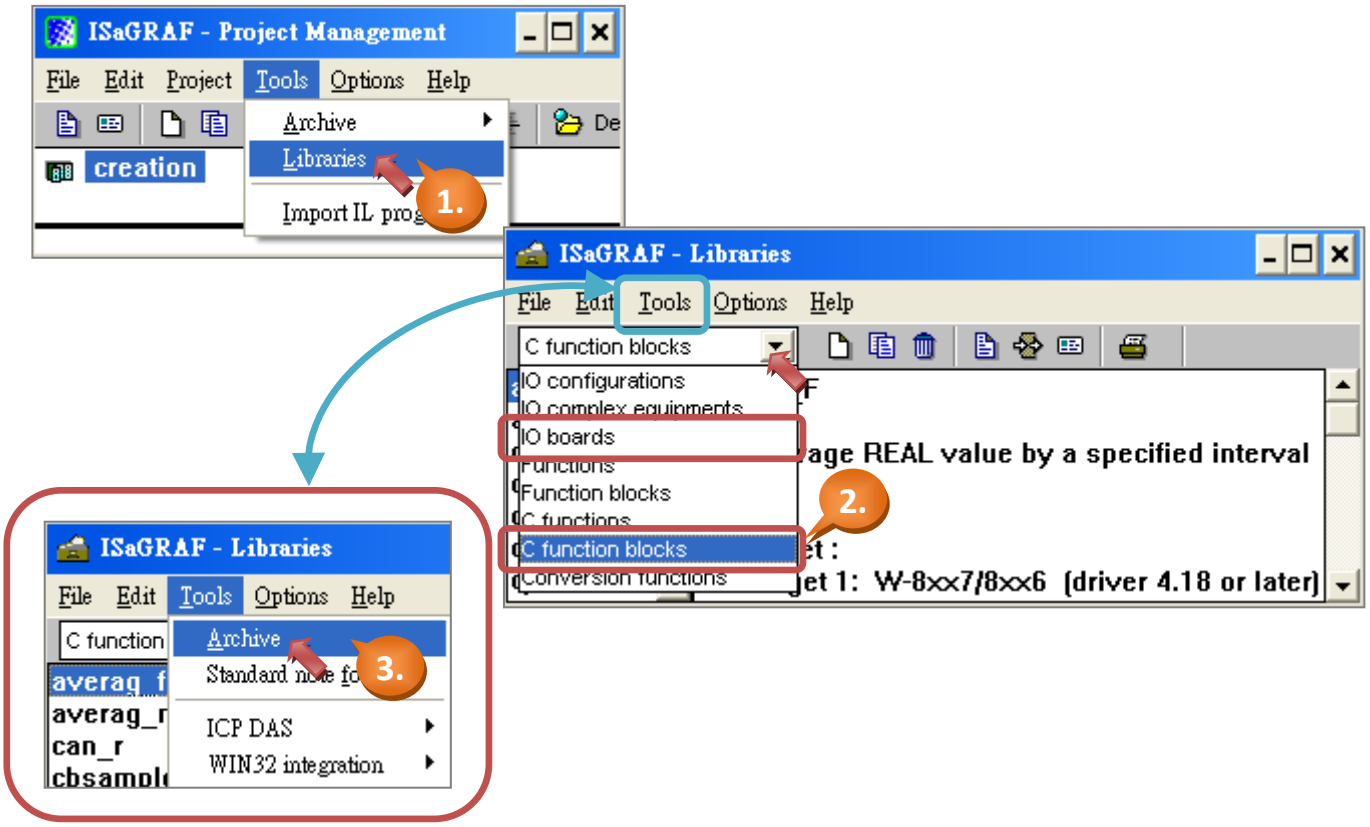


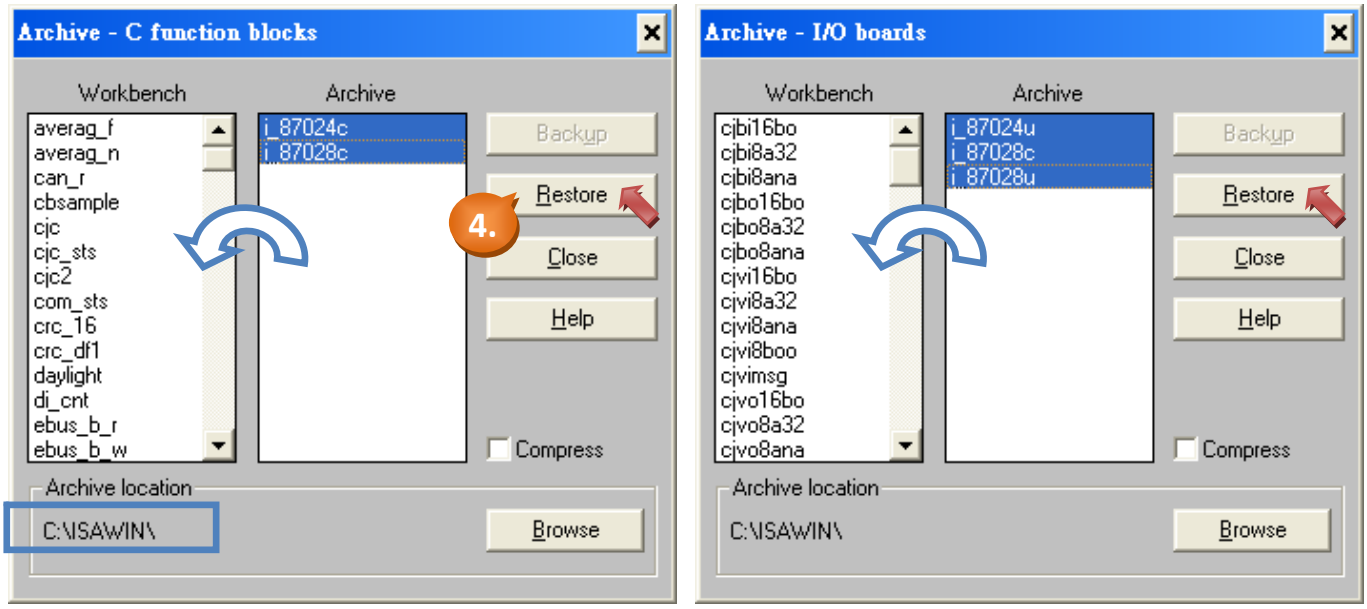
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Restore the ISaGRAF Libraries:

C function blocks: i_87024c.fia, i_87028c.fia,

I/O boards: i_87024u.bia, i_87028c.bia, i_87028u.bia





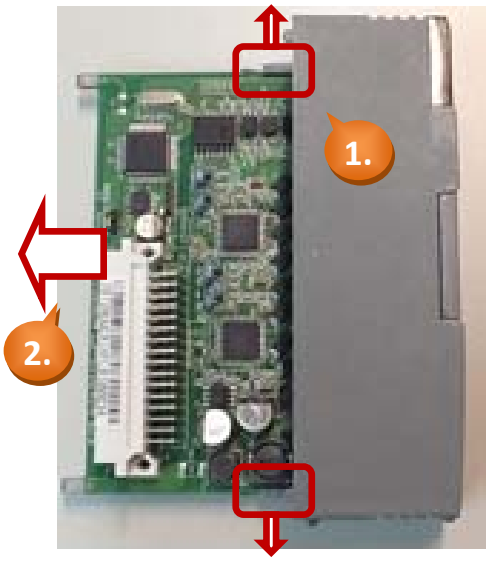
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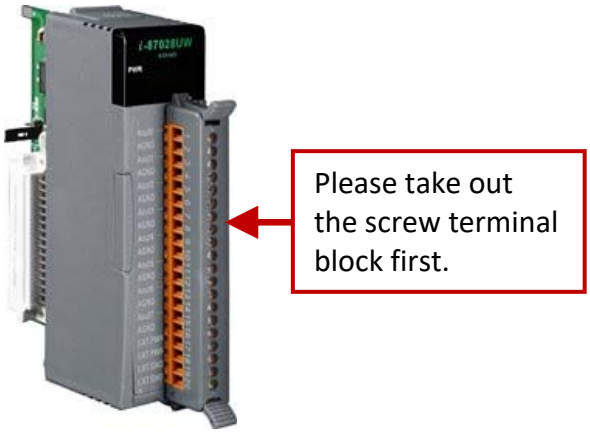
1.3. Using Notes on the I/O Module

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.

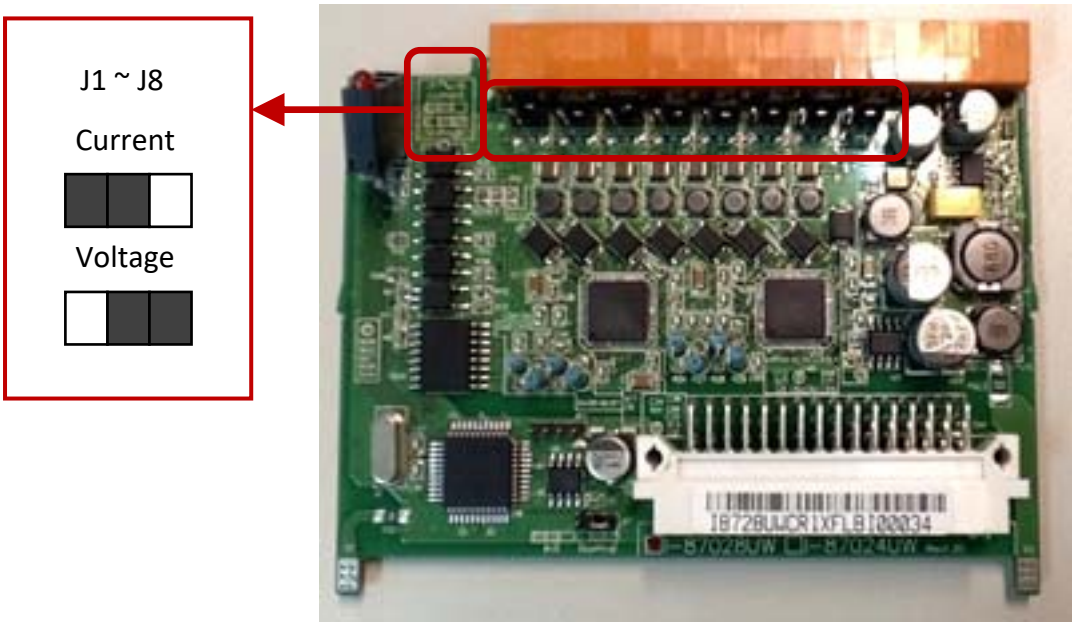
1. Push the tenon on both sides of the module outward slightly and then take out the I/O board.





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).



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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.)

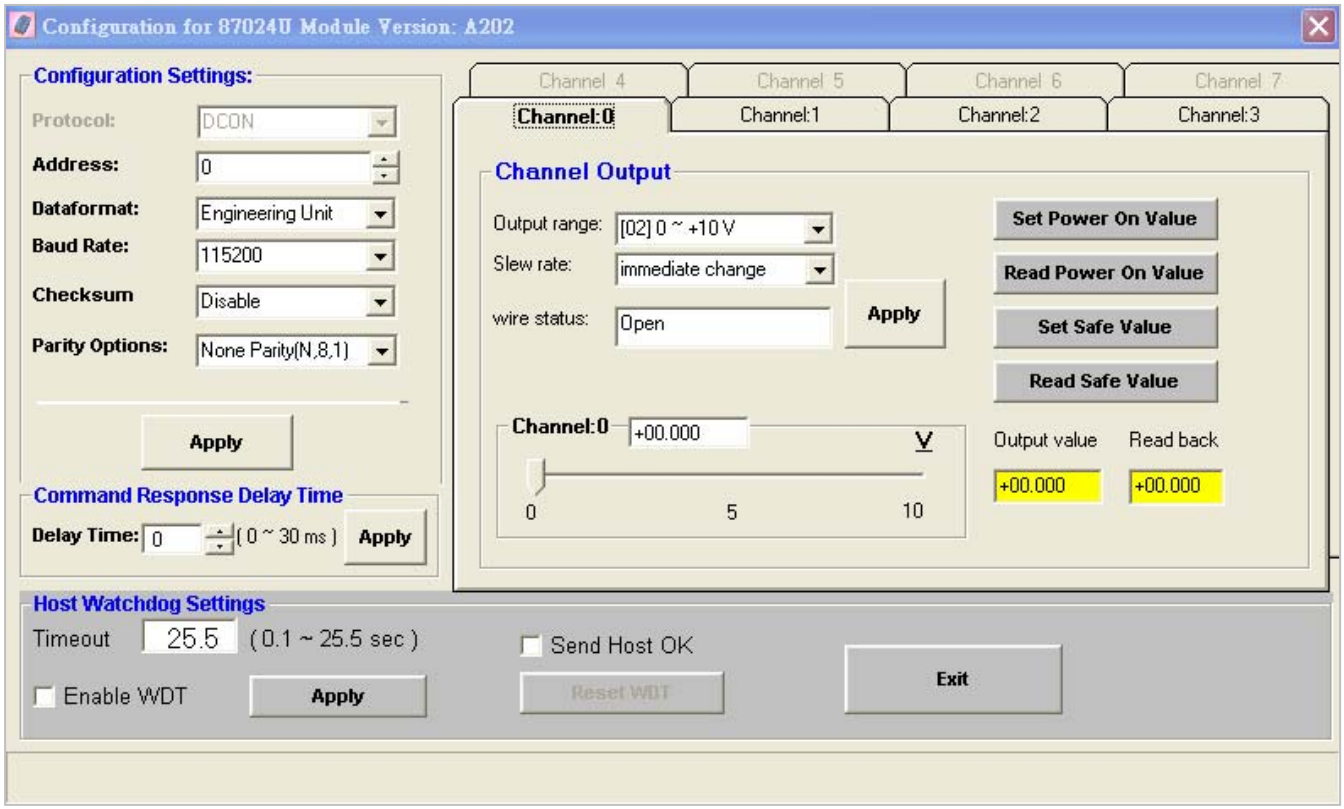
Download the "DCON Utility":
http://www.icpdas.com/en/download/show.php?num=1046&root=&model=&kw=DCON%20Utility
User Manual:
http://www.icpdas.com/en/download/show.php?num=1041&root=&model=&kw=DCON%20Utility

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).

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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.

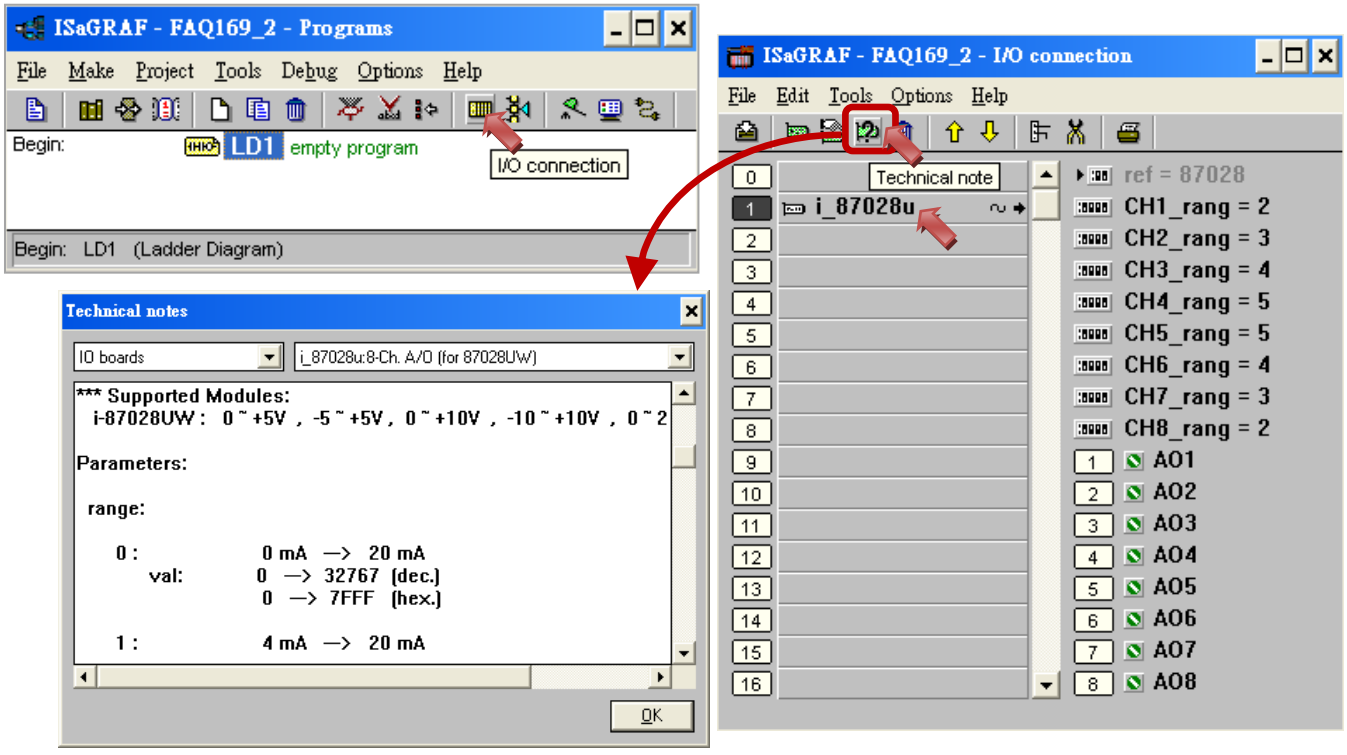
The I-87028**C**W is an 8-channel **current output module** that features channel-to-channel isolation. It also provides a programmable output range on all analog outputs (+4 ~ +20 mA or 0 ~ +20 mA), and each analog output can be configured for an individual range, and also has qualification for 4 KV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

Please visit to the websites for more information,
http://www.icpdas.com/en/product/I-87028UW-G

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).



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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:

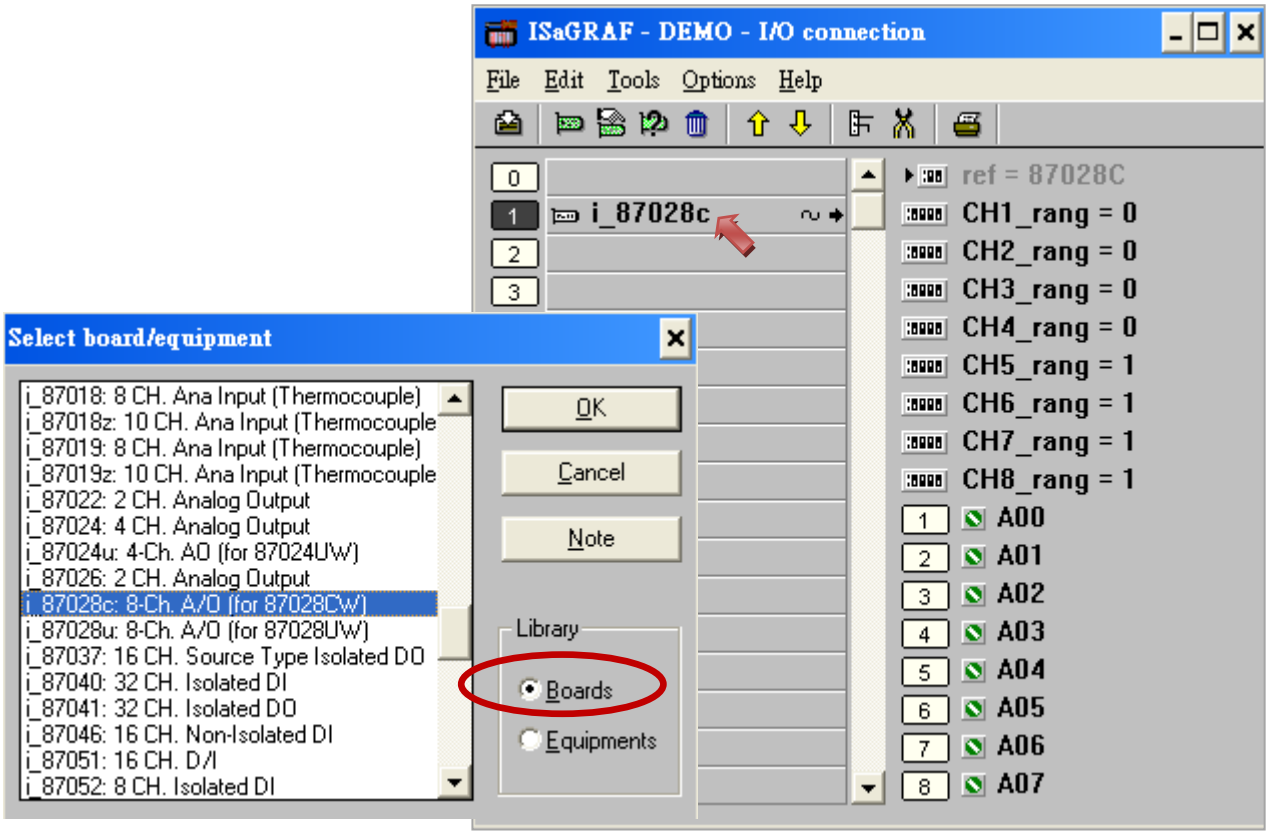
I-87028CW: (Current output) 0, 1 selectable

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

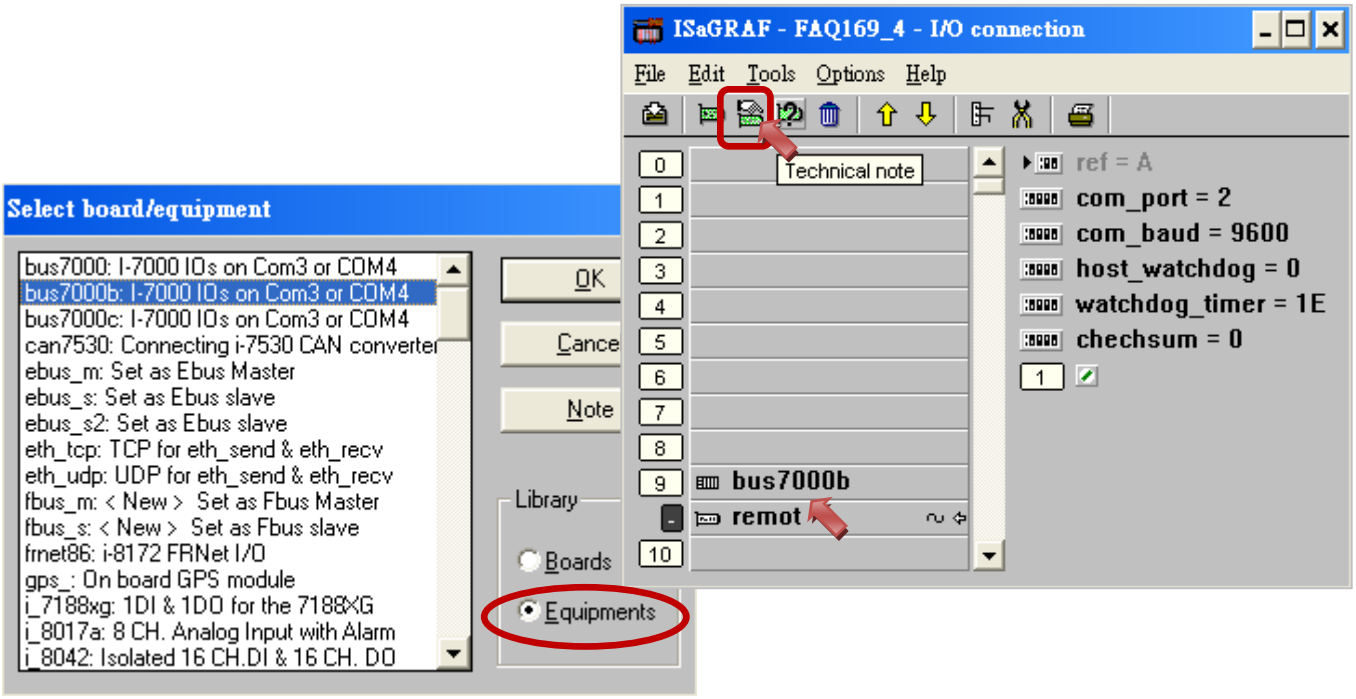
The operation steps for the I-87028CW and I-87028UW are similar, you can try it.



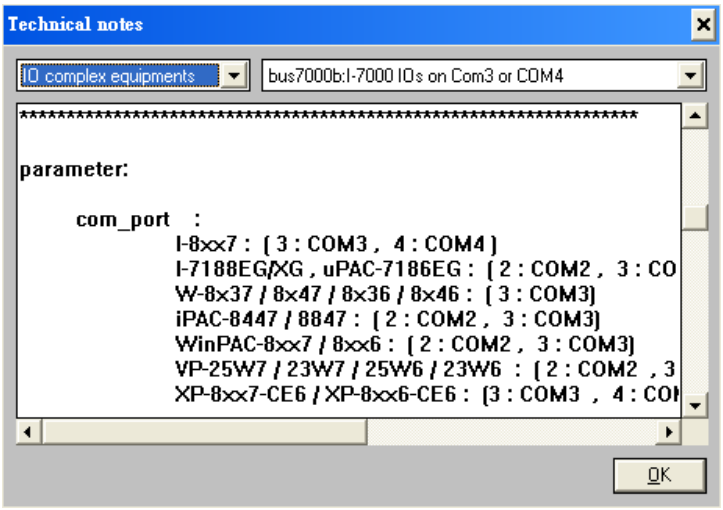
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1.4.2. Using the I-87028UW/CW as RS-485 Remote I/O Modules

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).

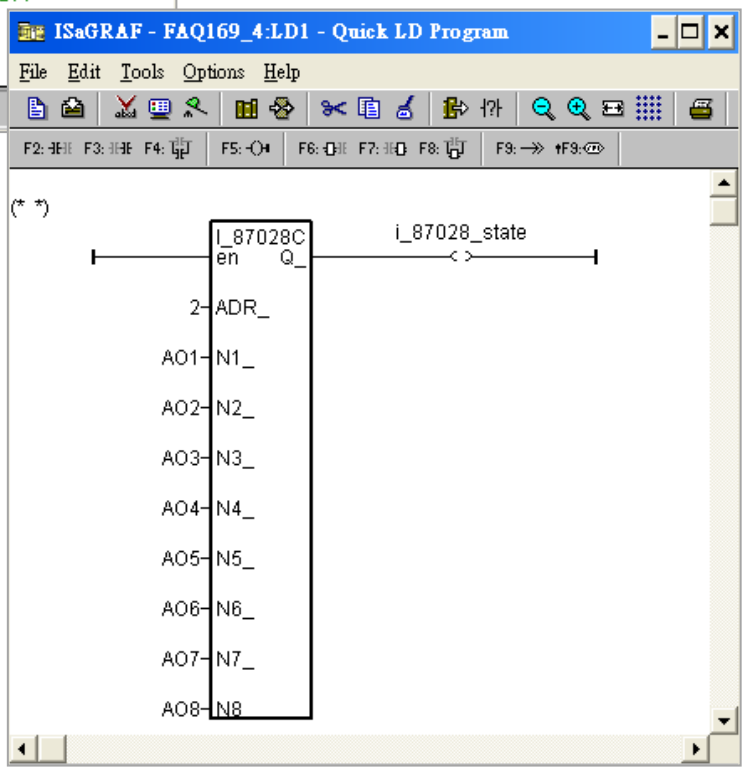
Host_watchdog, checksum
0: Disable 1: Enable

Watchdog_timer: (Hex.)
Default: 3 s, Unit: 0.1 s
For example: 1E(16) = 30(10) = 3 s

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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.

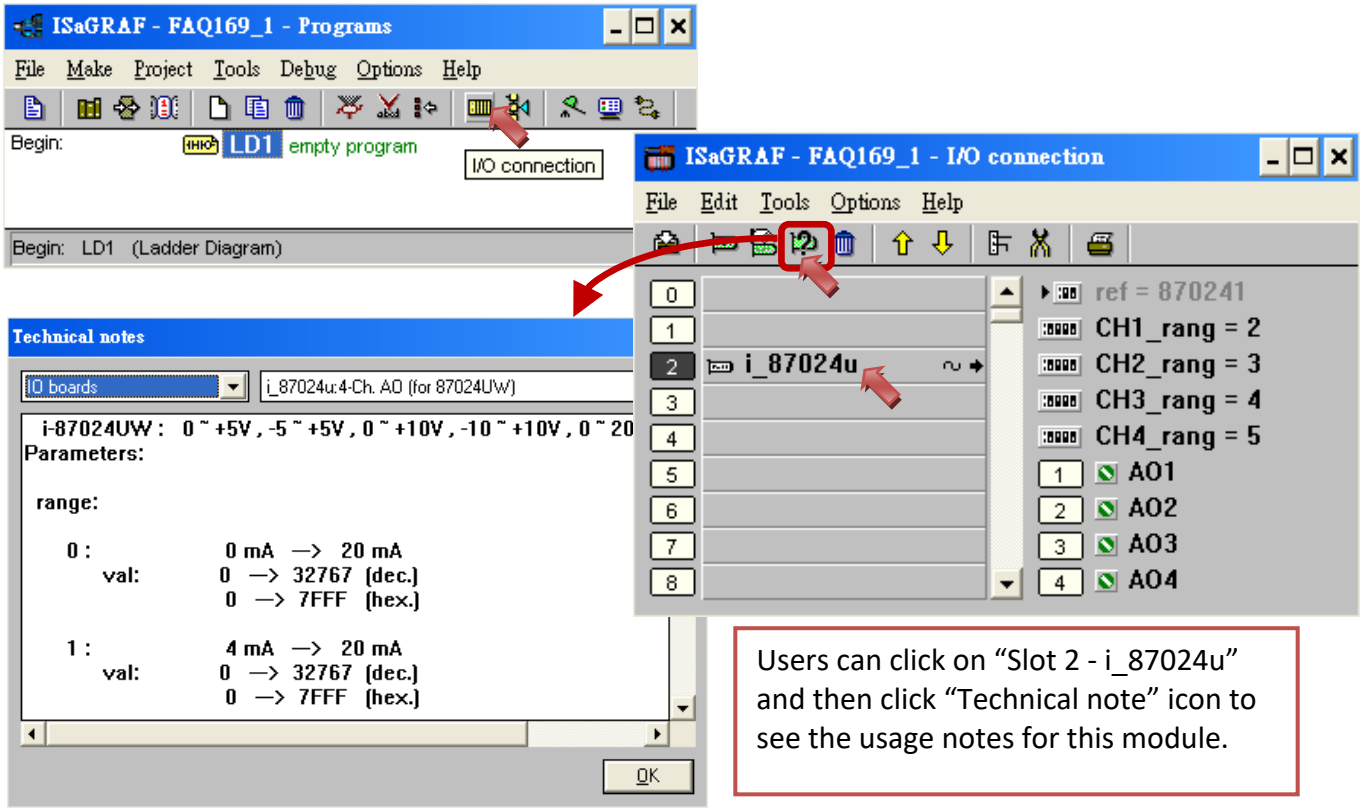
Please visit to the websites for more information,
http://www.icpdas.com/en/product/I-87024CW-G

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

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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

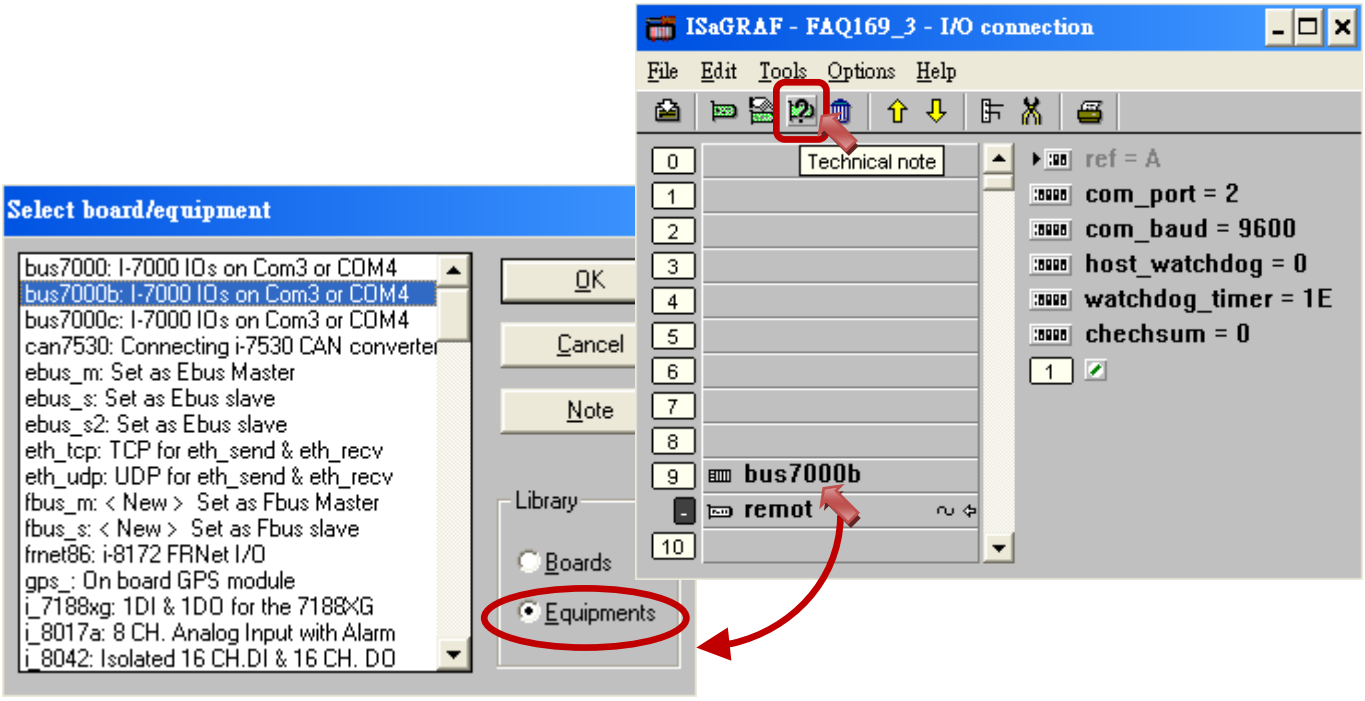
ISaGRAF Settings	Output Range		
	Type	Decimal	Hex.
0	0 ~ +20 mA	0 ~ 32767	0 ~ 7FFF
1	+4 ~ +20 mA	0 ~ 32767	0 ~ 7FFF
2	0 ~ 10 V	0 ~ 32767	0 ~ 7FFF
3	-10 ~ +10 V	-32768 ~ 32767	8000 ~ 7FFF
4	0 ~ 5 V	0 ~ 32767	0 ~ 7FFF
5	-5 ~ +5 V	-32768 ~ 32767	8000 ~ 7FFF

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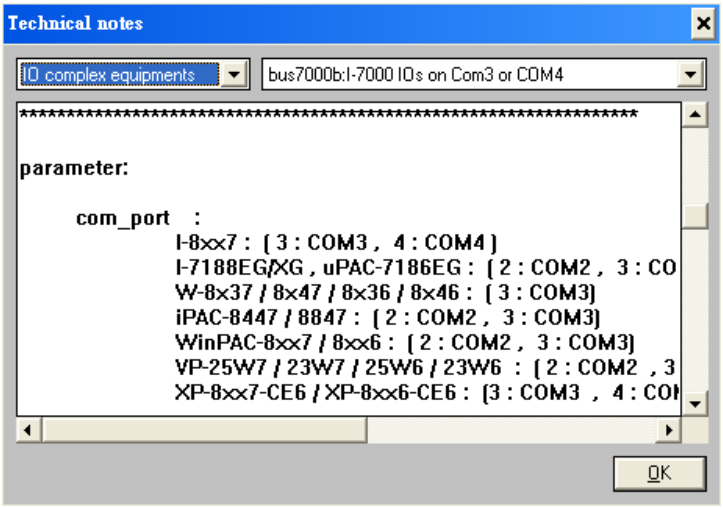
The operation steps for the I-87024CW and I-87024UW are similar, please refer to the I-87028CW (P7). (The I-87024CW is not yet supported! Sep. 2013)

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.



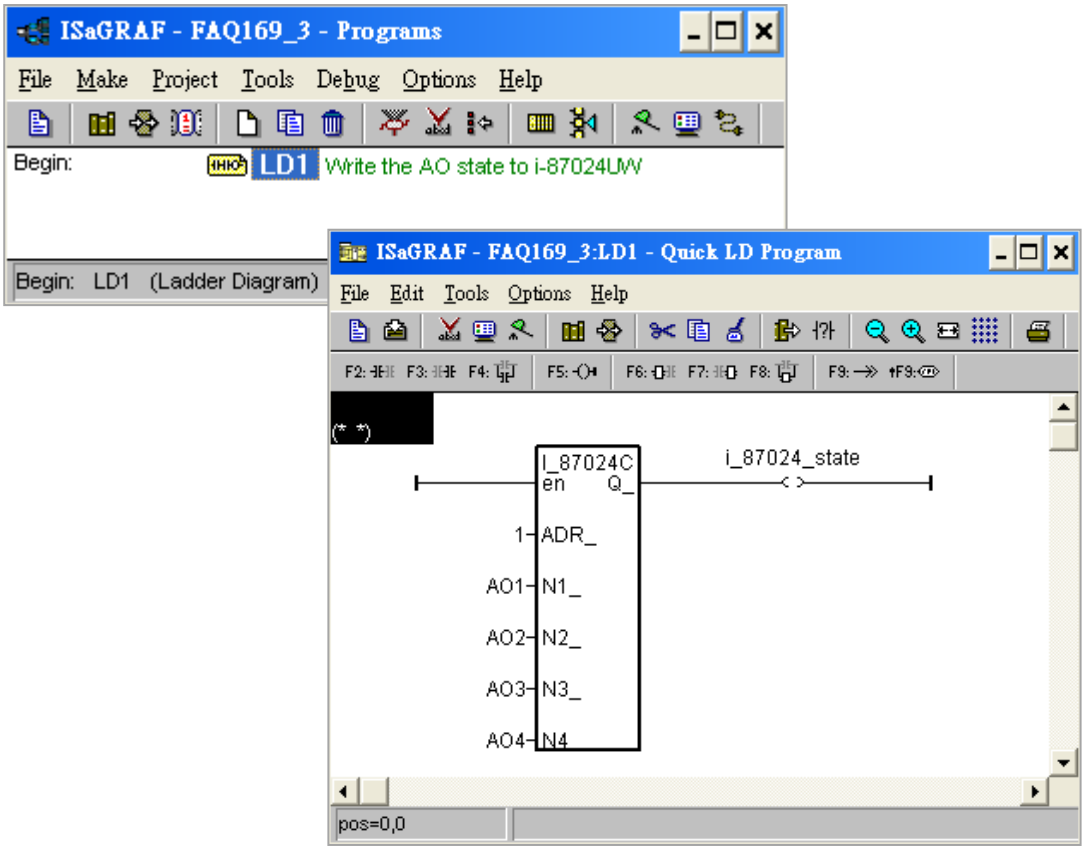
As the figure above, the "com_baud" and "checksum" must equal to the setting of I/O module (refer to section 1.3.2).

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

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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.

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