



泓格科技股份有限公司

Win-GRAF



Jul. 24, 2017



What is Win-GRAF?

- A Programming Tool supports IEC61131-3 Standard

- Programming Languages:

Ladder Diagram	(LD)
Function Block Diagram	(FBD)
Structured Text	(ST)
Sequential Function Chart	(SFC)
Instruction List	(IL)

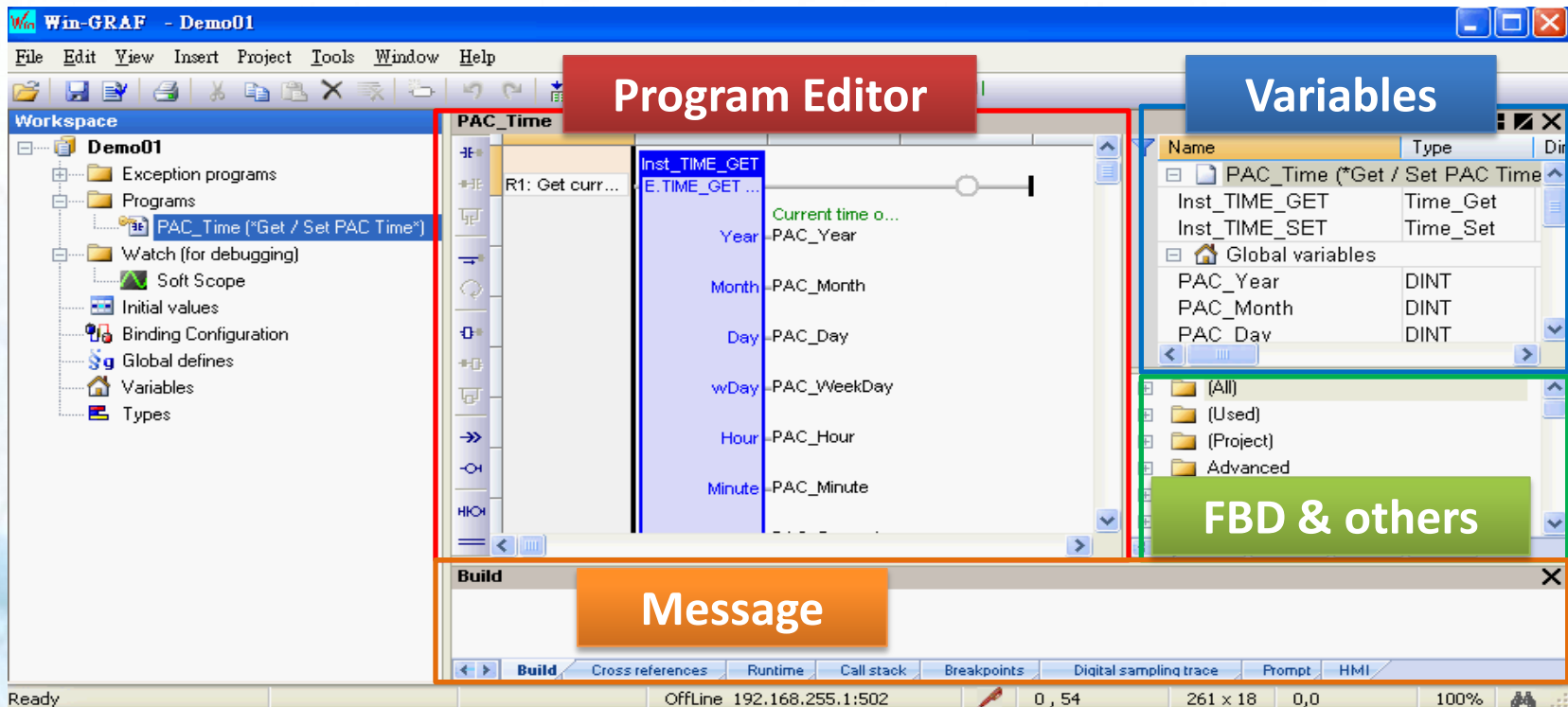
- An Useful Debugging Tool



Win-GRAF Workbench

Available on Windows XP/7/8/10 (32-bit or 64-bit)

- Delivered with a Win-GRAF USB Dongle.
- It becomes Trial (Demo) Version if without the USB Dongle.



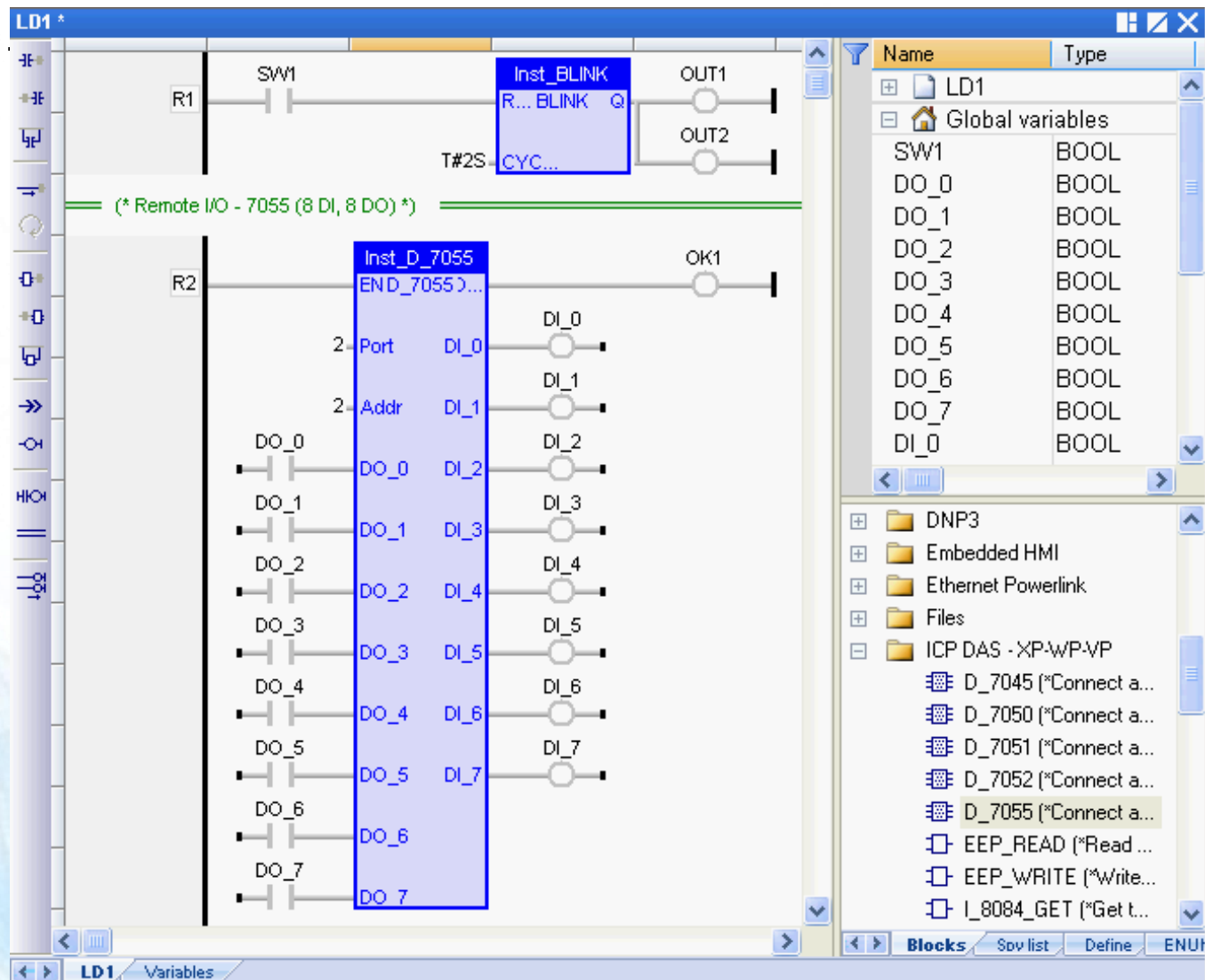


Protocols embedded in the Win-GRAF PAC

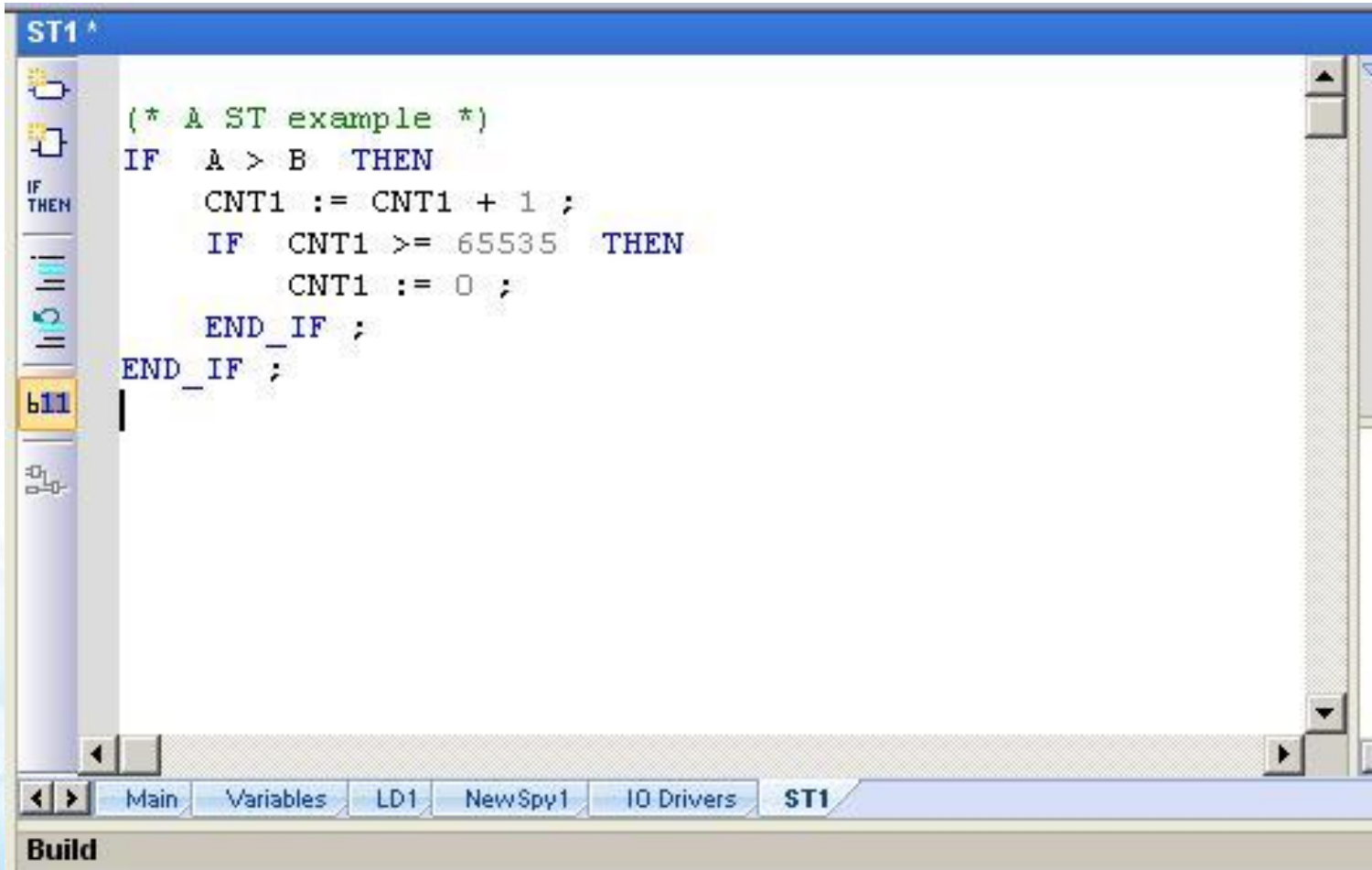
- Modbus TCP (Slave, Master)
- Modbus RTU (Slave, Master)
- Modbus UDP (Master)
- Modbus ASCII (Master)
- HART (Master)
- DCON (ICP DAS I-7000 series modules,
RU-87P8/P4 + I-87xxxW cards,
I-87K8/K4 + I-87xxxW cards)



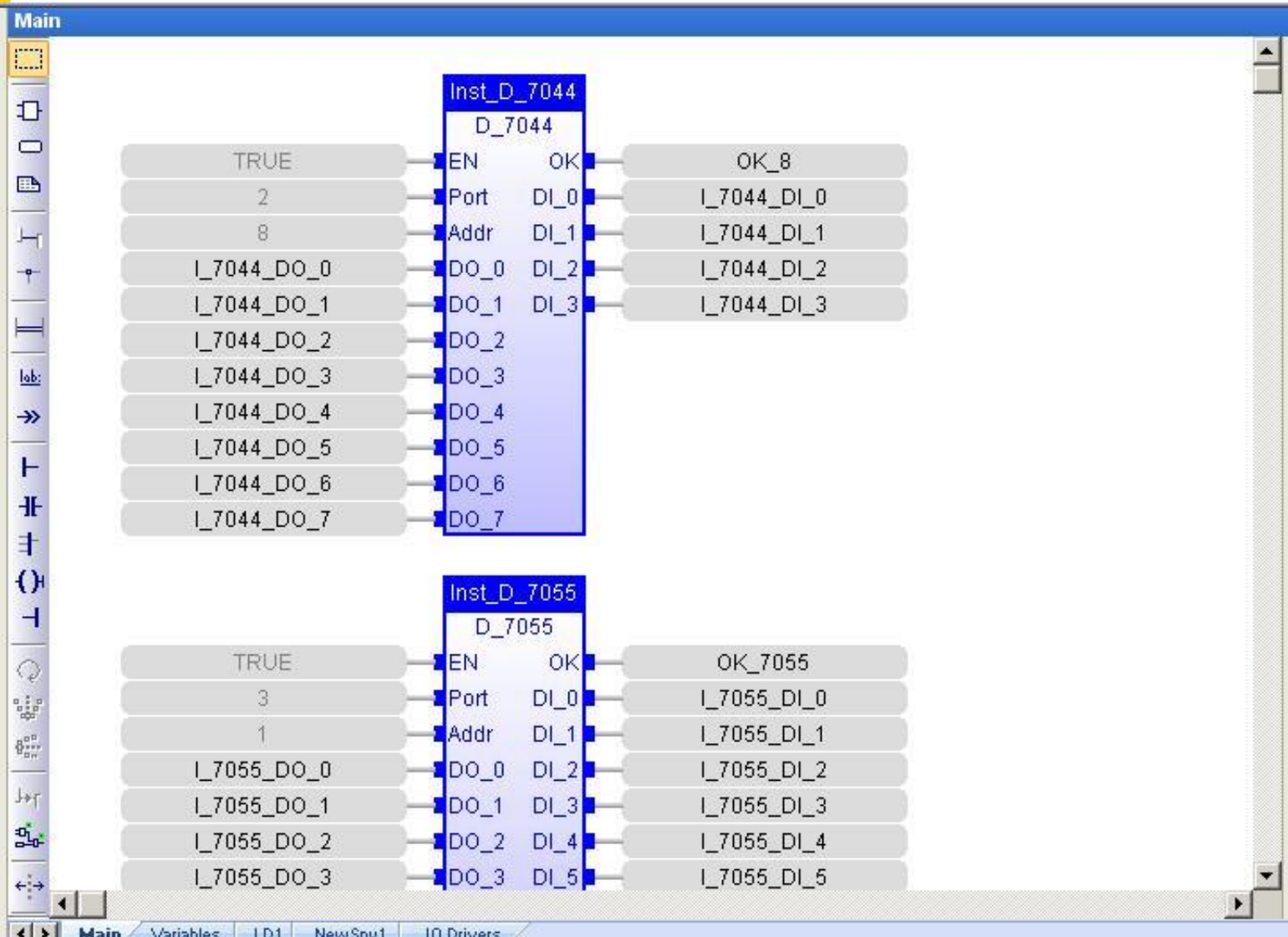
Ladder Diagram



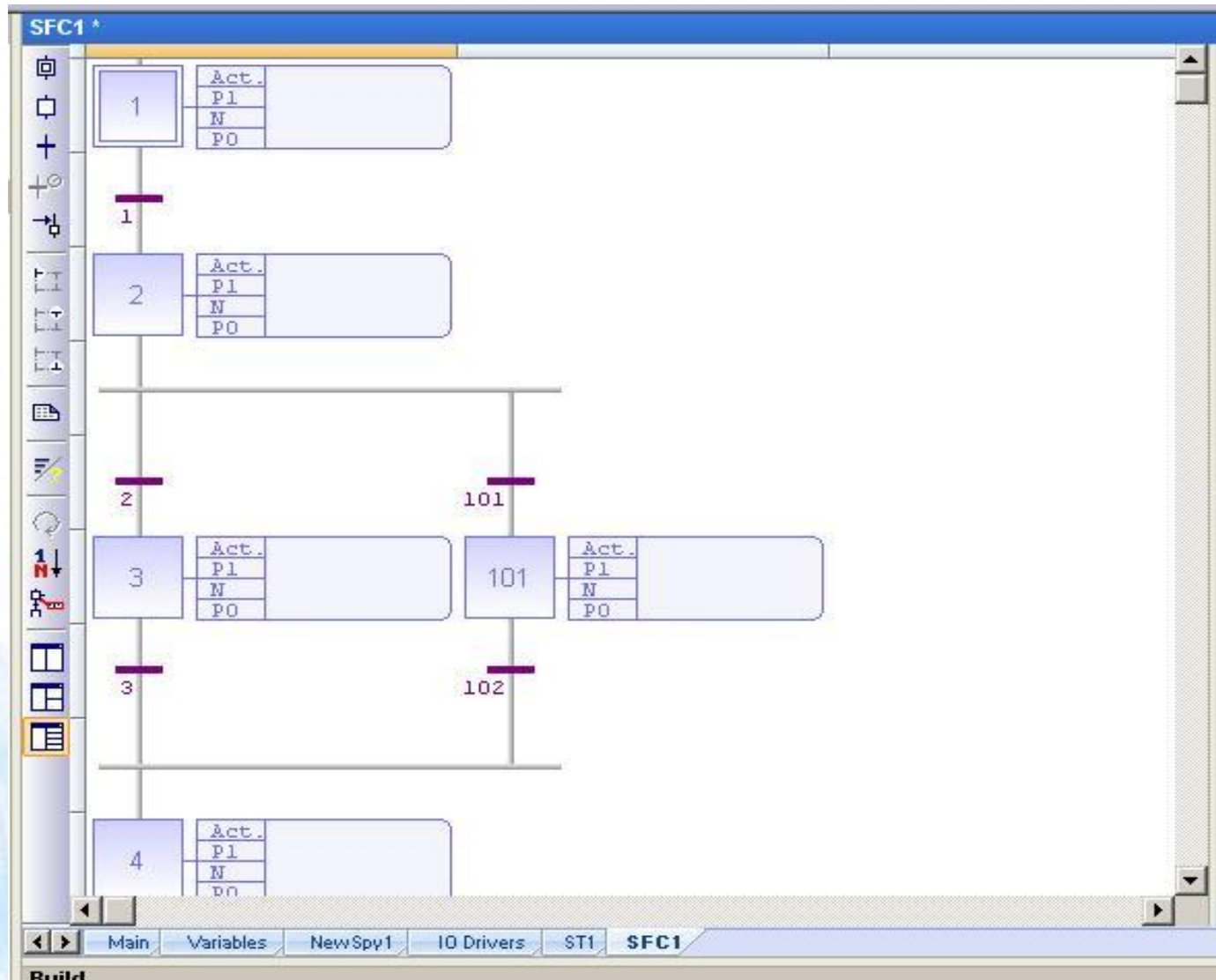
ST



FBD



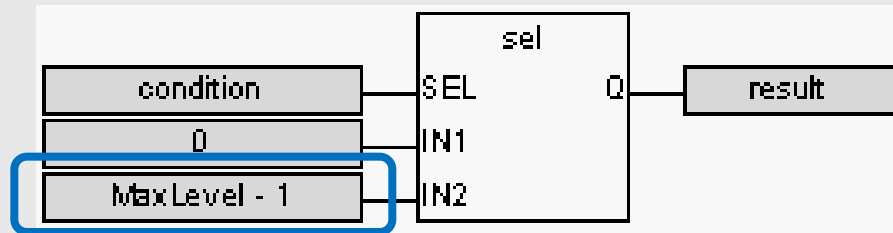
SFC



Uses ST in Graphical Editor

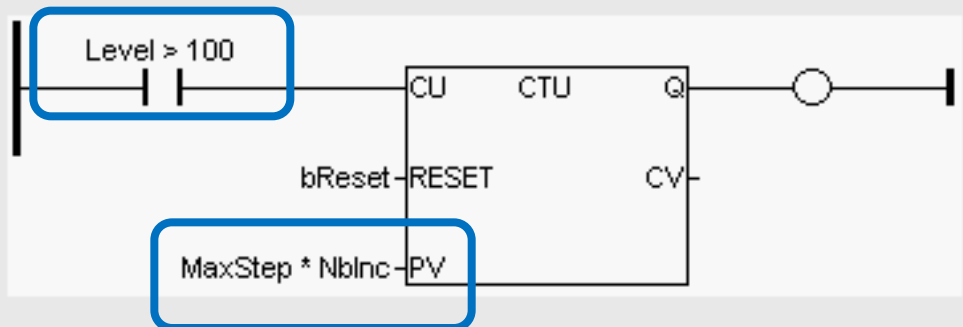
Example

FBD



Example

LD





Win-GRAF PAC

(Programmable Automation Controller)

- WP-8**1**48/8**4**48/8**8**48
- WP-8**1**28-CE7/8**4**28-CE7/8**8**28-CE7
- WP-5238-CE7 (1x LAN)
- VP-**1**2**3**8-CE7 (**5.7"**, 3x I/O Slots)
VP-**2**2**0**8-CE7 (**7"**, w/o I/O Slot)
VP-**4**2**0**8-CE7 (**10.4"**, w/o I/O Slot)
VP-**4**2**3**8-CE7 (**10.4"**, 3x I/O Slots)
- XP-8**0**48-CE6/8**3**48-CE6/8**7**48-CE6





Various Local I/O Modules (1)

(Plugged in the PAC)

Digital Input (DI)	I-8040W, I-8046W, I-8051W, I-8052W, I-8053W, I-8053PW, I-87040W, I-87040PW, I-87046W, I-87051W, I-87052W, I-87053W, I-87053PW, I-87053W-A2, I-87053W-A5, I-87053W-E5
Digital Input/Output (DIO)	I-8042W, I-8050W, I-8054W, I-8055W, I-87042W, I-87054W, I-87055W
Digital Output (DO)	I-8037W, I-8041W, I-8041AW, I-8056W, I-8057W, I-87037W, I-87041W, I-87057W, I-87057PW
Relay Output	I-8060W, I-8063W, I-8064W, I-8068W, I-8069W, I-87061W, I-87061PW, I-87063W, I-87064W, I-87065W, I-87066W, I-87068W, I-87068W-2A, I-87069W, I-87069PW
AC Input	I-8058W, I-87053W-AC1, I-87058W, I-87059W
Analog Input (AI)	I-8017DW, I-8017HW, I-8017HCW, I-87017W, I-87017RW, I-87017RCW, I-87017DW, I-87017EW, I-87018W, I-87018RW, I-87018PW, I-87018ZW, I-87019PW, I-87019RW, I-87019ZW
Analog Output (AO)	I-8024W, I-87024CW, I-87024UW, I-87024DW, I-87024RW, I-87024W, I-87028CW, I-87028UW, I-87028VW, I-87028VW-20V



Various Local I/O Modules (2)

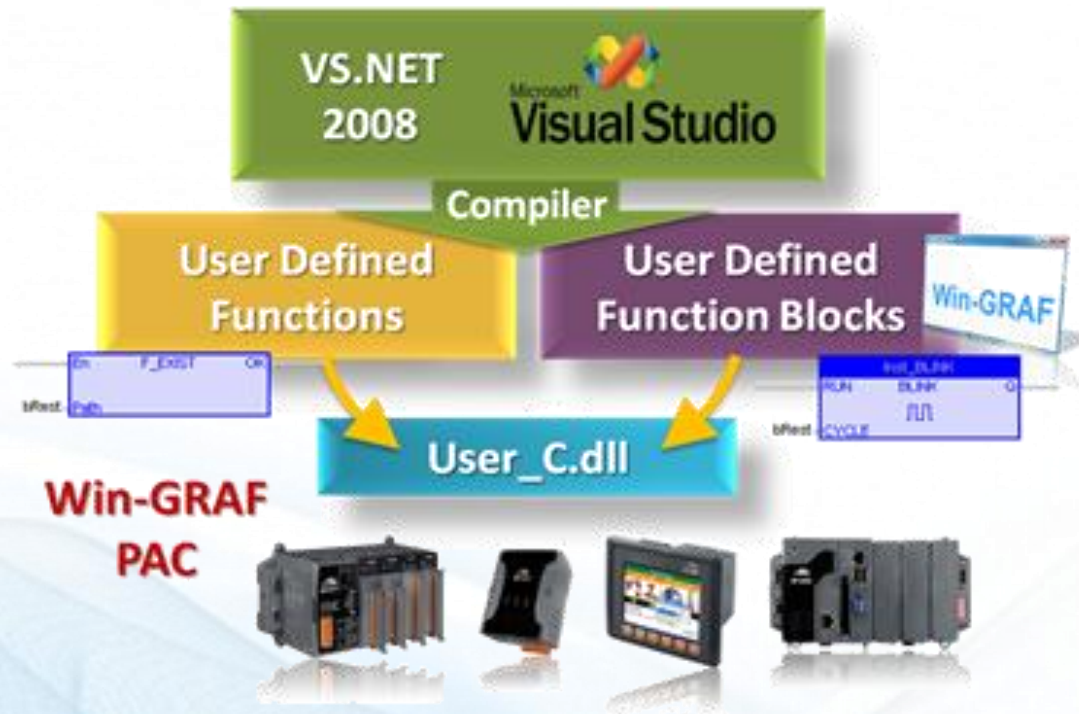
(Plugged in the PAC)

Multifunction (DIO, AIO)		I-87026W
Temperature Input	Thermister	I-87005W
	RTD	I-87013W, I-87015W, I-87015PW
	T/C	I-87018W, I-87018RW, I-87018PW, I-87018ZW, I-87019PW, I-87019RW, I-87019ZW
HART		I-87H17W
Strain Gauge		I-87016W
Counter/Frequency Input		I-8084W, I-87082W, I-87084W
Encoder Input		I-8093W
PWM Output		I-8088W
Communication Module		I-8112iW, I-8114W, I-8114iW, I-8142iW, I-8144iW
Temperature & Humidity Input		DL-100T485, DL-100T485-W, DL-100T485P, DL-100T485P-W (DCON Protocol) DL-100TM485, DL-100TM485-W, DL-100TM485P, DL-100TM485P-W (Modbus RTU Protocol)



Win-GRAF Features

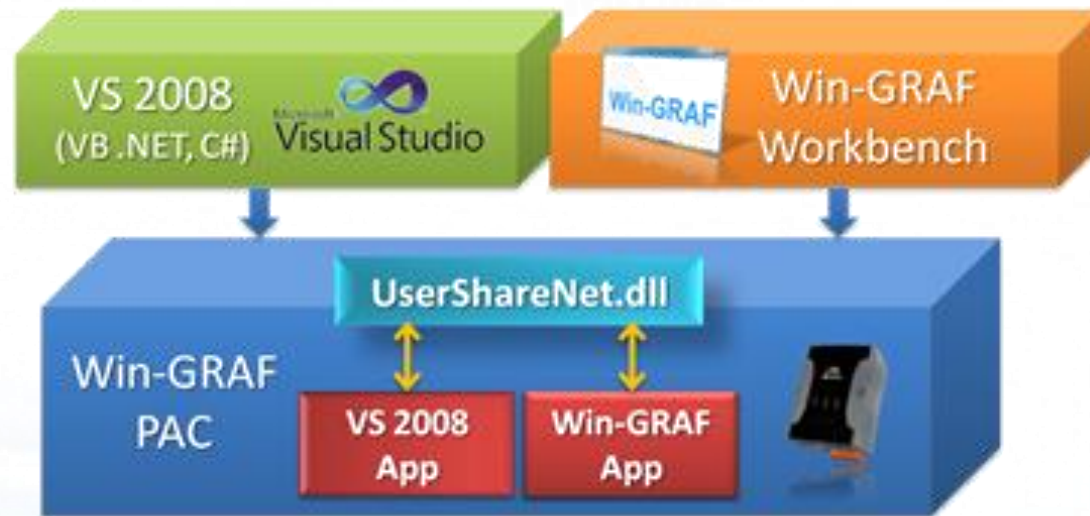
Create your own C Function & Function Blocks





Win-GRAF Features

Working With VB.net , C# App.





Win-GRAF Features

Protect your Software

- Win-GRAF PAC is equipped with a unique 64-bit serial number. It can be used to generate a license key to protect the software against illegal copy.



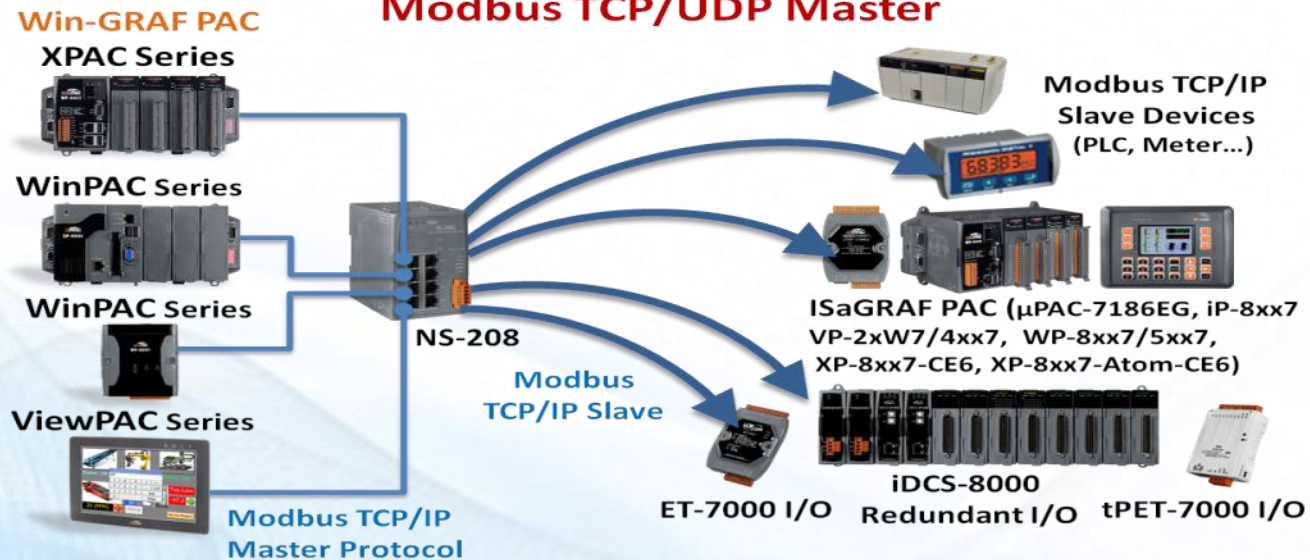
Win-GRAF Features

Multi-Modbus Master

Modbus RTU/ASCII Master



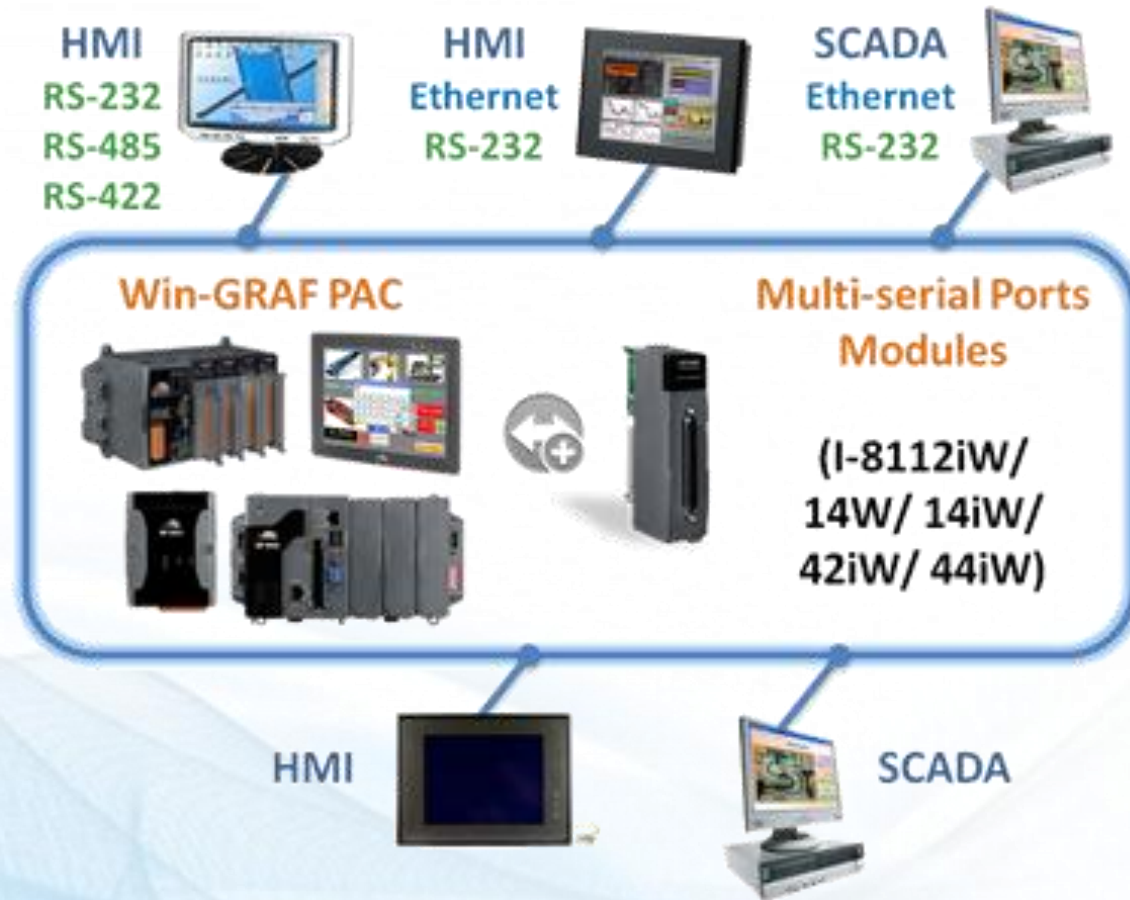
Modbus TCP/UDP Master



XPAC support max. 200 devices
WinPAC & ViewPAC support max. 32 devices

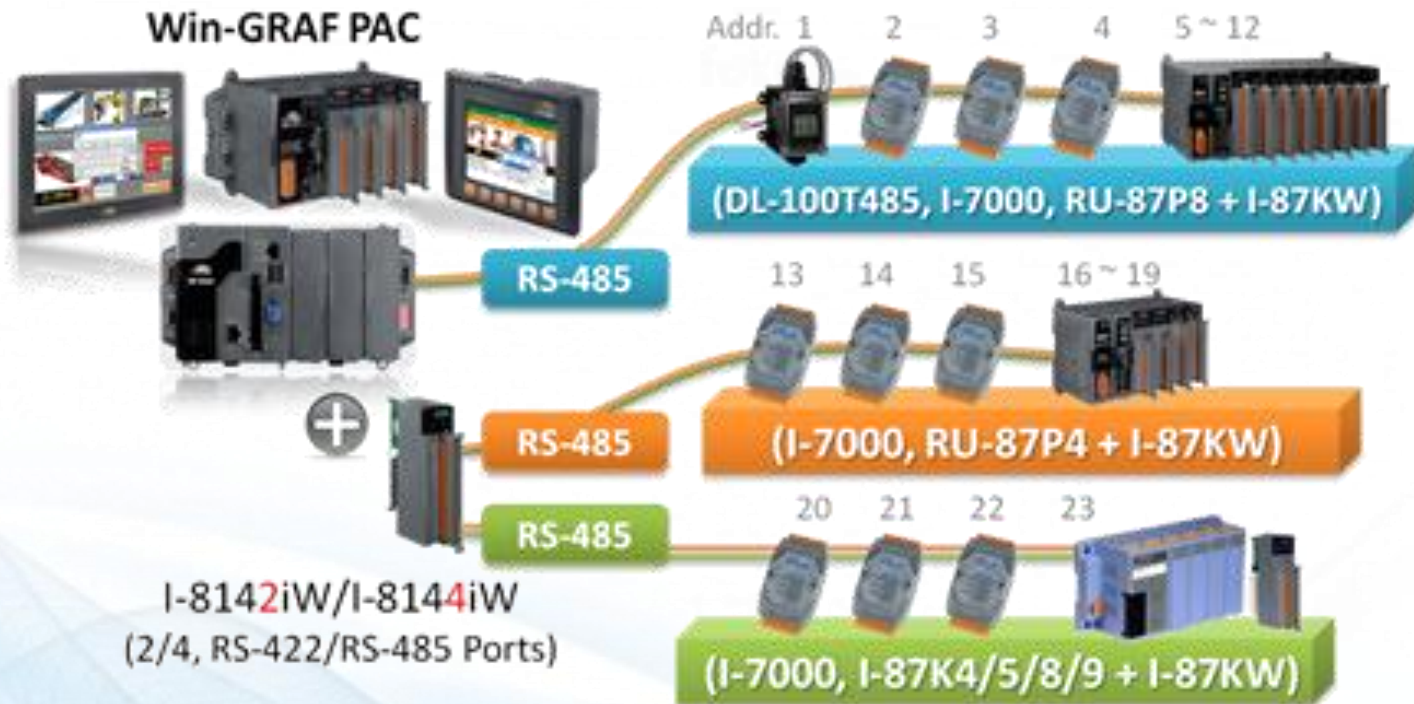
Win-GRAF Features

Multi-Modbus TCP/RTU Slave



Win-GRAF Features

DCON Remote I/O





Win-GRAF Features

Local & Web HMI

- Support remotely device control by using a smart phone, tablet, or laptop.

The diagram illustrates the ICP DAS software ecosystem. At the top, two software development tools are shown: **Win-GRAF** (Software Development Tool) and **eLogger** (HMI Development Tool). Win-GRAF features include: Simulate without PAC, Debug / Control / Monitor online, and Five Open SoftLogic Languages (LD, ST, ..). eLogger features include: Free HMI Toolkit, Web HMI, and Easy & Useful. Below the software tools, two large orange arrows point down to a row of hardware components: **WinPAC**, **XPAC-CE6**, and **ViewPAC**. Each hardware component is shown with its corresponding software interface on a screen.

- Simulate without PAC
- Debug / Control / Monitor online
- Five Open SoftLogic Languages (LD, ST, ..)

Win-GRAF
Software Development Tool

- Free HMI Toolkit
- Web HMI
- Easy & Useful

eLogger
HMI Development Tool

WinPAC
XPAC-CE6
ViewPAC



Win-GRAF & eLogger

- <http://www.icpdas.com/root/support/faq/win-graf.php>



Win-GRAF Soft-Logic PAC

- 繁體中文 -

No. Title

018 How to Use Win-GRAF SoftLogic and eLogger HMI in the Win-GRAF PAC?

017 How to build Your own Function, Function Block and Library Project in the Win-GRAF PAC ?



Win-GRAF & eLogger

■ <http://www.icpdas.com/root/news/products/2017/2017062807.php>





Win-GRAF PAC Features

Controller Redundancy #1

- LAN1: Public port (to connect the SCADA)
- LAN2: Replication port (to synchronize data between two PACs)
- RS-232: Alive port (to detect the PAC living)
- Even one cable can make the redundancy work

HMI/SCADA

Switch



Win-GRAF PAC

LAN1

Main

Rotary switch(7)

Alive
Port
(RS-232)

LAN2

Backup

Rotary switch(9)

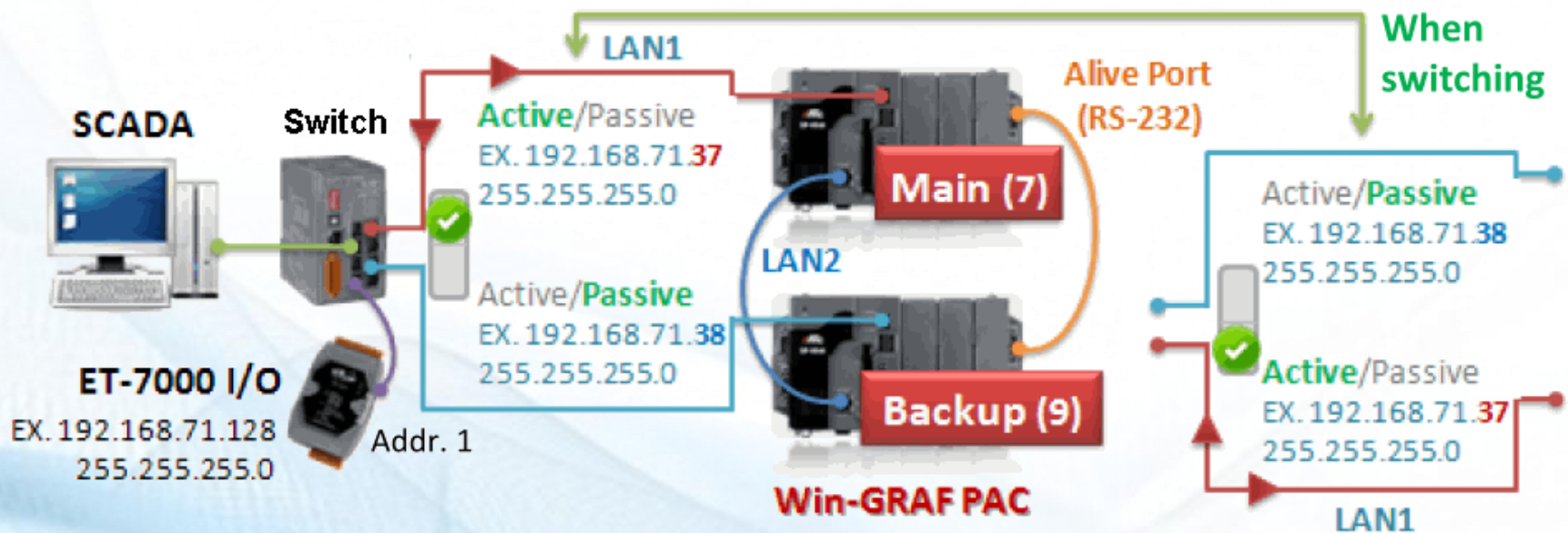




Win-GRAF PAC Features

Controller Redundancy #2

- SCADA just connects to the Active_IP
- The two PAC will automatically switch Active_IP and Passive_IP
- The project will be automatically restored to the new one

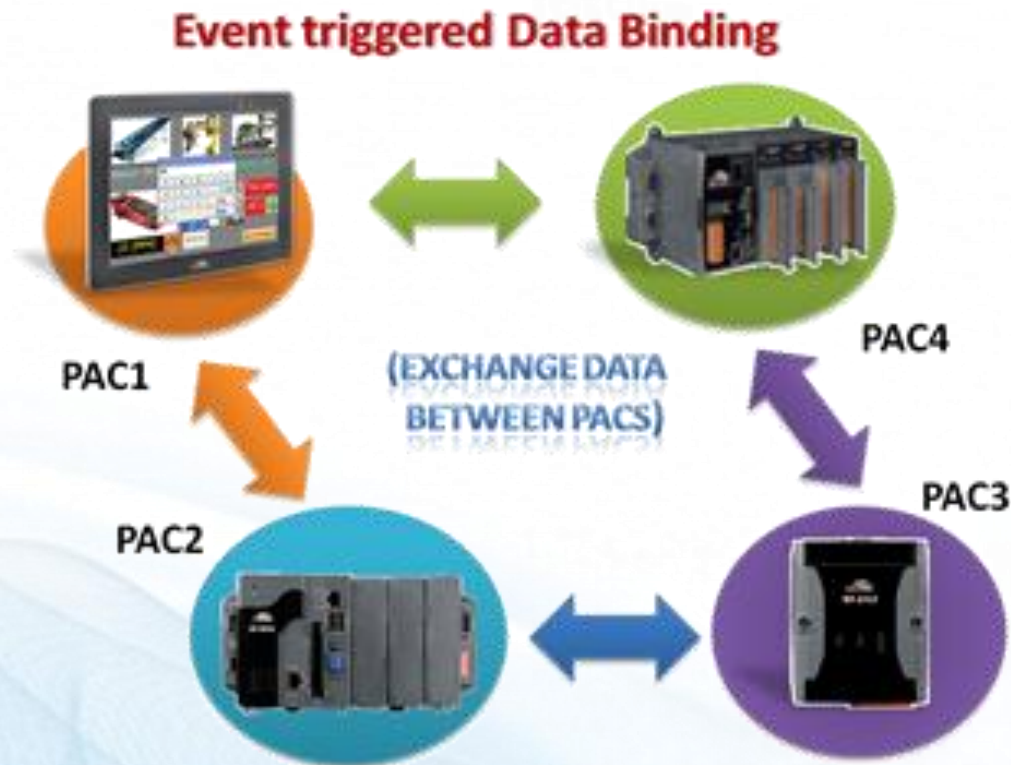




Win-GRAF PAC Features

Data Binding

- Can get data from max. of another 16 PACs





Win-GRAF PAC Features

Schedule Control

- Supports “Schedule-Control Utility” (freeware)
- One PAC can implement max. 10 Targets (devices) with different schedule control.
- Can apply schedule in Day, Holiday, Special Day, Season, Year.

SCHEDULE CONTROL



Win-GRAF
PAC
bvc



ViewPAC
AIGM6AC



WinPAC
AIGM6AC



XPAC
Y6AC

Win-GRAF PAC Features

On-line Change

- Change the code of a program (LD, ST, IL)
- Change the condition of a SFC transition or the actions of a SFC step
- Create, rename or delete global and local variables
- Create, rename or delete global and local function block instances

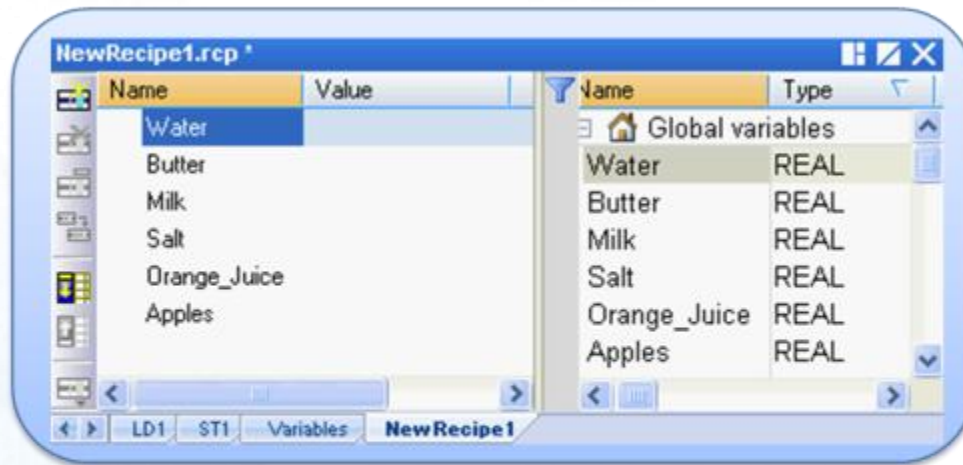




Win-GRAF PAC Features

Recipe

PC/Win-GRAF



WP-8xx8



Variables:

Water
Butter
Milk
Salt
Orange Juice
Apple



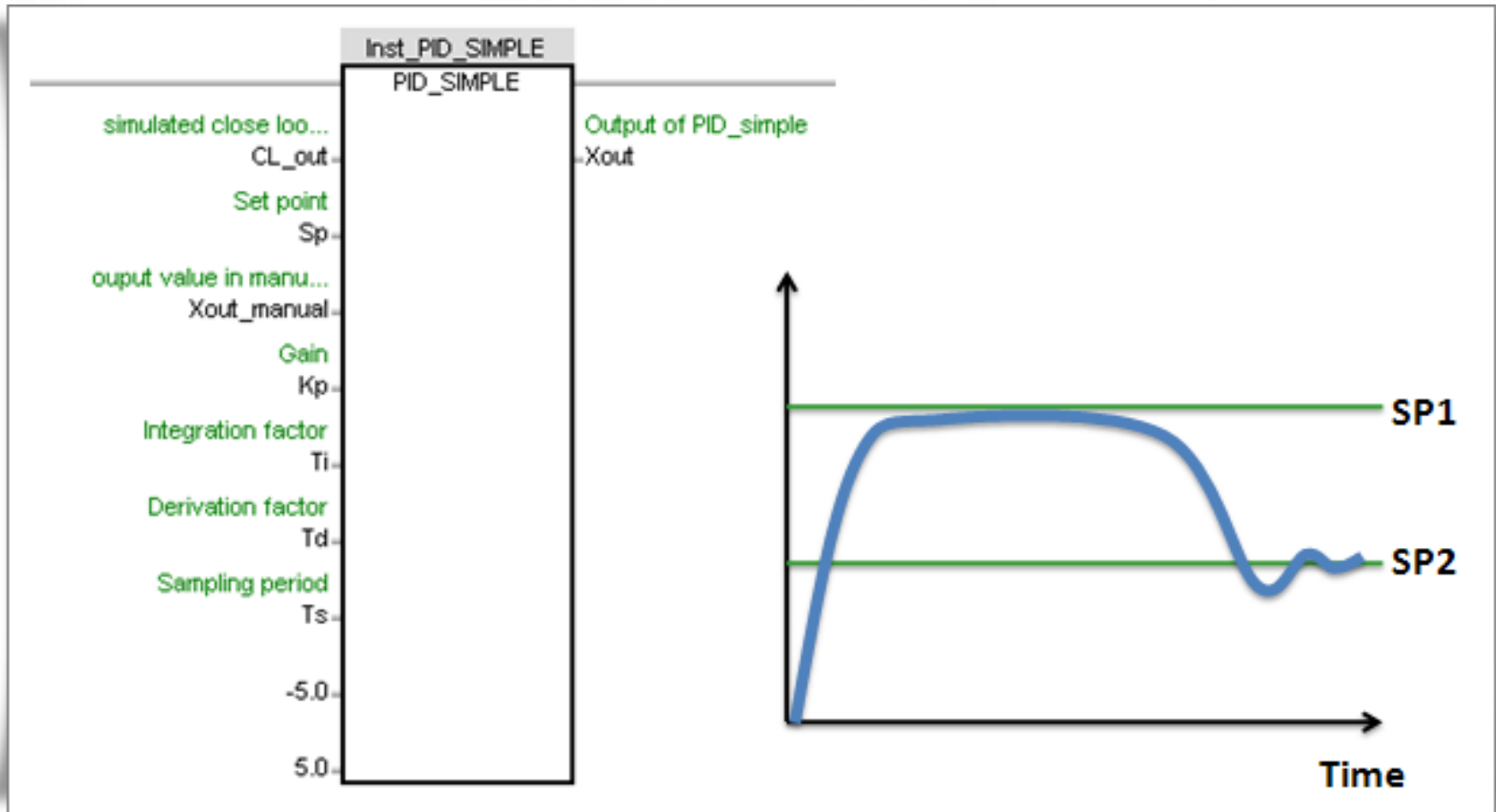
Recipe Value



Win-GRAF PAC Features

PID Control

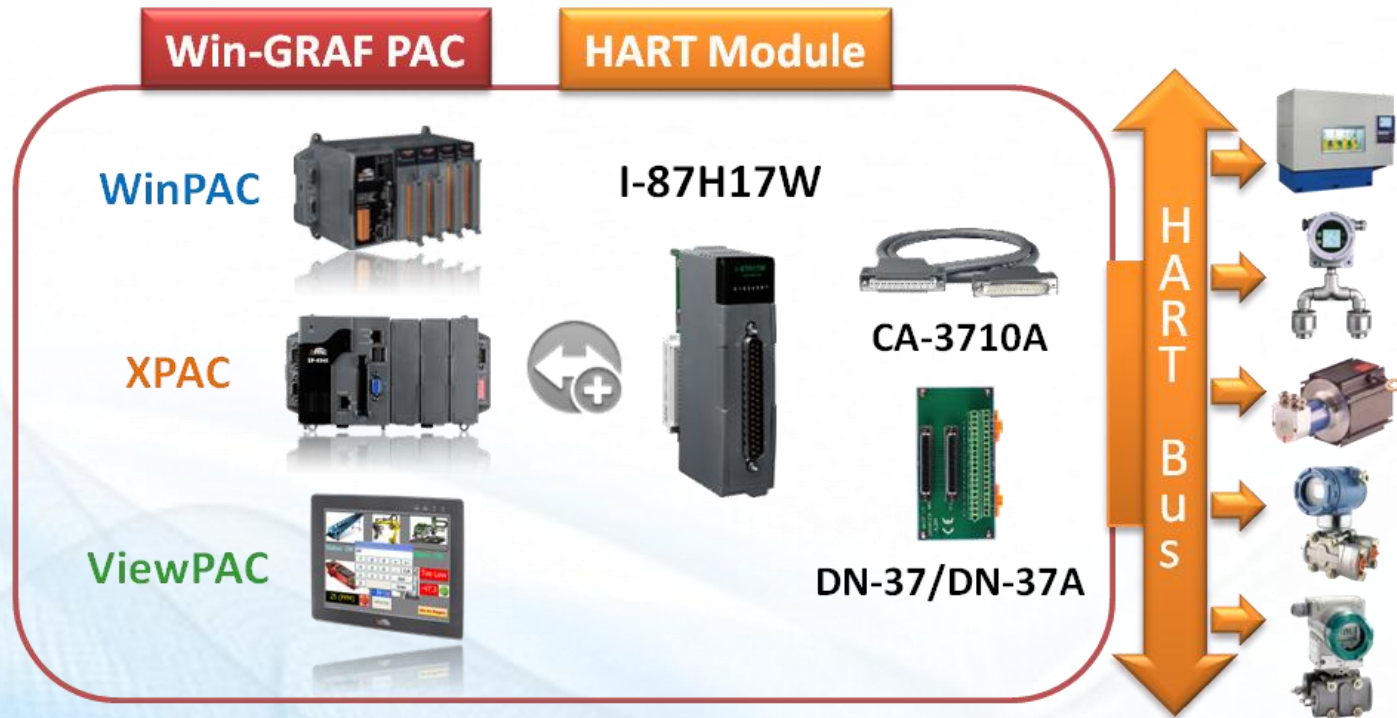
- One PAC can handle more than 200 PID.



Win-GRAF PAC Features

HART Master

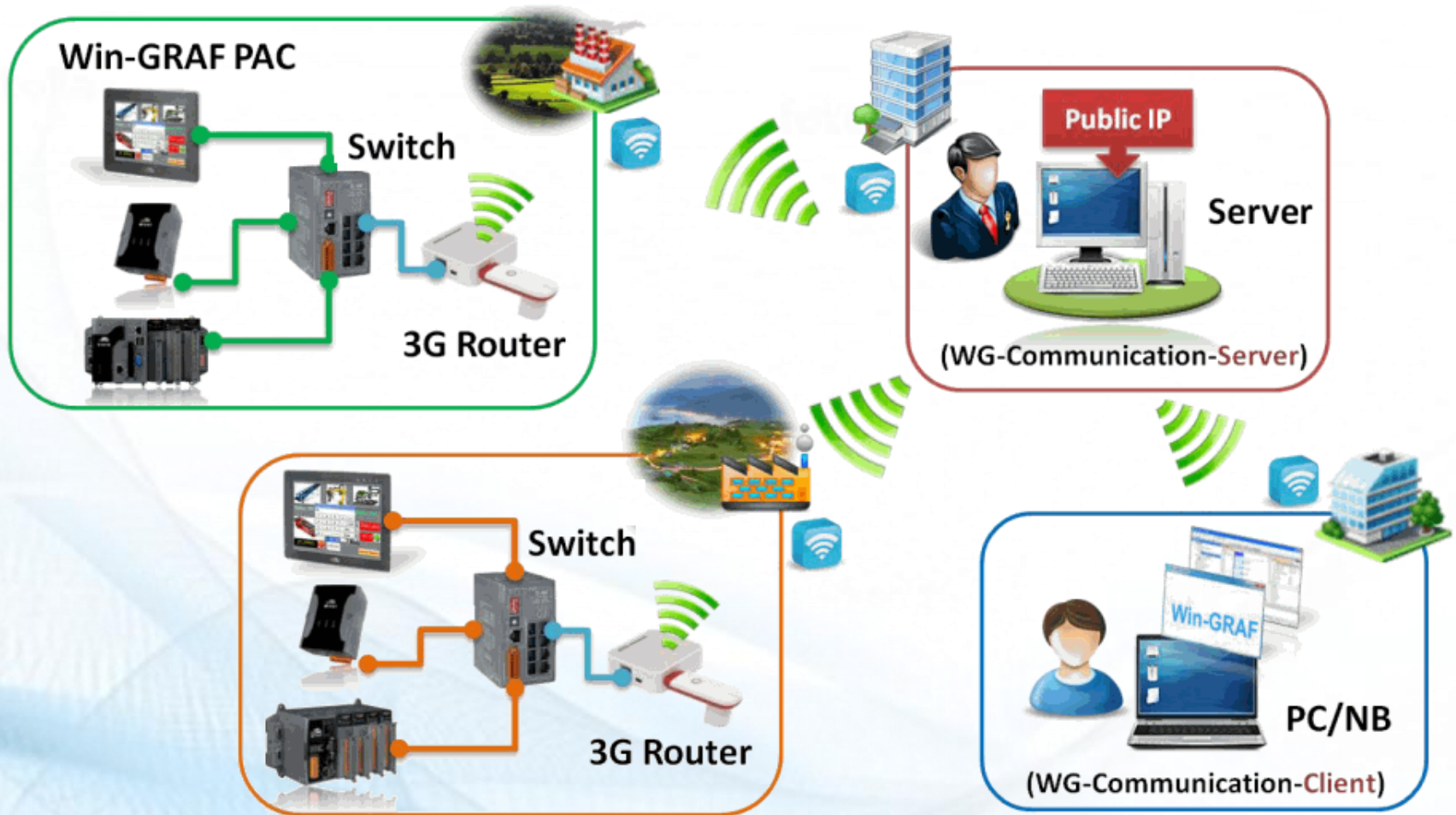
- Support the I-87H17W that plugged in the PAC to communicate with other HART devices.





Win-GRAF Features

Intelligent Win-GRAF 3G Solution





Basic Concepts For Programming



Variables

- Name : Starting with “A” ~ “Z”
Case insensitive , “MOT” is same as “moT”
Can use 0 ~ 7 or “_” for 2nd ~ *th character
- Input / Output variable only appear in I/O boards
- Function block instance variables must assign type as a function block name, for example, the type of the Inst_TIME_GET variable must be TIME_GET.



Variable Types

Type	Bits	Value range
BOOL (*)	---	TRUE · FALSE
SINT	8 bits (Small int, signed)	-128 ~ +127
USINT	8 bits (Unsigned small int)	0 ~ +255
BYTE		
INT	16 bits (Int, signed)	-32768 ~ +32767
UINT	16 bits (Unsigned int)	0 ~ +65535
WORD		
DINT (*)	32 bits (Double int, signed)	-2147483648 ~ +2147483647
UDINT	32 bits (Unsigned double int)	0 ~ +4294967295
DWORD		
LINT	64 bits (Large int, signed)	$-2^{63} \sim +(2^{63}-1)$
ULINT (No support)	64 bits (Unsigned large int)	$0 \sim +(2^{64}-1)$
LWORD (No support)	No support the Win-GRAF PAC.	
REAL (*)	32 bits (Floating point)	$\pm 3.4 \times 10^{-38} \sim \pm 3.4 \times 10^{38}$
LREAL	64 bits (Floating point)	$\pm 1.7 \times 10^{-308} \sim \pm 1.7 \times 10^{308}$
STRING (*)	Max. 255 characters	---
TIME (*)	32 bits	T#0ms ~ T#23h59m59s999ms

*: Common



TIME Variable

- Value : T#23h59m59s999ms
- Always positive, “-T#5s “ is wrong
- “T#10.5s” is wrong, “T#10s500ms” is correct
- Can tick / stop / reset a time variable

tStart(TIME_VAR1) ;

tStop(TIME_VAR1) ;

TIME_VAR1 := T#0s ;



Type Conversion

- Math calculation should use same type.

Wrong : `DINT01 := REAL01 + 5 ;`

Correct: `DINT01 := Any_To_DINT(REAL01) + 5 ;`

- Comparing value should use same type.

Wrong : `if DINT01 > REAL01 then`

Correct: `if Any_To_REAL(DINT01) > REAL01 then`



Type Conversion Functions

- Help on Win-GRAF workbench, search “conversion”

Any_To_BOOL , Any_to_SINT

Any_To_INT , Any_To_DINT

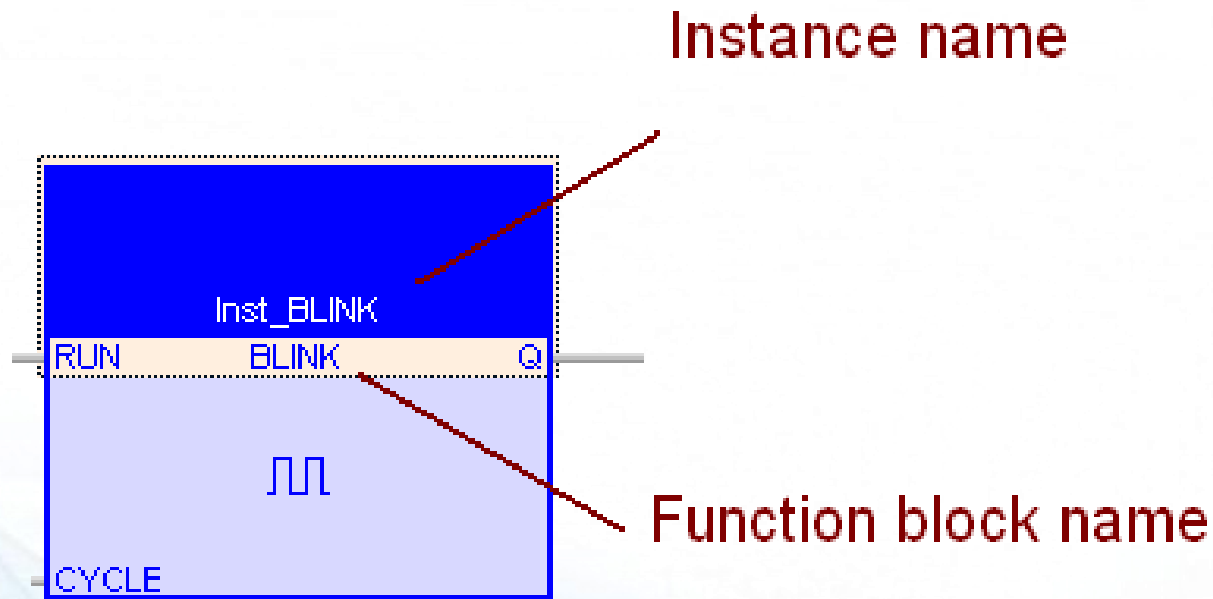
Any_To_LINT , Any_to_REAL

Any_To_LREAL , Any_To_TIME

Any_To_STRING , NUM_To_STRING

BIN_To_BCD , BCD_To_BIN

Function Block Instance





ST Basics 1

- (* Here is comment *)
- Each statement ends with a “;”
A := B + C ; (* “:=” means assign *)
if A <= D then
 (* do operations ... *)
end_if ;



ST Basics 2

- “:=” means assignment
A := B * 5 ; (* correct *)
A = B * 5 ; (* wrong *)
- “=” means “are they equal?”, result is TRUE or FALSE
if A = B then (* correct *)
end_if ;
if A := B then (* wrong *)
end_if ;



Call a Function in ST

- `Return_val := fun_name(par1,par2, ...) ;`

or

`fun_name(par1,par2, ...) ;`

example:

`OK1 := COM_OPEN( 2 , '9600,N,8,1' ) ;`

`COM_OPEN( 2 , '9600,N,8,1' ) ;`



Call a Function Block in ST

- First declare a FB instance , type = FB name
- `fb_instance_name(par1,par2, ...)` ;
Return1 := fb_instance_name.out_par1;
Return2 := fb_instance_name.out_par2;

...

example: `my_unpack8` (type “unpack8”)

`my_unpack8( BYTE1)` ;

`BOO0 := my_unpack8.Q0` ;

...

`BOO7 := my_unpack8.Q7` ;



Have a try

Runtime Driver for PAC

Products	Version	Download	Size	Update
WP-8xx8	1.09	wp-8xx8-driver.zip	545 KB	Nov-02-2016
XP-8xx8-CE6	1.07	xp-8xx8-ce6-driver.zip	538 KB	Oct-07-2016
VP-x2x8	1.04	vp-x2x8-driver.zip	579 KB	Nov-23-2016
WP-5xx8	1.05	wp-5xx8-driver-1.05.zip	522 KB	Jul-27-2015
Win-GRAF Lib	1.07	Win-GRAF-Lib-1.07.zip	496 KB	Jun-24-2015

Note: The Win-GRAF Driver can run only 2 hours on the controller (PAC) without runtime license.



Have a try Developer for PC



Products	Version	Download	Size	Update
Win-GRAF Workbench	1.07	Win-GRAF-setup-ver-1.08.zip	55.6 MB	Jul-29-2015

- Available on Windows **XP/7/8/10**
- Limitation in Demo Mode:
 - Applications are limited to **40 I/Os**
 - The code generated by the compiler and run in the controller (PAC) stops after **15 minutes**
 - The simulation on PC stops after **15 minutes**



Further Information

http://www.icpdas.com/root/product/solutions/softplc_based_on_pac/win-graf/download.html

Home > Product > Solutions > Soft PLC, Win-GRAF & eLogger HMI > Documents - PPT/Data Sheet/Manual/

Win-GRAF



PAC/Soft PLC Development Kit

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Introduction

[What is Win-GRAF ?](#)

[Win-GRAF Workbench Features](#)

[Win-GRAF PAC Features](#)

[Ordering Information](#)

Software / Support

[PAC Driver](#)

[Win-GRAF Workbench](#)

[Win-GRAF FAQ](#)

Documents

[Win-GRAF vs ISaGRAF](#)

[Win-GRAF Sliders](#)

[Win-GRAF Datasheets](#)

[Win-GRAF Manuals](#)

Win-GRAF PAC

[WP-5238-CE7](#)

[WP-8xx8](#)

[WP-8xx8-CE7](#)

[VP-x208-CE7](#)

[VP-x238-CE7](#)

[XP-8x48-CE6](#)

[WP-9xx8-CE7 \(Available soon\)](#)

Documents

中文

Products	Download	Size	Date
Win-GRAF vs ISaGRAF		283 KB	Dec-07-2015
Win-GRAF vs ISaGRAF Slider	 	2.6 MB / 3 MB	July-03-2017
Win-GRAF Workbench Slider	 	3.8 MB / 6.6 MB	July-21-2017
Win-GRAF PAC Slider	 	1.1 MB / 1.3 MB	July-24-2017

中文

Datasheets

Products	Download	Size	Date
Data Sheet: Win-GRAF		981 KB	Mar-21-2017
Data Sheet: WP-5238-CE7		1.3 MB	Mar-21-2017
Data Sheet: WP-8xx8		1.3 MB	Mar-21-2017



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Thank you!



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