

ROBOGUIDE + Ethernet I/P

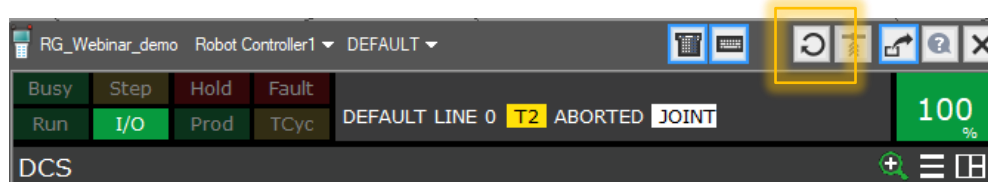
- ROBOGUIDE can support Ethernet I/P communication with Rockwell PLCs!
- Limitations
 - Can only connect to one virtual robot at a time
 - Does not work if virtual robot is using loopback addressing (i.e. RIPE in multi-robot iRPickPRO cell or Paint cell, IIC, etc.)
 - RPI settings may need to be relaxed (~750ms) to maintain good PC performance



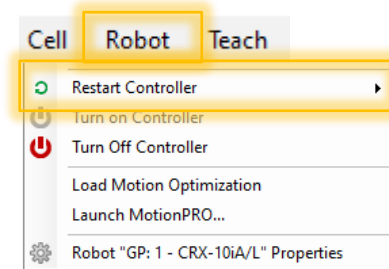
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Workcell Configuration:

- Select one or more of:
 - Advanced EIP Pkg. (R860),
 - Ethernet/IP Scanner (R540) (Scanner includes Adapter)
 - Ethernet/IP Adapter (R784) (does not include Scanner)
 - Ethernet/IP EDA (R822)
- Set \$EIP_ENBL_IO = 1, and confirm \$IO_AUTO_CFG and \$IO_AUTO_UP are FALSE ([MENU]->Next->System->Variables)
- Cold Start Controller:



<OR>

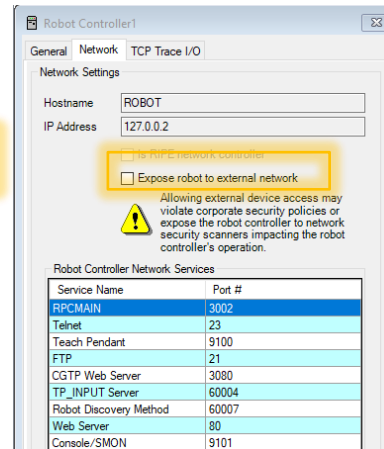
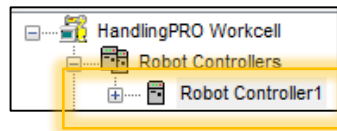
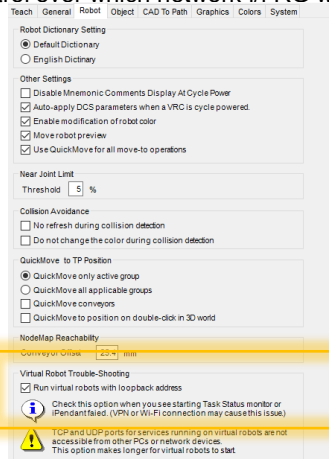


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Robot IP Configuration (**ROBOGUIDE V9 Rev T or later**): older RG version proceed to next slide

- In ROBOGUIDE window, go to Tools->Options, then Robot tab, and ensure box is checked for “Run virtual robots with loopback address”
- Select “Robot Controller1” from the Cell Browser tree and find the Network Tab
- Check ‘expose robot to external network’. Robot will power cycle and you will then see your PC’s IP Address in the IP Address field

Unfortunately there is little control over which network i/f RG will bind to. You may need to temporarily disable all network interfaces you DON'T want RG to bind to before doing this



Robot IP Configuration

- This is required for any version of RG even later than Rev T.
- On Teach Pendant go to TCP/IP Detail Screen in Host Comms ([MENU]->Setup->Host Comm)
- Check your PC's IP address ('ipconfig' from Command Prompt, or Windows Network and Sharing Center)
- Match the PC's IP info into Port 1 of the TCP/IP configuration

Ethernet adapter Ethernet:
Connection-specific DNS Suffix . : frna.com
Link-local IPv6 Address : fe80::e5f3:e851:7557:1d03%15
IPv4 Address. : 172.22.72.1
Subnet Mask : 255.255.240.0
Default Gateway : 172.22.64.1

RoboGuideToRockwell - Robot Controller1

Busy Step Hold Fault PRIO-230 EtherNet/IP Adapter Error (1)
Run I/O Prod TCyc PRIO-231 EtherNet/IP Adapter Idle JOINT 100%

SETUP Host Comm 7/42

TCP/IP
Robot name: ROBOT
Port#1 IP addr: 172.22.72.1
Subnet Mask: 255.255.240.0
Board address: *****
Router IP addr: 172.22.64.1
PC Jog IP addr: 192.168.0.100
OP Panel IP addr: 192.168.0.100

Host Name (LOCAL) Internet Address
1 *****
2 *****

Robot EIP Adapter Configuration:

- Go to Ethernet I/P configuration ([I/O]->F1:Type->EthernetI/P)
- Set Connection1 ENABLE to TRUE
- Go to F4:Config for Connection1
- Record the Input and Output size (16-bit words)

Busy	Step	Hold	Fault	PRIO-230 EtherNet/IP Adapter Error (1)				100 %
Run	I/O	Prod	TCyc	PRIO-231 EtherNet/IP Adapter Idle JOINT				
I/O EtherNet/IP								
EtherNet/IP List (Rack 89)					1/64			
Description		TYP	Enable	Status	Slot			
Connection1		ADP	TRUE	ONLINE	1			
Connection2		ADP	FALSE	OFFLINE	2			

```
Adapter config(Read-only):

Description :      Connection1
Input size (words) :      4
Output size(words) :      4
Alarm Severity : WARN

Scanner IP : *****
API O=>T :      0
API T=>O :      0
```

PLC Configuration:

- Configure Ethernet cards as appropriate using RS Linx and RS Logix
 - See page 11 for Remote Scanner configuration details
- Once configured, add new module as 'FANUC Robot R30iB Plus' EtherNet/IP connection
- Configure EIP Module to scan PC's IP Address
- Note Input Output Size in PLC is in (8-bit) bytes and Robot control is in words ($8 \times 8 = 64$, $16 \times 4 = 64$). Ensure total size matches
- May need to increase EIP to up to 750ms for a stable connection
- RSLinx or any other software that uses TCP port 44818 must be disabled (may need to reboot PC after). See addendum at end for more information

Robot I/O Configuration:

- Delete assignment of first 64 DI and DO bits ([I/O]->F2:Config)
 - You can use any 64 bits, does not have to be the first 64.
- Then set to Rack 89, slot 1, start 1

#	RANGE	RACK	SLOT	START	STAT.
1	DO[1- 8]	0	1	21	ACTIV
2	DO[9- 16]	0	1	29	ACTIV
3	DO[17- 20]	0	1	37	ACTIV
4	DO[21- 24]	0	0	0	UNASG
5	DO[25- 64]	0	2	1	ACTIV
6	DO[65- 104]	0	3	1	ACTIV
7	DO[105- 144]	0	4	1	ACTIV
8	DO[145- 512]	0	0	0	UNASG



#	RANGE	RACK	SLOT	START	STAT.
1	DO[1- 64]	0	0	0	UNASG
2	DO[65- 104]	0	3	1	ACTIV
3	DO[105- 144]	0	4	1	ACTIV
4	DO[145- 512]	0	0	0	UNASG



#	RANGE	RACK	SLOT	START	STAT.
1	DO[1- 64]	89	1	1	PEND
2	DO[65- 104]	0	3	1	ACTIV
3	DO[105- 144]	0	4	1	ACTIV
4	DO[145- 512]	0	0	0	UNASG

- You can also map UOP/UIP

#	RANGE	RACK	SLOT	START	STAT.
1	UO[1- 20]	89	1	1	PEND

#	RANGE	RACK	SLOT	START	STAT.
1	UI[1- 18]	89	1	1	PEND

ROBOGUIDE + Ethernet I/P

- To be able to cycle start the robot from the PLC:
 - Map UIP/UOPs to EIP
 - Make sure Enable UI Signals is set to TRUE and Remote/Local set to Remote in System->Config
 - set \$RMT_MASTER = 0 to cycle start (this may get periodically reset so use BG Logic or Cold Start program to set the value back)
 - Cycle start requires special registry file from FANUC to allow external control of ROBOGUIDE
 - MapPnsRsrSignals_Disable.reg allows UOPs to be mapped to PLC
 - MapPnsRsrSignals_Enable returns virtual control to the robot
 - Re-open ROBOGUIDE after running
 - Contact FAC for these files

```
5 HOT START done signal: DO[ 0]
6 Restore selected program: TRUE
7 Enable UI signals: TRUE
8 START for CONTINUE only: FALSE
9 CSTOP for ABORT: FALSE
```


Virtual Robot as Scanner

- It is also possible to use ROBOGUIDE's virtual robot to scan a real controller or other I/O device(s)
 - Follow all steps thru Slide 4
 - For scanning a real controller with ROBOGUIDE-based scanner, an example of valid config details are below. See Slide 11 for more info
 - Again, relaxed RPI settings will be required

```
I/O EtherNet/IP
Scanner config(Read-only) :
  Description :      real robot
  Name/IP address :  192.168.1.100
  Vendor Id :      356
  Device Type :     12
  Product code :     4
  Input size ( words):  2
  Output size ( words): 2
  RPI (ms) :        750
  Assembly instance(input) : 101
  Assembly instance(output) : 151
  Configuration instance : 100
```

Input/output size can be larger than 2/2, this is just example

Port 44818 Addendum

- RSLinx always wants to bind to Port 44818, so if possible, close it, reboot, and ensure you open ROBOGUIDE first.
- Two good methods to check if ROBOGUIDE has bound to port 44818
 - CMD prompt: 'netstat -a -b -o', scroll to find 44818 and make sure FRVIRT~.exe is shown
 - PowerShell: `Get-Process -Id (Get-NetTCPConnection -LocalPort 44818).OwningProcess`
 - Also looking for FRVIRT~.exe here
- Permanently Prevent RS Linx from grabbing 44818:
 - Open RS Linx, under View select Options...
 - In General tab, uncheck "Accept UDP messages on Ethernet Port"
 - Restart RS Linx, check if it still has 44818. If no, that is all. If yes, continue below.
 - Open FactoryTalk Admin console and select Local directory
 - Select Communications in bottom tab
 - Right Click EtherNet module, select Properties
 - Advanced tab, uncheck "Listen on EtherNet I/P encapsulation ports". You may get some warnings here
 - Restart RS Linx again and confirm it does not have 44818

Configuring remote scanner (3.2.2 from EIP Setup/Operations Manual)

Table 3–3. Adapter Configuration Summary

ITEM	DESCRIPTION
Vendor ID	356
Product Code	4 or 40 (Please refer Table 2–3)
Device Type	12 or 140 (Please refer Table 2–3)
Communication Format	Data – INT
Input Assembly Instance	101 –132 for slots 1 –32 and 1101 — 1132 for slots 33–64
Input Size	User Configurable, Set in 16-bit Words
Output Assembly Instance	151 –182 for slots 1 –32 and 1151 –1182 for slots 33–64
Output Size	User Configurable, Set in 16-bit Words
Configuration Instance	100
Configuration Size	0

Table 3–4. Connection Points

Slot Number	Input Assembly Instance	Output Assembly Instance
1	101	151
2	102	152
3	103	153

Slot Number	Input Assembly Instance	Output Assembly Instance
1	101	151
2	102	152
3	103	153

Slot Number	Input Assembly Instance	Output Assembly Instance
4	104	154
5	105	155
6	106	156
7	107	157
8	108	158
9	109	159
10	110	160
11	111	161
12	112	162
13	113	163
14	114	164
15	115	165
16	116	166
17	117	167
18	118	168
19	119	169
20	120	170
21	121	171
22	122	172
23	123	173
24	124	174
25	125	175
26	126	176
27	127	177
28	128	178
29	129	179
30	130	180
31	131	181
32	132	182
33	1101	1151
34	1102	1152
35	1103	1153
36	1104	1154
37	1105	1155
38	1106	1156
39	1107	1157