Cost Effective Redundancy System by uPAC-7186EG or I-8437-80

Download FAQ-084 Demo

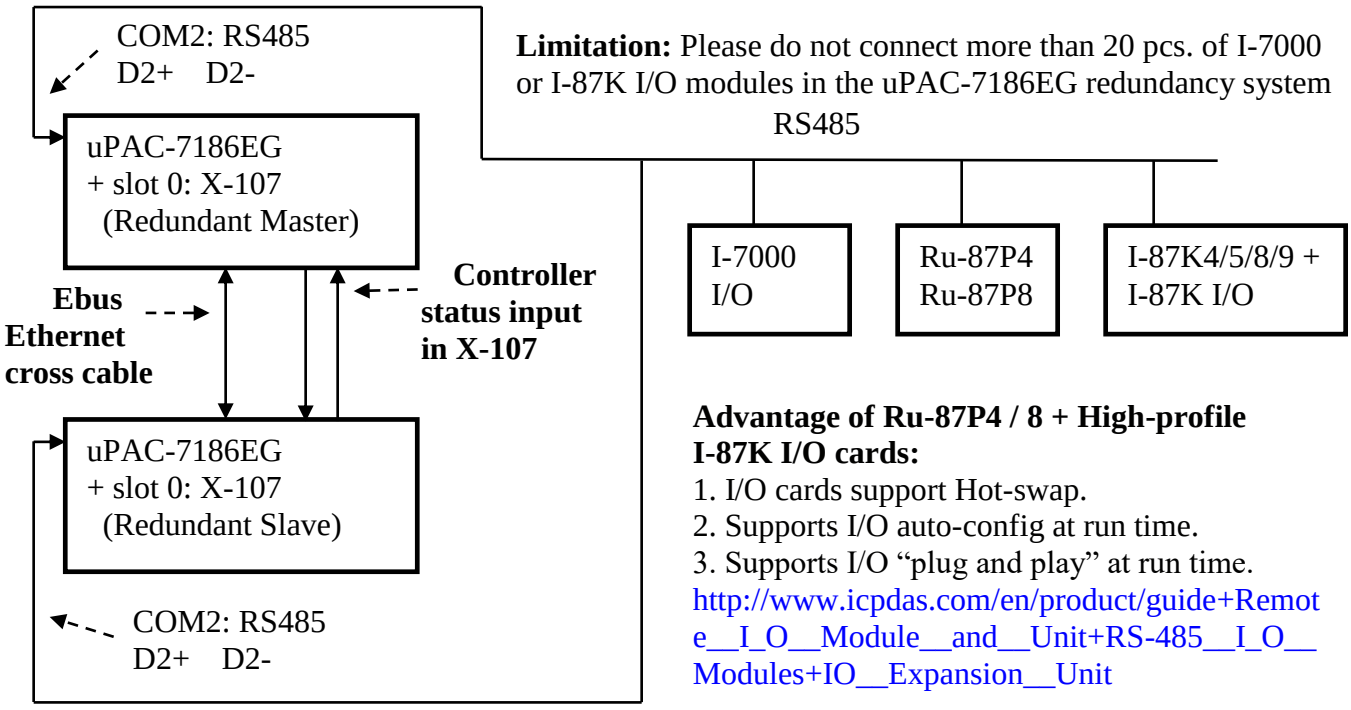
Note:

1. W-8347 and W-8747 support better CPU redundancy solutions. Please refer to https://www.icpdas.com/en/faq/index.php?kind=280#751 >FAQ-041 and FAQ-062. The CPU speed of Wincon is about 10 to 20 times faster compared with the 40MHz I-8417/8817/8437/8837 and I-7188EG/XG's CPU.
2. The uPAC-7186EG and I-8437-80 can setup a redundancy system. Their CPUs are 80MHz. The CPU speed is about 2 to 4 times faster compared with the 40MHz I-7188EG/XG's CPU.

1. Hot-Swap Redundancy System by uPAC-7186EG plus RU-87P4 / RU-87P8

uPAC-7186EG (Driver since it is released) supports Redundancy solution. The configuration is listed as the following. It supports hot-swap I/O if using RS-485 expansion unit of RU-87P4 and RU-87P8 plus high-profile I-87K I/O cards. The Ebus are for exchanging data between the "Redundant Master" & "Redundant Slave". The controller status inputs in X-107's D/I channel are to indicate the other controller – "I am still alive". Please wire Ch. 1 output of the redundant master's X-107 to Ch.1 input of the redundant slave's X-107. And also wire Ch. 1 output of the redundant slave's X-107 to Ch.1 input of the redundant master's X-107.

uPAC-7186EG: Redundancy system



Advantage of Ru-87P4 / 8 + High-profile I-87K I/O cards:

1. I/O cards support Hot-swap.
2. Supports I/O auto-config at run time.
3. Supports I/O "plug and play" at run time.

http://www.icpdas.com/en/product/guide+Remote__I_O__Module__and__Unit+RS-485__I_O__Modules+IO__Expansion__Unit

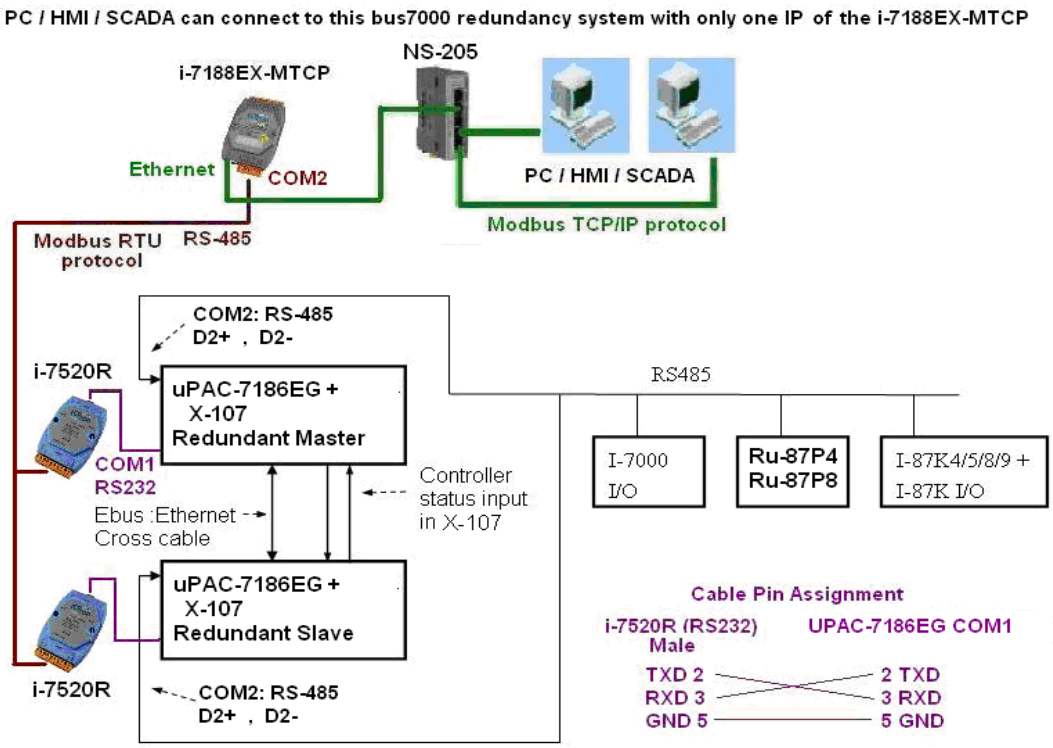
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Operations Principle:

1. When the system is powered up, the control of RS-485 I/O modules belong to “Redundant Master”.
2. If “Redundant Master” is damaged (or Power off), “Redundant Slave” takes the control of RS-485 I/O modules.
3. If “Redundant Master” is alive from damaged (or power up again), it takes the control of RS-485 I/O modules again. The change over time of (2) and (3) is about 5 seconds.
4. Control data is exchanging via Ebus (if using a cross cable, no need any Ethernet switch).
5. All I/O should be RS-485 I/O except the status I/O in the slot 0: X-107

Demo program: new “demo_51a” and “demo_51b” released since Nov.10, 2007
http://www.icpdas.com/en/download/show.php?num=1005&nation=US&kind1=&model=&kw=isagraf

User can use the “COM_MRTU” function to disable the uPAC-7186EG’s COM1 port if it is NOT redundant active (then its COM1 will never answer any question to the PC / HMI / SCADA). And also enable its COM1 by “COM_MRTU” function if it is redundancy active. Then at any time only the redundancy active controller will reply to the PC / HMI / SCADA as below configuration. (Please refer to demo_51a & demo_51b). Section 3 of this paper lists the steps to setup the I-7188EX-MTCP (Modbus TCP/IP to Modbus RTU gateway). (**Important: Please set these two uPAC-7186EG’s Net-ID to the same No. for ex., setting as No. 1. And the IP should be different but in the same domain. For ex., setting as 192.168.1.8 and 192.168.1.9. Mask should all set to 255.255.255.0**)



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Some important note in the demo program “demo_51a” and “demo_51b”:

1. If your application doesn’t setup any HMI or SCADA device to connect to this redundancy system, you can delete the first Ladder run which using the “COM_MRTU” function in the “M_B7000” program in the “demo_51a” and in “S_B7000” program in the “demo_51b”. Then the COM1 port of the uPAC-7186EG will be always Modbus RTU slave port. It will reply always if you send Modbus request to it even it is not redundant active.

2. There are three useful variables which show “who is the current active controller” and the “controller (or Ebus communication or DI / DO) status”. Your HMI and SCADA can request these three values to know the current working status if assigning a proper Modbus network number to them. They are listed as following.

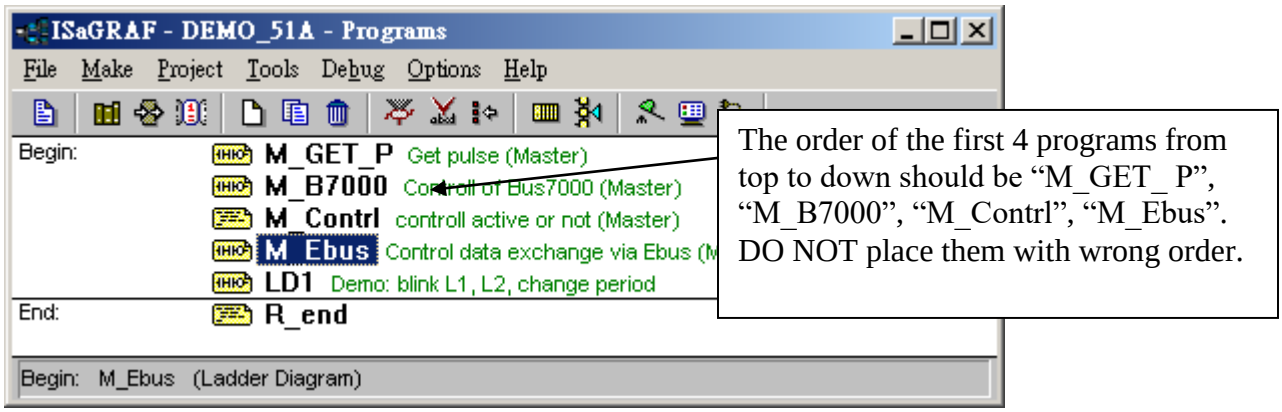
Name	**Type**	**Description**	**NetWork number**
i_am	Integer	1: means I am Master controller 2: means I am Slave controller	Not assigned yet
Master_Ok	Boolean	True: Master controller is working OK Flase: Master controller is not working OK (for ex, power OFF, Ebus cable broken, DI/DO broken)	Not assigned yet
Slave_Ok	Boolean	True: Slave controller is working OK Flase: Slave controller is not working OK (for ex, power OFF, Ebus cable broken, DI/DO broken)	Not assigned yet

3. There are three programs should to be modified in “demo_51a” and “demo_51b” to fit your real application.

(1) In the “M_B7000” and “S_B7000” programs:
search the “Add YOUR RS-485 I/O CONTROL of BUS7000 Here”
(2) In the “M_Contrl” and “S_Contrl” programs:
search the “Add YOUR CONTROLL data here”
(3) In the “M_Ebus” and “S_Ebus” programs:
search the “ADD YOUR EBUS CONTROL in the Following”

4. All the other programs below the “M_Ebus” and “S_Ebus” in the “demo_51a” and “demo_51b” should be identical programs. Only the first 4 - “M_GET_P”, “M_B7000”, “M_Contrl” & “M_Ebus” in the “demo_51a” are different as the first 4 - “S_GET_P”, “S_B7000”, “S_Contrl” & “S_Ebus” in the “demo_51b”.

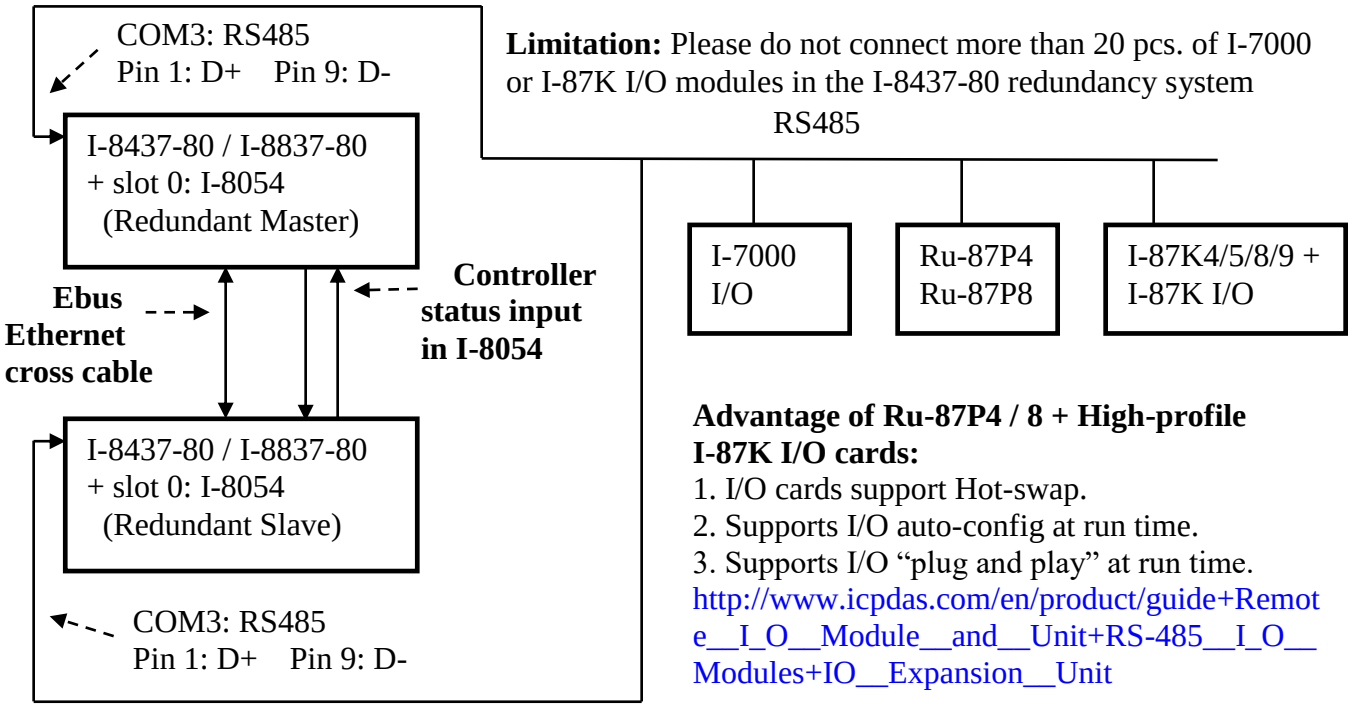
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2. Hot-Swap Redundancy System by I-8437-80 plus RU-87P4 / RU-87P8

I-8437-80 / I-8837-80 (Driver rev.3.23 or later version) supports Redundant Bus7000b. The configuration is listed as the following. It supports hot-swap I/O if using RS-485 expansion unit of RU-87P4 and RU-87P8. The Ebus are for exchanging data between the "Redundant Master" & "Redundant Slave". The controller status inputs in I-8054's D/I channel are to indicate the other controller – "I am still alive". Please wire Ch. 1 output of the redundant master's I-8054 to Ch.1 input of the redundant slave's I-8054. And also wire Ch. 1 output of the redundant slave's I-8054 to Ch.1 input of the redundant master's I-8054.

I-8437-80: Redundancy system



Advantage of Ru-87P4 / 8 + High-profile I-87K I/O cards:

1. I/O cards support Hot-swap.
2. Supports I/O auto-config at run time.
3. Supports I/O "plug and play" at run time.

http://www.icpdas.com/en/product/guide+Remote__I_O__Module__and__Unit+RS-485__I_O__Modules+IO__Expansion__Unit

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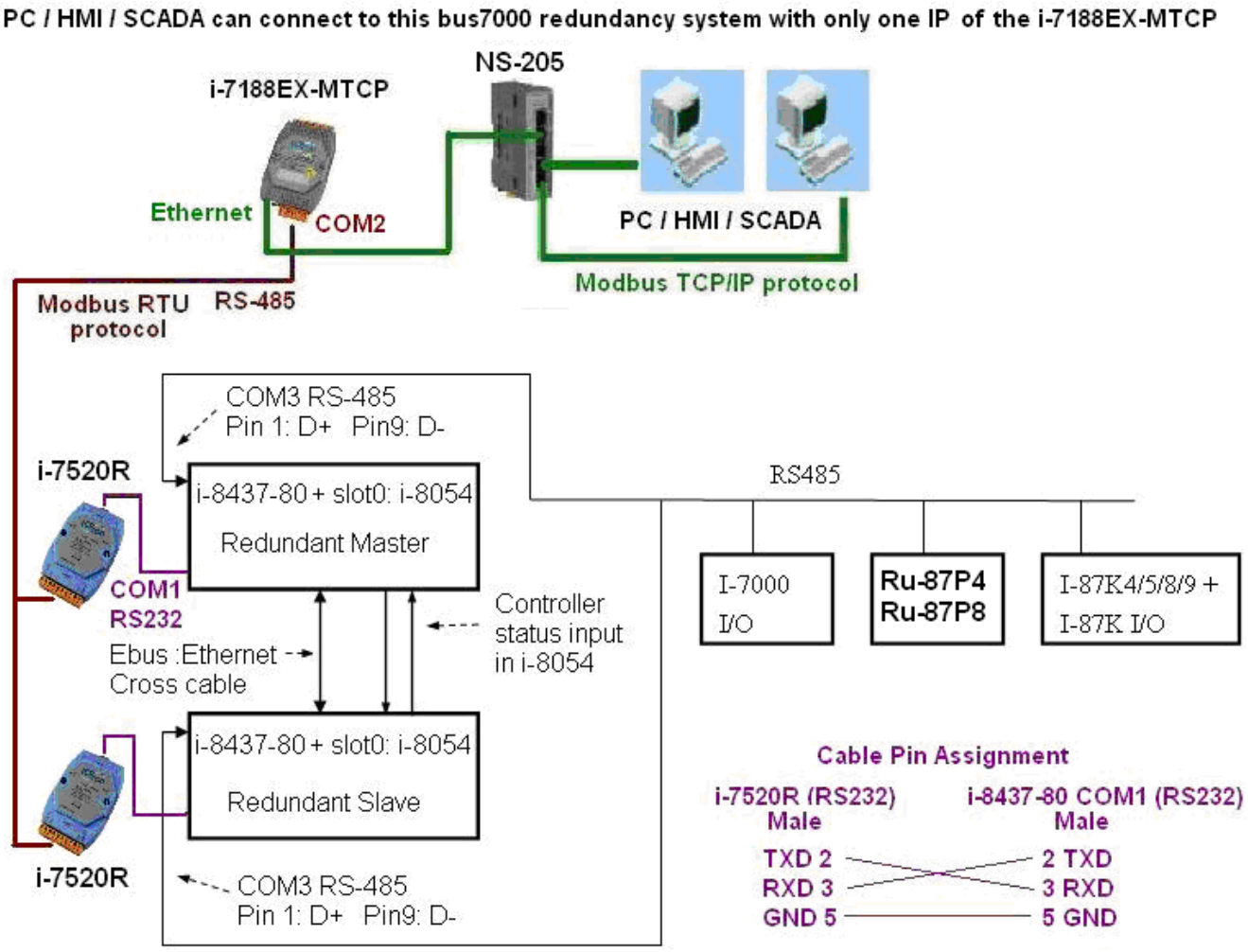
Operations Principle:

1. When the system is powered up, the control of RS-485 I/O modules belong to “Redundant Master”.
2. If “Redundant Master” is damaged (or Power off), “Redundant Slave” takes the control of RS-485 I/O modules.
3. If “Redundant Master” is alive from damaged (or power up again), it takes the control of RS-485 I/O modules again. The change over time of (2) and (3) is about 5 seconds.
4. Control data is exchanging via Ebus (if using a cross cable, no need any Ethernet switch).
5. All I/O should be RS-485 I/O except the status I/O in the slot 0: I-8054

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Demo program: new “demo_48a” and “demo_48b” released since Nov.10, 2007
http://www.icpdas.com/en/download/show.php?num=1005&nation=US&kind1=&model=&kw=isagraf

User can use the “COM_MRTU” function to disable the I-8437-80’s COM1 port if it is NOT redundant active (then its COM1 will never answer any question to the PC / HMI / SCADA). And also enable its COM1 by “COM_MRTU” function if it is redundancy active. Then at any time only the redundancy active controller will reply to the PC / HMI / SCADA as below configuration. (Please refer to demo_49a & demo_49b). Section 3 of this paper lists the steps to setup the I-7188EX-MTCP (Modbus TCP/IP to Modbus RTU gateway). (**Important: Please set these two I-8437-80’s Net-ID to the same No. for ex., setting as No. 1. And the IP should be different but in the same domain. For ex., setting as 192.168.1.8 and 192.168.1.9. Mask should all set to 255.255.255.0**)



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Some important note in the demo program “demo_49a” and “demo_49b”:

1. If your application doesn’t setup any HMI or SCADA device to connect to this redundancy system, you can delete the first Ladder rung which using the “COM_MRTU” function in the “M_B7000” program in the “demo_49a” and in “S_B7000” program in the “demo_49b”. Then the COM1 port of the I-8437-80 will be always Modbus RTU slave port. It will reply always if you send Modbus request to it even it is not redundant active.

2. There are three useful variables which show “who is the current active controller” and the “controller (or Ebus communication or DI / DO) status”. Your HMI and SCADA can request these three values to know the current working status if assigning a proper Modbus network number to them. They are listed as following.

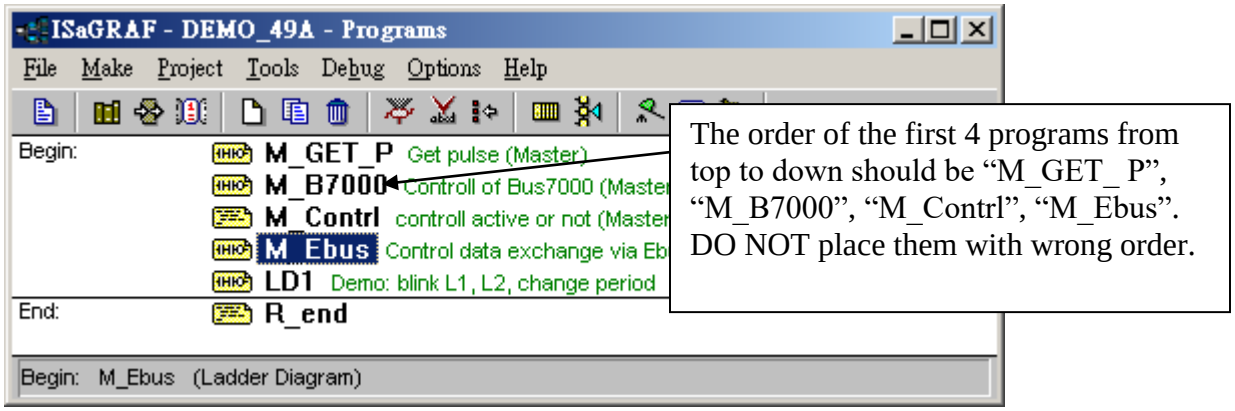
Name	**Type**	**Description**	**NetWork number**
i_am	Integer	1: means I am Master controller 2: means I am Slave controller	Not assigned yet
Master_Ok	Boolean	True: Master controller is working OK Flase: Master controller is not working OK (for ex, power OFF, Ebus cable broken, DI/DO broken)	Not assigned yet
Slave_Ok	Boolean	True: Slave controller is working OK Flase: Slave controller is not working OK (for ex, power OFF, Ebus cable broken, DI/DO broken)	Not assigned yet

3. There are three programs need to be modified in “demo_49a” and “demo_49b” to fit your real application.

(1) In the “M_B7000” and “S_B7000” programs:
search the “Add YOUR RS-485 I/O CONTROL of BUS7000 Here”
(2) In the “M_Contrl” and “S_Contrl” programs:
search the “Add YOUR CONTROLL data here”
(3) In the “M_Ebus” and “S_Ebus” programs:
search the “ADD YOUR EBUS CONTROL in the Following”

4. All the other programs below the “M_Ebus” and “S_Ebus” in the “demo_49a” and “demo_49b” should be identical programs. Only the first 4 - “M_GET_P”, “M_B7000”, “M_Contrl” & “M_Ebus” in the “demo_49a” are different as the first 4 - “S_GET_P”, “S_B7000”, “S_Contrl” & “S_Ebus” in the “demo_49b”.

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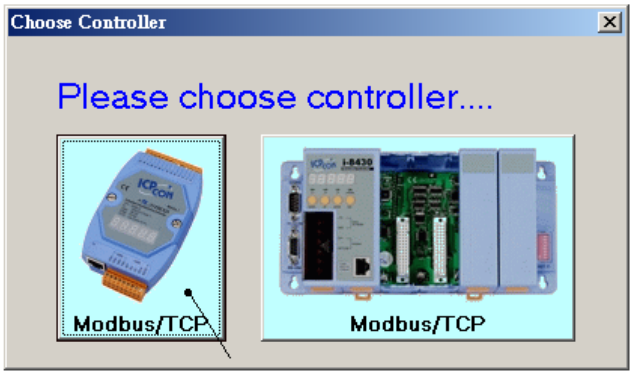


3. Configure the I-7188EX-MTCP to link to the redundancy system

If you have installed I-7188EX-MTCP in this example, please set a fixed IP to it by the “7188xw.exe” utility. (Power off 7188EX-MTCP, short its “INIT*” pin to “GND”, power it up, connecting one RS232 cable from I-7188EX-MTCP’s COM1 to PC’s COM1, PC running “7188xw.exe”, key-in, for ex, “**ip=10.0.0.107**” to set ip address and “**mask=255.255.255.0**” to set mask address)

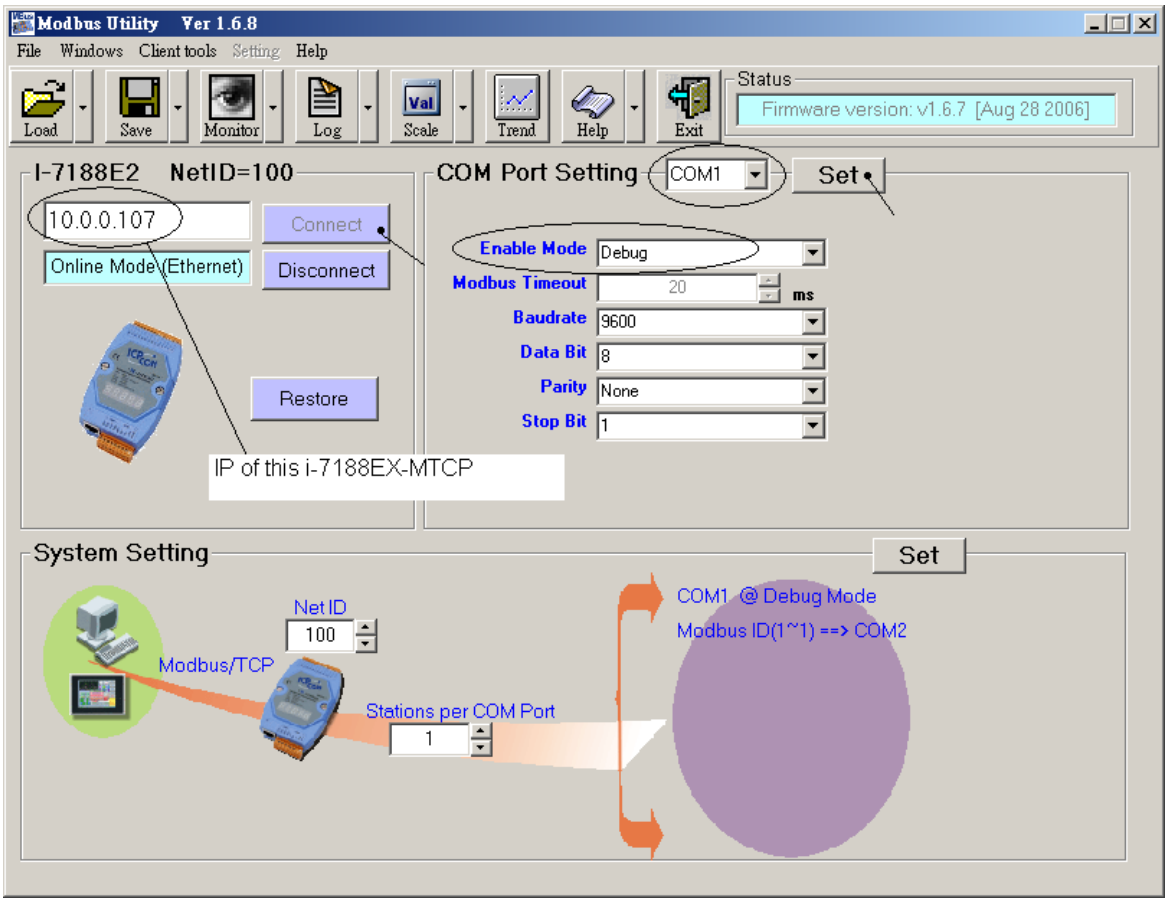
After I-7188EX-MTCP’s IP and Mask is well set. Please run “Modbus utility” to configure this I-7188EX-MTCP to become a Modbus TCP/IP to Modbus RTU Gateway as below steps.





Please set its COM1 as “Debug” mode.

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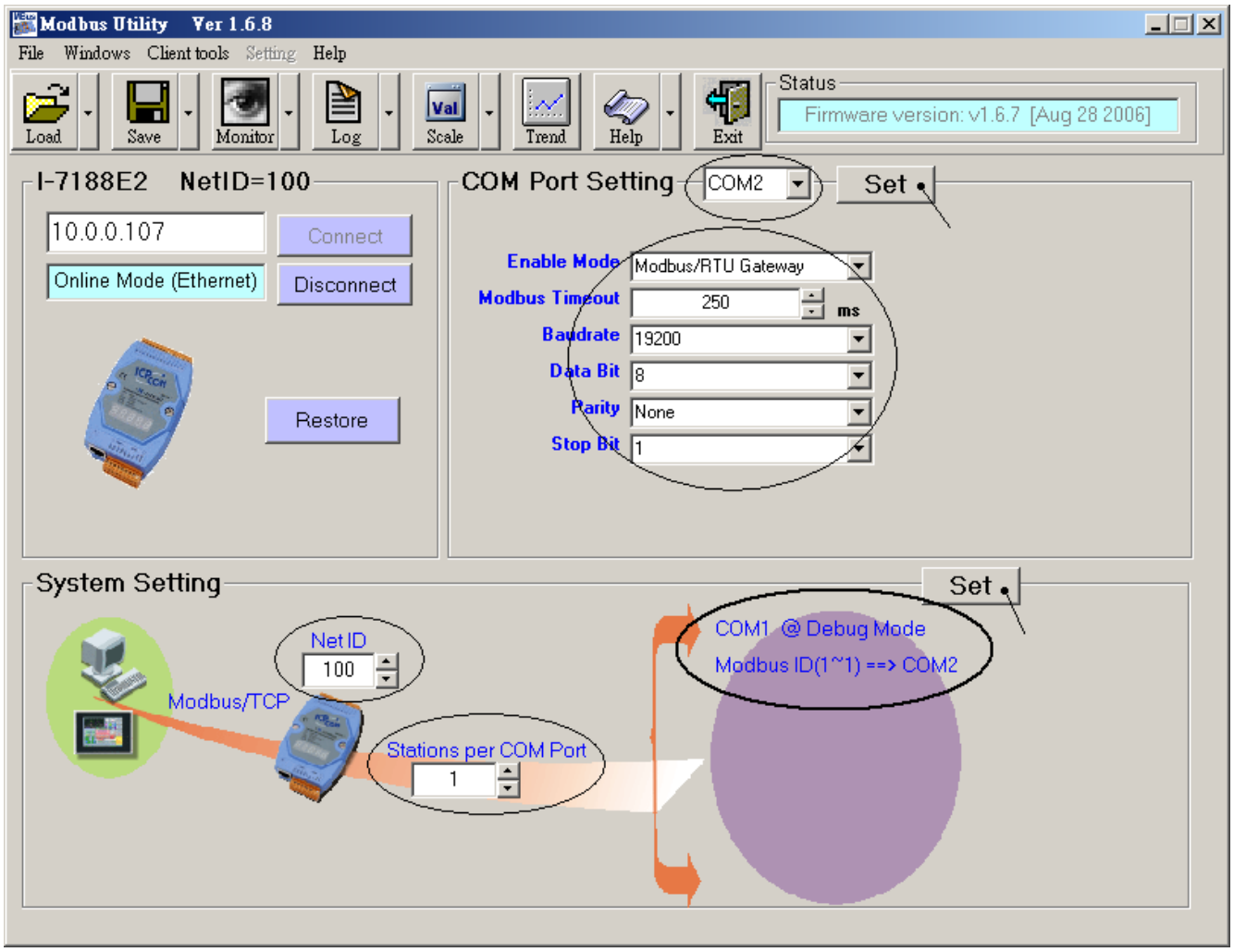
Then please set COM2 to “Modbus/RTU Gateway”, a proper timeout (250 ms), other parameters as 19200,8,None,1. then Click on “Set”

In the “System Setting” area, please set this I-7188EX-MTCP’s Net-ID to a value not equal to 1, for example, 100. And “Stations per COM Port as 1”, then click on “Set”.
If it display “Modbus ID (1 ~ 1) ==> COM2”, the configuration is well done.

Note: If I-7188EX-MTCP’s COM1 is not set as “Debug” mode in the former page, the setting will become “Modbus ID (1 ~ 1) ==> COM1”. **That is not correct**, because here we want it send to I-7188EX-MTCP’s COM2: RS-485.

Then when this I-7188EX-MTCP receives Modbus TCP/IP protocol to request Net-ID: 1, it will send this request to its COM2: RS-485. And then if controller reply, it will reply back to the Ethernet port.

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