Application Note GE IP (GE Fanuc) I/O and Proficy Machine

This document guides you through the setup of proprietary vendor specific software installed on you PC. Your supervisor may provide you with additional or alternative instructions.

The document consists of standard instructions that may not fit your particular solution. Please visit our support website for latest revisions of documentation and firmware:

http://www.secomea.com

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Prerequisites for This Guide

This guide will assist you to setup a remote and online connection to the GE Intelligent Platforms Remote I/O CPU placed on the customer site using the Proficy Machine software installed on your PC.

This guide discusses a GE Intelligent Platforms Remote I/O Series 9030 (CPU IC693 / CPU313) and connection via Proficy Machine Edition 8.0.

Other GE controllers or program editions (such as Versapro) may work, but has not been verified.

Also note the Appendix B, which briefly explains possible steps to adapt to older GE equipment and software.

Prerequisites for this guide are:

- You have an operational LinkManager build 13094 or later installed on your PC with a GateManager certificate that allows you to connect to the SiteManager agents.
- You have the Proficy Machine software installed on your PC.
- You have the GE device agent installed and configured on the SiteManager with FW 13495 or later at the remote site, and there is access between the SiteManager and the GE device, by either Serial and/or Ethernet. The corresponding agent in the SiteManager will be as one of the agents depicted here:

					GateMa	anager Ag	ents
					Using	; 2 of 2 agent	ts
Status	Disable	S/N	Device Name		Device Type		Device IP & Parameters
IDLE		#01	Series 9030 Ethernet	GE IP	•	Ethernet 🔻	192.168.0.160
IDLE		#00	Series 9030 Serial	GE IP	•	Serial 🔻	
					Save	SNMF	>>>

If any of these prerequisites are not met, you should contact the person / department responsible within your own company or at the company responsible hereof.

System Overview

The communication path is as follows:

Proficy Machine \rightarrow LinkManager \rightarrow GateManager \rightarrow SiteManager \rightarrow PLC.

This guide will elaborate on the components marked with **bold**.

The following system overview depicts a SiteManager 1029 at the customer location:





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Ethernet Access 1.

Note: The network attached PLC must be configured with agent device type GE IP / Ethernet on the SiteManager with minimum firmware version 13495

1. Locate the agent that represents you Ethernet attached GE IP, and click the text to connect to it

LinkManager sectmea	
Logout Services GM Login	Sniffer Chat Refresh
mary-domain:	gm07.Mary-Inc
gm07.Mary-Inc	🖉 🖌 — mary-domain [PH-DTP-PC]
Show all Refresh	Image: Warys installation <connect all=""> Image: Warys installation Image: Warys installating<</connect>
	Show all Expand all Refresh

2. You will not see any activity on it yet. This only starts when you connect to the PLC via your project (Make a note of the IP address of the PLC):

Link	(Ma iea	nager									
		Disconnect	Logout Se	ervices	Sr	iffer	Cha	at			
			gm07	.Mary-Inc	:						
		Ser	ies 9030 Ethernet (Mar	ys installa	tion) -	192.168.0	.160				
		Agent	Address	Status	Con	nects	Pac	kets	By	tes	
		Agene	Address	Status	ok	fail	tx	rx	tx	rx	
	8	Series 9030 Ethernet	192.168.0.160:18245	IDLE	0	0	0	0	0	0	



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 Make sure the Proficy Machine Edition 8.0 software is set for the correct CPU type.



4. Set the Target Connection type:





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5. Set the Physical port to Ethernet and set the SNP_T1 parameter to 30 or higher (Minimum Turn-around Time)

🔏 Secomea - Proficy Machine Edition - [Info	Inspector	
🗚 Eile Edit Search Project Target Variables	Туре	GE IP Controller
i 📴 🚅 🖬 🍜 🧹 🖣 🛼 🔿 🕺 🖁 😭 😭	Description	
	Documentation Address	
	Family	Series 90-30 PLC
	Controller Target Name	ecomea1
Navigator 4 X	Update Rate (ms)	250
P	Sweep Time (ms)	Offline
E A Target 1	Controller Status	Offline
🚽 Data Watch Lists 🔍 📕	Enable Shared Variables	False
	Physical Port	ETHERNET
<u></u>	Additional Configuration	
Companion	SNP ID	
Additional Configuration ▷ Advanced SN	Stop Bits	1
SNP_11 The value of the SND T1 timer. This is the	Parity	Odd
around Time, in milliseconds. Default: 10 i	Baud Rate	19200
Additional Configuration > Advanced SN	Connect Timeout (ms)	10000
SNP_T2	Request Timeout (ms)	16000
The value of the SNP 12 timer. This is the	EAdvanced SNP Parame	
Enter a positive value (ms).	SNP_T1	80

6. Configure the IP address to be the local address of the GE IP (in this example 192.168.0.160), and connect to it.

You are now online with the PLC. You can now observe data traffic in the LinkManager:

Link secum	(Mai lea	nager									١
		Disconnect	Logout Se	ervices	Sn	iffer	Ch	at			
			gm07	.Mary-Inc	:						
		Ser	ies 9030 Ethernet (Mary	ys installa	tion) -	192.168.	0.160				
		A	A	Chatra	Conr	iects	Pac	kets 🛛	By	tes	
		Agent	Address	Status	ok	fail	tx	rx	tx	rx	
	'⊛*	Series 9030 Ethernet	192.168.0.160:18245	UP:1	2	0	1,312	1,312	3,951	34,762	
		Rour	id-trip time: Min: 5.7 m	s, Avg: 5.	9 ms, I	Max: 6.0	ms 🤣				

Basic hints on Proficy setup: To be able to Upload and download a project you need to select the right PWR and CPU. In this example we have set the modules ...321 PWR and ...313 CPU under properties. First try Uploading the project, then set the online command to Programmer Mode then you can download the project again.



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2. Serial Access (SNP communication)

Note: The network attached PLC must be configured with agent device type **GE IP / Serial** on the SiteManager with minimum firmware version 13495.

1. Locate the agent that represents your Serial attached GE IP, and click the text to connect to it.

LinkManager secimea	
Logout Services GM Login	Sniffer Chat Refresh
mary-domain:	gm07.Mary-Inc
gm07.Mary-Inc	₽ ₽ ₩ mary-domain [PH-DTP-PC]
Show all Refresh	
	Show all Expand all Refresh

2. When connecting to the agent, you should see some activity in the tray icon area, which is the auto configuring of a virtual serial port. If your SiteManager, and GE IP is correctly attached, you should also see the status of the agent become OK, and a few bytes of traffic:

Lin	kMana mea	ger								5
		Discor	nnect Logout Ser	vices	Sniffe	er	Chat			
			gm07.1	Mary-Inc						
			Series 9030 Serial	(Marys ins	tallatio	ו)				
	Acont		Address	Ctatur	Conr	iects	Pac	kets	By	tes
	Agent		Address	Status	Conr ok	nects fail	Pac tx	kets rx	By: tx	rx
	Agent √ Series 9	030 Serial	Address	Status	Conr ok 1	nects fail 0	Pac tx 3	kets rx 2	Byt tx 39	rx 39



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3. Now right click the LinkManager system tray Icon, and select **Status**. Make note of the Serial port that has been assigned (in this case COM3):



4. Enter the Inspector panel for the Target and set the Physical Target port to the same port, and set the SNP_T1 parameter to 30 or higher (Minimum Turn-around Time)

🔏 Secomea - Proficy Machine Edition - [Info	Inspector	×
🗚 Eile Edit Search Project Target Variables	Туре	GE IP Controller
i 💯 🚅 🖬 🍜 🗸 🎙 🛼 💿 🧴 🛍 😭	Description	
	Documentation Address	
	Family	Series 90-30 PLC
	Controller Target Name	ecomea1
Navigator + ×	Update Rate (ms)	250
Pi	Sweep Time (ms)	Offline
E Secomea	Controller Status	Offline
🚔 Data Watch Lists 🛛 🖌	Enable Shared Variables	False
<	Physical Port	СОМЗ
<u> Z. /. Z. </u> Z. <u>Z.</u>	EAdditional Configuration	
Companion	SNP ID	
Additional Configuration ▷ Advanced SN	Stop Bits	1
SNP_TI The value of the SNB T1 timer. This is the	Parity	Odd
around Time, in milliseconds. Default: 10 i	Baud Rate	19200
Additional Configuration > Advanced SN	Connect Timeout (ms)	10000
SNP_T2	Request Timeout (ms)	16000
The value of the SNP 12 timer. This is the	EAdvanced SNP Parame	
Enter a positive value (ms).	SNP_T1	30



5. Connect, and you should now be online with the PLC. You can now observe data traffic in the LinkManager:

Lin	KΜ(mea	anager							(
			Disconnect Logout	Servi	ces	Sniff	er			
			gm06.Je IMO Seriel PL	C (PH-De	mo2)					
		Agent	Address	Status	Con	nects	Pack	kets	By	tes
					ok	fail	tx	rx	tx	rx
	5	IMO Seriel PLC	172.24.2.128:23> 127.0.0.1	UP:1	1	0	101	2	398	101

Basic hints on Proficy setup: To be able to Upload and download a project you need to select the right PWR and CPU. In this example we have set the modules ...321 PWR and ...313 CPU under properties. First try Uploading the project, then set the online command to Programmer Mode then you can download the project again.

 Optionally right click the LinkManager system tray icon again, and select Options. Enter the number of the COM port you found under status. This will ensure that you will always get this port in the future.

IMPORTANT: if you change the port you must stop and start the LinkManager.

Options	
COM port	Net Type C Bridged C NAT
ОК	Cancel

Note: You can also force another COM port (e.g. COM2). Just ensure in your Windows device manager, that the port is not conflicting with an existing COM port. See Appendix A for info on how to organize COM ports.

2.1. Trouble shooting

If you have trouble connecting, or the connection is instable, it may be because you are running on a slow line. Try increasing the SNP_T1 (Minimum Turn-around Time) and retry.

Note: There may be a limit to how slow a line you can obtain a reliable connection on. If the connection remains unstable or very slow, you may conclude that the setup is not suited for remote access. Try using Ethernet connection instead, which will usually be faster, even on slow connections.



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3. Ethernet Connection from Virtual Machine

You can run the Proficy software inside a VMWare or VirtualBox machine, to a GE IP that is Ethernet attached to a SiteManager.

You can choose to run the LinkManager in-side or outside the virtual machine. Note that LinkManager can only run inside the virtual machine if the host OS is Windows 7 or 8 and the PC's CPU has support for virtualization.

The following illustrates VMWare Player, which can be downloaded from http://www.vmware.com/support/product-support/player/, and for LinkManager running outside the virtual machine (i.e. on the host OS system)

1. Locate your Windows VM that has the Proficy software installed, and enter Edit virtual machine settings.

Home Windows XP Professional 2
Windows XP Professional 2 State: Powered Off OS: Windows XP Professional Version: Workstation 5.x virtual machine RAM: 1024 MB
Edit virtual machine

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2. Make sure the Network Adapter settings is set to **NAT**:

Device	Summary	Device status
Wemory Processors Hard Disk (IDE)	1024 MB 1 8 GB (Preallocated)	Connected
SCD/DVD (IDE) ☐ Floppy	Auto detect Using drive A:	Network connection Origed: Connected directly to the physical network
Network Adapter	NAT Present	Replicate physical network connection state
🥯 Serial Port	Using port COM6	NAT: Used to share the host's IP address O Host-only: A private network shared with the host

- 3. Start the VMWare engine and on the host PC start LinkManager.
- 4. Follow the procedure of section **1 Ethernet Access** to get access to the PLC via LinkManager



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4. Serial connection from Virtual Machine

You can run the Proficy software inside a VMWare or VirtualBox machine, to a GE IP PLC that is attached to a SiteManager via a Serial cable.

You can choose to run the LinkManager in-side or outside the virtual machine. Note that LinkManager can only run inside the virtual machine if the host OS is Windows 7 or 8 and the PC's CPU has support for virtualization.

The following illustrates VMWare Player, which can be downloaded from http://www.vmware.com/support/product-support/player/, and for LinkManager running outside the virtual machine (i.e. on the host OS system)

- 1. Follow the steps in section **0**. This will create a COM port even if the PC does not have a physical COM port.
- 2. Locate your Windows VM machine that has Proficy software installed, and without starting it, enter **Edit virtual machine settings.**



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3. Add Serial Port to the Hardware list (if it does not already exist).

CD/DVD (IDE) Auto Floppy Using Network Adapter NAT OUSB Controller Prese	G Hardware Hard Disk CD/DVD Drive Floppy Drive USB Controller Sound Card	Explanation Add a serial port.
	Parallel Port Serial Port Generic SCSI Device	
	Add Remove	< Back Next > Cancel

4. Select "Use physical port" (Even though LinkManager makes a virtual COM port, VMWare sees it as a physical port)

Add Hardware Wizard 🛛 🛛 🔀
Serial Port Type What media should this serial port access?
Serial port
O Use physical serial port on the host
Output to file
Output to named pipe
< Back Next > Cancel



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5. Set the port to the COM port used by the LinkManager (see section 0)

Virtual Machine Setting	s	
Hardware Options		
Device Memory Processors Hard Disk (IDE) CD/DVD (IDE) Floppy Network Adapter USB Controller Sound Card Serial Port	Summary 256 MB 1 4 GB Using drive F: Using drive A: NAT Present Auto detect Using port COM3	Device status Image: Connected Image: Connection Image: Commercial port: Image: C

Note: If VMWare does not allow you to add a Serial port, it may be because the PC does not have a physical Serial port, but if LinkManager is started and connected, it would have created a virtual COM port that VMWare will see as a physical COM port.

- 6. Press **OK** twice, and select the Select **Finish** and **OK**, Start the VMWare Windows image, and start the Proficy software.
- 7. Follow the procedure described in section **2** on getting access to the PLC via LinkManager.

Note: VMWare will typically make the physical COM port of the host system (e.g. COM3) appear to the virtual OS as COM1. You should configure the Proficy to use the port of VMWare (COM1) and <u>not</u> the physical port of the host system (COM3) that is used by LinkManager.

4.1. Startup order of VMWare, LinkManager and Proficy

If you have already preset a COM port in LinkManager as well as in VMWare, the startup order would be irrelevant. You can stop and start the components individually.

If you encounter problems, or you have changed the COM port setting of LinkManager it is recommended to do the following:

- 1. Stop the VMWare engine.
- 2. Stop LinkManager completely.
- 3. Start LinkManager.
- 4. Connect to the Serial PLC and check the assigned COM port under Status (by right-clicking the LinkManager tray icon)
- 5. Check the COM port settings of the Virtual Machine Settings of the Windows image with the Proficy software.
- 6. Start the VMWare image.
- 7. Start Proficy software and connect to the PLC

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Appendix A, Organizing COM ports in Windows

Clean up Windows Registry for redundant COM ports:

You may experience that older versions of the Proficy software require a lower COM port number. In case your PC assigns a COM port of e.g. 13, it may be due to previous installs of virtual COM ports from in relation to installation of other programs.

You can clean your PC for redundant COM ports in Windows registry:

- 1. Open regedit (Start \rightarrow run \rightarrow Regedit)
- 2. Navigate to:

HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\COM Name arbiter

- 3. In the ComDB set all values to 00
- 4. Restart your PC

Enable LinkManager to use COM1:

If you prefer the COM port to be COM1:

Even if no COM ports are installed on the PC, Windows will never assign a COM port lower than COM3 to the LinkManager. You therefore have to do the following to force LinkManager to use COM1:

- Open Windows Control Panel → System → Hardware → Device Manager → Ports (COM & LPT).
- 2. If there already are physical COM ports listed, you must re-assign the port numbers to free up COM1.

Right click a COM port and select Properties \rightarrow Port Settings \rightarrow advanced

- 3. Change the COM port number in the drop down list.
- 4. Restart your PC.
- 5. Right click the LinkManager system tray icon and select Options.
- 6. Enter 1 in the COM port field.

Options	
COM port	Net Type C Bridged NAT
ОК	Cancel

7. Stop and Start the LinkManager and start the Serial agent.



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Appendix B, GE Fanuc Legacy Serial devices and software

You may come across other GE products, and you cannot be sure they will work according to the above procedure.

You may be able to pass date in a loopback test using a PC, but not via a modem or similar remote connection. Generally you may discover that Versamax products will not communicate at baud rates below 4800.

An example is the VersaMax products that beside the Proficy software, can be operated with the discontinued VersaPro software. Also you want to connect with other tools such as the Wizcon SCADA software.

Typical challenges is the Serial communication that may work fine locally, but may run slow or unstable remotely.

The following is some hints on tuning the serial agent:

1. In the SiteManager select a Customer / Serial agent, and click the Parameter details icon

	GateManager Agents							
				Usi	ng 2 of 2 agents			
Status	Disable	S/N	Device Name	Device Typ	e	Device IP & Parameters		Comment
IDLE		#01	Series 9030 Ethernet	GE IP	Ethernet 🔻	192.168.0.160	🔫 🗗	1
IDLE		#00	VersaMax	CUSTOM (Advanced) 🔻	Serial 🔻		(Pì	IC200UDR005-BG
				Sav	e SNMP	>>		

2. Click the Serial button:



 Change the Protocol from Vendor Agent Controlled to Raw+Telnet (RFC2217)

× 1	Serial Port
Protocol:	Raw+Telnet(2217)
Serial Driver:	Vendor Agent Controlled SMS Modem
Serial Driver Frame Size:	Telnet Telnet (RFC2217)
Serial Driver Frame Timeout	Raw
	Raw+Telnet
Add Latency:	Raw+Telnet(2217)

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4. Try adjust the Send Break on Connect parameter. It has been seen that lowering it to 100030 has a positive impact on older GE equipment.

	Serial Port	
Protocol:	Raw+Telnet(2217) ▼	
Serial Driver:	Standard 🔻	-
Serial Driver Frame Size:	255 bytes	
Serial Driver Frame Timeout:	10 milli-secs	
Add Latency:	0 m ¹ ecs	
Send Break on Connect:	100030 milli-secs	
Send Break on Disconnect:	0 milli-secs	
Port Number:	23	

- 5. Save the changes, and try to connect with LinkManager.
- 6. If you have problems still, try increasing the SNP_T1 (Maximum Turnaround Time) of the program up to e.g. 200.

NOTE: For general trouble shooting on serial connections, refer to the guide "SiteManager Serial agent setup and trouble-shooting guide" found in the Secomea support section.



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