Classification ISaGRAF English FAQ-169									
Author	Janice Hong	Version	1.0	Date	Sep. 2013	Page	1 / 12		
How to use the I-87028UW/CW, I-87024UW/CW modules on ISaGRAF PAC?									
Introduction: The ICP DAS <u>ISa</u> current output <u>expansion unit</u> (	<u>GRAF PACs</u> has a modules. Users e.g. I-87K4/5/8/9	added sup can plug or RU-87	port for the I- it in the PAC P4/8) as the RS	87028U\ as the l -485 rem	N/CW and I-8 ocal I/O or p note I/O modu	37024 UW/0 blug it in th ules.	CW voltage of ne <u>remote I/C</u>		
<ul> <li>I-87028UW 8-channel 1</li> <li>I-87028CW 8-channel 1</li> <li>I-87024UW 4-channel 1</li> <li>I-87024CW 4-channel 1</li> </ul>	6-bit Isolated Sou 2-bit Channel-to- 6-bit Isolated Sou 2-bit Channel-to-	Irce Type \ Channel Is Irce Type \ Channel Is	Voltage or Curr solated Current Voltage or Curr solated Current	rent Outp t Output rent Outp t Output	out Module Module out Module Module				
Please visit to t	he websites for r odas.com/root/p	nore infor roduct/sol	mation, lutions/remote	io/rs-48	<u>85/i-8k_i-87k/</u>	/ <u>i-87028uw.</u>	<u>html</u>		

# 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	2							
WP-5147/5146	Ver. 1.10 or later	μPAC-7186EG	Ver. 1.22 or later					

Notice:

The WP-5147 and  $\mu$ PAC-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).

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### Download the ISaGRAF Driver:

If your driver version is the earlier one, you may download the new ISaGRAF Driver from the website <u>www.icpdas.com > Soft PLC ISaGRAF... > Driver</u> 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

🔯 ISaGRAF - Pr	oject Management	- 🗆 ×	
<u>File E</u> dit <u>P</u> roject	<u>T</u> ools <u>O</u> ptions <u>H</u> elp		
	<u>A</u> rchive •	Projects	
ereation	<u>L</u> ibraries	Common data	
m Demo	Import IL program	Archive - Projects	×
SaGRAF - Pr	oject Management	Workbench Archive Creation demo faq169_1 faq169_2 faq169_3 faq169_4 Creation faq169_1 faq169_2 faq169_3 faq169_4	Backup Restore Close Lelp
File     Edit     Project       Im     creation       Im     Demo       Im     faq169_1	<u>Tools</u> <u>Options</u> <u>H</u> elp ISaGRAF PAC + i-87024	4UW Archive location	Compress
<pre>faq169_2 faq169_3 faq169_4</pre>	ISaGRAF PAC + i-87028l ISaGRAF PAC + i87K5 + ISaGRAF PAC + i87K5 +	3UW + i-87024UW + i-87028UW	Browse
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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.

<u>Notice:</u> 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": <u>http://ftp.icpdas.com/pub/cd/8000cd/napdos/driver/dcon\_utility/</u> User Manual: <u>http://ftp.icpdas.com/pub/cd/8000cd/napdos/driver/dcon\_utility/manual/</u>

Please follow the instructions as below:

- 1. Set "Address" to a unique No. (e.g.  $1 \sim 255$ )
- 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.

Configuration	for 870240 Module Versio	n: A202	×
Configuration S	ettings:	Channel 4 Channel 5	Channel 6 Channel 7
Protocol:	DCON	Channel:0 Channel:1 Ch	iannel:2 Channel:3
Address:	0 .	Channel Output	
Dataformat:	Engineering Unit 🔍	Output range: [[]2] [] ~ +1] V	Set Power On Value
Baud Rate:	115200 💌	Slew rate: immediate change	Read Power On Value
Checksum	Disable 🗨	wire status: Open Apply	Cont Code Malue
Parity Options:	None Parity(N,8,1) 💌		Set Sate Value
	_		Read Safe Value
	Apply	Channel:0 +00.000	Output value Read back
Command Resp	oonse Delay Time		+00.000 +00.000
Delay Time: 0	+(0~30 ms) Apply	0 5 10	
,			
Host Watchdog	Settings		
nineout   2	0.0 (0.1 20.0 sec)	Send Host UK	
Enable WDT	Apply	Reset WDT	
Note: The "	Wire Status" field o	each channel:	
Open	(it means open wir	e) ; Close (it means close wire: Normal).	
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## 1.4. I-87028UW/CW User Guide

The I-87028UW 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 ( $0 \sim 5 V$ ,  $-5 \sim +5 V$ ,  $0 \sim 10 V$ ,  $-10 \sim +10 V$ ,  $+4 \sim +20 mA$  or  $0 \sim +20 mA$ ), 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-87028CW 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  $\sim$  +20 mA or 0  $\sim$  +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

<u>Notice:</u> 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 :  $0 \sim 10 \text{ V}$ ) and the corresponding I/O tag (e.g. AO1).

ISaGRAF - FAQ169_2 - Programs         File       Make       Project       Iools       Debug       Options       Help         Image: Apple and the second	ISaGRAF - FAQ169_2 - I/O connection         File Edit Tools Options Help         Image: Provide the state of the sta
Begin: LD1 (Ladder Diagram)	3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 5 5 5 5 5 5 5 5 5 5 5 5 5
ID boards I i.87028u:8-Ch. A/D (for 87028UW)	5         :soon         CH5_rang = 5           6         :soon         CH6_rang = 4
*** Supported Modules: i-87028UW: 0 ~ +5V , -5 ~ +5V , 0 ~ +10V , -10 ~ +10V , 0 ~ 2	7         ::::::::::::::::::::::::::::::::::::
Parameters:	9 1 0 A01 2 0 A02 11 3 A03
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	12       4       A04         13       5       A05         14       6       A06         15       7       A07
	8 <b>S</b> AO8
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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 <u>hardware setup</u>.

ISaGRAF	Output Range							
Settings	Туре	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-48	5 Rem	ote I/O I	<b>Modules</b>		as the RS-18	s remote I/O	
modules. First, ru In the ISaGRAF "I, the correct value	nodules. First, run the "DCON Utility" on a PC to configure the I-87028UW/CW (refer to section <u>1.3.2</u> ). n 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.								
				👬 ISaGRI	AF - FAQ1	69_4 - I/O conne	ction	- 🗆 ×	
				File Edit	Iools Opti	ons <u>H</u> elp 仓 -  日  -  -  -  -  -  -  -  -  -  -  -  -  -	<b>=</b>		
Select board/equips	ment on Com3 or COM4		<u>0</u> K	0 1 2 3	Technic			= 2 1 = 9600 :hdog = 0	
bus/000b: 1-7000 to bus7000c: 1-7000 to can7530: Connecting ebus_m: Set as Ebus ebus_s: Set as Ebus ebus_s2: Set as Ebus eth_tcp: TCP for eth eth_udp: UDP for eth fbus_m: < New > Set fbus_s: < New > Set	s on Com3 or CUM4 s on Com3 or COM4 g i-7530 CAN convert s slave s slave _send & eth_recv h_send & eth_recv t as Fbus Master t as Fbus slave	er Libr	<u>C</u> ance <u>Note</u>	4 5 6 7 8 9 m b 5 7 8 9 m b	us7000b emot 🍝		‱ watchdog ‱ chechsum 1. ℤ	_timer = 1E n = 0	
gps_: On board GPS i_7188xg: 1DI & 1DO i_8017a: 8 CH. Analo i_8042: Isolated 16 C	module for the 7188×G og Input with Alarm CH.DI & 16 CH. DO		<u>B</u> oards Equipmer						
As the figure abo the usage notes f	ve, users can cli or this module.	ck on "Slo	ot 9 – b	us7000bʻ	' and the	en click "Techı	nical note" ic	on to see	
Technical notes	bus7000b:1-7000 10	s on Com3 or CO	M4	× ×	As the "cheo I/O m	e figure above cksum" must e nodule (refer t	e, the "com_l equal to the s o section <u>1.3</u>	baud" and setting of 3.2).	
com_port :  -8x  -71 	x7: [3:COM3, 4: 88EG/XG, uPAC-718 x37/8x47/8x36/0	: COM4 ) 6EG : (2 : C 3x46 : (3 : C	COM2, 3 COM3)	3 : CO	Host_ 0: Dis	_watchdog, ch sable 1: Enat	ecksum ble		
Win VP- XP-	C-8447 / 8847 : [ 2 : IPAC-8xx7 / 8xx6 : [ 25W7 / 23W7 / 25W 8xx7-CE6 / XP-8xx6-	COM2, 3:C 2:COM2, 3 6/23W6 : ( CE6: (3:CC	20M3j 3 : COM3 2 : COM DM3 , 4	3)  2 , 3   : COł ↓	Watc Defau For e	hdog_timer: ( ult: 3 s, Unit xample: 1E(16)	Hex.) : 0.1 s = 30(10) = 3 s		
			L	<u>0</u> K					
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Then, wri	Then, write an ISaGRAF Ladder program as below to use it.									
📲 ISaG		×								
<u>File M</u> al	ke <u>P</u> roject	t <u>T</u> ools De <u>b</u> ug <u>O</u>	ptions <u>H</u> elp	-						
Begin:	l 🏖 🛄		🎎 🍫 🔲	<b>₽</b> <u></u>	S 🛄 🕏	¢				
Degin.	t	HOULD I WITTE THE .	AU state to I-	870280	UW ISaGRAF - FAQ169_4:LD1 - Quick LD Program					
					<u>F</u> ile <u>E</u> dit	<u>I</u> ools <u>O</u> ption	ns <u>H</u> elp			
Begin: LC	01 (Ladde	er Diagram)			🖹 🖄 🔮	🖌 🛄 🛠 📗	11 🗞	* 🗈 👌	🚯 निः 🤤 🔇	2, 🖽 🏢 🧉
					F2: HHE F3: HH	l€ F4: 1 F	5:-0• F	6: OH F7: HO	F8: T <mark>0</mark> J F9: →> +F9	
The ISaGRAF settings must be the same with the I/O module (refer to section <u>1.3.2</u> ).				:h	(* *) F	I er 2- Al	87028C 1 Q_ DR_	<u></u>	37028_state	
ADR_:	The I-8	7028UW/CW's a	ddress			A01-N	1_			
_	(unique	e NET-ID) in the	remote I/	0		A02-N	2_			
	expans	ion unit (e.g. I-8 <sup>-</sup>	7K5).			A03- N	3_			
N1 ~ N8:	Output	values for 8 cha	nnels.			A04- N	4_			
Q_:	Connec	tion status of th	e I/O moo	dule.		A05- N	5_			
						A06- N	6_			
						A07- N	7_			
						A08- N	8			
					•			-		<u> </u>

# 1.5. I-87024UW/CW User Guide

The I-87024UW 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 ( $0 \sim 5 V$ ,  $-5 \sim +5 V$ ,  $0 \sim 10 V$ ,  $-10 \sim +10 V$ ,  $+4 \sim +20 mA$  or  $0 \sim +20 mA$ ), 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-87024CW 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  $\sim$  +20 mA or 0  $\sim$  +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

<u>Notice</u>: 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).



### 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	Output Range						
Settings	Туре	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 <u>1.3.2</u>). 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.

Technical notes     Image: Complex equipments     Image: Comp	As the figure above, the "com_baud" and "checksum" must equal to the setting of I/O module (refer to section <u>1.3.2</u> ).							
com_port : I-8xx7: (3:COM3, 4:COM4) I-7188EG/XG, uPAC-7186EG: (2:COM2, 3:CO W-8x37 / 8x47 / 8x36 / 8x46: (3:COM3) iPAC-8447 / 8847: (2:COM2, 3:COM3) WinPAC-8xx7 / 8xx6: (2:COM2, 3:COM3) VP-25W7 / 23W7 / 25W6 / 23W6 : (2:COM2, 3 XP-8xx7-CE6 / XP-8xx6-CE6: (3:COM3, 4:CO) ↓	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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Author	Janice Hong	Version	1.0	Date	Sep. 2013	Page	12 / 12	
Author       Janice Hong       Version       1.0       Date       Sep. 2013       Page       12 / 12         Then, write an ISaGRAF Ladder program as below to use it.         Image: ISaGRAF - FAQ169_3 - Program         File       Make       Project       Iools       Debug       Options       Help         Begin:       Image: Iool       Diate       Image: Iool       Image: Iool								
The ISaGRAF set	tings must be th	e same wi	th the I/O mod	ule (refe	r to section <u>1.</u>	<u>3.2</u> ).		
<ul> <li>ADR_: The I-87024UW/CW's address (unique NET-ID) in the remote I/O expansion unit (e.g. I-87K5).</li> <li>N1 ~ N4: Output values for 4 channels.</li> <li>Q_: Connection status of the I/O module.</li> </ul>								