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# How to program an XP-8xx7-CE6 redundant system (with I-87K8 expansion base or Modbus I/O or other I/O) ?

Advantage more than the WP-8xx7 redundant system:

1. The PC / HMI / SCADA can connect to only one IP address (the "active\_IP1" address) to monitor / control the XP-8xx7-CE6 redundant system (The "Active\_IP1" address will auto-switch to the active XP-8xx7-CE6 's LAN1 or LAN2 port).

2. The running speed of program in the XP-8xx7-CE6 is faster than the WP-8xx7. The windows behavior is much smooth than the WP-8xx7.

User can download this paper and demo programs at the following web site.

FAQ document and emo programs: https://www.icpdas.com/en/faq/index.php?kind=280#751 > FAQ-138 .

Data Sheet:

http://www.icpdas.com/en/download/index.php?nation=US&kind1=6&kind2=15&model=&kw=isagraf

## 1.1 : Configuration of serval redundant systems

The first configuration is using two XP-8xx7-CE6 PAC to connect one or more I-87K8 expansion base (each I-87K8 base can have max. eight I-87xxxW I/O cards in it). One or more stations can join together as the following figure. Each station contains one or two NS-208 (or RSM-208) and two XP-8xx7-CE6 controllers and one or more I-87K8 base with I-87xxxW I/O cards.









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1.2 : Configure b	1.2 : Configure both PACs and all I-87xxxW I/O cards in the I-87K8 expansion base									
Note: The ISaGRAF driver version of the XP-8xx7-CE6 redundant system should be version 1.14 or later version. If your XP-8xx7-CE6 's ISaGRAF driver version is older, it's better to update it. (visit http://www.icpdas.com/en/download/show.php?num=368&nation=US&kind1=&model=&kw=isagraf for new driver)										
Important note : Please must do the settings of the following item 1 to 3 to make the XP-8xx7-CE6 redundant system work properly. If user don't do the below settings (especially item 1 and 2), the XP-8xx7-CE6 redundant system may happen some errors like "IP conflict" and "communication broken".										
1. Set the Hardware IP address of both XP-8xx7-CE6 (at rotary switch position 0) as different address than the IP address assigned in the "RDN_New2" in the IO connection window. For example, only set the first number as different one and remain the other three numbers as the same and set all Mask as 255.255.255.0										
For example, if the "RDN_new2" setting in the IO connection windows are as the following, Redundant IP: (Rotary switch at 7: Main and 9: Backup) Active_IP1 = <b>192</b> .168.2.100 Active_IP2 = <b>192</b> .168.2.101 InActive_IP1 = <b>192</b> .168.2.102 InActive_IP2 = <b>192</b> .168.2.103.										
Then we can set Hardware M M Ba Ba Ba	Then we can set the hardware IP address (at Rotary switch 0) as the below. Hardware IP: (both PAC at rotary switch 0) Main PAC 's LAN1 = <b>200</b> .168.2.100 Main PAC 's LAN2 = <b>200</b> .168.2.101 Backup PAC 's LAN1 = <b>200</b> .168.2.102 Backup PAC 's LAN2 = <b>200</b> .168.2.103									
Refer to the next	Refer to the next page for an example.									
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For example, the	e setting in the ISaGRAF - FAQ ile Edit Iools Q Edit Io	"faq138_1. 138_1 - I/O с Dptions Help 1 1 ↓	pia" proje	ct is as the for f = 15BFA ctive_IP1 = 1 ctive_IP2 = 1 hActive_IP2 = 1 hActive_IP2 = temote_IO_ty CDN_BREAK_ eserved = 0 eserved = 0 is_Active	ollowing figure 92.168.2.100 92.168.2.101 = 192.168.2.10 = 192.168.2.10 /pe = 3 _TIME = 250		
Then turn the ro Hardware IP( m Hardwar N B run [Start] > [Se run "Network an Then set "IP ado	otary switch of eans the IP add re IP: (rotary sw Main PAC 's LAN ackup PAC 's LA tting] > [Contro nd Dial-up Cont dress" and "Sub	both XP-8xx Iress at rota vitch at 0) I1 = <b>200</b> .168 AN1 = <b>200</b> .1 DI Panel] on nections" onet Mask" o	7-CE6 to ( ry switch ( 3.2.100 , 68.2.102, the XP-8x; of both "L	) and then po )) as below ( Main F Backup k7-CE6 's VG/ AN1" and "L/	ower on them. set all Mask as PAC 's LAN2 = 2 p PAC 's LAN2 A monitor AN2" .	After boot 255.255 200.168.2.1 = 200.168	ing up, set th 5.255.0) 01 5.2.103
PCI- FETCE5B1	PCI- FETCE5B2	PCINFETC IP Addres An IP addres automati compute does not IP addres administr and then provided	ESB1' Set ESB1' Set Name Se Name Se cally assigne r. If your n automatica ses, ask you ator for an type it in t	ettings ervers ed to this etwork ur network address he space	) Obtain an IP a ) Specify an IP P Address: Subnet Mask: Default Gateway:	address via Di address 200.168 255.255	HCP
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2. After setting th version) to check	ne proper hardw the " <b>Manual Sa</b>	are IP add ve To Fla	dress, run the <b>sh</b> " . Then rur	XPAC Uti "File > S	ility (should be ave and Reboo	version 1.0.2 t".	.5 or later
Note :DO NOT ch	eck the "Auto Sa 1 Utility [1.0.2.5]	ave To Fla	sh" for the XF	-8xx7-CE	6 redundant sy	vstem.	
File	Help						
: Save Save <u>R</u> ebo Rest	e and Reboot oot ore Utility Default S	ettings	ork Device Infi	ormation	Auto Execution	Rotary Executi	on   Ml_
		Arri	inii i		This tool will h use XPAC CE s Task Bar settin	elp you easy to eries. Ig:	
				Auto Hide			
	Industrial C	C WIN	CE Series		HIVE Registry: Auto S Mauna	ave To Flash (I I Save To Flasł	Default)
	Configure the sync	hronizatior	n with a time se	rver	Configure	]	
After answer "Ok	<" to the pop-up	dialog, th	e XP-8xx7-CE	6 will res	et once automa	atically.	
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When the XP-8xx7-CE6 booting up completely, set both XP-8xx7-CE6 's COM2 as "Modbus RTU slave Port". Then click ok and reset the XP-8xx7-CE6 once to make the setting happen. This COM2 setting is for downloading the ISaGRAF project.

	XP-8xx7-CE6 ISaGRAF Driver	OK
isaXPce6	Setting Web About Configueston Slove Norber : 1 Modbus RTU Slave Port COM2 Baud Rate 19200 , N, 6, 1 ModFy Project Current Application wp_yb03, ISA11=1956, ISA12=376 Elapsed Time 0:0:32:15 End Driver	
Configuration Configuration S Slave	Setting	
Baud Rate	COM2 , 19200 19200 V N, 8, 1 Cancel	

Note: The PC / ISaGRAF can download the ISaGRAF project to the XP-8xx7-CE6 redundant system only when they are booting up at rotary swtich 0. The position 7 and 9 are for running the redundant system (not for downloading project).

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E	ISaGRAF - FAQ1 File Make Project [ Begin: (10) PC-PLC link parame	88_1 - Prog [ools Debug GO 7K87 RDN_dat GO1 ters	rams <u>Options</u> <u>H</u> elp <del> <sup>™</sup> <u>L</u>ink RU-87P8 a</del>	¥1   & 9	Link setup		
	Target Slave Number Communication port: Control Time out (seco	X					
		Bau Parit Form Flow	drate: 1920 y: none nat: 8 bits y control: none	90 9 8, 1 stop 9		<u>OK</u> Cancel	

3. If the redundant system has the I-87K8 (with I-87xxx cards) expansion unit installed, like the configuration 1 and 3 listed in section 1.1 of this paper, please must run PC / DCON utility to configure all the I-87xxx cards in the I-87K8 once (includes the settings of Address, baud-rate, checksum, ...).

For example, the "faq138\_1.pia" project uses two XP-8047-CE6 's COM3:RS-485 to connect one I-87K8 base and there are three I/O cards in the I-87K8. They are I-87053W (16-Ch. D/I) and I-87057W (16-Ch. D/O) and I-87017W (8-Ch. A/I). Please must configure these three I/O cards as the following settings by the DCON utility before running the "faq138\_1.pia" project.

I-87053W : address : 2 , baud-rate : 9600 , checksum disabled I-87057W : address : 3 , baud-rate : 9600 , checksum disabled I-87017W or I-87017RW : address : 4 , baud-rate : 9600 , checksum disabled, format: 2's compliment range-type of Ch.1 to 8 : +/- 10V

Note: All remote RS-485 I-7000 A/I modules and remote I-87xxxW A/I cards connectted by the ISaGRAF PAC must using format "2's compliment", or they will become disconnectted.

All the "baud-rate" and "checksum" setting of all remote I/O modules must use the same setting as the setting in the ISaGRAF PAC 's "bus7000b".

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👬 IS	aGRAF - FAQ138_1 - I/O connection	
<u>F</u> ile	<u>E</u> dit <u>T</u> ools <u>O</u> ptions <u>H</u> elp	
≌	🔤 🗟 🎾 💼 👌 🕂 🕒 🖿 👗 🖴	
0	▶ 100 ref = A	
1	com_port = 3	
2	::::::::::::::::::::::::::::::::::::::	
3	host_watchdog = 0	
4	watchdog_timer = 32	
5	chechsum = 0	
6		
7		
8	m rdn new2	
-	— m RDN ip л.+	
-	™ M_or_B ∾ ♦	
9	m bus7000b	
-	⊨ remot ~ ↔	
10	<b></b>	
10	remot ∿ ↔	

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### 1.3 : Program the redundant system

This section lists the example project "faq138\_1.pia". User may download this project file from https://www.icpdas.com/en/faq/index.php?kind=280#751 .Then restore it to the PC/ISaGRAF.



Project structure:

The "faq138\_1" project contains two Ladder programs and one ST program. The "GO\_7K87K" must place on the top-most position followed by the "RDN\_data" program. Then place the "GO1" program after the "RDN\_data".



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Author	Chun Tsai	Version	1.1		Date	May.2011	Page	12 / 33
Variable declarat Boolean : Please m	ion: nust set "RDN_IN	VIT" 's initi	al value	to TRU	E.			
A IG- GD A	E ELO120 1 41	-1-111						
NISaGRA	F - FAQ138_1 - GI	obal boolea	ns					
		′ 🔼 🔼 📧	S 🗈	<b>d</b> 1925	æ			
Baalaana lu			0~ 4 <u>3</u>	• · · ·	<u> </u>			
	ntegers/Reals   Timers	: Messages  Attrib.	FB instand Addr.	es   Defin Comme	ed word it	is		
is_Active Main_ok Backup_ Main_is Backup_ Active_L Active_L	e [ ok [ _active [ is_active [ AN_plug1 [ AN_plug2 [	input] input] input] input] input] input]	0000 0000 0000 0000 0000 0000 0000	Comme	u			
	T	internell	0000	// post ipitis	l valua s			
COMM_( COMM_( COMM_( COMM_( TMP IN_01 IN_02 IN_03 IN_04 IN_05 IN_06 IN_07 IN_06 IN_07 IN_08 IN_09 IN_10 IN_11 IN_12	DK2 DK3 DK4 [ [ [ [ [ [ [ [ [ [ [ [ [ [ [ [ [ [ [	internal] internal] internal] internal] internal] internal] internal] internal] internal] internal] internal] internal] internal] internal] internal] internal]	0000 0000 0000 0000 0000 0000 0000 0000 0000	Boolean Name: Comm Attri © 0 0 0 Dim:	Varial R ent: se butes nternal nput Dutput Const <u>a</u> n	at TTOL ble CDN_INIT et initial value at TRL value at TRL	JE alues False: True: set to t <u>r</u> ue at init R <u>e</u> tain	
IN_12 IN_13 IN_14 IN_15 IN_16 RDN_INIT (* @0000 [inte	[ [ [ set initial value at TRU ernal] (false,true) [:=	internal] internal] internal] internal] JE *) =TRUE]	0000	//		<b>•</b>		
(more Boolea	n variables on th	ne next pa	ge)					

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🍆 ISaGRAF - 🛛	FAQ138_1 - Global boolea	ns	
<u>File Edit T</u> ool	ls <u>O</u> ptions <u>H</u> elp		
	📓 🔾 🕓 🤘	😽 🗈 🤞 📉 🖀	
Booleans Integ	ers/Reals   Timers   Messages	FB instances [Defined wo	rds
Name	Attrib.	Addr. Comment	
		//	
OUT_01	[internal]	0000	
OUT_02	[internal]	0000	
OUT 03	[internal]	0000	
OUT_04	[internal]	0000	
OUT <sup>-</sup> 05	[internal]	0000	
OUT_06	[internal]	0000	
OUT_07	[internal]	0000	
0UT_08	[internal]	0000	
OUT_09	[internal]	0000	
OUT <sup>-</sup> 10	[internal]	0000	
0UT <sup>-</sup> 11	[internal]	0000	
0UT <sup>-</sup> 12	[internal]	0000	
0UT <sup>-</sup> 13	[internal]	0000	
0UT_14	[internal]	0000	
0UT <sup>-</sup> 15	[internal]	0000	
OUT_16	(internal)	0000	

Integer / Real : Please must set "This\_PAC" to "input" attribution .

Booleans Integers/Reals	Timers Messages FB instances Defined words
Name	Attrik Addr. Comment
This_PAC	[Input,Integer] 0000 1: Main PAC , 2: Backup PAC
¥1 V0	(internal,integer)/0000
VZ Do oli Mil	linternal, integer juuuu
	[internal,real] 0000
Real_V2	
Hour1	[internal integer] 0000
Minute1	[internal integer] 0000
Second1	finternal.integer10000
	· · · · · · · · · · · · · · · · · · ·
AL 1	[internal,integer] 0000
AI_2	[internal,integer] 0000
AI_3	[internal,integer] 0000
AI_4	[internal,integer] 0000
AI_5	[internal,integer] 0000
AI_6	[internal,integer] 0000
AI_7	[internal,integer] 0000
AI 8	[internal,integer] 0000
~	

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Timer : Set "T1" 's initial value as T#2s									
21 🧪	aGRAF - FAQ138	_1 - Global	timers						
File	<u>E</u> dit <u>T</u> ools <u>O</u> ptio	ns <u>H</u> elp							
	2	à   🔾 🕓 (	9 🖷 🏍 🗈	🖌 📉 🖨	3				
Boo	leans [ Integers/Reals	Timers Me:	ssages (FB instance	es Defined	words				
Name Attrib. Addr. Comment T1 [internal] 0000 set init val as T#2s									
	limer Yariable					X			
	Name: T1			Networ	rk Address:				
T1 (	* Comment: Set	init val as T#2							
@000				-					
	Attributes		Initial value: t#2s			<u>S</u> tore			
	C Constant					Cancel			
	Constant				_	Nout			
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					_	<u>P</u> revious			
Extended									
IU connection :									
AF - FAQ138_1 - I Project Tools F	Programs Johng Options Hel		iSaGRAF - 1	FAQ138_1	- I/O connecti	on	_		
- <u>1</u> 10)ect <u>1</u> 0018 1 	n X X ia	₩ <b>™ %</b>	<u>File E</u> dit <u>T</u> ool	s <u>O</u> ptions	<u>H</u> elp				
	K87K Link RU-87P			2) 💼 🕴 🕯	🖁 🕂 🖓	<b>=</b>			
📂 RDN	data	1/O connectio				ref = A			
👐 G01						com_port =	3		
ul data . (Structurad )	Tout		2			com_baud	= 9600 dog = 0		
v_data (Structured	Text)					watchdog t	timer = 32		
			5		:80	chechsum	= 0		
			6						
			7						
				new2					
				p r B	~ ♦				
			9 💷 bus7	 7000ь					
			- 📼 remo	ot 📃	∿ \$ ▼				
(more IO conn	ection on the ne	ext page)							
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"GO_7K87K" pro	gram :							
	Г	I_87053		C	COMM_OK	(2	_	
F	19 2 Al	ו Q רוג פון	-IN 01		< >		4	
	2 O	BI2_	HN_02					
		BI3	HN_03					
		BI4_	HN_04					
		BI5	HN_05					
		BI6_	HN_06 ⊣N_07					
		BI8	-IN_07 -IN_08					
		BI9	-IN_09					
		BI10_	HN_10					
		BI11_	HN_11					
		BI12_	HN_12					
		BI13_	-1N_13 -1N_14					
		BI15_	-IN_15					
		BI16	HN_16					
		I_87057		C	oww_ok	(3		
	er 2Ar	) <u>4</u> -					1	
		ля_ 1						
		02						
	OUT_03-B	02_ 03_						
		 D4						
	OUT_05-B	05_						
		D6_						
	OUT_07-B	07_						
		28_						
		09_						
		010_ 011						
	OUT 12-B	012						
	OUT_13-B	D13_						
	OUT_14-B	D14_						
	OUT_15-B	015_						
	OUT_16- <u>B</u>	D16						
(moro prog	ram on the	novt nago)						
		nevr hagel						
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F	4 -	L_870 en ADR_	17 QAI_1 NI2AI_2 NI3AI_3 NI4AI_4 NI5AI_5 NI6AI_6 NI7AI_7 AI_8	COM	и_ок4 >	<b>I</b>	
"RDN_init" prog	gram : then						
RDN_INIT := TMP := RDN TMP := RDN	False ; _T(T1) ; _N(V1) ; _N(V2) ; _F(Real_V1) ; _F(Real_V2) ; _B(OUT_01) ; _B(OUT_02) ; _B(OUT_03) ; _B(OUT_04) ; _B(OUT_04) ; _B(OUT_06) ; _B(OUT_06) ; _B(OUT_07) ; _B(OUT_08) ; _B(OUT_08) ; _B(OUT_09) ; _B(OUT_09) ; _B(OUT_10) ; _B(OUT_11) ; _B(OUT_12) ; _B(OUT_13) ; _B(OUT_15) ; _B(OUT_16) ;		All the D/I and A 87xxx cards don value are auto-u However all D/C data to be excha Some other cont set as redunda	/I channe 't need to pdate be and A/C anged be trol data ant data t	els on the I-70 o set as Redur etween both P O channels mu tween both P ("internal" at 500.	000 modules ndant data. T PACs. Ist set as redu AC. tribution) sho	and I- heir undant buld be

end\_if;



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To easily debug th	ne project and t	est it, bet	ter to add the '	'Spy lists	" as the follow	/ing.	
File M Begin:	SRAF - FAQ138_         [ake Project Tool         [ake Project Project         [ake Project Project Project Project         [ake Project         [ake Project Projec		AS Deptions Help M I ← IIII M Link RU-87P8 Sger - List of variable Comm 1: Ma PAC PAC	es . nent in PAC , 2:	■ □ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■		
(more on the	next page)						
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		MTAQ-130	>				
Author	Chun Tsai	Version	1.1	Date	May.2011	Page	20/33
Author Insert all the fol File Name This_F is_Act Main_ Backu Main_ COMM COMM COMM COMM COMM COMM COMM COM	Chun Tsai	Version to the "Sp I:[untitled] - I:[untitled] - [untitled] - [untit] - [untitled] - [unt	1.1 y lists", then - List of variable Com 1: Ma Save list as ist1 set in	Date	May.2011 d exit simulation Backup PAC	Page on.	20/33
V1 V2 T1 Real_Y N_01 N_02 N_03 OUT_( OUT_( OUT_( OUT_1 AI_1 AI_2 AI_3 <end 0<="" td=""><td>0 0 1#2s /1 0 /2 0 FAL FAL FAL 12 FAL 13 FAL 13 FAL 5 TRL 6 TRL 0 0 0 0 0</td><td>SE SE SE SE E E</td><td>set i</td><td>hit valas T#2</td><td>23</td><td></td><td></td></end>	0 0 1#2s /1 0 /2 0 FAL FAL FAL 12 FAL 13 FAL 13 FAL 5 TRL 6 TRL 0 0 0 0 0	SE SE SE SE E E	set i	hit valas T#2	23		
	e <u>C</u> ontrol <u>T</u> ools (	a_1 - Debuy Options Help	ggei				
(more on the	next page)						

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Then move the spy-lists to the right hand side (Workspace). The new created spy-lists will automatically pop-up every time when using PC / ISaGRAF to connect (debug) the XP-8xx7-CE6.



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#### 1.4 : Download the project to the redundant system and test it

The following steps are for downloading and testing the "faq138\_1" project to the application which listed in the configuration 1 in the section 1.1. Please first make sure the XP-xx7-CE6 's COM2 has enabled as Modbus RTU slave port and with baud-rate as 19200 (refer to item 2 listed in the section 1.2). Then power off both XP-8xx7-CE6, turn rotary-switch to 0, then power it on. Connect PC to the XP-8xx7-CE6 's COM2 port by a RS-232 cable to download the project. Both XP-8xx7-CE6 should run the same project. (If has modified the program, variables, IO connection, please must re-compile the project and download it to both PAC again).

Note: Please DO NOT re-compile the project if modify only the "Link setup" .

File Make Project Jools Debug Options Help   Begin:   Begin: Begin: Begin: Begin: Ink setup   FDN_data   Begin: Begin: Begin:   FO-PLC link parameters   Target Slave Number 1   Communication port: COM1   Control COM1   Control COM1   Control COM1   Control COM1   Control COM1   Control COM2   Control COM2   Control COM2   Control COM2   Control COM2   Control COM2
Image: Second structure       Image: Second structure       Image: Second structure       Image: Second structure         Image: Second structure       Image: Second structure       Image: Second structure       Image: Second structure         Image: Second structure       Image: Second structure       Image: Second structure       Image: Second structure         Image: Second structure       Image: Second structure       Image: Second structure       Image: Second structure
Begin: WW GO 7K87K Link RU-87P8 W GO1 PC-PLC link parameters Target Slave Number Communication port: COM1 Control COM2 COM2 COM3 Time out [seconds]:
RDN_data   GO1     PC-PLC link parameters     Target Slave Number     1     Communication port:     COM1     Control     COM1     Setup     Time out (seconds):
PC-PLC link parameters       Target Slave Number       1       Communication port:       COM1       Control       COM2       CoM3
Target Slave Number     1 <u>QK</u> Communication port:     COM1 <u>Cancel</u> Control     COM1 <u>Setup</u> Time out (seconds):     COM3
Target Slave Number     1 <u>DK</u> Communication port:     COM1 <u>Cancel</u> Control     COM1 <u>Setup</u> Time out (seconds):     COM3
Communication port: COM1 Cancel Control COM2 Setup Time out (seconds): COM3
Control COM1 Control COM2 Time out (seconds):
Control COM2 Setup
Time out (seconds):
Serial link parameters
Retries:
Baudrate: 19200
Parity: none  Caucal
Format: 8 bits, 1 stop
Flow control:
- ISaGRAF - FAQ138_1 - Programs
Fue Make Project Lools Debug Options Help
BDN data Debug
SaGRAF - FAQ138_1 - Debugger
<u>File Control Tools Options H</u> elp
- ©↓H ≈ → H → ⊗ # #
RUN allowed=0 current=3 maximum=4 overflow=0
Stop application
SaGRAF - FAQ138_1 - Debugger
<u>File Control Tools Options H</u> elp
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No application
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After completely downloading the project to the two XP-8xx7-CE6, power off them first. Then turn the Min PAC 's rotary switch to position 7, while 9 for Backup PAC. Then make sure all the cables (includes LAN1, LAN2, COM3: RS-485, ...) has been connectted well as listed in the configuration 1 (refer to section 1.1). This "faq138\_1" project connect only one I-87K8 with one I-87053W and one I-87057W and one I-87017W in it (I/O cards should be configured once as listed in item 3 listed in the section 1.2). Then turn on both PAC and the I-87K8 (The time for booting up the XP-8xx7-CE6 takes about 75 to 120 seconds).

# Note:

1. Each Ethernet cable in the redundant system must be plugged in a fixed port. The Ethernet communication may have problem if plug an Ethernet cable to different ports. Recommend to stamp a label on every Ethernet cable and specify ID something like"Main, LAN1", "Main, LAN2", "Backup, LAN1", "Backup, LAN1", "iDCS, LAN1", "iDCS, LAN2" to make sure all of them are plgged in the correct ports.

2. The "Active\_IP1" of this demo is 192.168.2.100. It will auto-switch to one working Ethernet port of the active PAC. When the active PAC is dead or damaged, the active PAC will switch to the other PAC and also the "Active\_IP1" will auto-swich to one working port of the new active PAC. So the PC / HMI / SCADA just need to connect this "Active\_IP1" (not necessary to connect the "Active\_IP2"). The PAC switching time is about 0.5 second.

3. The new active PAC will not release its control right to the other PAC until it is damaged or its "Active\_IP1" communication is broken.

Then the PC / ISaGRAF can debug the XP-8xx7-CE6 redundant system (rotary switch at 7 and 9) by ethernet communication. Please connect the IP = 192.168.2.100 and port = 502 as below (The PC 's IP should set in the same IP domain as the the XP-8xx7-CE6 's Active\_IP1 )

ISaGRAF - FAQ138_1 - Programs         File       Make       Project       Tools       Debug       Options       Help	
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Begin: GO 7K87K Link RU-87P8	
PC-PLC link parameters     Image: Slave Number:       Target Slave Number:     1	
Communication port:	
Time out (seconds): 2 ETHERNET link parameters	
Retries:     1       Internet address:     192.168.2.100       Port number:     502       Cancel	
ISaGRAF - FAQ138_1 - Programs	
File Make Project Tools Debug Options Help   Image: Second state Image: Second state Image: Second state Image: Second state   Begin: Image: Second state Image: Second state Image: Second state   Image: Begin: <t< td=""><td></td></t<>	
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The "Spy lists" will auto pop-up when PC / ISaGRAF connect the redundant system well. The below figure shows "This\_PAC" as 1, it means the Main PAC is connected by the ISaGRAF. The "is\_Active" is TRUE, it means this Main PAC is currently active. "Backup\_ok" and "Main\_ok" are TRUE, it means these two PAC are working well. The "COMM\_OK2" and "COMM\_OK3" shows TRUE, it means the addr=2: I-87053W and addr=3: I-87057W in the I-87K8 are communicated well. The "COMM\_OK4" is False, it means the addr=4:I-87017W are disconnectted (then it need to check the setting of address, baud-rate, checksum of the I-87017W is correct or not. The format should set as "2's compliment" for A/I cards ).

୫< Qୁ Value 1	Comment	
Value 1	Comment	
1	The state of the second s	
TRUE	T. Main PAC , 2. Dackup PA	۲ ۲
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TRUE		
TRUE		
FALSE		
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0		
0		
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Test 1: Modify the value of "V1" to 11, "V2" to -22, "Real\_V1" to 1.01 and Real\_V2 to 2.05, then power off the Main PAC. Check if the control right switch to the Backup PAC (check the value of "This\_PAC" and "is\_Active"). And also check if the value of the V1, V2, Real\_V1 and Real\_V2 are correct or not when the Backup PAC takes the control.

🚊 ISaGRAF - FAC	2138_1:LIST	1 - List of variables	
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Name	Value	Comment	
This_PAC	2	1: Main PAC , 2: Backup PAC	<b></b>
is_Active	TRUE		
Main_ok	FALSE		
Backup_ok	TRUE		
Main_is_active	FALSE		
Backup_is_active	TRUE		
Active_LAN_plug1	TRUE		
Active_LAN_plug2	FALSE		
Hour1	0		
Minute1	12		
Second1	51		
COMM_OK2	TRUE		
COMM_OK3	TRUE		
COMM_OK4	FALSE		
V1	11		
V2	-22		_
T1	t#2s	set init val as T#2s	
Real_V1	1.01		
Real_V2	2.05		
IN_01	FALSE		
IN_02	FALSE		
IN_03	FALSE		-

Test 2: Power on the Main PAC (it takes about 75 to 120 to boot up well). Then check if the "Main\_ok" becomes TRUE. Then plug-out the Backup PAC 's LAN1 cable. Check if the control right will release to the Main PAC. (Remember to plug in the LAN1 cable of the Backup PAC after this testing).

Test 3: Modify the "OUT\_01" and "OUT\_02" as TRUE and "T1" as T#4s. Then check if the behavior of the relative output LED on the I-87057W is correct or not. Then plug out the LAN1 cable of the Main PAC to see if the control right is released to the Backup PAC. (Remember to plug in the LAN1 cable of the Main PAC after this testing)

Note:

1. If the COM3 port of both XP-8xx7-CE6 doesn't link the I-87K8 + I-87053W + I-87057W + I-87017W, the redundant system will not work and the PC / ISaGRAF can not connect them well.

2. When doing switching test (release control right to the other), please make sure the other PAC is power ON and booting up well already .

3. If the application has no I-7000 and I-87xxx cards installed, please use the configuration listed in the section 1.5.



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Begin: 🧯	🗝 GO_7K87K	Link RU-87P8		
	Send 3 601			
Begin: Send_3 (St	ructured Text)			

Classification	ISaGRAE Engl	ish EAO-139	2				
Author	Chun Tsai	Version	1 1	Date	May 2011	Page	27 / 33
Addio	chun rsu	Version	1.1	Dute	10103.2011	1 dgc	27733
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3			:8998	nActive_IP1 = 1	92.168.2.102		
4			:8998	nActive_IP2 = 1	92.168.2.103		
5			:0000 F	REAK T	e = 3 IME = 250		
7			:8998 r	eserved = 0			
8	m rdn_new2		:8998 T	eserved = 0			
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			4	Nain_is_acti Rackun is a	ve ctive		
12			6	Active_LAN_	plug1		
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14							
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r	Chun Tsai	Version	1.1	Date	May.2011	Page	28/3
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Author
                Chun Tsai
                               Version
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                                                                           Page
                                                                                       29/33
"GO 7K87K" program: (its content is empty)
"RDN data" program:
                                       All the D/I and A/I channels on the I-7000 modules and I-
 if RDN_INIT then
                                       87xxx cards don't need to set as Redundant data. Their
                                       value are auto-update between both PACs.
    RDN INIT := False ;
                                       However all D/O and A/O channels must set as redundant
    TMP := RDN T(T1);
                                       data to be exchanged between both PAC.
    TMP := RDN N(V1);
                                       Some other control data ("internal" attribution) should be
    TMP := RDN_N(V2);
                                       set as redundant data too.
    TMP := RDN F(Real V1);
    TMP := RDN F(Real V2);
    TMR3 := T#0s ; (* reset as 0 *)
    Tstart(TMR3); (* start ticking TMR3 to triger to send ~** from COM3 *)
 end if;
"Send_3" program :
 (* Send '~**' to XP-8xx7-CE6 's COM3 every 50 ms if this PAC is active *)
 if is Active then
   if TMR3 > T#50ms then
       TMP := COMSTR W(3, '^{**'});
       TMR3 := T#0s; (* reset as 0 *)
    end if;
 end if;
"GO1" program :
                           SYSTIM R
                                                               < >
                         en
                                    enol
                                    HH_Hour1
                                   MM_HMinute1
                                    SS_-Second1
The testing steps of the "faq138_2" is similar as the "faq138_1", please refer to section 1.4.
                               ICP DAS Co., Ltd. Technical document
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# **1.6 : The XP-8xx7-CE6 redundant system with Modbus RTU or Modbus ASCII or Modbus TCP device installed**

This section is for the configuration 3 and 4 listed in the section 1.1.

The project for the configuartion 3 can use the "faq138\_1.pia" and do some modifications.

The project for the configuartion 4 can use the "faq138\_2.pia" and do some modifications.

The main difference is in the I/O connection windows and should add some "Mbus\_xxx" function blocks in a Ladder program to control the Mobus devices.

For example, the following figure shows both XP-8xx7-CE6 's COM4 are enabled as Modbus RTU Master port to connect some other Modbus RTU slave devices.

Please refer to the Chapter 8 of the "ISaGRAF User's manual" for more information about programming the Modbus device .

(http://www.icpdas.com/en/download/show.php?num=333&nation=US&kind1=&model=&kw=isagraf), And also refer to https://www.icpdas.com/en/faq/index.php?kind=280#751 > FAQ-075, FAQ-101, 096, 047, 046.

ISaGRAF - FAQ138_2 - I/O connection	
<u>File Edit T</u> ools <u>Options H</u> elp	
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0 ► 107	
1	
2 ::::::::::::::::::::::::::::::::::::	
3 ::::::::::::::::::::::::::::::::::::	
4 see parity = 0	
5 stop_bit = 1	
6 ineout = 500	
7	
8 m rdn_new2	
- 📼 RDN_ip л +	
- ⊨ M_or_B ~ •	
9 m bus7000b	
- memot v 🗢	
10	
11 m mbus	
🗖 📼 com_port л ф	
12	

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For example, the following figure shows both XP-8xx7-CE6 's COM4 are enabled as Modbus RTU Master and COM5 are enabled as Modbus ASCII Master.

Please refer to the Chapter 8 of the "ISaGRAF User's manual" for more information about programming the Modbus device .

(http://www.icpdas.com/en/download/show.php?num=333&nation=US&kind1=&model=&kw=isagraf), And also refer to https://www.icpdas.com/en/faq/index.php?kind=280#751 > FAQ-075, FAQ-101, 096, 047, 046.

0 1 2 3 4 5 6 7	<pre></pre>
8 m rdn_new2	ISaGRAF - FAQ138_2 - I/O connection
- 📼 RDN_ip	rue hau Toors Obrauus Herb
- 📼 M_or_B	
	▲ :sees ref = 108
10	2 www baud = 9600
11 m mbus	3 :5000 char = 7
📕 📼 com_port	4 ::::::::::::::::::::::::::::::::::::
12	5 stop_bit = 1
	6 imeout = 500
	□ <u>1</u> <u>2</u>
	- <b>□</b> M_or_B ~ ◆
	9 m bus7000b
	- memot ~ +
	10
	- m mbus asc
	E m com port

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For example, the following figure shows both XP-8xx7-CE6 have enabled one Modbus TCP Master to connect the Modbus TCP device which has IP address 192.168.2.153.

Please refer to the https://www.icpdas.com/en/faq/index.php?kind=280#751 > FAQ-113 and then refer to the Chapter 8 of the "ISaGRAF User's manual" for more information about programming the Modbus device

(http://www.icpdas.com/en/download/show.php?num=333&nation=US&kind1=&model=&kw=isagraf).

And also refer to https://www.icpdas.com/en/faq/index.php?kind=280#751 > FAQ-075, FAQ-101 , 096, 047, 046.

ISaGRAF - FAQ138_2 - I/O connection	
<u>File Edit T</u> ools <u>Options H</u> elp	
🙆 📼 🗟 🎾 💼 🗘 🦊 🕞 👗 🖀	
0 ref = 168	
1 Device_IP = 192.16	8.2.153
2 Device_NET_ID = 1	
3 Timeout = 2000	
4 Min_Wait_Time = 4	0
5 Port_No = 502	
6 Which_LAN = 0	
7	
8 m rdn_new2	
- Em RDN_ip л + Reserved = 0	
- 📼 M_or_B ~ ↔ 1 Z	
9 🖿 bus7000b 🛛 2 🗹	
- 📼 remot 🛛 💠 🛛 🗹	
10 4 2	
11 m mbus_tcp	
- <b>□ To_IP</b> ~ ↔	
12	

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#### 1.7: Connecting some other non-DCON I/O and non-Modbus devices

The XP-8xx7-CE6 redundant system is enabled when programing the "RDN\_new2" in the ISaGRAF IO connection window. This "RDN\_new2" will automatically control all the connected DCON series I/O (like the I-7000 series I/O, I-87K4/5/8/9 base + I-87xxx I/O or + I-87xxxW cards and RU-87P4/8 base+ I-87xxxW I/O cards ) and automatically control all Modbus devices ( like the Modbus RTU, Modbus ASCII and Modbus TCP devices). The XP-8xx7-CE6 redundant system will only let the active PAC to communicate with the above I/Os and devices. The in-Active PAC will not send the command to those devices until it becomes active (means takes the control right).

However if the XP-8xx7-CE6 redundant system has installed some other non-DCON I/O and non-Modbus devices, the "RDN\_new2" will not automatically control them. For example, both XP-8xx7-CE6 connecting to some 3rd party communication devices, or both XP-8xx7-CE6 connecting to one I-7530 to become CAN signal to link other CAN/CANopen devices. These case may happen both XP-8xx7-CE6 will try to communicate with those devices at the same time. The result will be "communication error". To solve this problem, user should add the following similar codes to only let the active PAC do the communication (let the in-active PAC stand-by).

For example, there is some application which stores data to the Microsoft Database (SQL server), then user can use the "is\_Active" to let the active PAC to do the writing action to the SQL server.(refer to https://www.icpdas.com/en/faq/index.php?kind=280#751 > FAQ-135 for SQL server applications)

If is\_Active then

- (\* Do the communication only when the PAC is active \*)
- (\* ... \*)

End\_if ;

n in 1002 Opu	nis <u>n</u> eip 순 <del>-</del>	X	<b></b>
	 _	▶ :98	ref = 15BFA
1		:8996	Active_IP1 = 192.168.2.100
2		.8998	Active_IP2 = 192.168.2.101
3		:8998	InActive_IP1 = 192.168.2.102
4		:8998	InActive_IP2 = 192.168.2.103
5		10000	Remote_IO_type = 3
6		18995	RDN_BREAK_TIME = 250
7		:8998	reserved = 0
8 🎟 rdn_new2		10000	reserved = 0
💽 📼 RDN_ip	л (	:8998	reserved = 0
<u> ⊨ M_or_B</u>	~ ◆	1	IS_Active
9 💷 bus7000b		2	🖸 Main_ok
🕘 📼 remot	ο φ	3	🔊 Backup_ok