Topic: The PLC link function of DVP series PLCs

Applicable model	DVP-EH3 series, DVP-SV2 series, DVP-ES2/EX2 series, DVP-SX2 series, DVP-SA2 series, DVP-SS2 series, DVP-SE series, DVP-10MC series, DVP-SX series, TP04P series, TP70P series
Keyword	PLC link function

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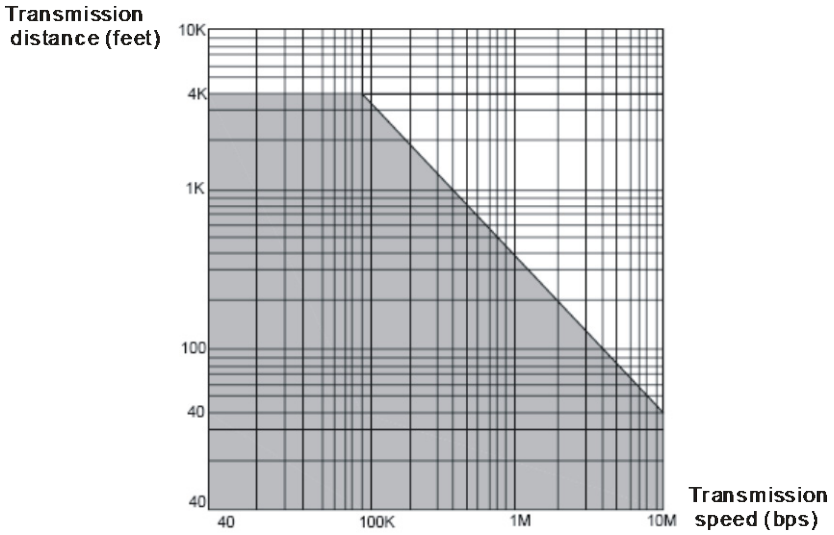
1. Preface, Purpose, and Note

Preface:
The PLC link wizards in WPLSoft and ISPSoft are used to set PLC links. DVP-EH3 series PLCs are used in the examples below.

Purpose: Helping users know how to use the PLC link wizards in WPLSoft and ISPSoft to construct PLC links
(1) Manually specifying linked slave stations
(2) Automatically searching for linked slave stations
(3) Manually specifying the same slave station, but different communication addresses
(4) Reading and writing simultaneously in a polling cycle
(5) Enabling the function of linking thirty-two PLCs and exchanging more than sixteen pieces of data
(6) Sending a write command after the change of values

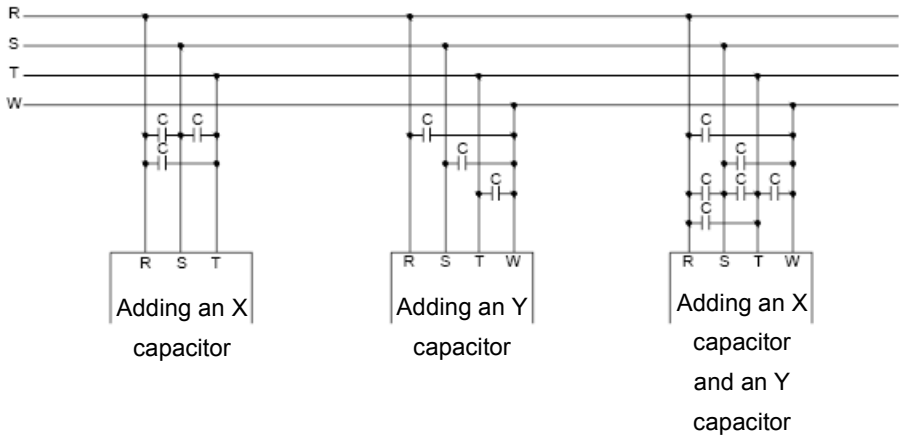
Note:
If RS-232/RS-485 is used for the wiring of hardware, the length of the connection created should be as short as possible, and should be far from high noise. An RS-232 interface is a one-to-one connection, and the length of the connection created is usually shorter. Therefore, the use of standard cables on the market or Delta cables generally does not cause any problems. The distance of a high-speed RS-485 connection is long. Besides, an RS-485 connection has a high transmission rate and numerous stations. It attenuates signals highly. If the problems related to improper ground potential, impedance matching, noise interference, and wiring are not solved, there will be low communication quality. Users have to pay attention to the following notes about the wiring of RS-485 communication.

- Limit on the number of stations
  The number of stations which can be connected to a DVP series PLC can be up to 254, but the maximum number of stations which can be driven by an RS-485 interface is 16. If more than 16 stations are required, an RS-485 repeater (IFD8510) should be used. Each repeater supports 16 stations. Users can add stations by adding repeaters until the number of stations reaches 254.
- Limit on distance
  If an RS-485 interface is used, the maximum length of the cable which can be used for a specific transmission path is the function of a data signaling rate. The maximum length is affected by the factors such as the distortion of signals and noise. The graph below is gotten by using a 24 AWG copper twisted pair telephone cable (a cable whose diameter is 0.51 mm) with a 52.5 PF/M bypass capacitor and a 100 Ω terminator. (Please refer to GB11014-89 Appendix A.) If the maximum acceptable signal loss allowed is 6 dBV when data a signaling rate is lower than 90 kbit/s, the limit on the length of the cable which can be used will be 1200 m (4K feet). However, the graph is conservative, and a longer cable length is accessible in practical application. If cables whose diameters are different are used, the maximum cable lengths which can be gotten will be different. For example, if a data signaling rate is 600 kbit/s, and a 24 AWG cable is used, the maximum cable length gotten will be 200 m. If a 19 AWG cable (a cable whose diameter is 0.91 mm) is used, the maximum cable length gotten can be longer than 200 m. If a 28 AWG cable (a cable whose diameter is 0.32 mm) is used, the maximum cable length gotten can only be shorter than 200 m. The relation between transmission rates (bps) and transmission distances for an RS-485 standard communication interface is shown below.



- Limitation on cables
  Users have to use shielded twisted pair cables. The quality of cables greatly influences transmission signals. If users use low quality cables (such as PVC twisted pair cables), signals will be attenuated highly and transmission distance will be shortened. In addition, noise can interfere with communication easily due to the poor noise immunity of low quality cables. Therefore, in a situation in which there is a high transmission rate, a long distance, or high noise, high quality twisted pair cables (such as polyethylene twisted pair cables) should be used. However, in a situation in which there are a low transmission rate and low noise, PVC twisted pair cable is an acceptable and cost saving choice though the signal loss of PVC cables is 1,000 times greater than high quality cables. If a long transmission distance attenuates signals, an RS-485 repeater (IFD8510) can be used to amplify the signals.
- Wiring topology
  In RS-485 wiring, nodes should be near the master cable as much as possible. Generally, a daisy chain is used for RS-485 wiring. Topology is the link structure of a connection. The topology of RS-485 wiring is a configuration of stations which are wired together in sequence. That is, in RS-485 wiring, the first station is connected to the second station, the second station is connected to the third station, and so on. Start topology and ring topology are not allowed.
- SG (signal ground)
  Though twisted cables can be used to connect an RS-485 network, noise can easily interfere with the twisted cables. The prerequisite for using twisted cables to connect an RS-485 network is that the ground potential (common mode voltage) between stations should not exceed the maximum common mode voltage allowed by an RS-485 IC. However, no matter how high the ground potential between stations is, users should use shielded twisted pair cables to connect the signal grounds of stations. The use of shielded twisted pair cables can reduce the common mode voltage between stations. It provides the shortest circuit for communication, and improves noise immunity.
- Terminator
  All cables have their own characteristic impedance (120 Ω for a twisted pair). If the terminal impedance of a cable is different from the characteristic impedance of the cable when a signal in the cable is transmitted to a terminal, an echo signal will occur, and the waveform of the signal will be distorted (convex or concave). The distortion of the waveform of a signal will not be obvious if the cable used to transmit the signal is short. If the cable used to transmit a signal is long, the distortion of the waveform of the signal will become serious, and a terminator will be needed to maintain normal transmission.
- Methods to reduce noise
  After an RS-485 network is wired according to the rules above, or connected to a 120 Ω terminator, noise interference can be reduced. If the noise interference can not be reduced, it means that there is a strong noise source near the network. In addition to keeping cables away from the strong noise source (such as an electromagnetic valve, AC motor drive, an AC servo drive, or power equipment) and its power lines, the best way to reduce the noise interference is to add a noise suppressor to the noise source. The figure below shows the methods for reducing the

noise caused by an AC motor drive, an AC servo drive, and power equipment.
C = 0.22 μf~0.47 μf/630 V AC



Generally, an RS-485 cable comprises two wires twisted together. It transmits signals by the potential difference between the twisted pair, and therefore the transmission is called differential mode transmission. Differential mode interference is transmitted between two signal wires. It is symmetric interference. Differential mode interference can be reduced by adding a bias resistor to a circuit and using twisted pair cables. Common mode interference is transmitted between a signal wire and the ground. It is asymmetric interference. Common mode interference can be reduced by using the following methods.

(1) Use shielded twisted pair cables and ground it properly.
(2) Use galvanized pipes in strong electric fields.
(3) Users should keep away from high voltage cables when they install cables. Do not bond high voltage power cables and signal cables together.
(4) Use a linear power supply or a high quality switching-mode power supply (ripple < 50mV).

2. Communication Rates and Formats

2.1 DVP Series PLCs Supporting PLC Links

In the table below, V means supporting PLC links, and X means not supporting PLC links.

Model	EH3	SV2	ES2/EX2	SA2	SX2	SS2	SE	SX	MC	ES/EX/EC3
Supporting PLC links or not	V	V	V	V	V	V	V	V	V	X

2.2 DVP Series PLCs Supporting Function Codes of PLC Links

In the table below, V means supporting function codes of PLC links, and X means not supporting.

Model / Function Code	EH3	SV2	ES2/EX2	SA2	SX2	SS2	SE	SX	MC
H03	V	V	V	V	V	V	V	V	V
H06	V	V	V	V	V	V	V	V	X
H10	V	V	V	V	V	V	V	V	V
H17	V	V	V	V	V	V	V	V	V

2.3 The Maximum Quantity of Data and Stations

The maximum quantity of data and station supported by DVP series PLCs are described below. In the table below, V means supporting and X means not supporting.

Model / Max. Quantity	EH3	SV2	ES2/EX2	SA2	SX2	SS2	SE	SX	MC
100 data & 32 stations	V	V	X	X	X	X	V1.60	X	X
50 data & 16 stations	X	X	V	V	V	V	X	V3.00	V

2.4 Communication Formats

DVP series PLCs support ASCII/RTU communication. The communication formats supported by DVP series PLCs are described below.

Model	Data length	Parity bit	Stop bit
EH3	7, 8	None, odd, even	1, 2
SV2	7, 8	None, odd, even	1, 2
ES2/EX2	7, 8	None, odd, even	1, 2
SA2	7, 8	None, odd, even	1, 2
SX2	7, 8	None, odd, even	1, 2
SS2	7, 8	None, odd, even	1, 2
SE	7, 8	None, odd, even	1, 2
MC	7, 8	None, odd, even	1, 2
SX	7, 8	None, odd, even	1, 2

2.5 Communication Rates

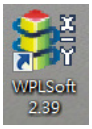
Users can set a communication format for a DVP series PLC by means of D1120 (COM2)/D1109 (COM3). The maximum communication rate that COM3 (DVP-F485) in a DVP-EH3 series PLC supports is 500 kbps. The setting of a communication format does not suppot bit 8~bit 15 in D1120/D1109. Please refer to the following table for more information about the communication rates that the RS-485 ports on DVP series PLCs support and the setting of a communication format.

Model	EH3	SV2/MC	ES2/EX2/SA2	ES2-C/SX2/SS2/SX	SE
RS-485 port	COM2/COM3	COM2	COM2/COM3	COM2	COM2/COM3
Baud rate (bps)	(V: Supporting the baud rate; X: Not supporting the baud rate)				
110	V	V	X	X	V
150	V	V	X	X	V
300	V	V	X	X	V
600	V	V	V	V	V
1200	V	V	V	V	V
2400	V	V	V	V	V
4800	V	V	V	V	V
9600	V	V	V	V	V
19200	V	V	V	V	V
31250	V	V	V	V	V
38400	V	V	V	V	V
57600	V	V	V	V	V
115200	V	V	V	V	V
500K	V	V	V	V	V
921K	COM2: V COM3: X	V	V	V	X

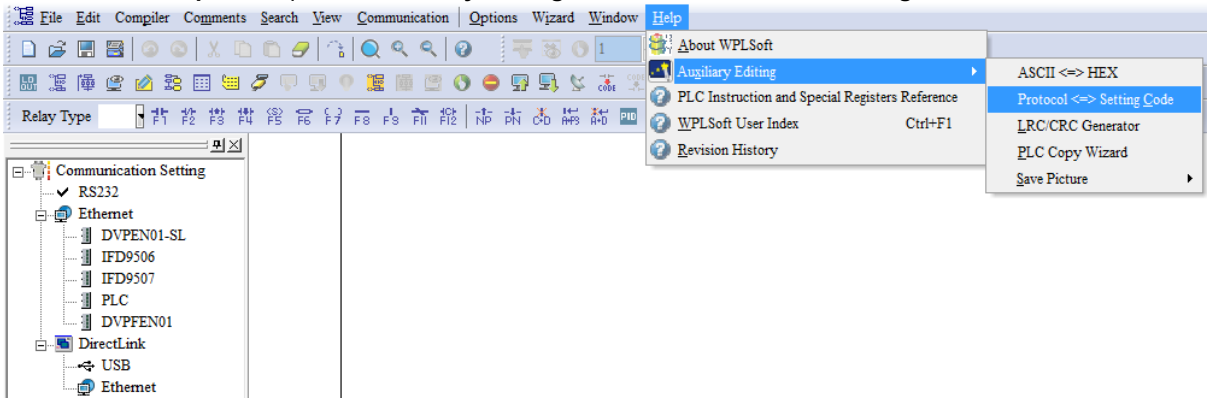
Communication format			
	Contents		
b0	Data length	0: 7 bits 1: 8 bits (If an RTU communication format is selected, the data length set needs to be 8 bits.)	
b1 **b2**	Parity bit	00: None 01: Odd 11: Even	
b3	Stop bit	0: 1 bit 1: 2 bits	
b4 **b5** **b6** **b7**	Serial transmission rate	0001 (H1): 110 0010 (H2): 150 0011 (H3): 300 0100 (H4): 600 0101 (H5): 1200 0110 (H6): 2400 0111 (H7): 4800 1000 (H8): 9600 1001 (H9): 19200 1010 (HA): 38400 1011 (HB): 57600 1100 (HC): 115200 1101 (HD): 500000 1110 (HE): 31250 1111 (HF): 921000	
b8	Start-of-text character	0: None	1: D1124
b9	First end-of-text character	0: None	1: D1125
b10	Second end-of-text character	0: None	1: D1126
b11~b15	Undefined		

Another way to set a communication format is described below.

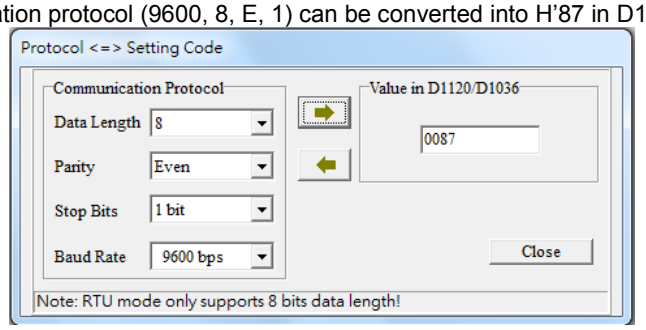
(1) Start WPLSoft.



(2) Click the the **Help** menu, point to **Auxiliary Editing**, and click **Protocol <=> Setting Code**.



(3) Select values in the **Data Length** drop-down list box, the **Parity** drop-down list box, the **Stop Bits** drop-down list box, and the **Baud Rate** drop-down list box in the **Protocol <=> Setting Code** window, and then click  . For example, the communication protocol (9600, 8, E, 1) can be converted into H'87 in D1120/D1036.



2.6 Setting a Communication format for COM2/COM3

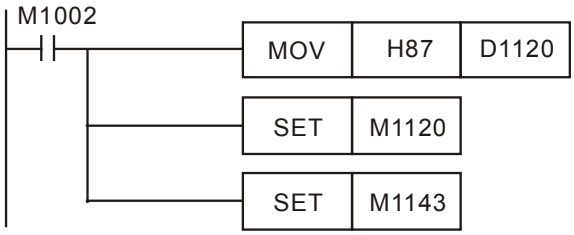
(1) If users want to change the communication format set for COM2/COM3, they need to write the program shown in (3). After the RUN/STOP switch on a PLC is moved out of the STOP position and into the RUN position, the PLC will detect whether M1120/M1136 is On in the first scan time. If M1120/M1136 is On, the settings related to COM2/COM3 will be changed according to the values in D1120/D1109.

(2) Whether the communication format set for COM2 is an ASCII mode or an RTU mode is determined by M1143, and whether the communication format set for COM3 is an ASCII mode or an RTU mode is determined by M1320. (If M1143/M1320 is Off, the communication format set for COM2/COM3 is an ASCII mode. If M1143/M1320 is On, the communication format set for COM2/COM3 is an RTU mode.)

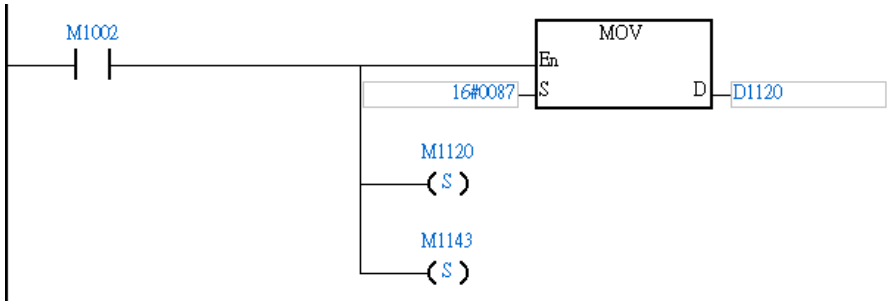
(3) If users want to change the communication format set for COM2/COM3 to an RTU mode and (9600, 8, E, 1), they need to write the program shown below.

- COM2:

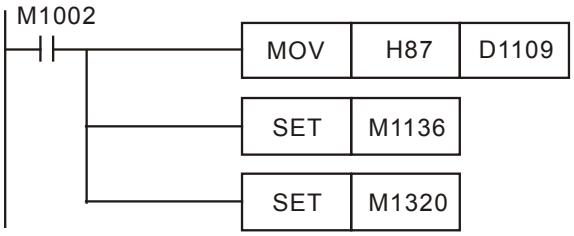
WPLSoft:



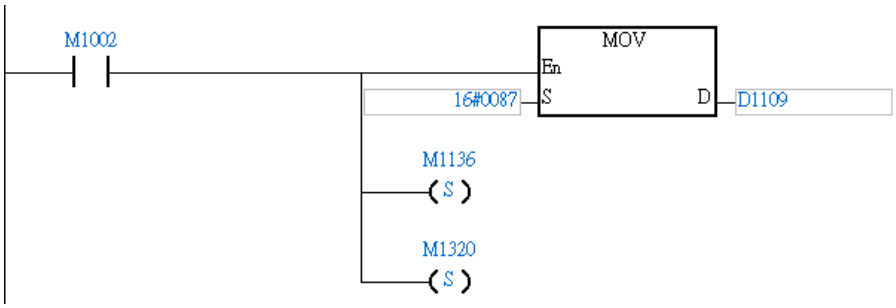
ISPSoft:



- COM3:
  WPLSoft:



ISPSoft:



Notes:

(1) If COM2/COM3 is used as a slave port, please do not use any communication instructions in the program for COM2/COM3.

(2) If the RUN/STOP switch on a PLC is moved out of the RUN position and into the STOP position after a communication format is modified, the communication format will not be changed.

(3) After the modification of a communication format is complete, if a PLC is disconnected when the RUN/STOP switch on the PLC is in the STOP position and then powered, the PLC will be restored to the default communication format (9600, 7, E, 1).

3. Example 1—Manually Specifying Linked Slave Stations (M1355=On)

If M1355 is ON, M1360~M1375 (M1440~M1455) can be used to specify the stations which need to be linked, and therefore read/write commands will be transmitted cyclically through PLC links according to M1360~M1375 no matter how many PLCs are connected. (The master stations and the slave stations in the examples below are DVP-EH3 series PLCs.)

3.1 Using the PLC Link Wizard in WPLSoft (ASCII/RTU Mode)

【Control requirement】
A master station (A DVP-EH3 series PLC) individually exchanges sixteen pieces of data (sixteen words) with the two slave stations (two DVP-EH3 series PLCs) manually specified through a PLC link.

【Setting station addresses of PLCs】

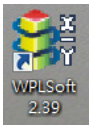
Master/Slave station	Station address	Communication format
Master PLC	K40 (D1121=K40)	1. ASCII, 9600, 7, E, 1 (D1120=H'86) 2. RTU, 9600, 8, E, 1 (D1120=H'87) The communication format of the slave PLCs needs to be the same as the communication format of the master PLC.
Slave PLC 1	K2 (D1121=K2)	
Slave PLC 2	K3 (D1121=K3)	

【Descriptions of devices】

Device in a PLC	Description
X0	X0 functions as a conditional contact used to enable M1350 and M1351.
D1120	Communication protocol of COM2 (RS-485)
D1121	PLC Communication address
D1129	Abnormal communication timeout Time unit: ms
M1120	M1120 is used to retain the communication format of COM2 (RS-485).
M1143	M1143 is used to determine whether the communication format set for COM2 (RS-485) is an ASCII mode or an RTU mode. Off: ASCII mode On: RTU mode
M1350	M1350 is used to enable a PLC link.
M1351	If M1351 is ON, the PLC link executed will be an automatic mode.

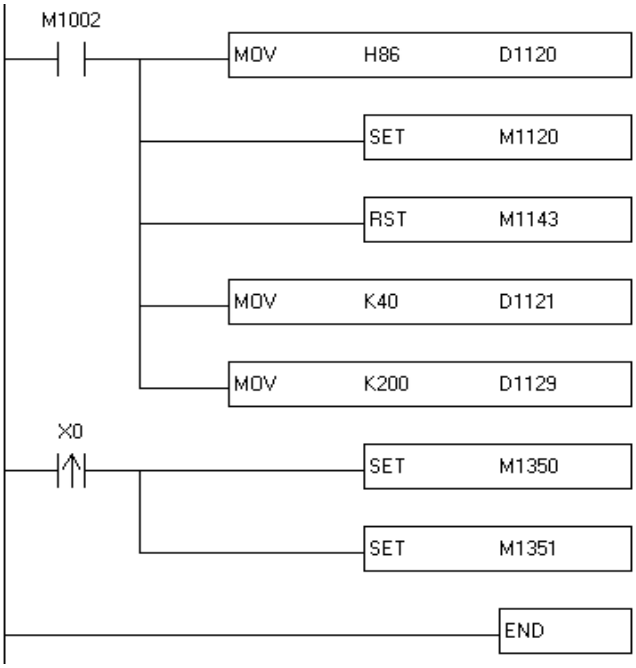
【PLC link wizard】

Step 1: Start WPLSoft, write a program to the master PLC connected, move the RUN/STOP switch on the PLC into the RUN position, and write related values to the PLC.

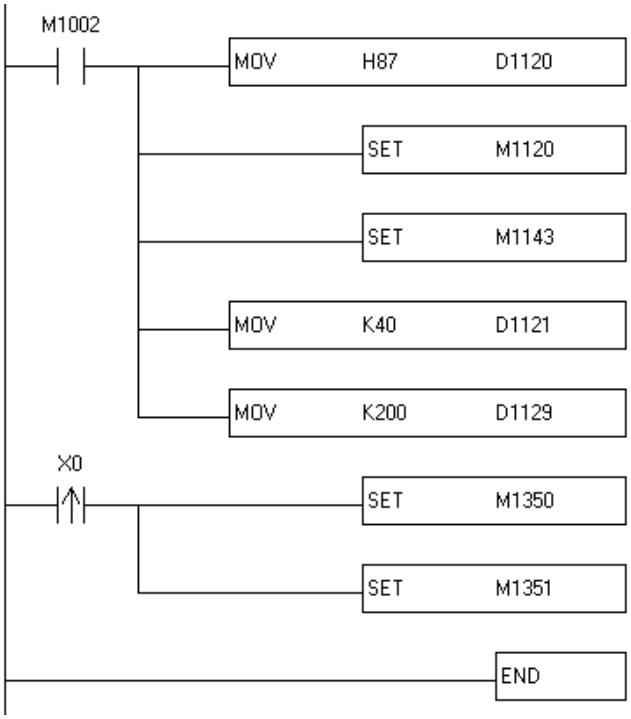


Owing to the fact that devices used to set related communication and a PLC link (M1350 and M1351) are not latching devices, they need to be set by means of a program. The PLC link wizard is used to manually specify the stations which need to be linked (M1355 is On).

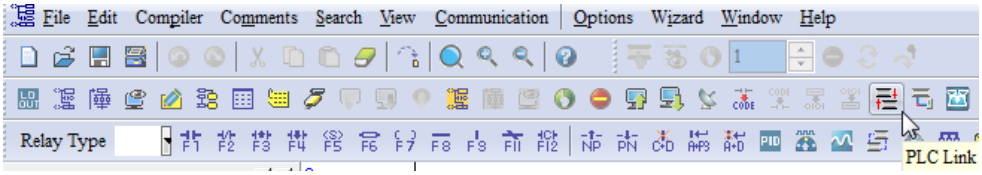
Program for ASCII communication:



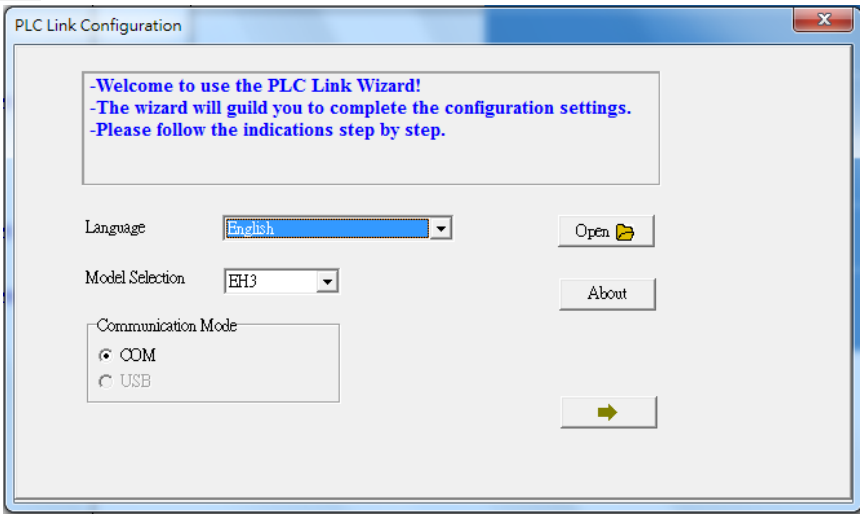
Program for RTU communication:



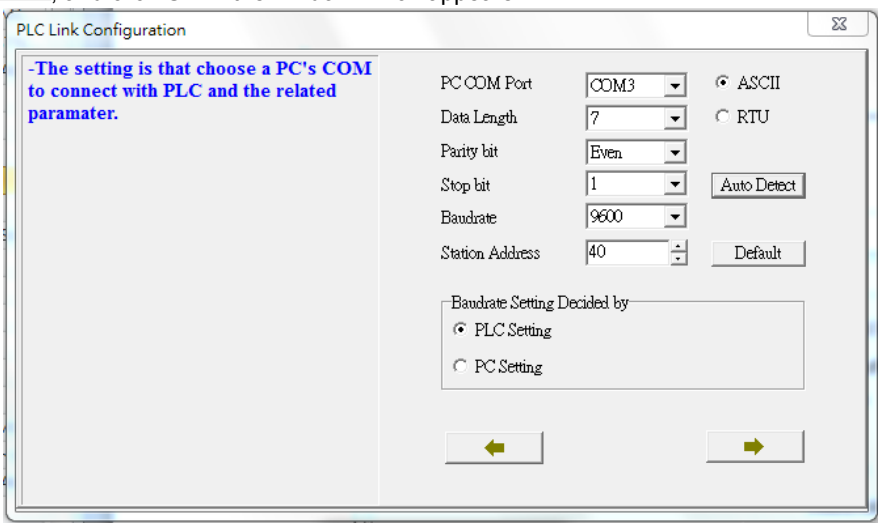
Step 2: Click the PLC link wizard in WPLSoft.

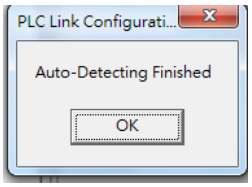


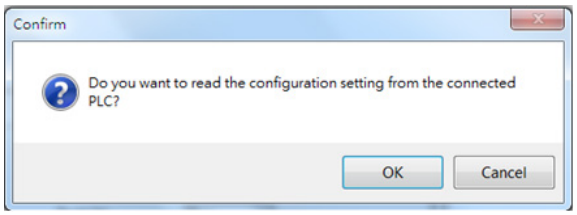
Step 3: Select a language in the **Language** drop-down list box, select a model in the **Model Selection** drop-down list box, and click .



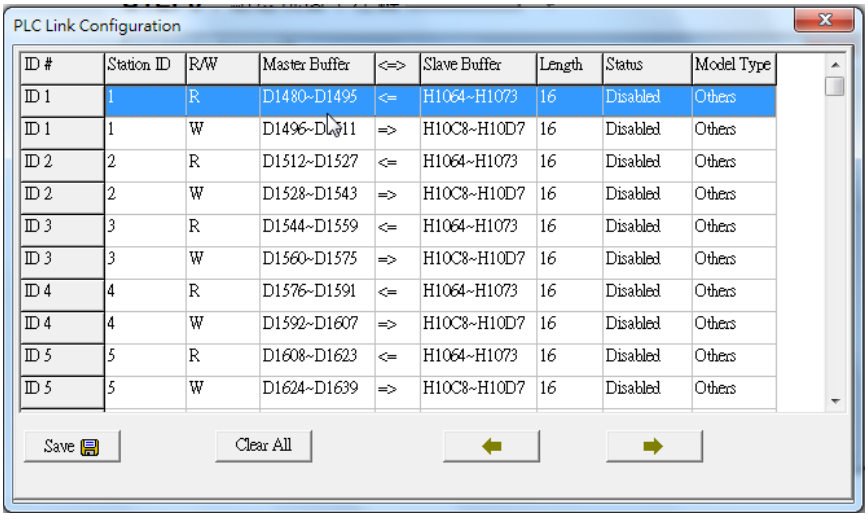
Step 4: Set a communication format for COM1 in the master PLC, click **Auto Detect**, click **OK** in the window which appears, click  , and click **OK** in the window which appears.





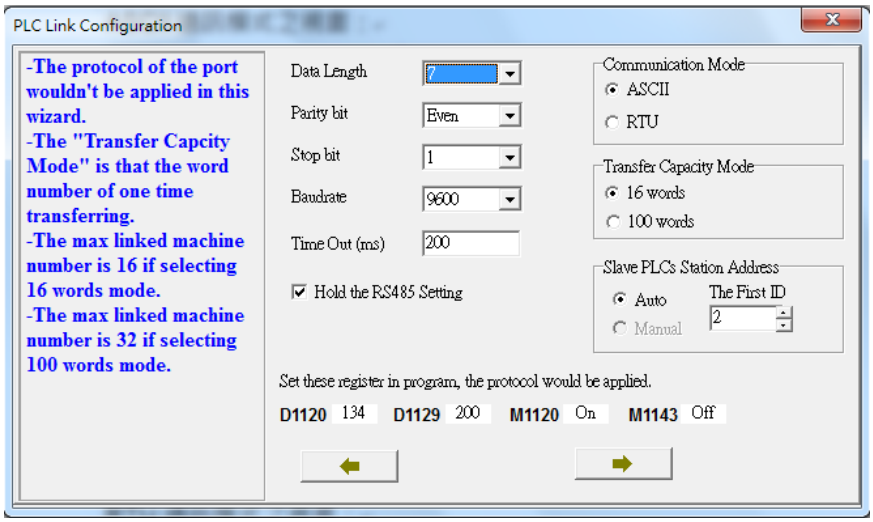


Step 5: Click  .

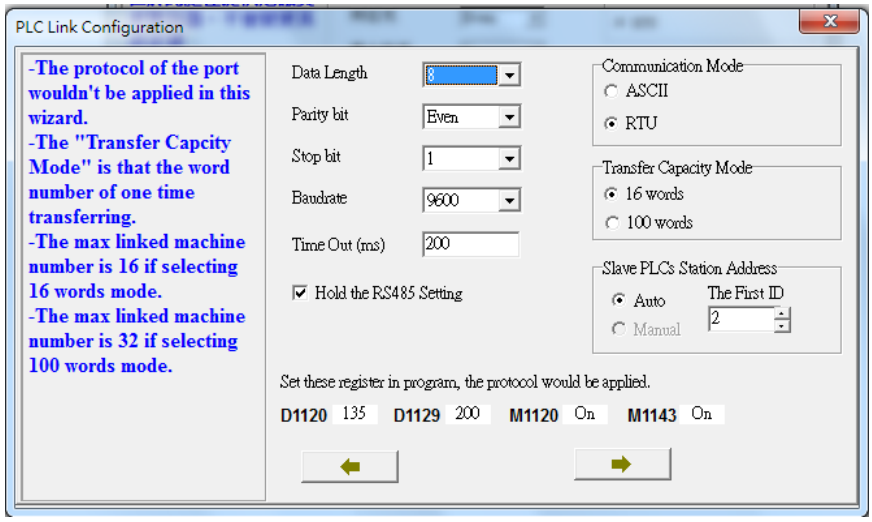


Step 6: The PLC link wizard reads values according to the communication format set for COM2 in the master PLC. Select the **16 words** option button in the **Transfer Capacity Mode** section, select the **Auto** option button and **2** in the **The First ID** box in the **Slave PLCs Station Address** section, and click  .

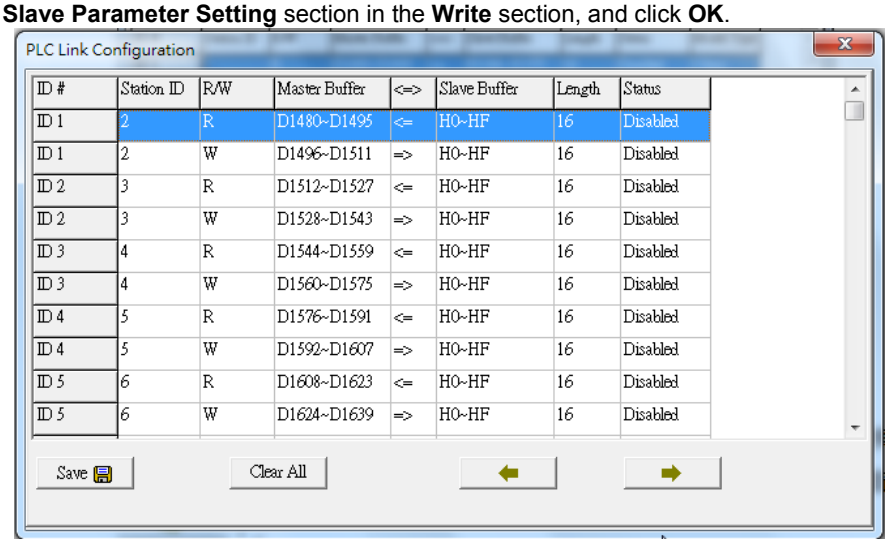
Window for ASCII communication:

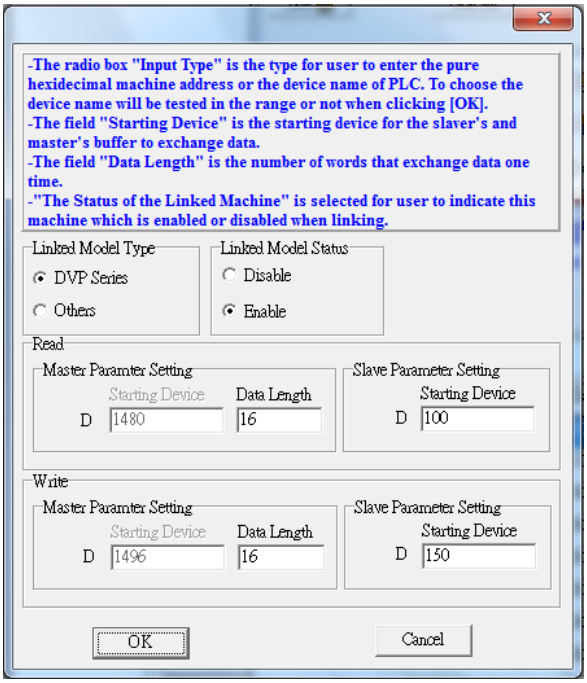


Window for RTU communication:

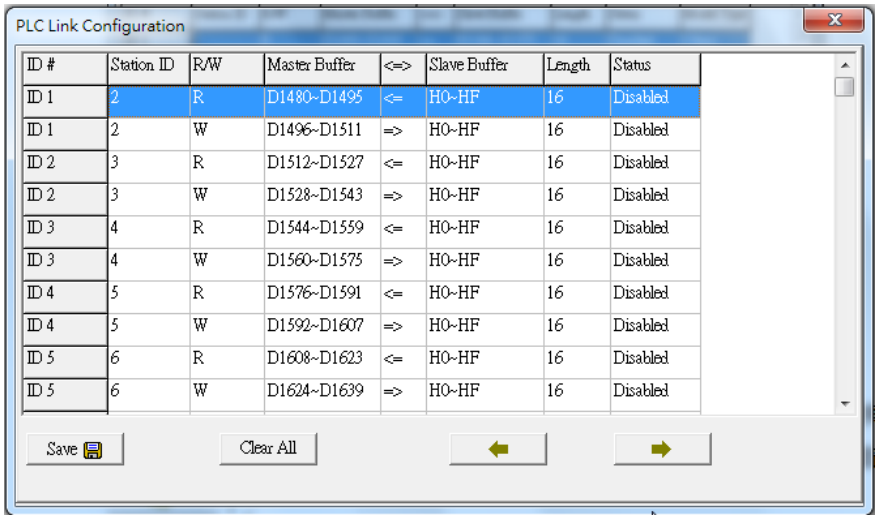


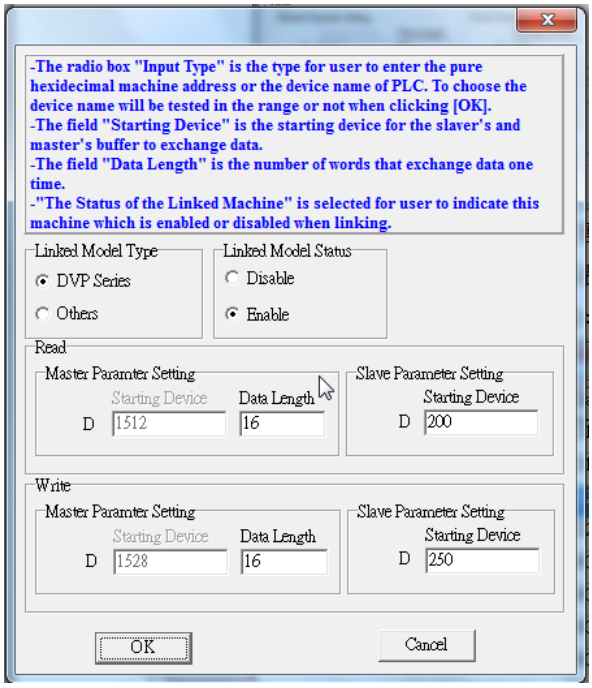
Step 7: Double-click the **ID 1** block in the **PLC Link Configuration** window, select the **DVP Series** option button in the **Linked Model Type** section, select the **Enable** option button in the **Linked Model Status** section (set M1360 to On), type “16” in the **Data Length** boxes in the **Master Parameter Setting** sections in the **Read** and **Write** sections, type “100” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Read** section, type “150” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.



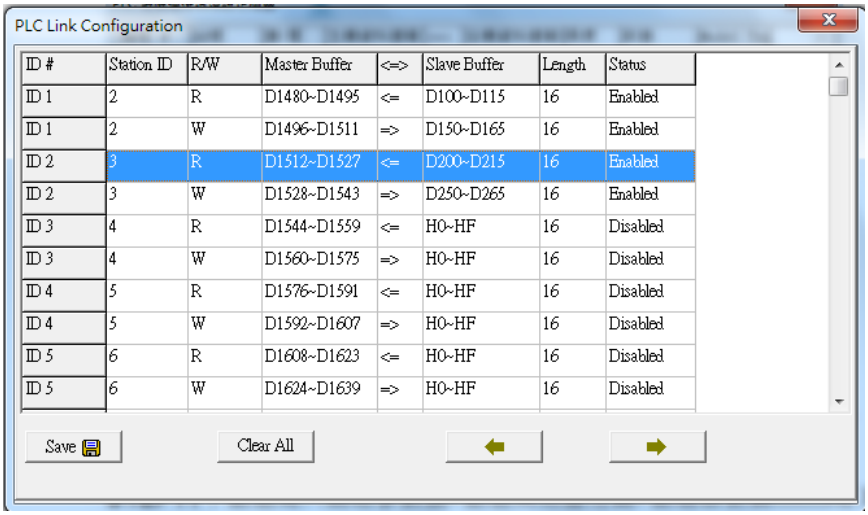


Step 8: Double-click the **ID 2** block in the **PLC Link Configuration** window, select the **DVP Series** option button in the **Linked Model Type** section, select the **Enable** option button in the **Linked Model Status** section (set M1361 to On), type “16” in the **Data Length** boxes in the **Master Parameter Setting** sections in the **Read** and **Write** sections, type “200” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Read** section, type “250” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.

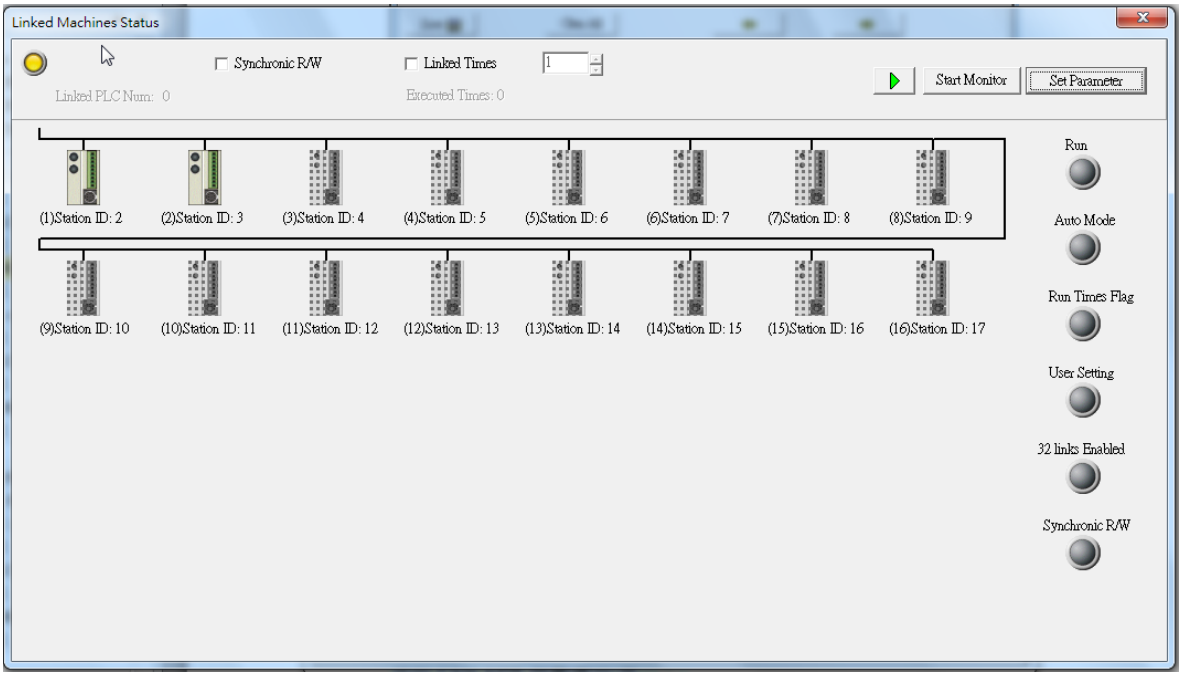




Step 9: Check whether the contents of the **ID 1** block and the **ID 2** block are correct, and then click  .

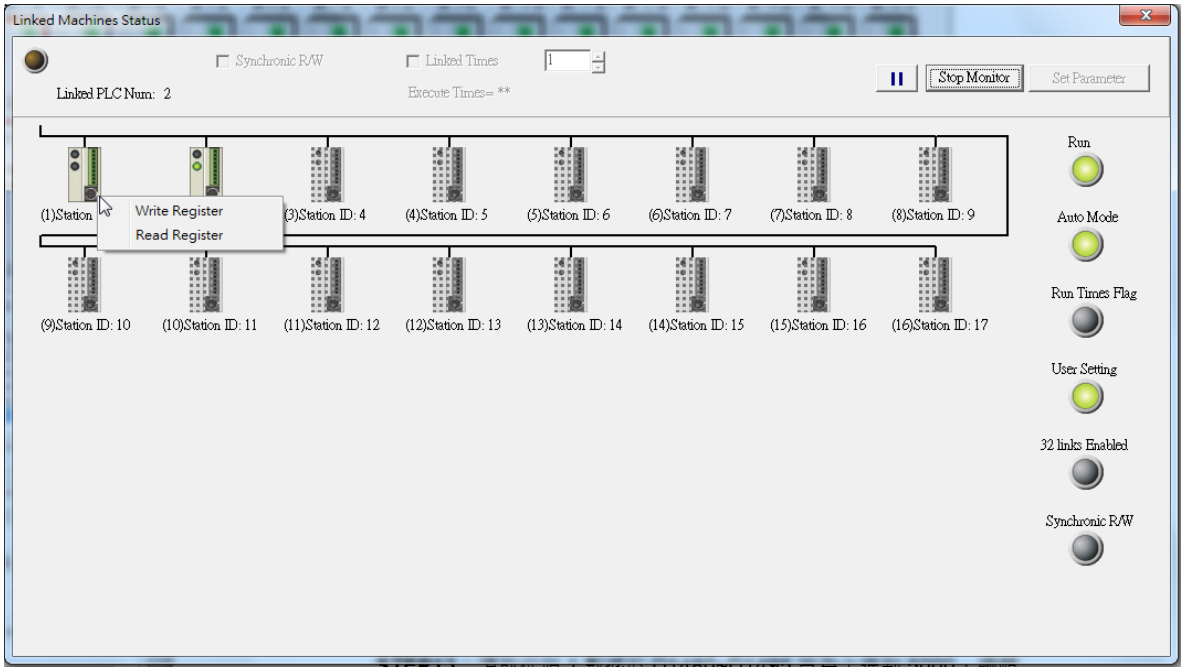


Step 10: Click the **Set Parameter** button, click the **Start Monitor** button, and click  or set X0 to On.

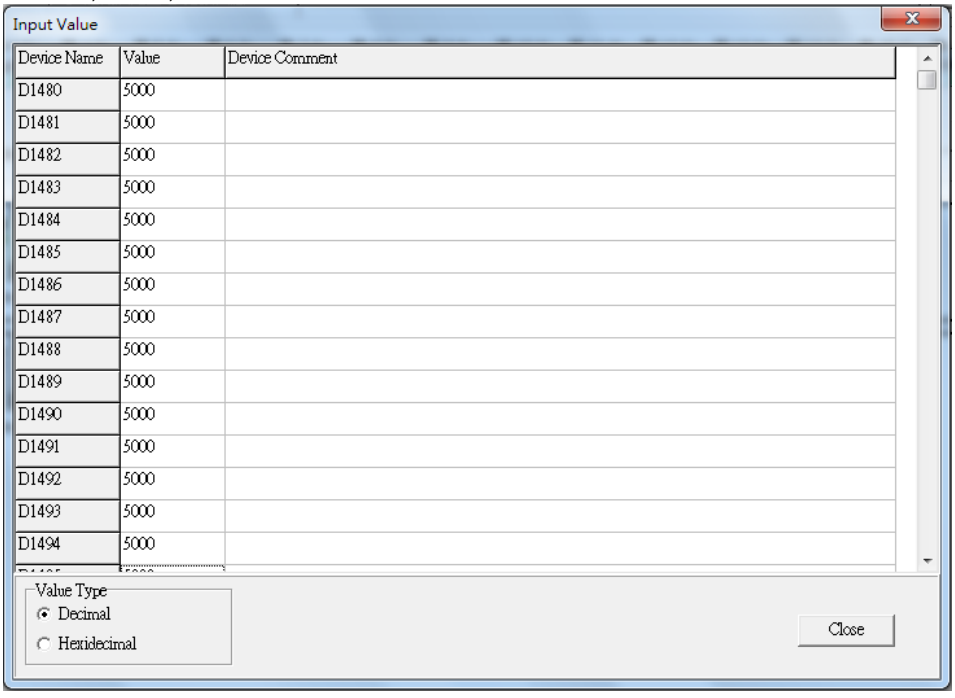


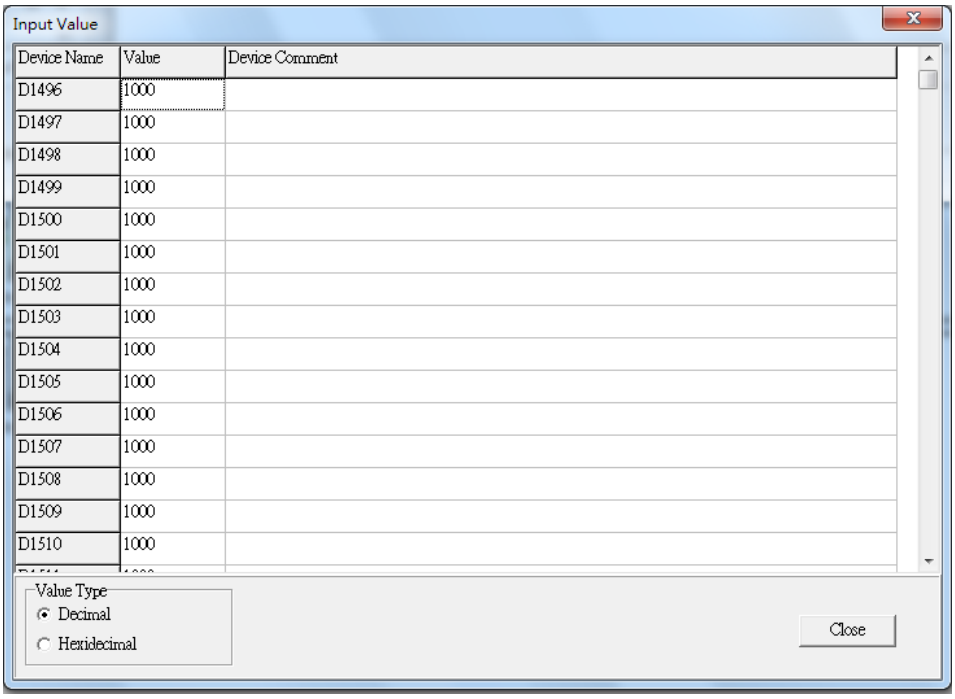
Step 11: The state of the PLC link executed is shown in the **Linked Machines Status** window. The master PLC can exchange data with the slave stations through a program or the PLC link wizard.

Reading/Writing data through the PLC link wizard: Right-click slave station (1)  /slave station (2)  , and click **Write Register**/**Read Register** on the context menu which appears.

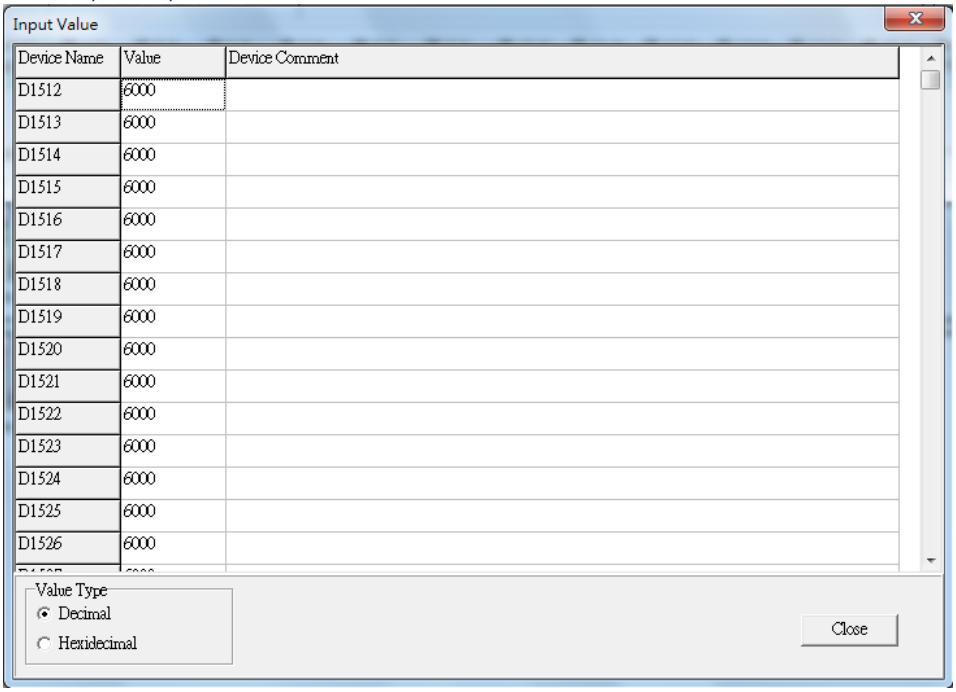


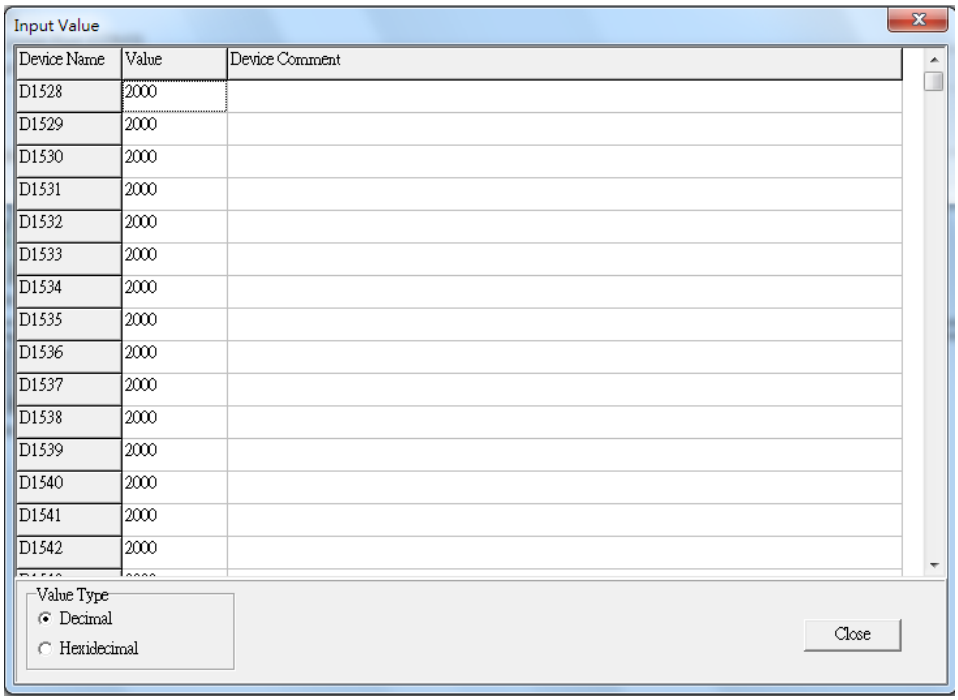
Step 12: The values read from slave 1 are 5000, that is, the values in D1480~D1495 are 5000. The values written to slave station 1 are 1000, that is, the values in D1496~D1511 are 1000.



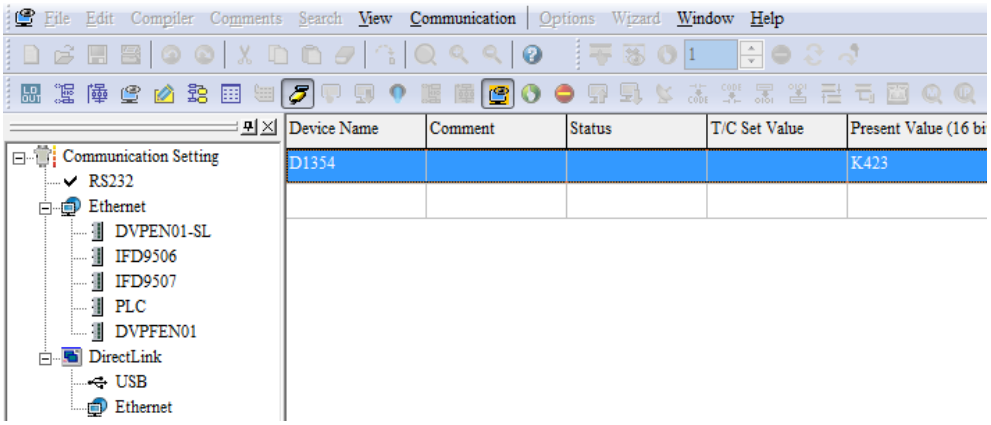


Step 13: The values read from slave 2 are 6000, that is, the values in D1512~D1527 are 6000. The values written to slave station 2 are 2000, that is, the values in D1528~D1543 are 2000.





Step 14: Close the **Linked Machines Status** window, click  , click  , and type “D1354”. The value in D1354 indicates PLC link scan time.



【Description of control】

- D1399 in the master PLC is used to set a start slave station address. The value in D1399 is K2, that is, the PLC whose station address is K2 is slave station 1, and the PLC whose station address is K3 is slave station 2.
- The master station exchanges data with the two slave stations by means of a PLC link. The values in D100~D115 in slave station 1 are written to D1480~D1495 in the master station, and the values in D1496~D1511 in the master station are written to D150~D165 in slave station 1. The values in D200~D215 in slave station 2 are written to D1512~D1527 in the master station, and the values in D1528~D1543 in the master station are written to D250~D265 in slave station 2.

Master PLC (1 PLC)		Slave PLC (2 PLCs)
D1480~D1495	Reading	D100~D115 in the slave PLC whose station address is K2
D1496~D1511	Writing	D150~D165 in the slave PLC whose station address is K2
D1512~D1527	Reading	D200~D215 in the slave PLC whose station address is K3
D1528~D1543	Writing	D250~D265 in the slave PLC whose station address is K3

- When M1350 is Off, the values in the data registers used for data exchange in the master station and the slave stations are the ones shown below.

Master PLC	Value	Slave PLC	Value
D1480~D1495	All are 0.	D100~D115 in slave station 1	All are 5000.
D1496~D1511	All are 1000.	D150~D165 in slave station 1	All are 0.
D1512~D1527	All are 0.	D200~D215 in slave station 2	All are 6000.
D1528~D1543	All are 2000.	D250~D265 in slave station 2	All are 0.

After M1350 is set to ON, the values in the data registers used for data exchange in the master station and the slave stations will become the ones shown below.

Master PLC	Value	Slave PLC	Value
D1480~D1495	All are 5000.	D100~D115 in slave station 1	All are 5000.
D1496~D1511	All are 1000.	D150~D165 in slave station 1	All are 1000.
D1512~D1527	All are 6000.	D200~D215 in slave station 2	All are 6000.
D1528~D1543	All are 2000.	D250~D265 in slave station 2	All are 2000.

3.2 Using the PLC Link Wizard in ISPSoft (ASCII/RTU Mode)

【Control requirement】
A master station (A DVP-EH3 series PLC) individually exchanges sixteen pieces of data (sixteen words) with the two slave stations (two DVP-EH3 series PLCs) manually specified through a PLC link.

【Setting station addresses of PLCs】

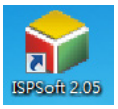
Master/Slave station	Station address	Communication format
Master PLC	K40 (D1121=K40)	1. ASCII, 9600, 7, E, 1 (D1120=H'86) 2. RTU, 9600, 8, E, 1 (D1120=H'87) The communication format of the slave PLCs needs to be the same as the communication format of the master PLC.
Slave PLC 1	K2 (D1121=K2)	
Slave PLC 2	K3 (D1121=K3)	

【Descriptions of devices】

Device in a PLC	Description
X0	X0 functions as a conditional contact used to enable M1350 and M1351.
D1120	Communication protocol of COM2 (RS-485)
D1121	PLC Communication address
D1129	Abnormal communication timeout Time unit: ms
M1120	M1120 is used to retain the communication format of COM2 (RS-485).
M1143	M1143 is used to determine whether the communication format set for COM2 (RS-485) is an ASCII mode or an RTU mode. Off: ASCII mode On: RTU mode
M1350	M1350 is used to enable a PLC link.
M1351	If M1351 is ON, the PLC link executed will be an automatic mode.

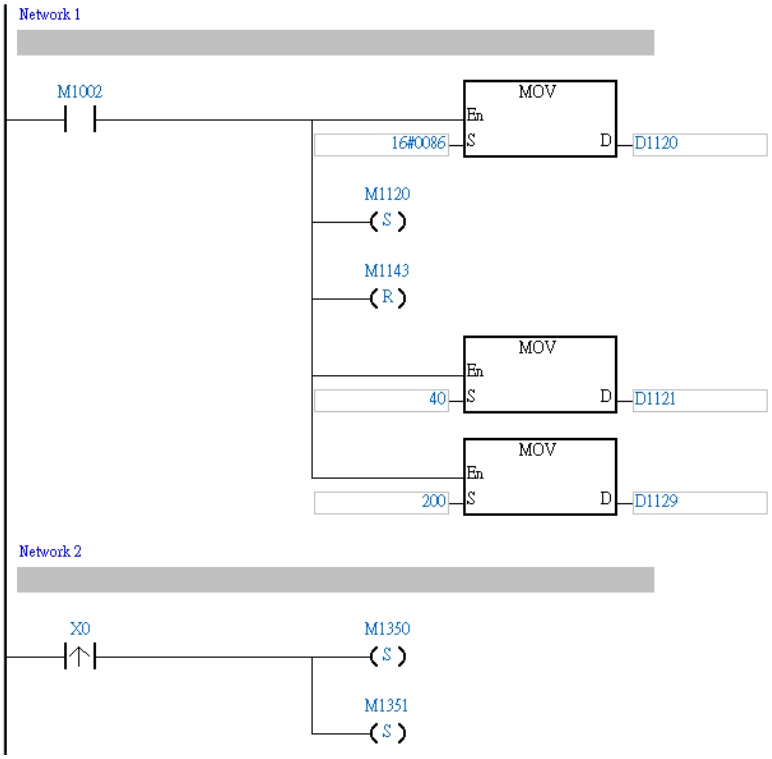
【PLC link wizard】

Step 1: Start ISPSoft, write a program to the master PLC connected, move the RUN/STOP switch on the PLC into the RUN position, and write related values to the PLC.

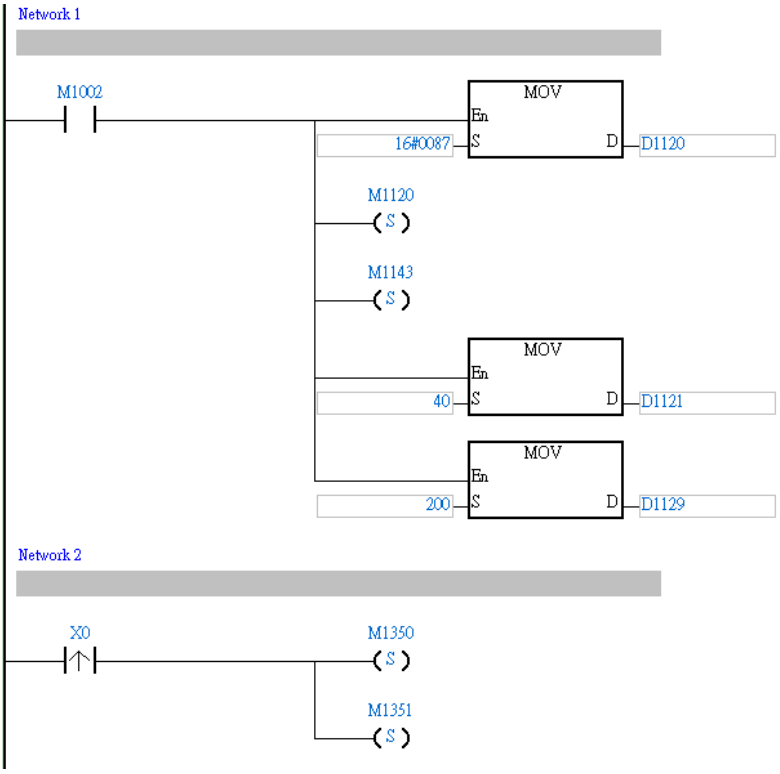


Owing to the fact that devices used to set related communication and a PLC link (M1350 and M1351) are not latching devices, they need to be set by means of a program. The PLC link wizard is used to manually specify the stations which need to be linked (M1355 is On).

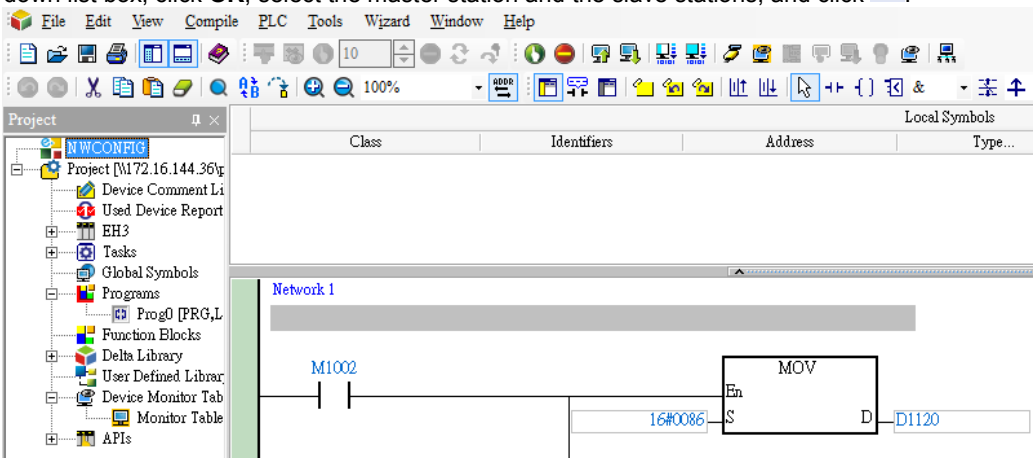
Program for ASCII communication:

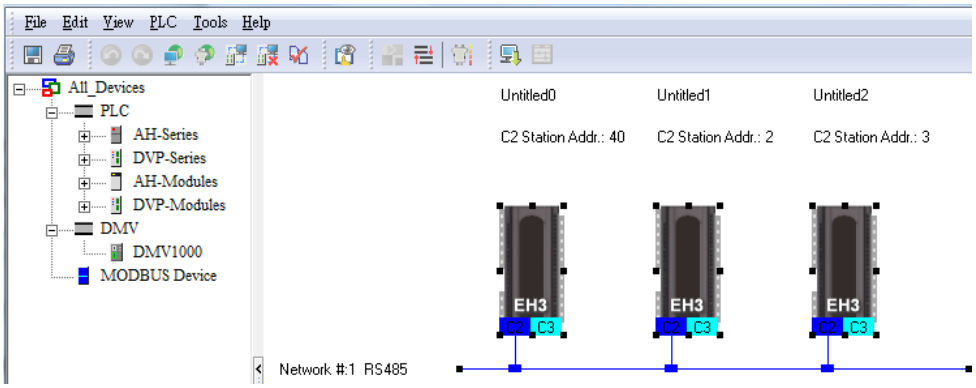


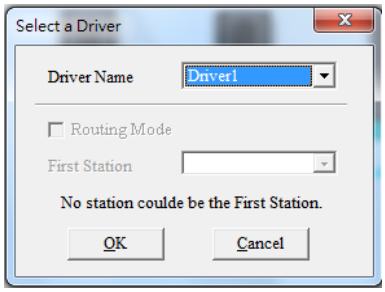
Program for RTU communication:



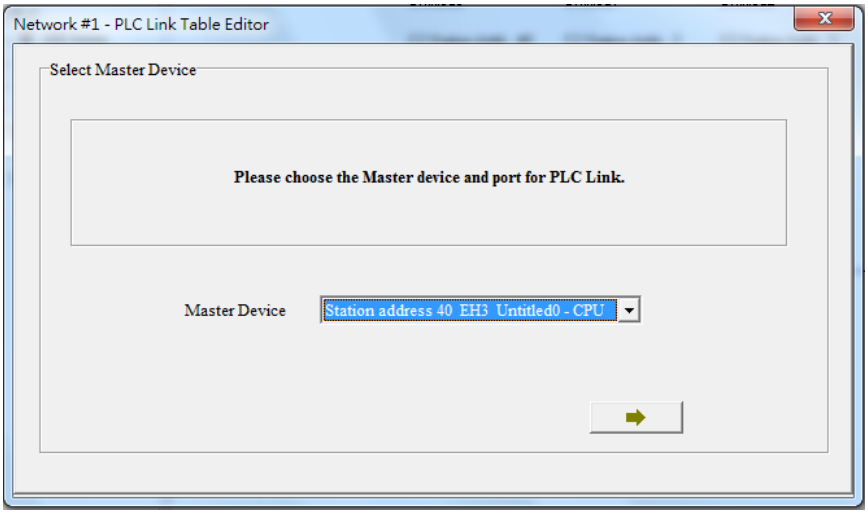
Step 2: Double-click **NWCONFIG** in the project management area, create a link, click , select **Driver 1** in the **Driver Name** drop-down list box, click **OK**, select the master station and the slave stations, and click .

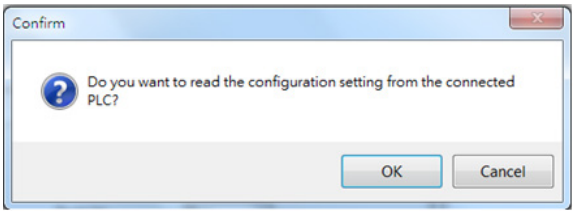




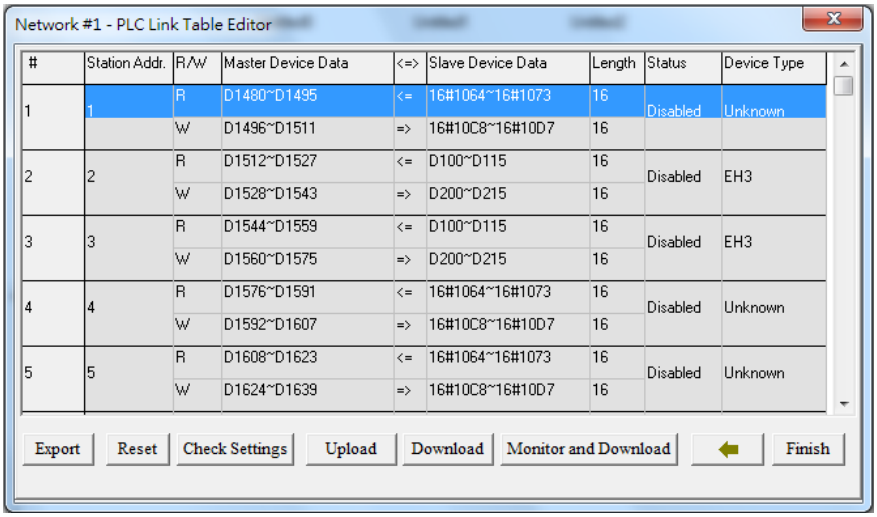


Step 3: Select a PLC in the **Master Device** drop-down list box, click ➡, and click **OK** in the window which appears.



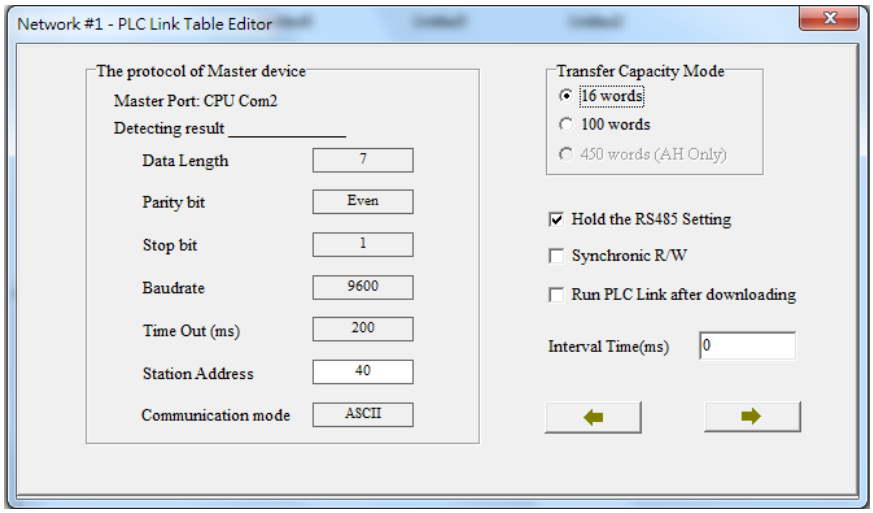


Step 4: Click  .

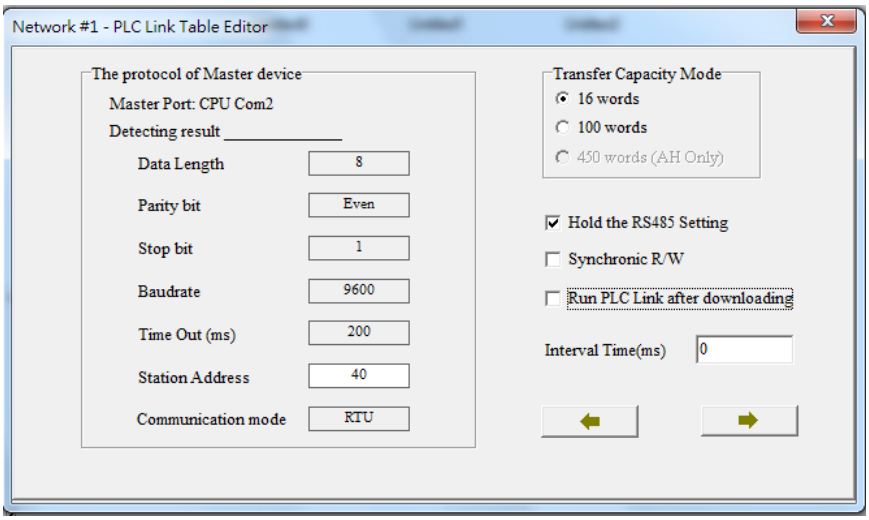


Step 5: The PLC link wizard reads values according to the communication format set for COM2 in the master PLC. Select the **16 words** option button in the **Transfer Capacity Mode** section, unselect the **Synchronic R/W** checkbox and the **Run PLC Link after downloading** checkbox, type “0” in the **Interval time** box, and click  .

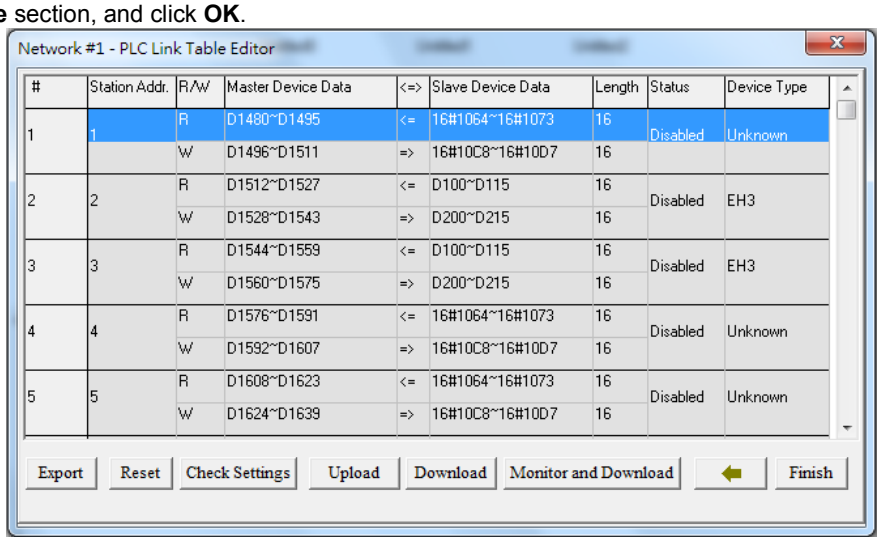
Window for ASCII communication:

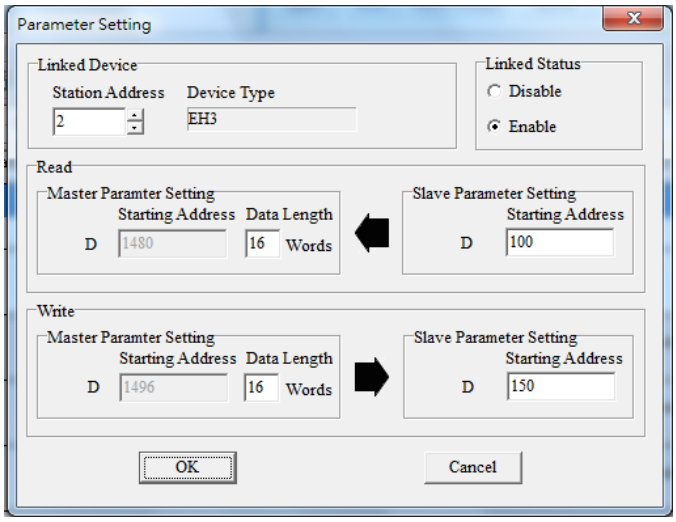


Window for RTU communication:

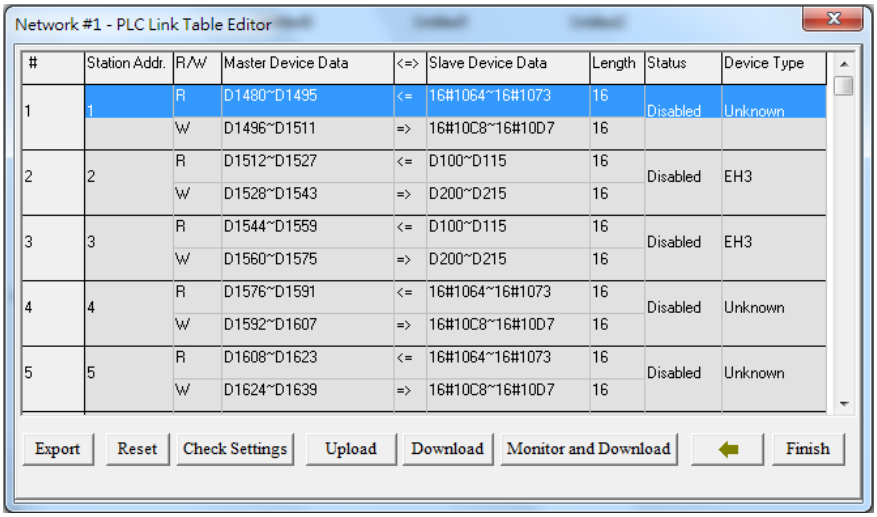


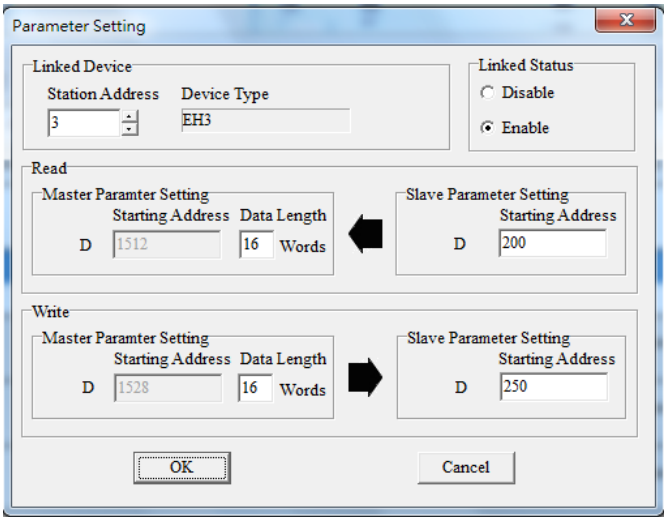
Step 6: Double-click the **1** block in the **PLC Link Table Editor** window, select **2** in the **Station Address** box, select the **Enable** option button in the **Linked Status** section (set M1360 to On), type “16” in the **Data Length** boxes in the **Master Parameter Setting** sections in the **Read** and **Write** sections, type “100” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Read** section, type “150” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.



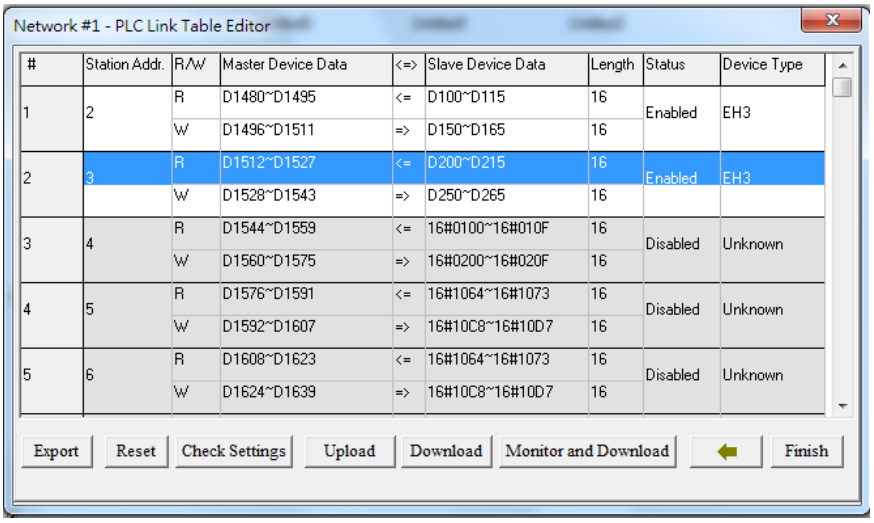


Step 7: Double-click the **2** block in the **PLC Link Table Editor** window, select **3** in the **Station Address** box, select the **Enable** option button in the **Linked Status** section (set M1361 to On), type “16” in the **Data Length** boxes in the **Master Parameter Setting** sections in the **Read** and **Write** sections, type “200” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Read** section, type “250” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.



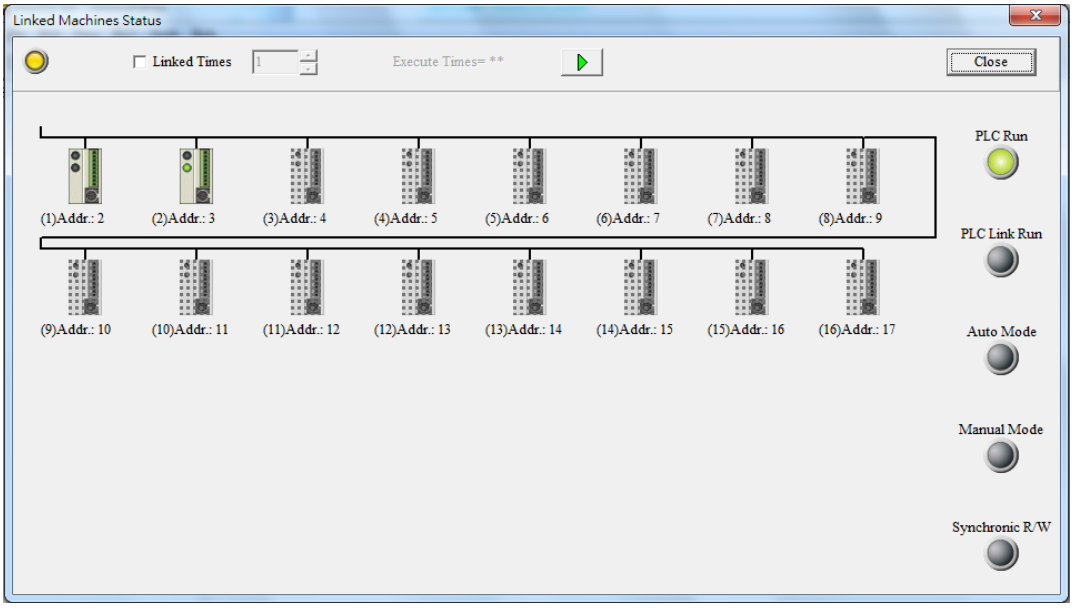


Step 8: Check whether the contents of the **1** block and the **2** block are correct, and then click **Monitor and Download**.



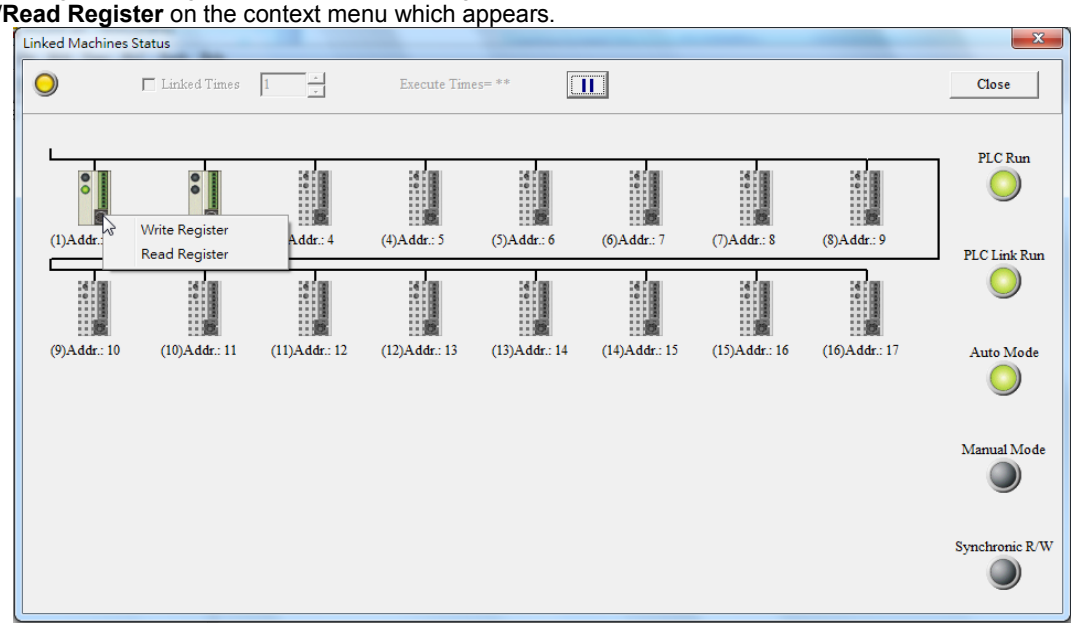
#	Station Addr.	R/W	Master Device Data	<=>	Slave Device Data	Length	Status	Device Type
1	2	R	D1480~D1495	<=	D100~D115	16	Enabled	EH3
		W	D1496~D1511	=>	D150~D165	16		
2	3	R	D1512~D1527	<=	D200~D215	16	Enabled	EH3
		W	D1528~D1543	=>	D250~D265	16		
3	4	R	D1544~D1559	<=	16#0100~16#010F	16	Disabled	Unknown
		W	D1560~D1575	=>	16#0200~16#020F	16		
4	5	R	D1576~D1591	<=	16#1064~16#1073	16	Disabled	Unknown
		W	D1592~D1607	=>	16#10C8~16#10D7	16		
5	6	R	D1608~D1623	<=	16#1064~16#1073	16	Disabled	Unknown
		W	D1624~D1639	=>	16#10C8~16#10D7	16		

Step 9: Click  or set X0 to On.

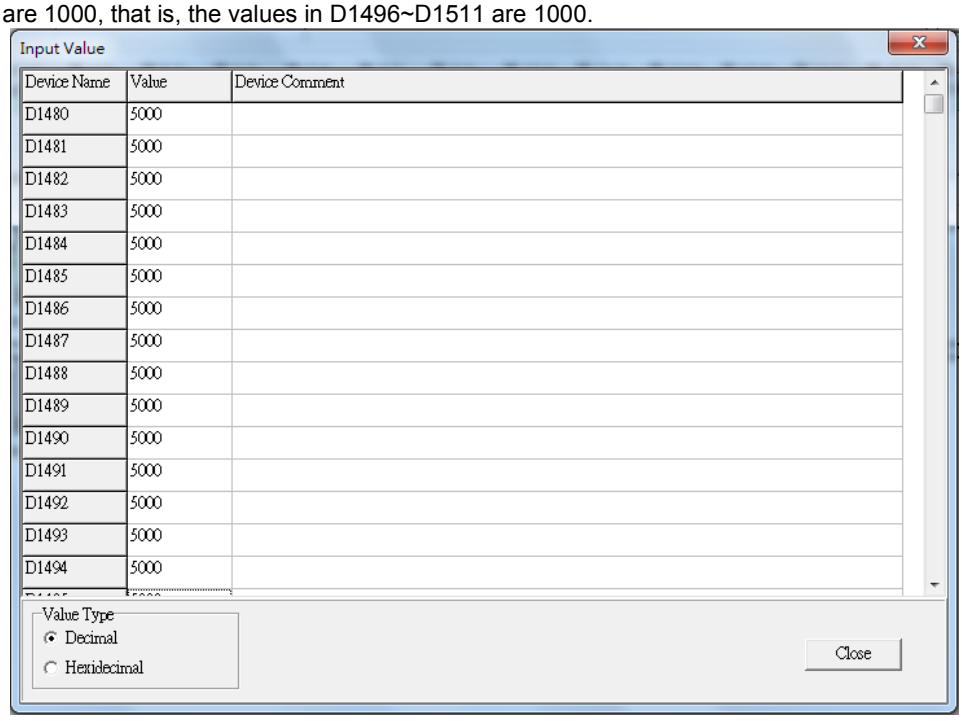


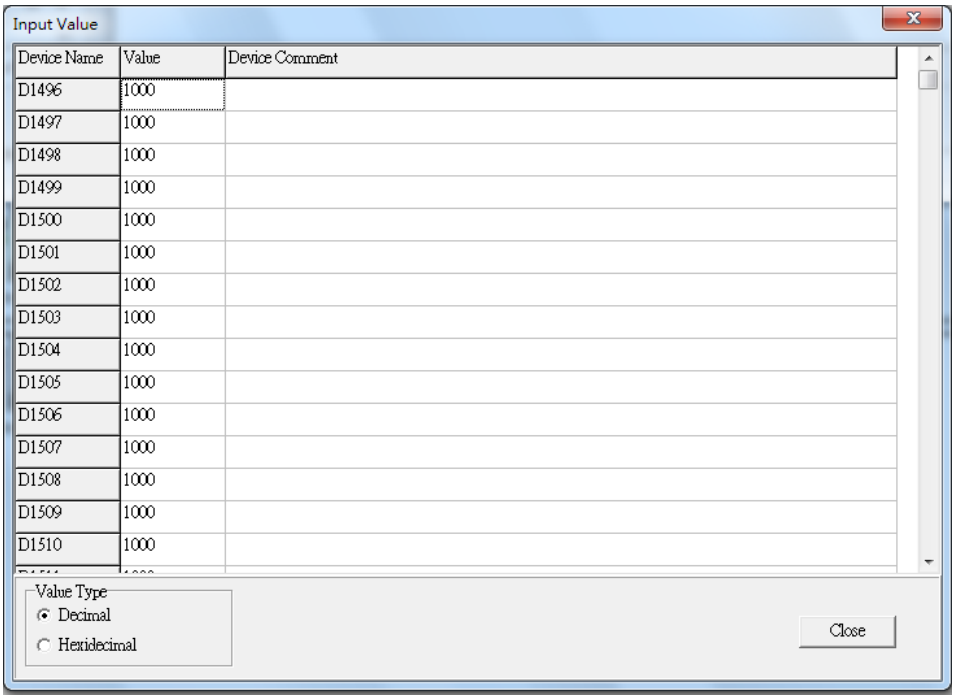
Step 10: The state of the PLC link executed is shown in the **Linked Machines Status** window. The master PLC can exchange data with the slave stations through a program or the PLC link wizard.

Reading/Writing data through the PLC link wizard: Right-click slave station (1)  /slave station (2)  , and click **Write Register**/**Read Register** on the context menu which appears.

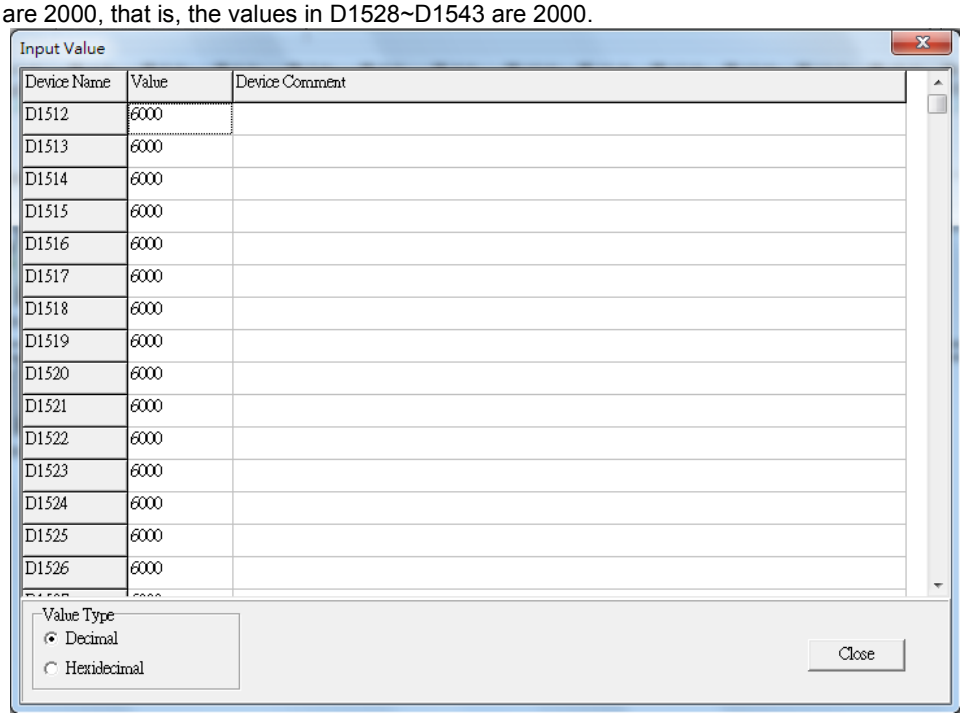


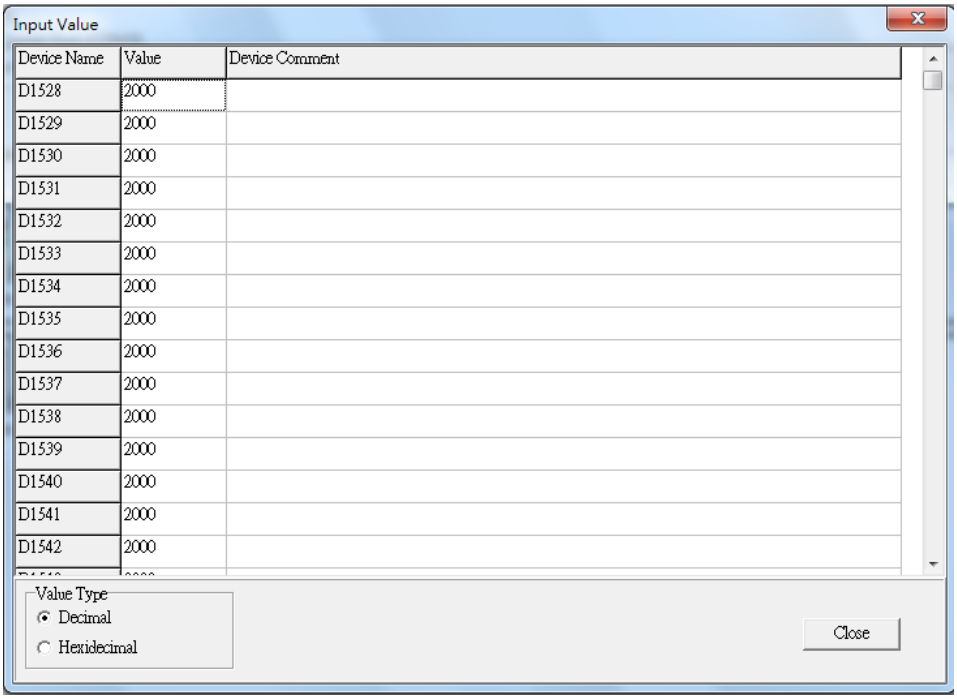
Step 11: The values read from slave 1 are 5000, that is, the values in D1480~D1495 are 5000. The values written to slave station 1 are 1000, that is, the values in D1496~D1511 are 1000.



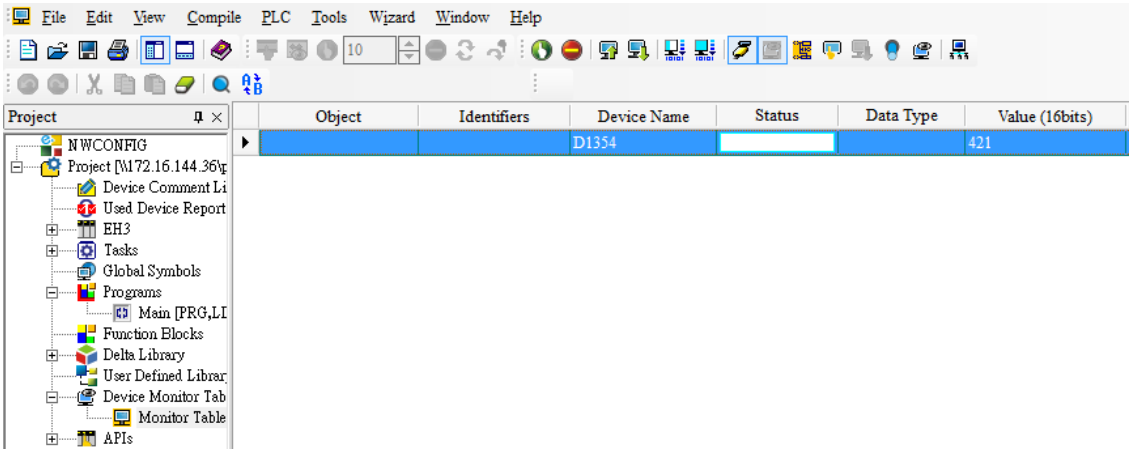


Step 12: The values read from slave 2 are 6000, that is, the values in D1512~D1527 are 6000. The values written to slave station 2 are 2000, that is, the values in D1528~D1543 are 2000.





Step 13: Close the **Linked Machines Status** window, create a device monitoring table by means of **Device Monitor Table** in the project management area, type “D1354” in the device monitoring table, and click . The value in D1354 indicates PLC link scan time.



【Description of control】

- D1399 in the master PLC is used to set a start slave station address. The value in D1399 is K2, that is, the PLC whose station address is K2 is slave station 1, and the PLC whose station address is K3 is slave station 2.
- The master station exchanges data with the two slave stations by means of a PLC link. The values in D100~D115 in slave station 1 are written to D1480~D1495 in the master station, and the values in D1496~D1511 in the master station are written to D150~D165 in slave station 1. The values in D200~D215 in slave station 2 are written to D1512~D1527 in the master station, and the values in D1528~D1543 in the master station are written to D250~D265 in slave station 2.

Master PLC (1 PLC)		Slave PLC (2 PLCs)
D1480~D1495	Reading ←	D100~D115 in the slave PLC whose station address is K2
D1496~D1511	Writing →	D150~D165 in the slave PLC whose station address is K2
D1512~D1527	Reading ←	D200~D215 in the slave PLC whose station address is K3
D1528~D1543	Writing →	D250~D265 in the slave PLC whose station address is K3

- When M1350 is Off, the values in the data registers used for data exchange in the master station and the slave stations are the ones shown below.

Master PLC	Value	Slave PLC	Value
D1480~D1495	All are 0.	D100~D115 in slave station 1	All are 5000.
D1496~D1511	All are 1000.	D150~D165 in slave station 1	All are 0.
D1512~D1527	All are 0.	D200~D215 in slave station 2	All are 6000.
D1528~D1543	All are 2000.	D250~D265 in slave station 2	All are 0.

After M1350 is set to ON, the values in the data registers used for data exchange in the master station and the slave stations will become the ones shown below.

Master PLC	Value	Slave PLC	Value
D1480~D1495	All are 5000.	D100~D115 in slave station 1	All are 5000.
D1496~D1511	All are 1000.	D150~D165 in slave station 1	All are 1000.
D1512~D1527	All are 6000.	D200~D215 in slave station 2	All are 6000.
D1528~D1543	All are 2000.	D250~D265 in slave station 2	All are 2000.

4. Example 2—Automatically Searching for Linked Slave Stations (M1355=Off)

If M1355 is Off, whether slave station 1~slave station 16 (slave station 1~slave station 32) are linked will be automatically detected (and can be monitored by means of M1360~M1375 and M1440~M1455 will be monitored). (The master stations and the slave stations in the examples below are DVP-EH3 series PLCs.)

4.1 Using the PLC Link Wizard in WPLSoft (ASCII/RTU Mode)

【Control requirement】
A master station (A DVP-EH3 series PLC) individually exchanges sixteen pieces of data (sixteen words) with the two slave stations (two DVP-EH3 series PLCs) automatically found through a PLC link.

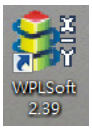
【Setting station addresses of PLCs】

Master/Slave station	Station address	Communication format
Master PLC	K40 (D1121=K40)	1. ASCII, 9600, 7, E, 1 (D1120=H'86) 2. RTU, 9600, 8, E, 1 (D1120=H'87) The communication format of the slave PLCs needs to be the same as the communication format of the master PLC.
Slave PLC 1	K2 (D1121=K2)	
Slave PLC 2	K3 (D1121=K3)	

【Descriptions of devices】

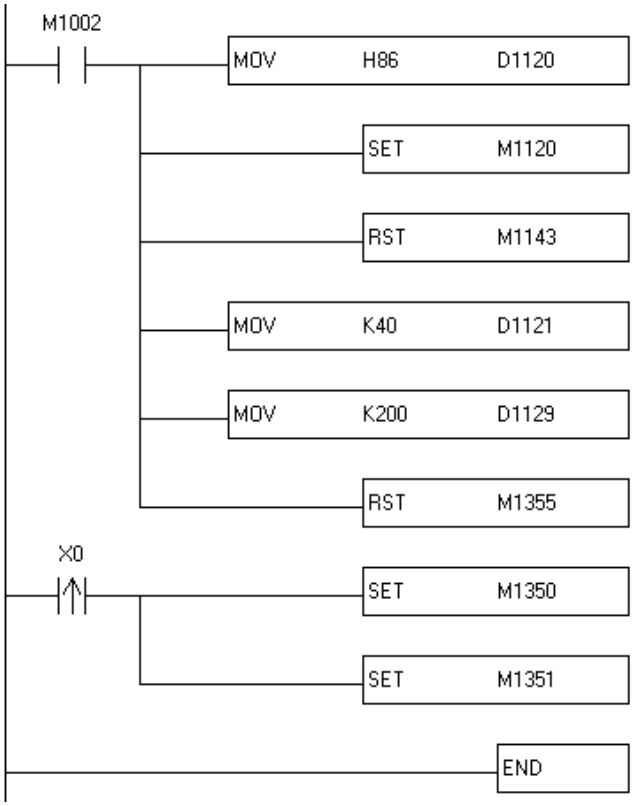
Device in a PLC	Description
X0	X0 functions as a conditional contact used to enable M1350 and M1351.
D1120	Communication protocol of COM2 (RS-485)
D1121	PLC Communication address
D1129	Abnormal communication timeout Time unit: ms
M1120	M1120 is used to retain the communication format of COM2 (RS-485).
M1143	M1143 is used to determine whether the communication format set for COM2 (RS-485) is an ASCII mode or an RTU mode. Off: ASCII mode On: RTU mode
M1350	M1350 is used to enable a PLC link.
M1351	If M1351 is ON, the PLC link executed will be an automatic mode.
M1355	M1355 is used to enable the function of automatically searching for linked slave stations.

【PLC link wizard】
Step 1: Start WPLSoft, write a program to the master PLC connected, move the RUN/STOP switch on the PLC into the RUN position, write related values to the PLC, and move the RUN/STOP switch into the STOP position.

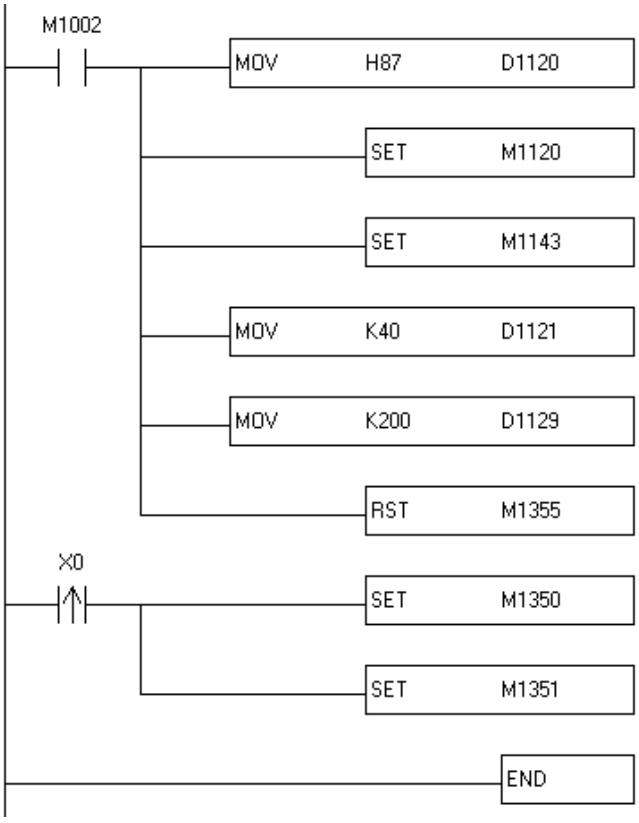


Owing to the fact that devices used to set related communication and a PLC link (M1350 and M1351) are not latching devices, they need to be set by means of a program.
The PLC link wizard is used to manually specify the stations which need to be linked (M1355 is On), and therefore parameters must be written when the the RUN/STOP switch is in the STOP position.

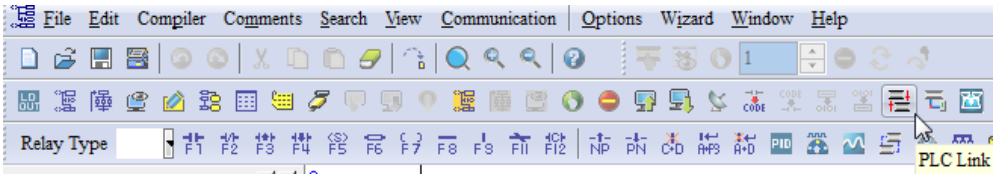
Program for ASCII communication:



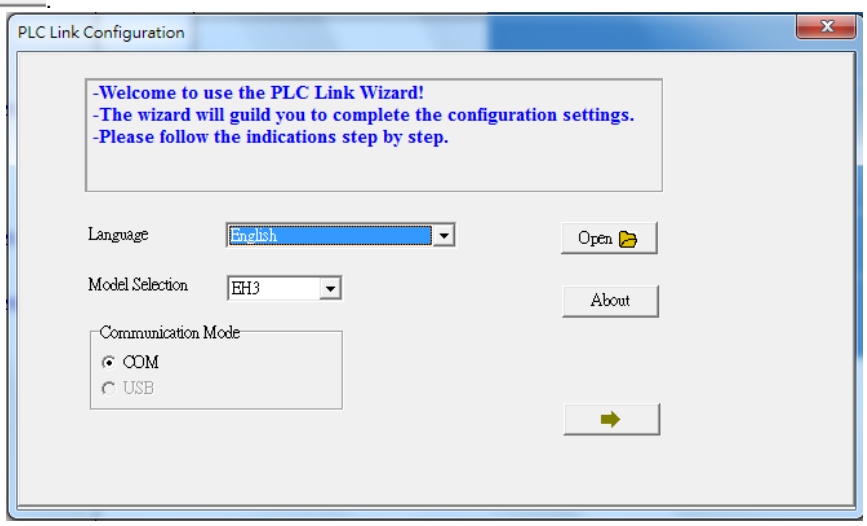
Program for RTU communication:



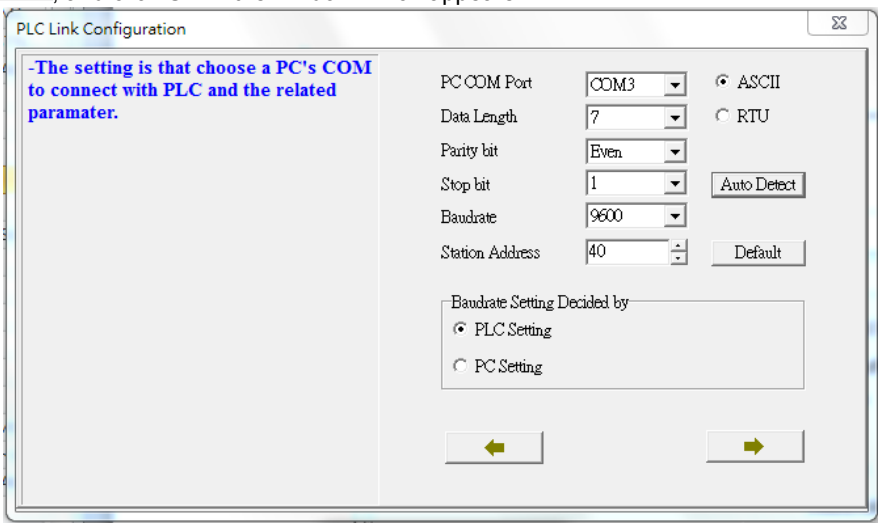
Step 2: Click the PLC link wizard in WPLSoft.

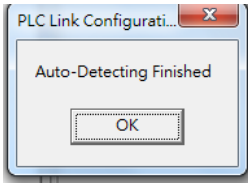


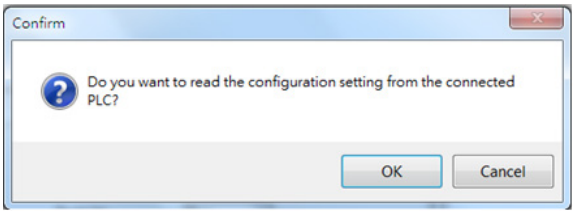
Step 3: Select a language in the **Language** drop-down list box, select a model in the **Model Selection** drop-down list box, and click .



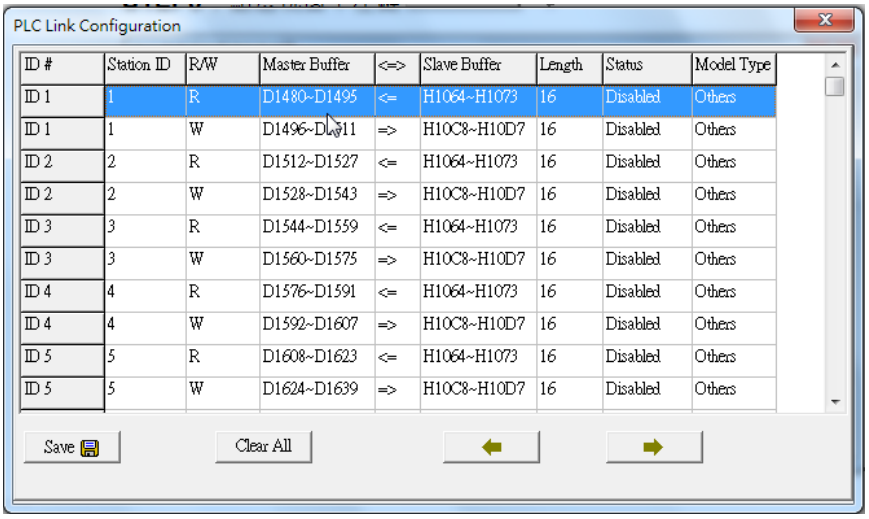
Step 4: Set a communication format for COM1 in the master PLC, click **Auto Detect**, click **OK** in the window which appears, click , and click **OK** in the window which appears.





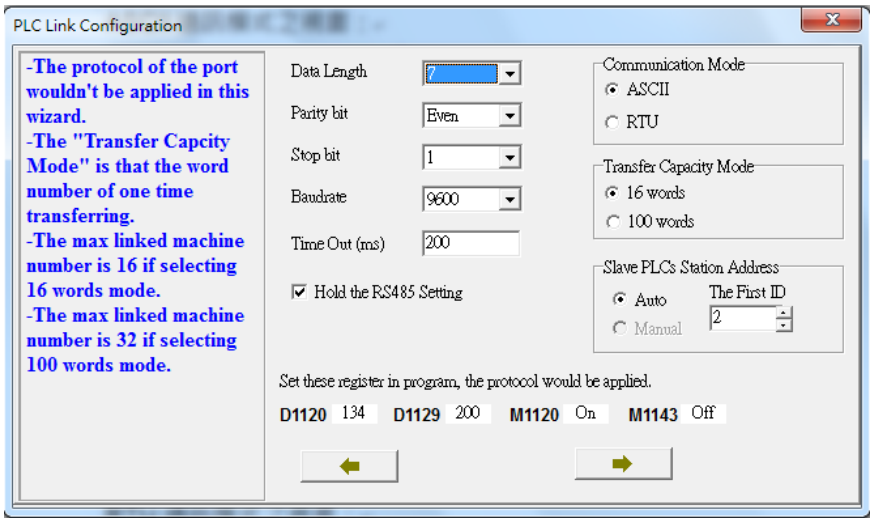


Step 5: Click  .

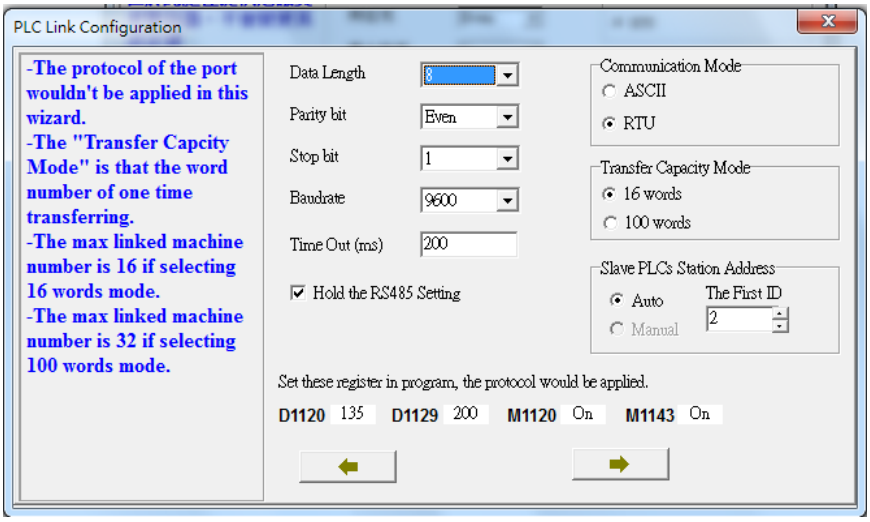


Step 6: The PLC link wizard reads values according to the communication format set for COM2 in the master PLC. Select the **16 words** option button in the **Transfer Capacity Mode** section, select the **Auto** option button and **2** in the **The First ID** box in the **Slave PLCs Station Address** section, and click  .

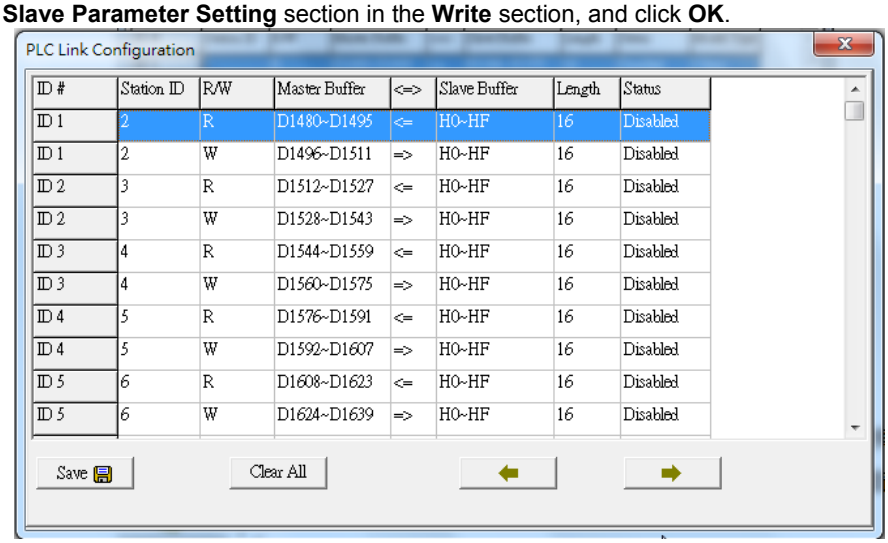
Window for ASCII communication:

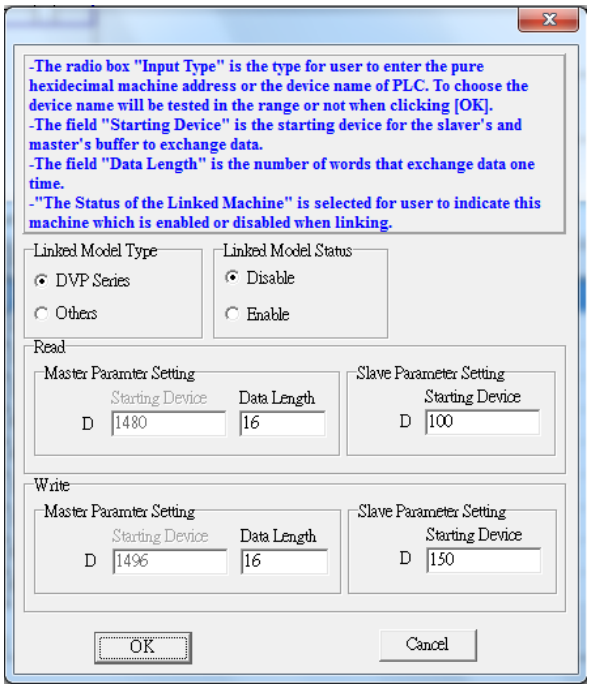


Window for RTU communication:

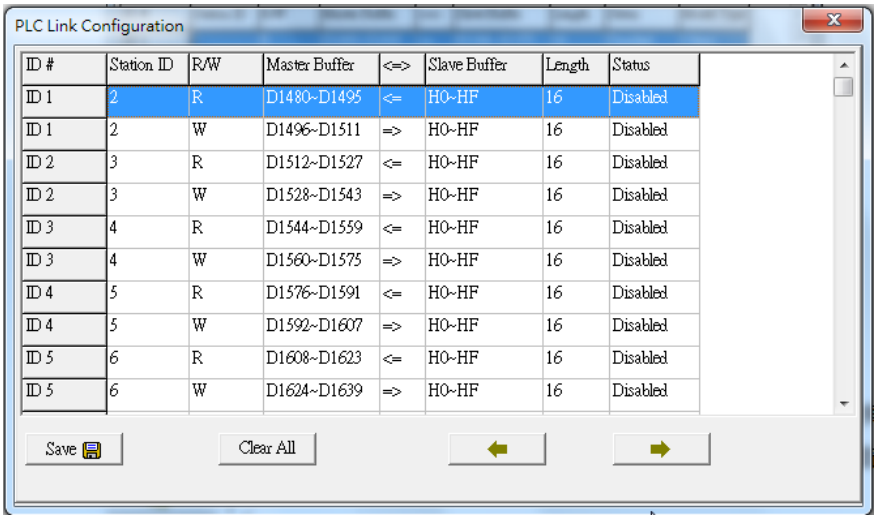


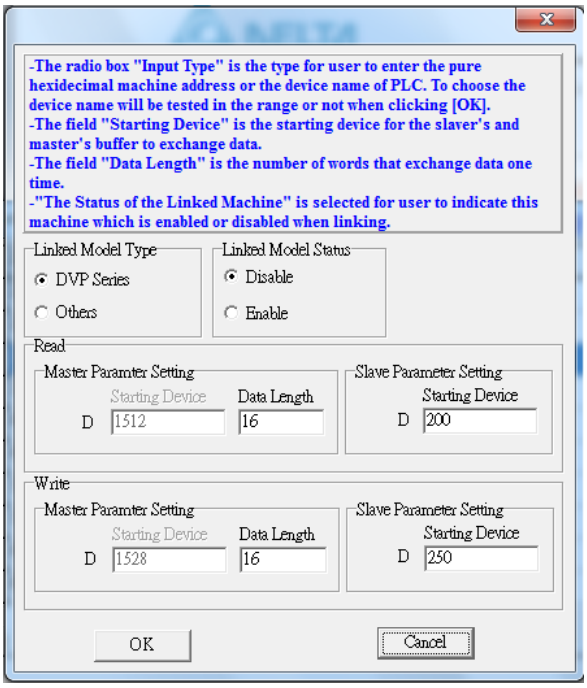
Step 7: Double-click the **ID 1** block in the **PLC Link Configuration** window, select the **DVP Series** option button in the **Linked Model Type** section, select the **Disable** option button in the **Linked Model Status** section (set M1360 to Off), type “16” in the **Data Length** boxes in the **Master Parameter Setting** sections in the **Read** and **Write** sections, type “100” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Read** section, type “150” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.



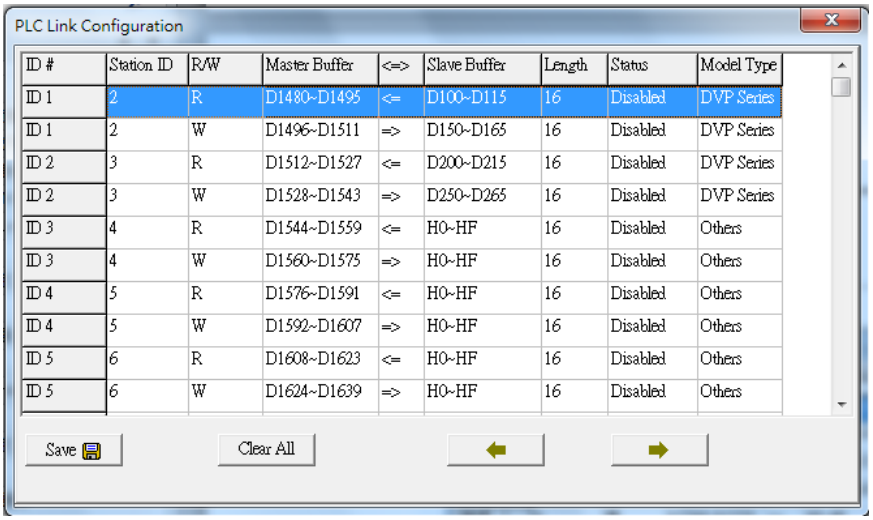


Step 8: Double-click the **ID 2** block in the **PLC Link Configuration** window, select the **DVP Series** option button in the **Linked Model Type** section, select the **Disable** option button in the **Linked Model Status** section (set M1361 to Off), type “16” in the **Data Length** boxes in the **Master Parameter Setting** sections in the **Read** and **Write** sections, type “200” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Read** section, type “250” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.

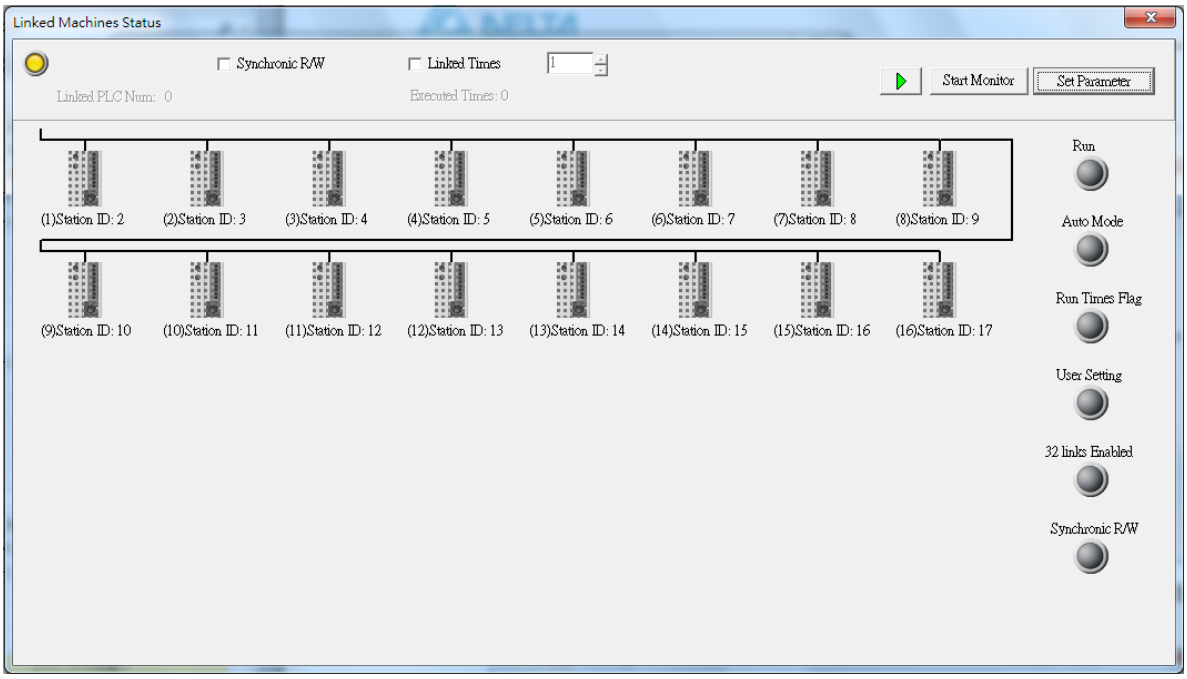




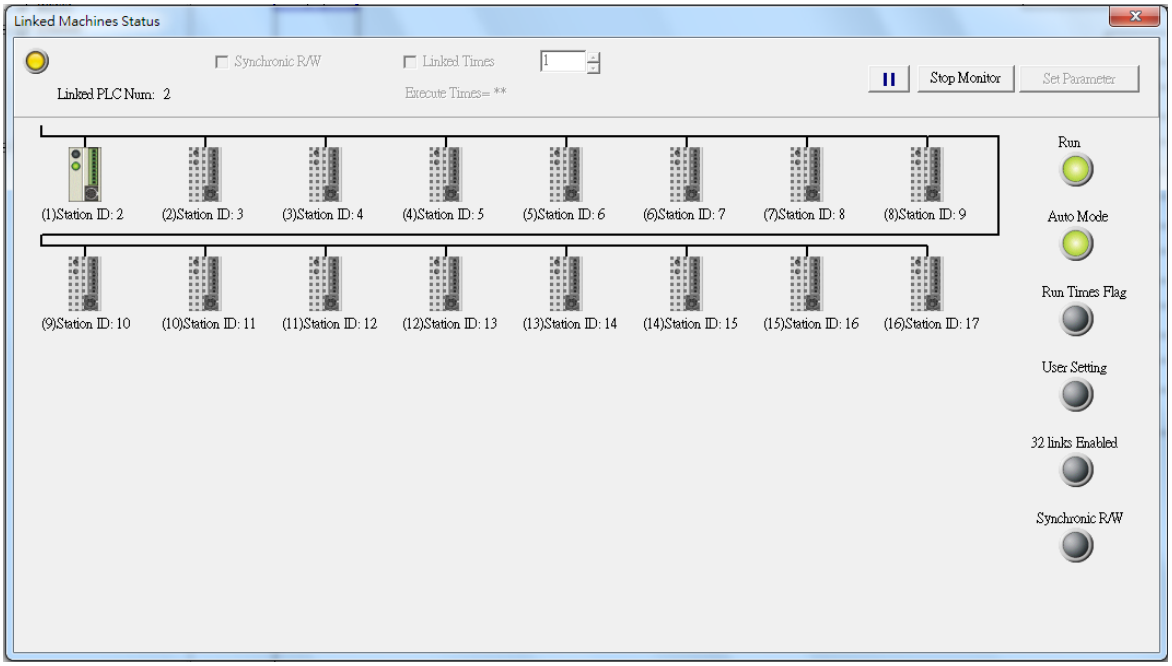
Step 9: Check whether the contents of the **ID 1** block and the **ID 2** block are correct, and then click  .



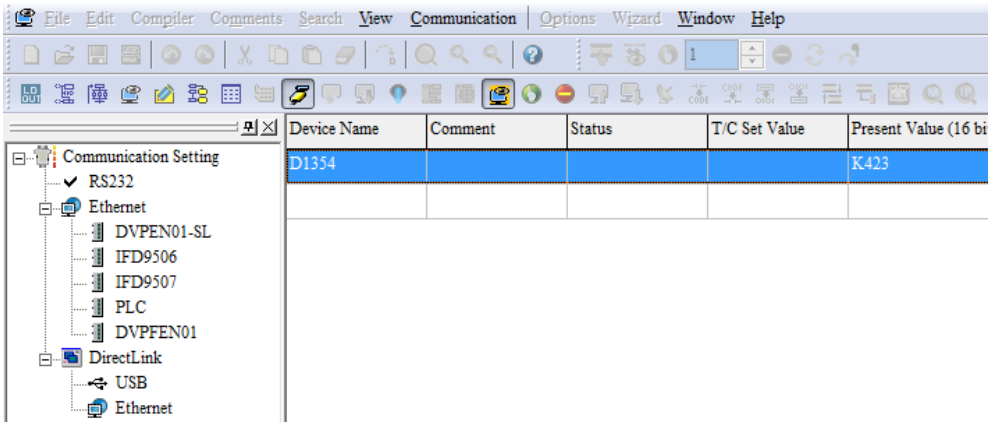
Step 10: Click the **Set Parameter** button, click the **Start Monitor** button, move the RUN/STOP switch on the PLC into the RUN position, and click  or set X0 to On.



Step 11: The state of the PLC link executed is shown in the **Linked Machines Status** window. The master PLC can exchange data with the slave stations through a program. If the window is not needed,  can be used to close the window.



Step 12: Close the **Linked Machines Status** window, click  , click  , and type “D1354”. The value in D1354 indicates PLC link scan time.



【Description of control】

- D1399 in the master PLC is used to set a start slave station address. The value in D1399 is K2, that is, the PLC whose station address is K2 is slave station 1, and the PLC whose station address is K3 is slave station 2.
- The master station exchanges data with the two slave stations by means of a PLC link. The values in D100~D115 in slave station 1 are written to D1480~D1495 in the master station, and the values in D1496~D1511 in the master station are written to D150~D165 in slave station 1. The values in D200~D215 in slave station 2 are written to D1512~D1527 in the master station, and the values in D1528~D1543 in the master station are written to D250~D265 in slave station 2.

Master PLC (1 PLC)		Slave PLC (2 PLCs)
D1480~D1495	Reading ←	D100~D115 in the slave PLC whose station address is K2
D1496~D1511	Writing →	D150~D165 in the slave PLC whose station address is K2
D1512~D1527	Reading ←	D200~D215 in the slave PLC whose station address is K3
D1528~D1543	Writing →	D250~D265 in the slave PLC whose station address is K3

- When M1350 is Off, the values in the data registers used for data exchange in the master station and the slave stations are the ones shown below.

Master PLC	Value	Slave PLC	Value
D1480~D1495	All are 0.	D100~D115 in slave station 1	All are 5000.
D1496~D1511	All are 1000.	D150~D165 in slave station 1	All are 0.
D1512~D1527	All are 0.	D200~D215 in slave station 2	All are 6000.
D1528~D1543	All are 2000.	D250~D265 in slave station 2	All are 0.

After M1350 is set to ON, the values in the data registers used for data exchange in the master station and the slave stations will become the ones shown below.

Master PLC	Value	Slave PLC	Value
D1480~D1495	All are 5000.	D100~D115 in slave station 1	All are 5000.
D1496~D1511	All are 1000.	D150~D165 in slave station 1	All are 1000.
D1512~D1527	All are 6000.	D200~D215 in slave station 2	All are 6000.
D1528~D1543	All are 2000.	D250~D265 in slave station 2	All are 2000.

4.2 Using the PLC Link Wizard in ISPSoft (ASCII/RTU Mode)

【Control requirement】
A master station (A DVP-EH3 series PLC) individually exchanges sixteen pieces of data (sixteen words) with the two slave stations (two DVP-EH3 series PLCs) automatically found through a PLC link.

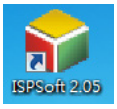
【Setting station addresses of PLCs】

Master/Slave station	Station address	Communication format
Master PLC	K40 (D1121=K40)	3. ASCII, 9600, 7, E, 1 (D1120=H'86) 4. RTU, 9600, 8, E, 1 (D1120=H'87) The communication format of the slave PLCs needs to be the same as the communication format of the master PLC.
Slave PLC 1	K2 (D1121=K2)	
Slave PLC 2	K3 (D1121=K3)	

【Descriptions of devices】

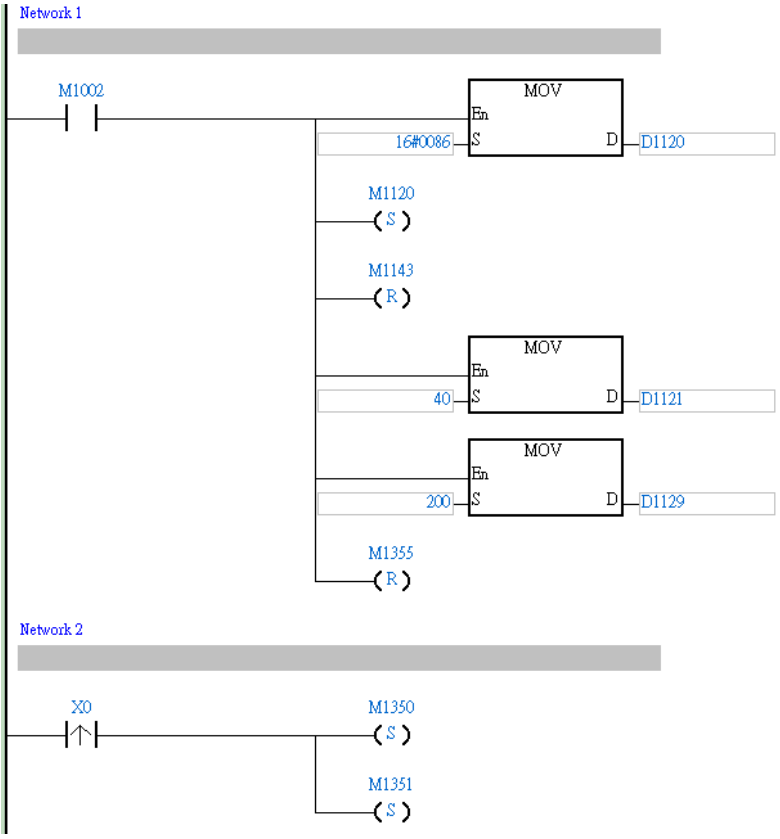
Device in a PLC	Description
X0	X0 functions as a conditional contact used to enable M1350 and M1351.
D1120	Communication protocol of COM2 (RS-485)
D1121	PLC Communication address
D1129	Abnormal communication timeout Time unit: ms
M1120	M1120 is used to retain the communication format of COM2 (RS-485).
M1143	M1143 is used to determine whether the communication format set for COM2 (RS-485) is an ASCII mode or an RTU mode. Off: ASCII mode On: RTU mode
M1350	M1350 is used to enable a PLC link.
M1351	If M1351 is ON, the PLC link executed will be an automatic mode.
M1355	M1355 is used to enable the function of automatically searching for linked slave stations.

【PLC link wizard】
Step 1: Start ISPSoft, write a program to the master PLC connected, move the RUN/STOP switch on the PLC into the RUN position, write related values to the PLC, and move the RUN/STOP switch into the STOP position.

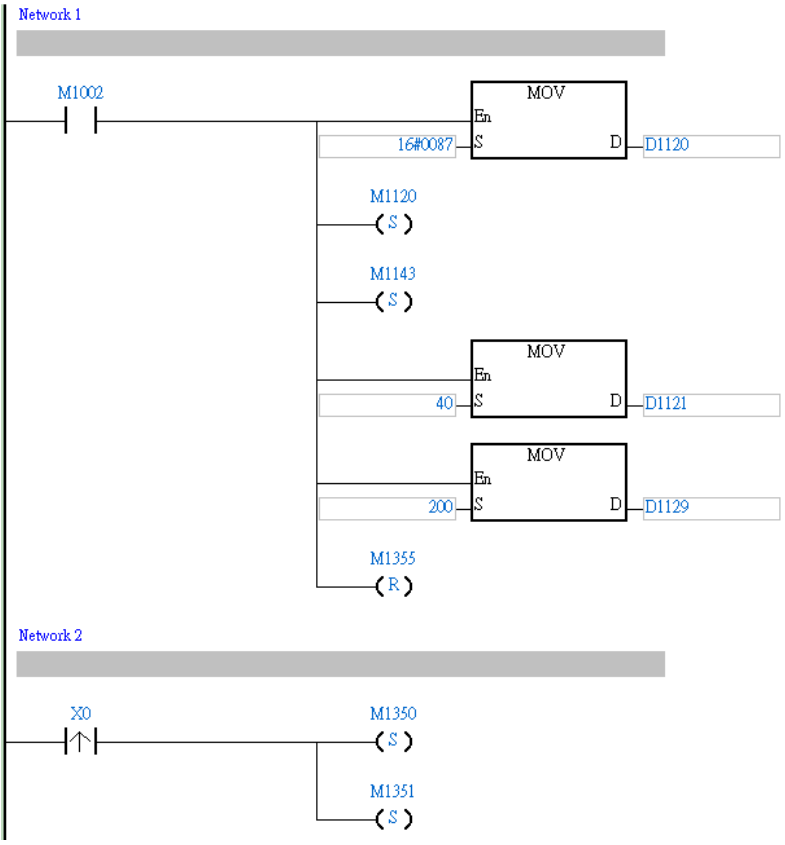


Owing to the fact that devices used to set related communication and a PLC link (M1350 and M1351) are not latching devices, they need to be set by means of a program.
The PLC link wizard is used to manually specify the stations which need to be linked (M1355 is On), and therefore parameters must be written when the the RUN/STOP switch is in the STOP position.

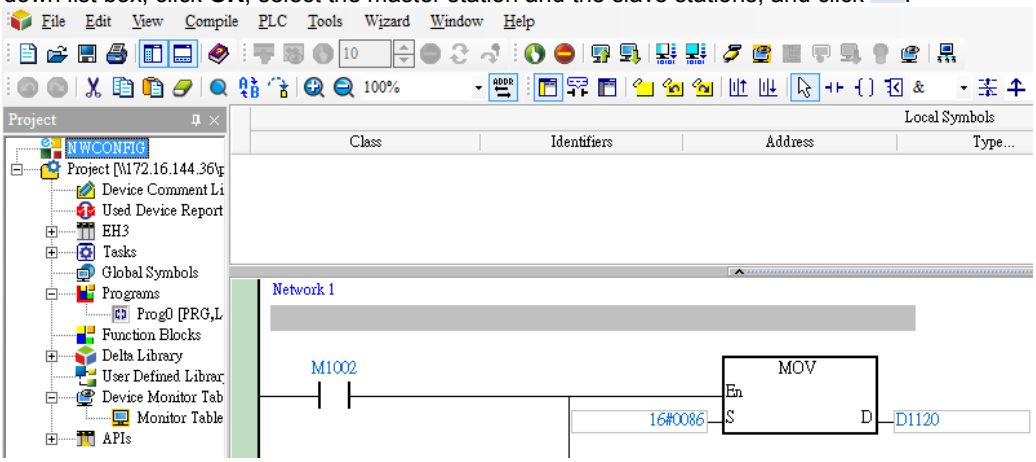
Program for ASCII communication:

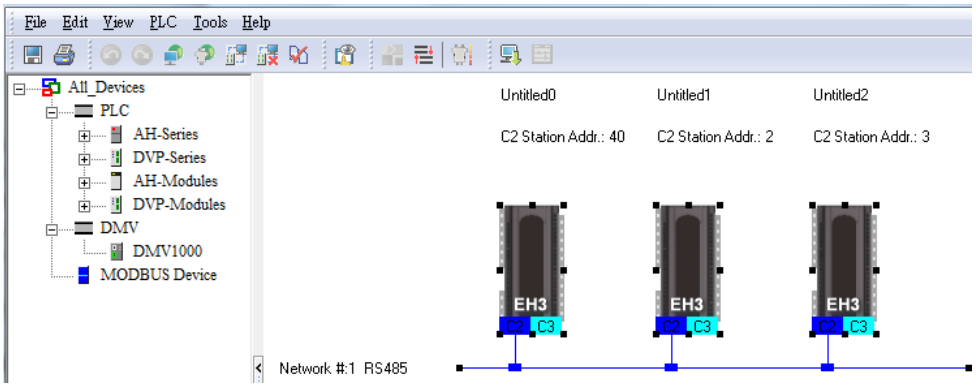


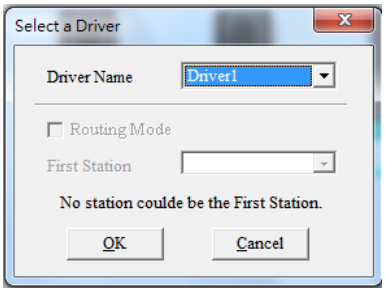
Program for RTU communication:



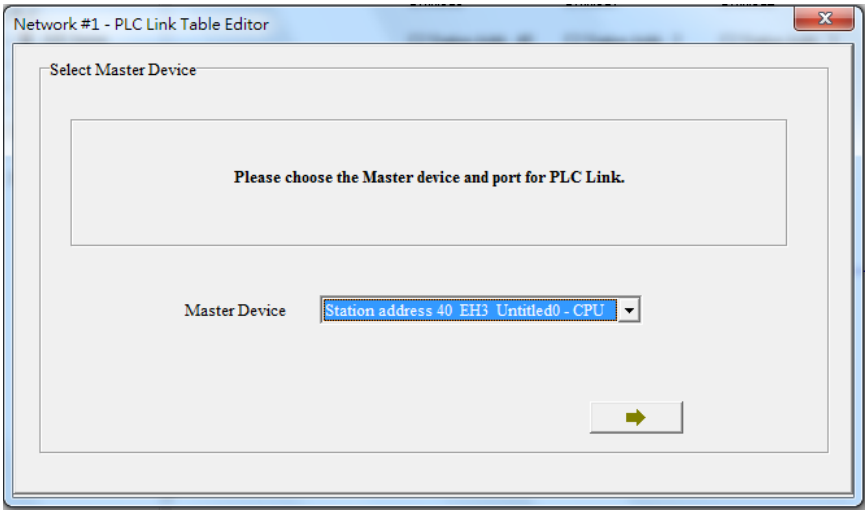
Step 2: Double-click **NWCONFIG** in the project management area, create a link, click  , select **Driver 1** in the **Driver Name** drop-down list box, click **OK**, select the master station and the slave stations, and click  .

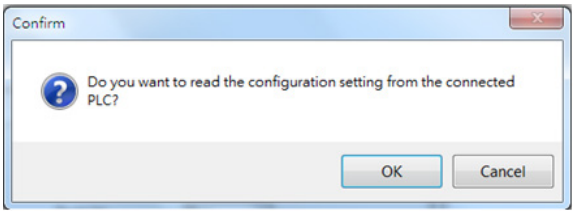




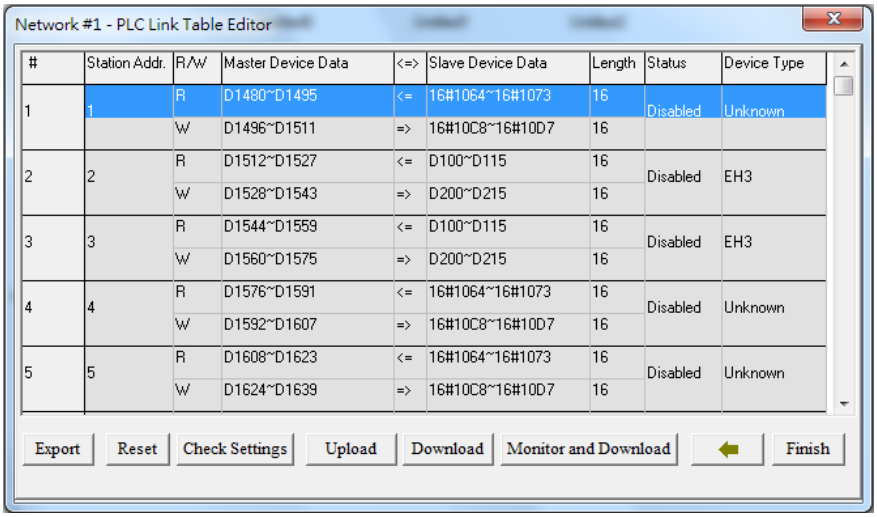


Step 3: Select a PLC in the **Master Device** drop-down list box, click  , and click **OK** in the window which appears.



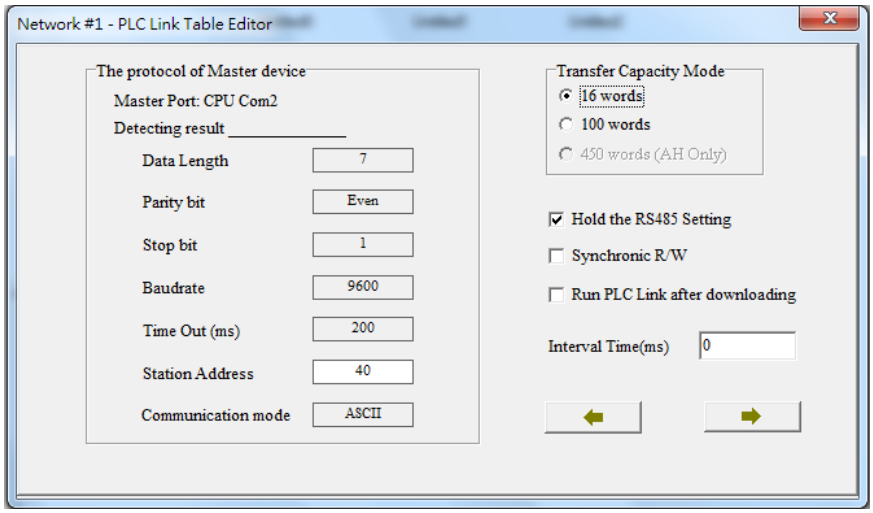


Step 4: Click  .

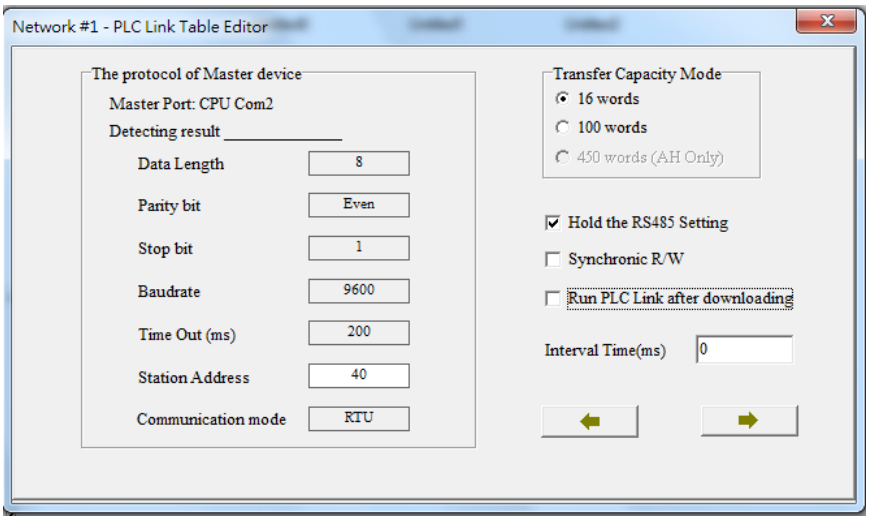


Step 5: The PLC link wizard reads values according to the communication format set for COM2 in the master PLC. Select the **16 words** option button in the **Transfer Capacity Mode** section, unselect the **Synchronic R/W** checkbox and the **Run PLC Link after downloading** checkbox, type “0” in the **Interval time** box, and click  .

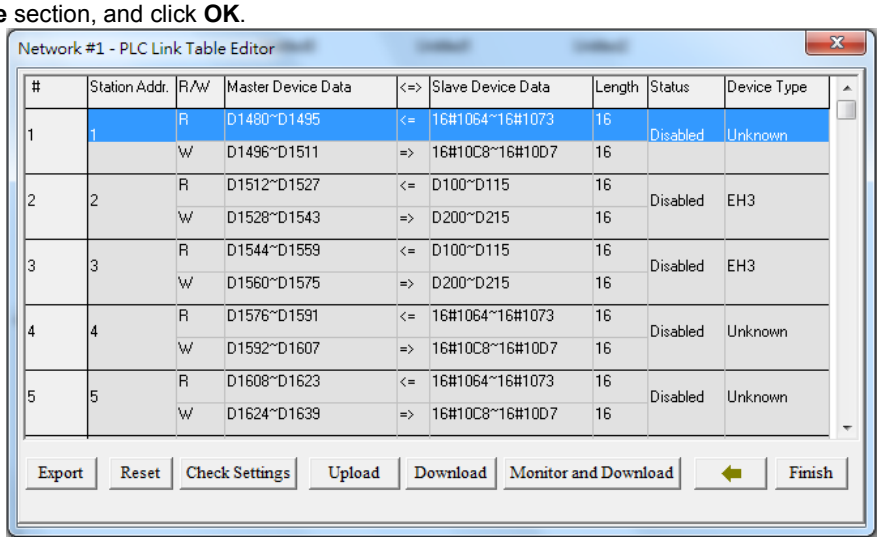
Window for ASCII communication:

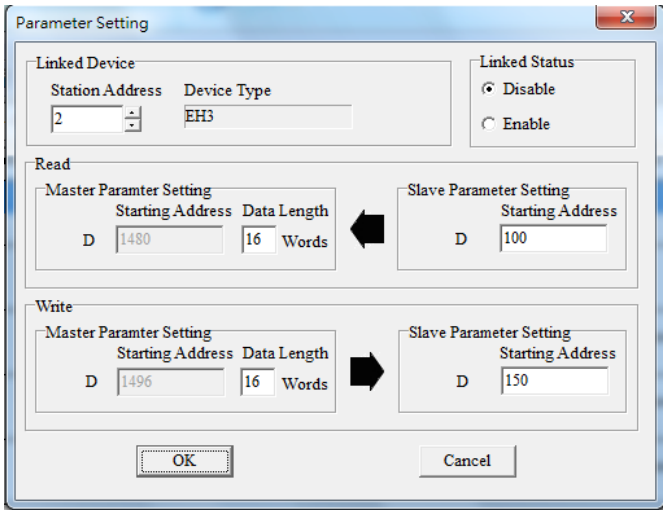


Window for RTU communication:

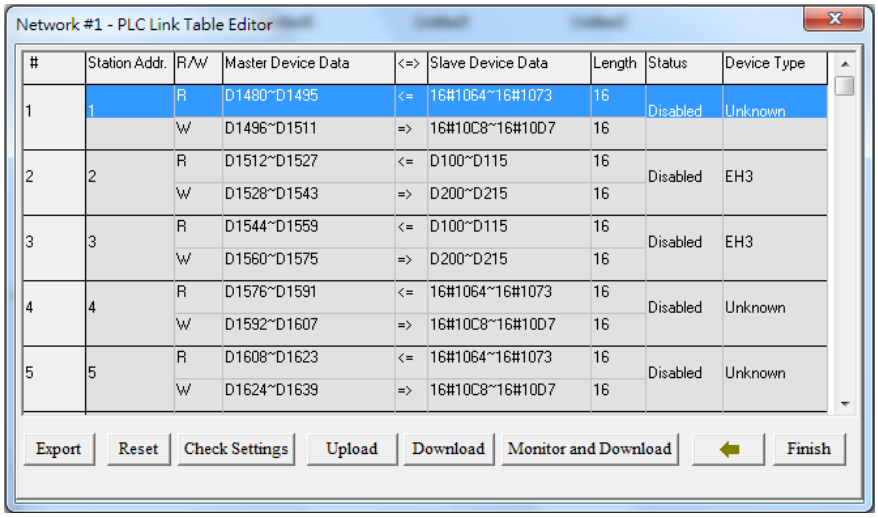


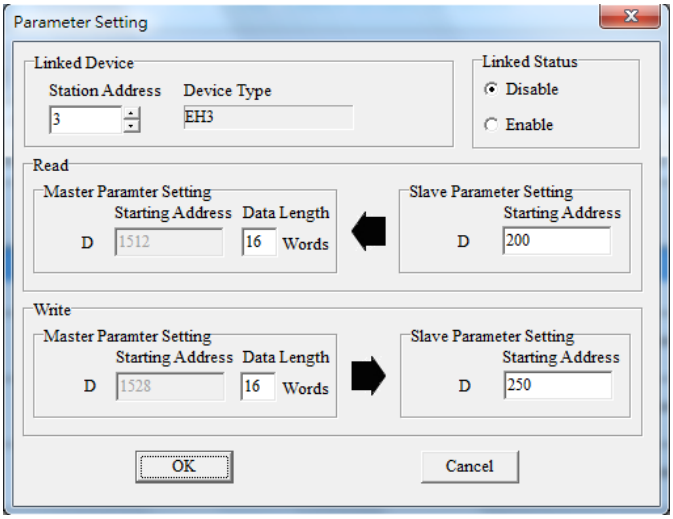
Step 6: Double-click the **1** block in the **PLC Link Table Editor** window, select **2** in the **Station Address** box, select the **Disable** option button in the **Linked Status** section (set M1361 to Off), type “16” in the **Data Length** boxes in the **Master Parameter Setting** sections in the **Read** and **Write** sections, type “100” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Read** section, type “150” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.



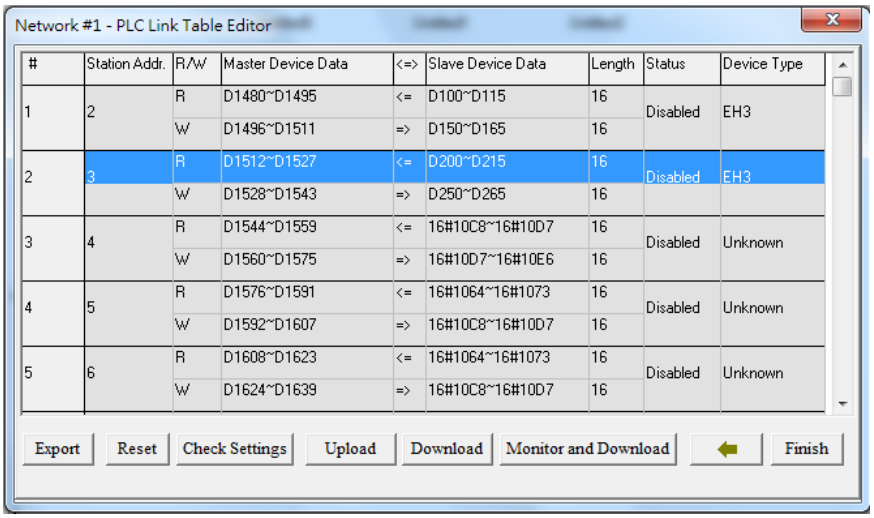


Step 7: Double-click the **2** block in the **PLC Link Table Editor** window, select **3** in the **Station Address** box, select the **Enable** option button in the **Linked Status** section (set M1361 to On), type “16” in the **Data Length** boxes in the **Master Parameter Setting** sections in the **Read** and **Write** sections, type “200” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Read** section, type “250” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.

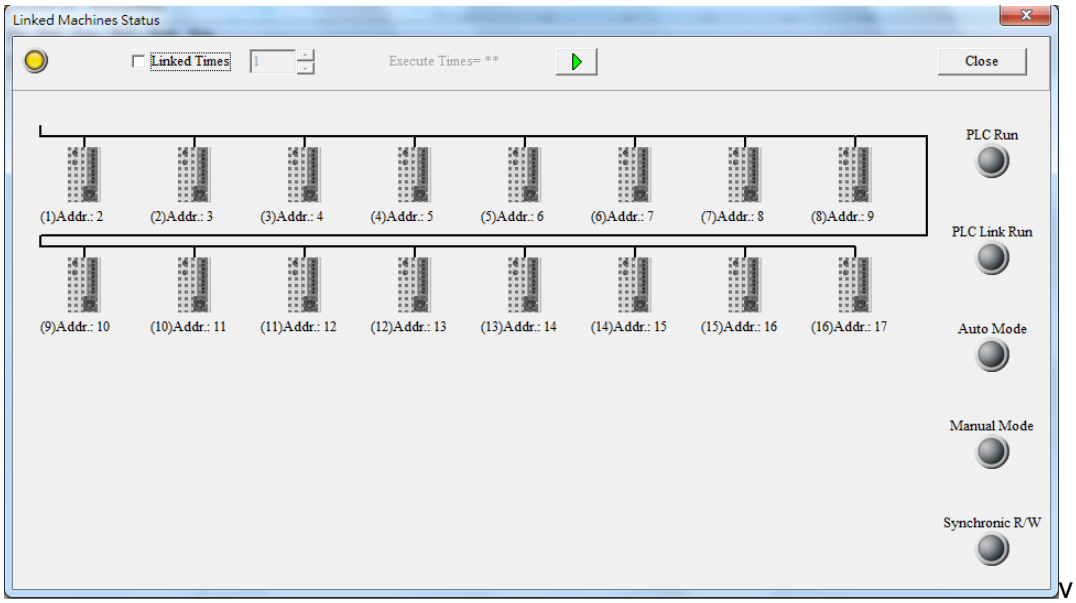




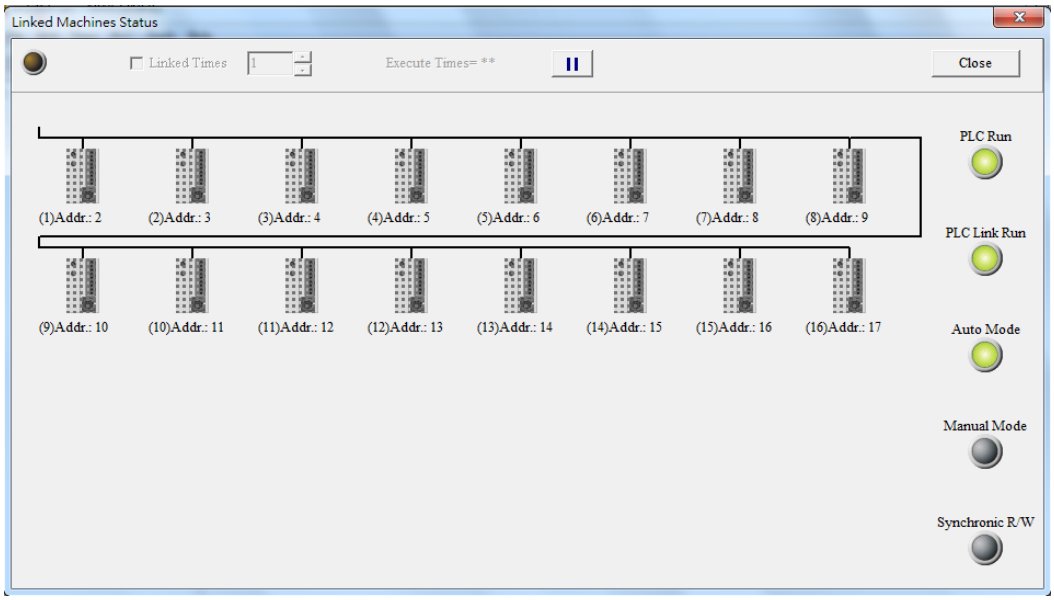
Step 8: Check whether the contents of the **1** block and the **2** block are correct, and then click **Monitor and Download**.



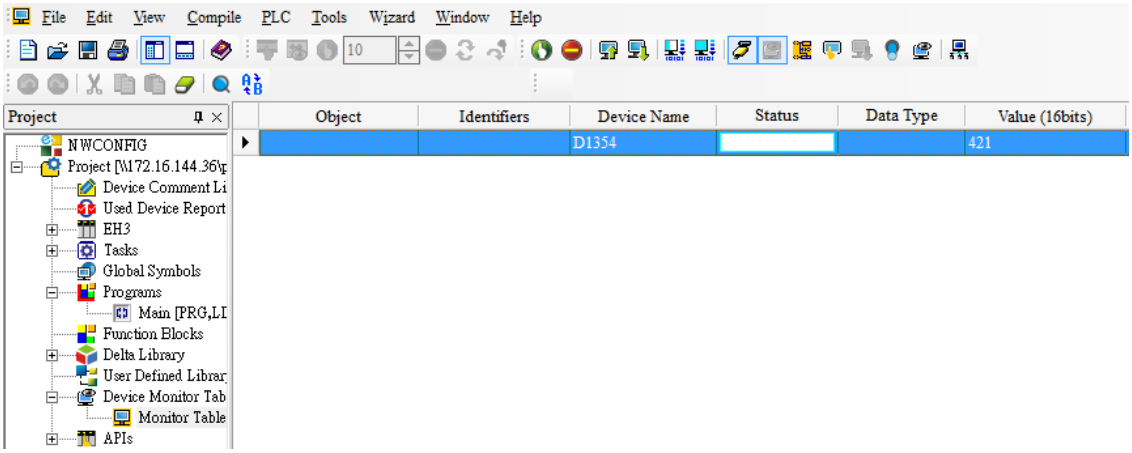
Step 9: Move the RUN/STOP switch on the PLC into the RUN position, and click  or set X0 to On.



Step 10: The state of the PLC link executed is shown in the **Linked Machines Status** window. The master PLC can exchange data with the slave stations through a program. If the window is not needed,  can be used to close the window.



Step 11: Close the **Linked Machines Status** window, create a device monitoring table by means of **Device Monitor Table** in the project management area, type “D1354” in the device monitoring table, and click . The value in D1354 indicates PLC link scan time.



【Description of control】

- D1399 in the master PLC is used to set a start slave station address. The value in D1399 is K2, that is, the PLC whose station address is K2 is slave station 1, and the PLC whose station address is K3 is slave station 2.
- The master station exchanges data with the two slave stations by means of a PLC link. The values in D100~D115 in slave station 1 are written to D1480~D1495 in the master station, and the values in D1496~D1511 in the master station are written to D150~D165 in slave station 1. The values in D200~D215 in slave station 2 are written to D1512~D1527 in the master station, and the value in D1528~D1543 in the master station are written to D250~D265 in slave station 2.

Master PLC (1 PLC)		Slave PLC (2 PLCs)
D1480~D1495	Reading ←	D100~D115 in the slave PLC whose station address is K2
D1496~D1511	Writing →	D150~D165 in the slave PLC whose station address is K2
D1512~D1527	Reading ←	D200~D215 in the slave PLC whose station address is K3
D1528~D1543	Writing →	D250~D265 in the slave PLC whose station address is K3

- When M1350 is Off, the values in the data registers used for data exchange in the master station and the slave stations are the ones shown below.

Master PLC	Value	Slave PLC	Value
D1480~D1495	All are 0.	D100~D115 in slave station 1	All are 5000.
D1496~D1511	All are 1000.	D150~D165 in slave station 1	All are 0.
D1512~D1527	All are 0.	D200~D215 in slave station 2	All are 6000.
D1528~D1543	All are 2000.	D250~D265 in slave station 2	All are 0.

After M1350 is set to ON, the values in the data registers used for data exchange in the master station and the slave stations will become the ones shown below.

Master PLC	Value	Slave PLC	Value
D1480~D1495	All are 5000.	D100~D115 in slave station 1	All are 5000.
D1496~D1511	All are 1000.	D150~D165 in slave station 1	All are 1000.
D1512~D1527	All are 6000.	D200~D215 in slave station 2	All are 6000.
D1528~D1543	All are 2000.	D250~D265 in slave station 2	All are 2000.

5. Example 3—Manually Specifying the Same Slave Station, but Different Communication Addresses (M1356=On)

If M1356 is On, station addresses can be specified. If M1353 is On and M1356 is On, the values in D1900~D1931 will be the station addresses of station 1~station 32, and the consecutive station addresses specified by D1399 will not be used. (The master stations and the slave stations in the examples below are DVP-EH3 series PLCs.)

5.1 Using the PLC Link Wizard in WPLSoft (ASCII/RTU Mode)

【Control requirement】
A master station (A DVP-EH3 series PLC) individually exchanges sixteen pieces of data (sixteen words) with different communication addresses in the two slave stations (two DVP-EH3 series PLCs) manually specified through a PLC link.

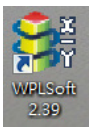
【Setting station addresses of PLCs】

Master/Slave station	Station address	Communication format
Master PLC	K40 (D1121=K40)	1. ASCII, 9600, 7, E, 1 (D1120=H'86) 2. RTU, 9600, 8, E, 1 (D1120=H'87) The communication format of the slave PLCs needs to be the same as the communication format of the master PLC.
Slave PLC 1	K2 (D1121=K2)	
Slave PLC 2	K3 (D1121=K3)	

【Descriptions of devices】

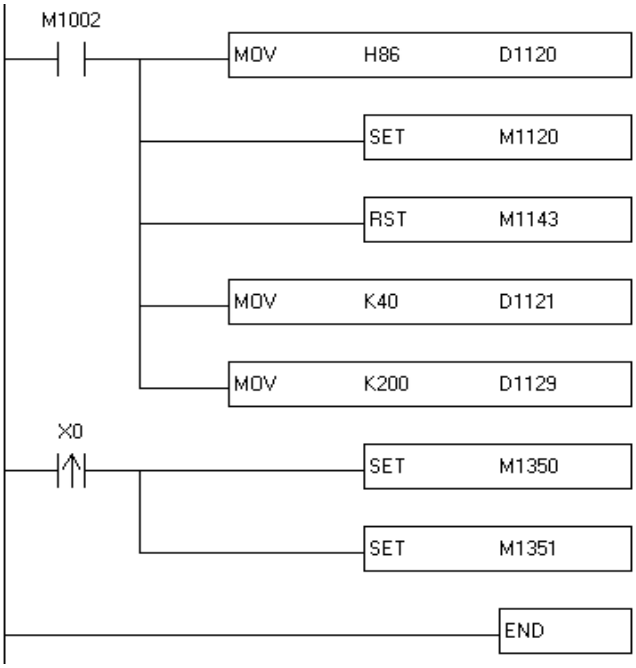
Device in a PLC	Description
X0	X0 functions as a conditional contact used to enable M1350 and M1351.
D1120	Communication protocol of COM2 (RS-485)
D1121	PLC Communication address
D1129	Abnormal communication timeout Time unit: ms
M1120	M1120 is used to retain the communication format of COM2 (RS-485).
M1143	M1143 is used to determine whether the communication format set for COM2 (RS-485) is an ASCII mode or an RTU mode. Off: ASCII mode On: RTU mode
M1350	M1350 is used to enable a PLC link.
M1351	If M1351 is ON, the PLC link executed will be an automatic mode.

【PLC link wizard】
Step 1: Start WPLSoft, write a program to the master PLC connected, move the RUN/STOP switch on the PLC into the RUN position, and write related values to the PLC.

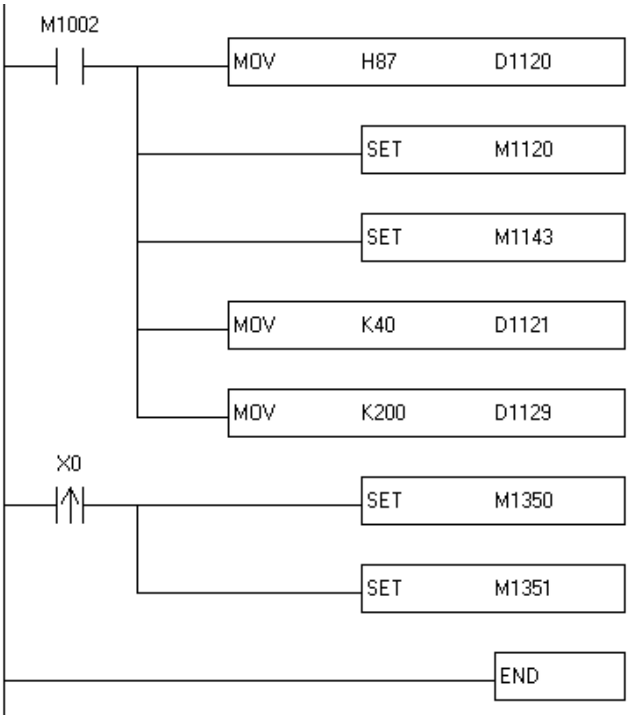


Owing to the fact that devices used to set related communication and a PLC link (M1350 and M1351) are not latching devices, they need to be set by means of a program. The PLC link wizard is used to specify the stations which need to be linked (M1355 is On).

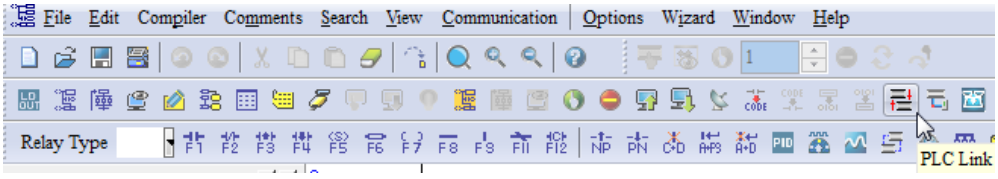
Program for ASCII communication:



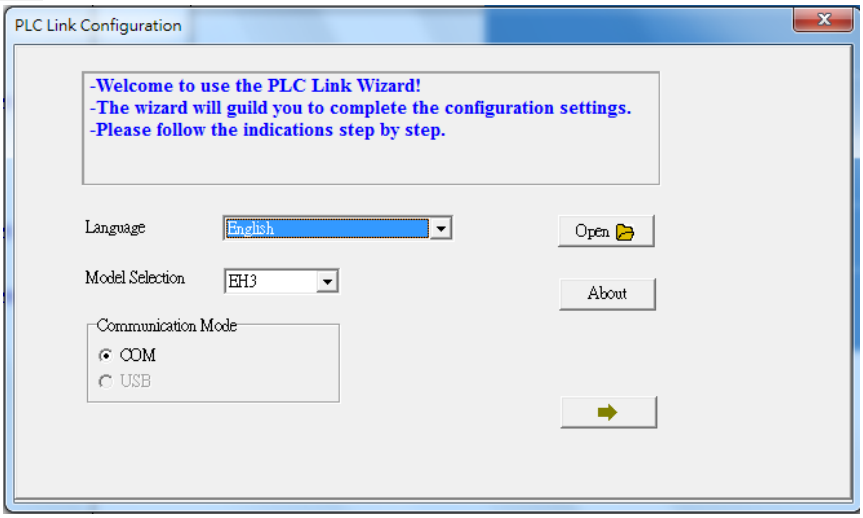
Program for RTU communication:



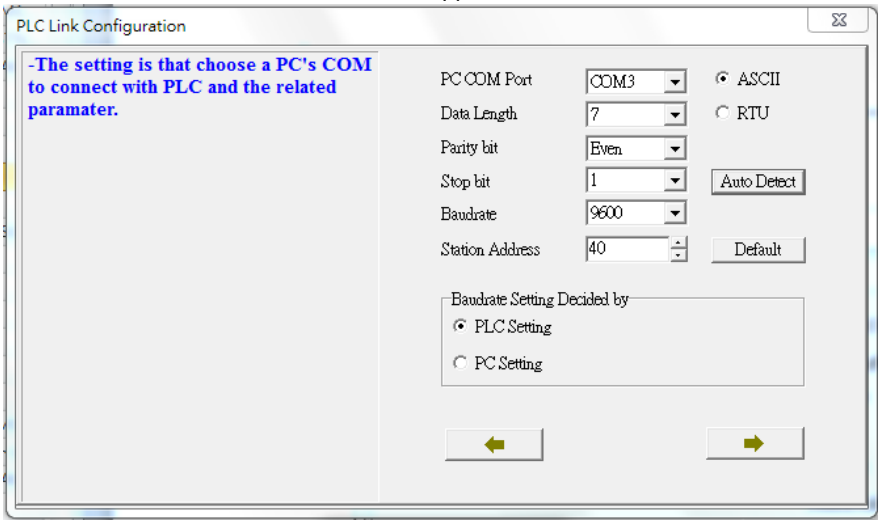
Step 2: Click the PLC link wizard  in WPLSoft.

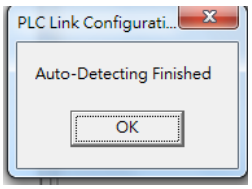


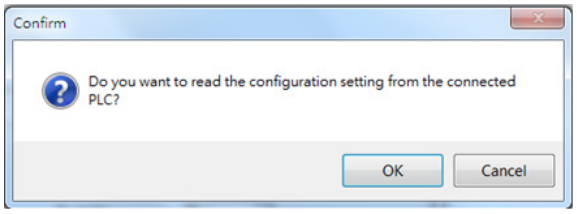
Step 3: Select a language in the **Language** drop-down list box, select a model in the **Model Selection** drop-down list box, and click .



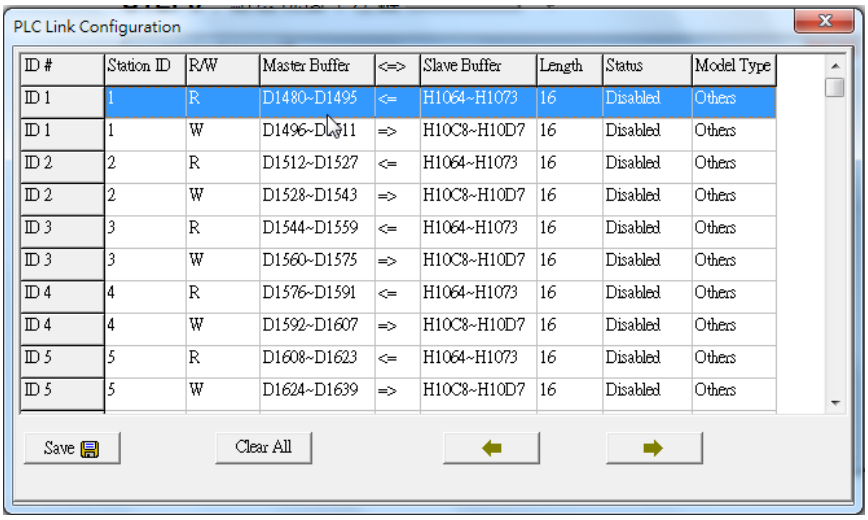
Step 4: Set a communication format for COM1 in the master PLC, click **Auto Detect**, click **OK** in the window which appears, click , and click **OK** in the window which appears.

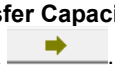




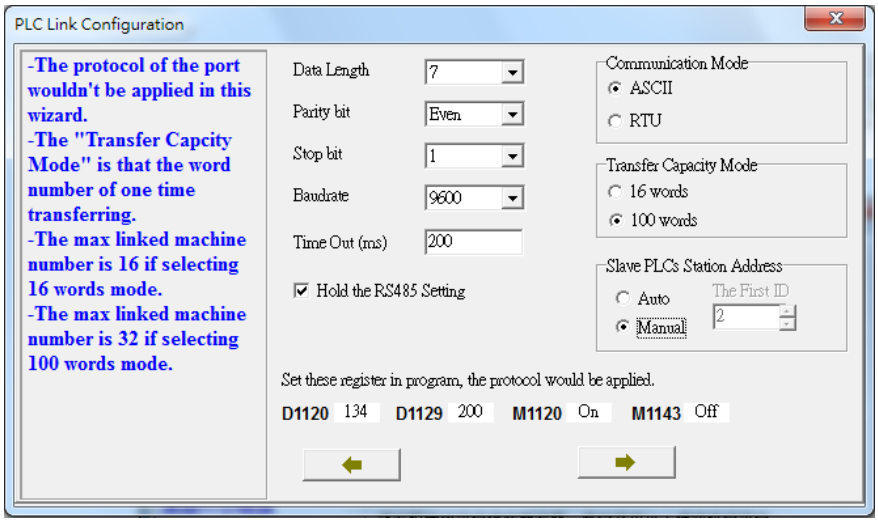


Step 5: Click  .

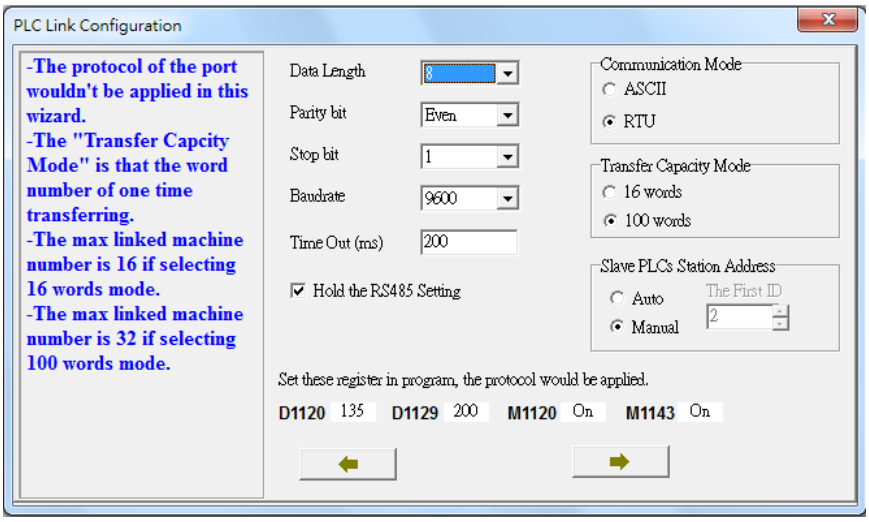


Step 6: The PLC link wizard reads values according to the communication format set for COM2 in the master PLC. Select the **100 words** option button in the **Transfer Capacity Mode** section, select the **Manual** option button in the **Slave PLCs Station Address** section, and click  .

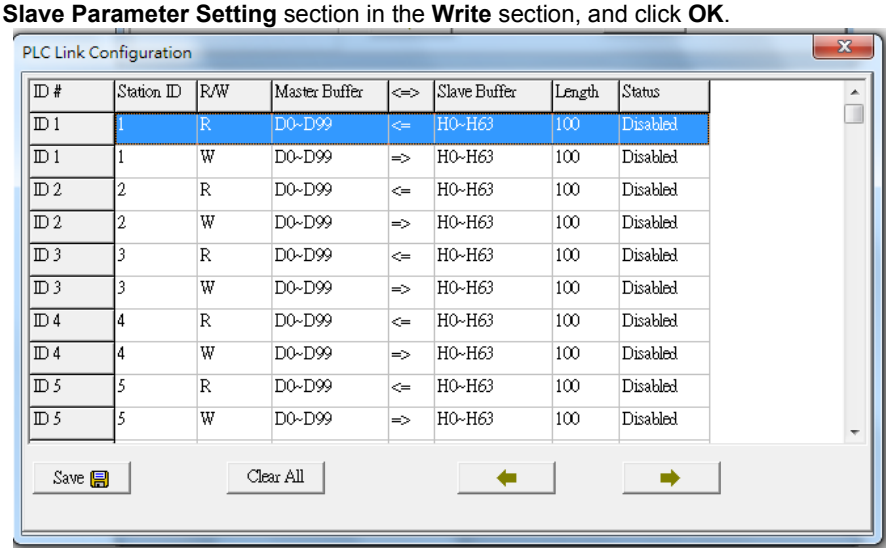
Window for ASCII communication:

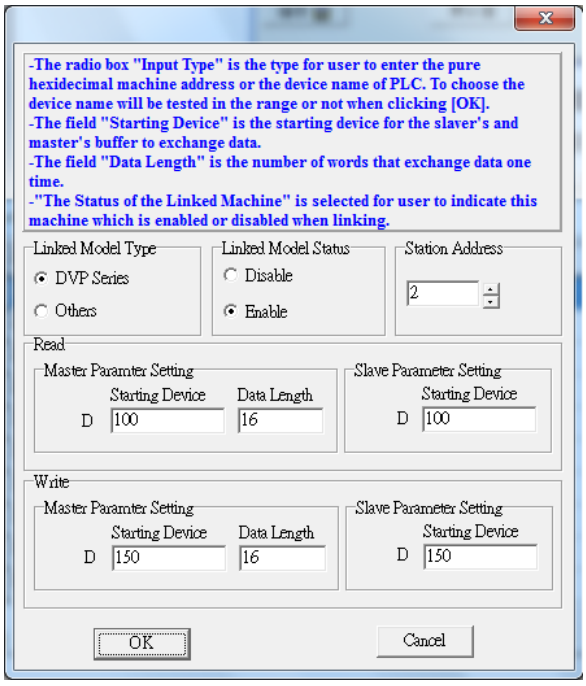


Window for RTU communication:

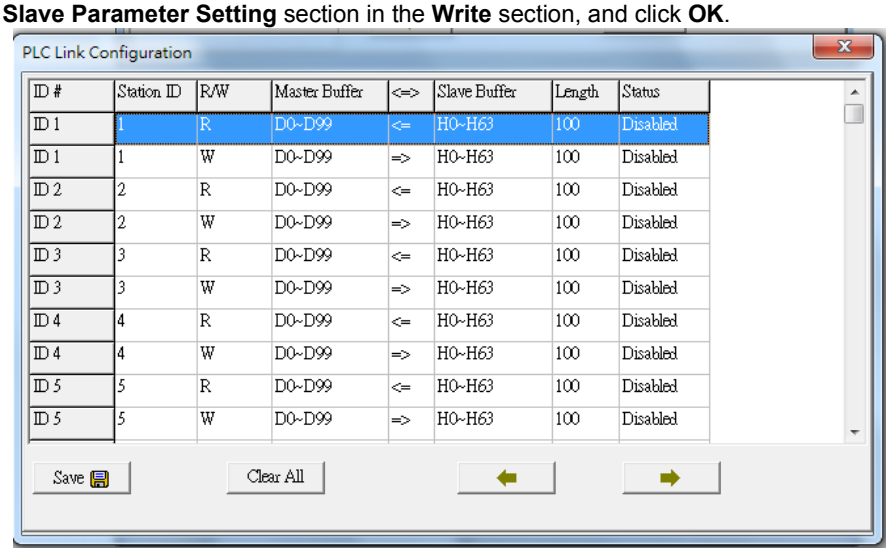


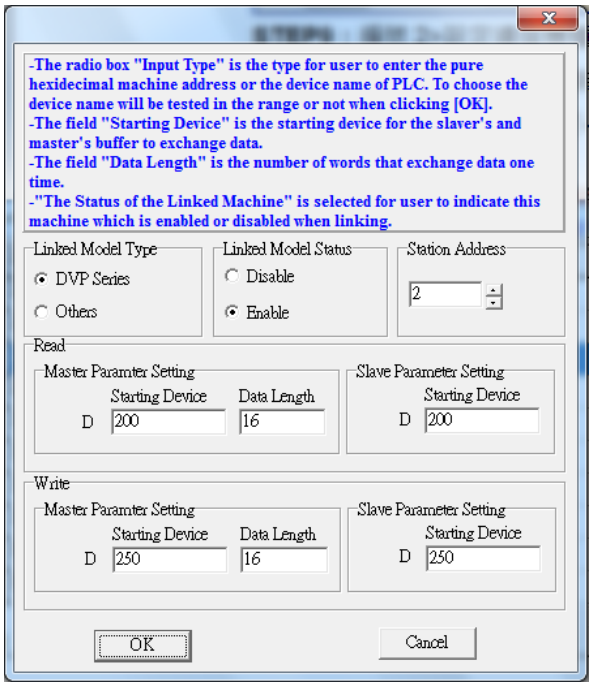
Step 7: Double-click the **ID 1** block in the **PLC Link Configuration** window, select the **DVP Series** option button in the **Linked Model Type** section, select the **Enable** option button in the **Linked Model Status** section (set M1360 to On), select **2** in the **Station Address** box, type “100” in the **Starting Device** box in the **Master Parameter Setting** section in the **Read** section, type “150” in the **Starting Device** box in the **Master Parameter Setting** section in the **Write** section, type “16” in the **Data Length** boxes in the **Master Parameter Setting** sections in the **Read** and **Write** sections, type “100” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Read** section, type “150” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.



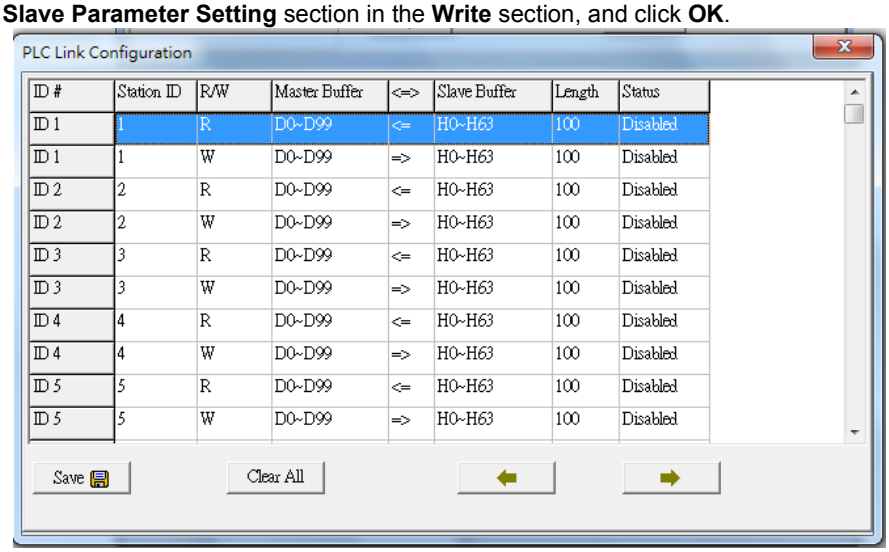


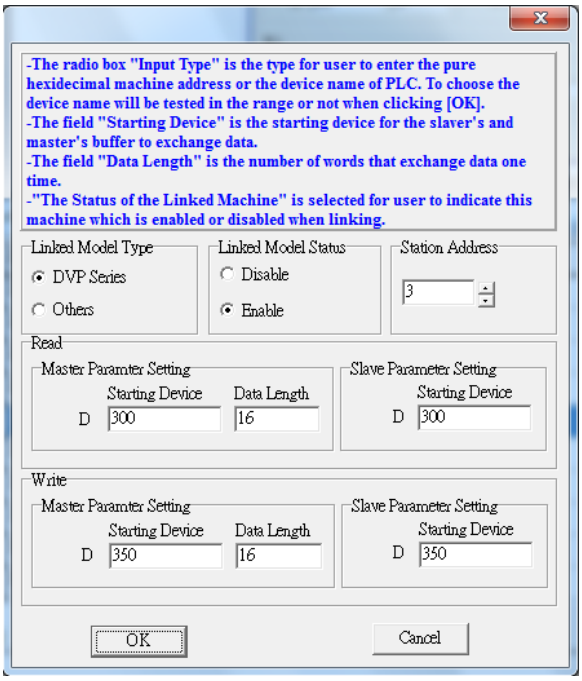
Step 8: Double-click the **ID 2** block in the **PLC Link Configuration** window, select the **DVP Series** option button in the **Linked Model Type** section, select the **Enable** option button in the **Linked Model Status** section (set M1360 to On), select **2** in the **Station Address** box, type “200” in the **Starting Device** box in the **Master Parameter Setting** section in the **Read** section, type “250” in the **Starting Device** box in the **Master Parameter Setting** section in the **Write** section, type “16” in the **Data Length** boxes in the **Master Parameter Setting** sections in the **Read** and **Write** sections, type “200” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Read** section, type “250” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.



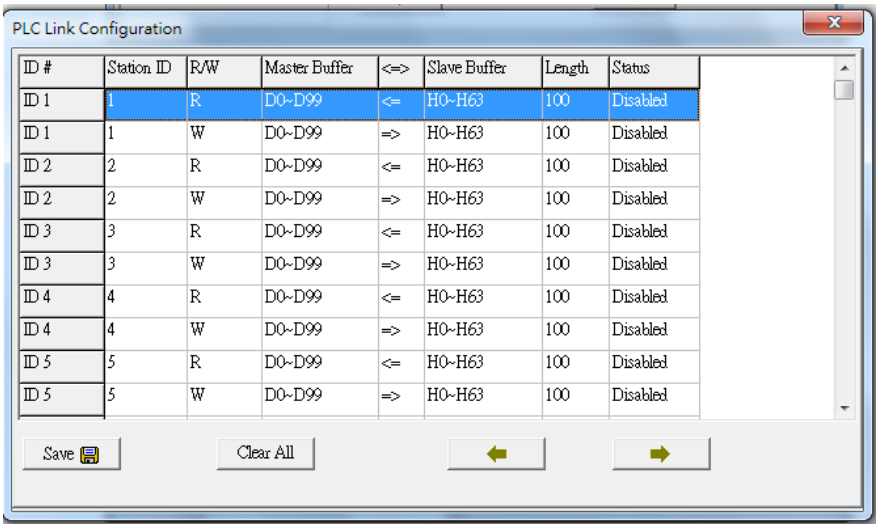


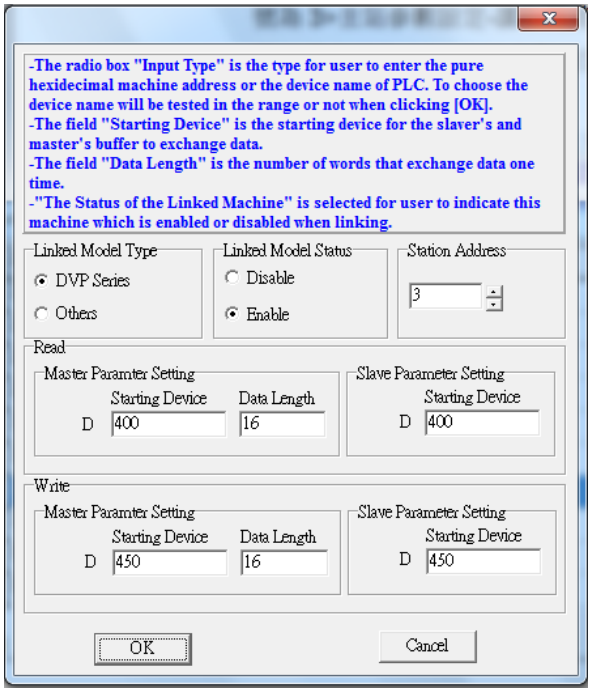
Step 9: Double-click the **ID 3** block in the **PLC Link Configuration** window, select the **DVP Series** option button in the **Linked Model Type** section, select the **Enable** option button in the **Linked Model Status** section (set M1361 to On), select **3** in the **Station Address** box, type “300” in the **Starting Device** box in the **Master Parameter Setting** section in the **Read** section, type “350” in the **Starting Device** box in the **Master Parameter Setting** section in the **Write** section, type “16” in the **Data Length** boxes in the **Master Parameter Setting** sections in the **Read** and **Write** sections, type “300” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Read** section, type “350” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.



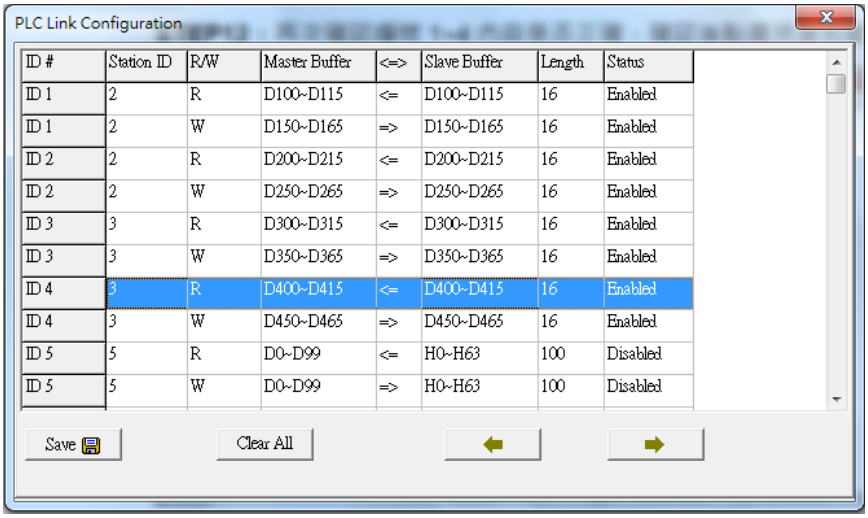


Step 10: Double-click the **ID 4** block in the **PLC Link Configuration** window, select the **DVP Series** option button in the **Linked Model Type** section, select the **Enable** option button in the **Linked Model Status** section (set M1361 to On), select **3** in the **Station Address** box, type “400” in the **Starting Device** box in the **Master Parameter Setting** section in the **Read** section, type “450” in the **Starting Device** box in the **Master Parameter Setting** section in the **Write** section, type “16” in the **Data Length** boxes in the **Master Parameter Setting** sections in the **Read** and **Write** sections, type “400” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Read** section, type “450” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.

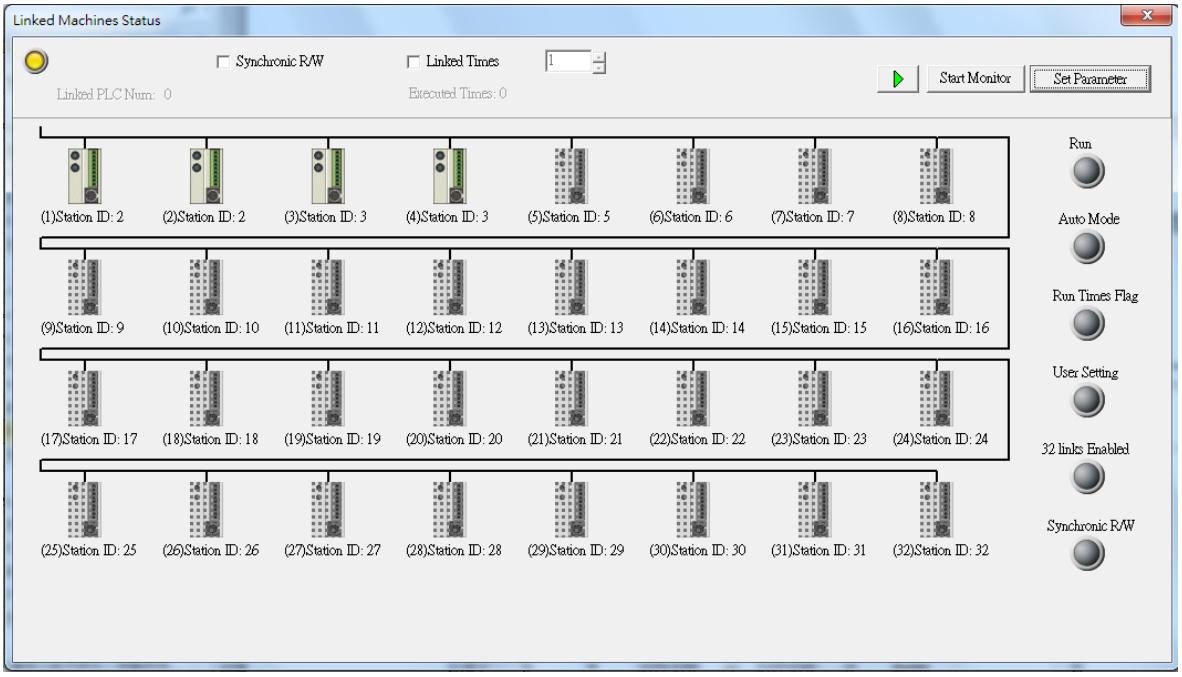




Step 11: Check whether the contents of the **ID 1** block~the **ID 4** block are correct, and then click  .

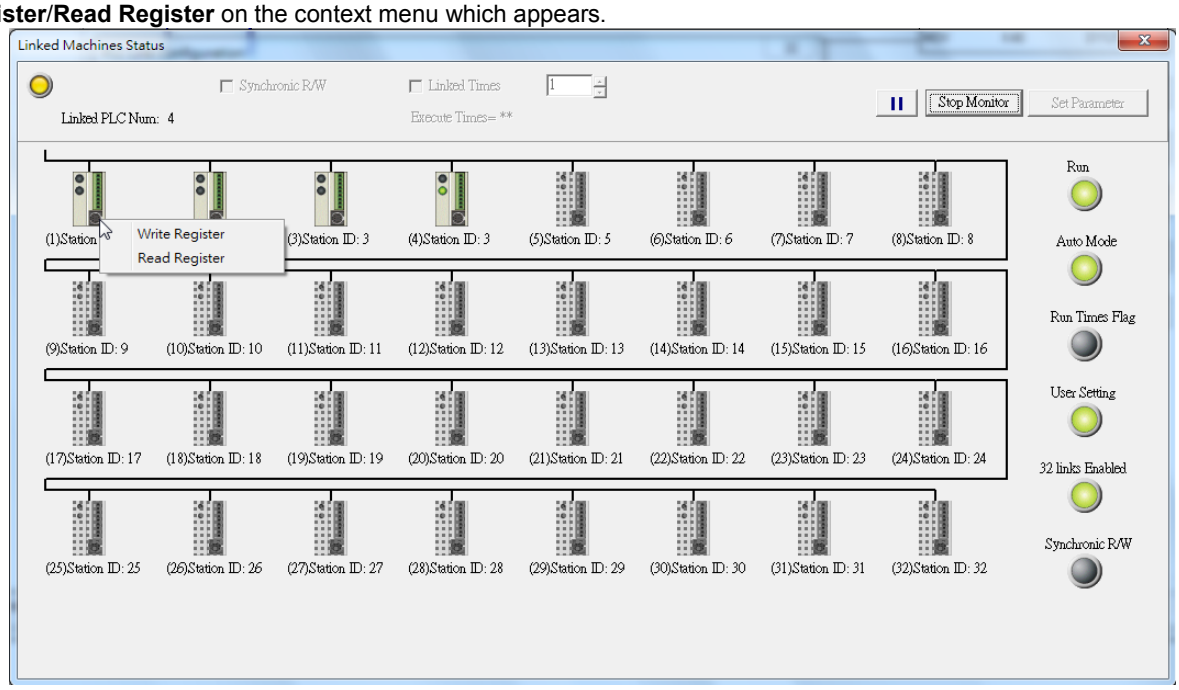


Step 12: Click the **Set Parameter** button, click the **Start Monitor** button, and click  or set X0 to On.

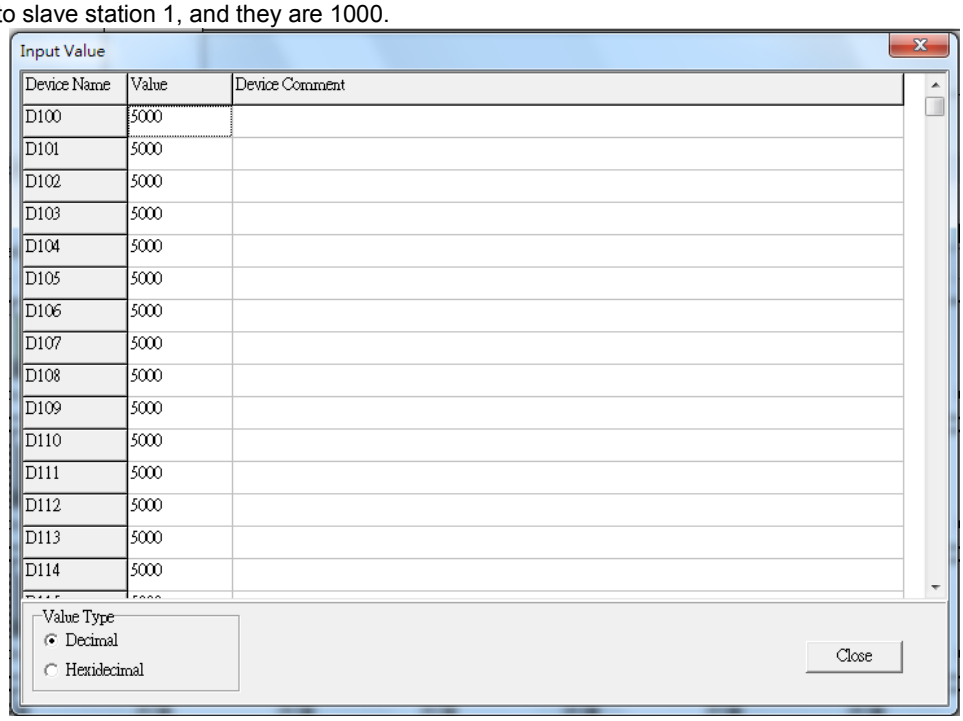


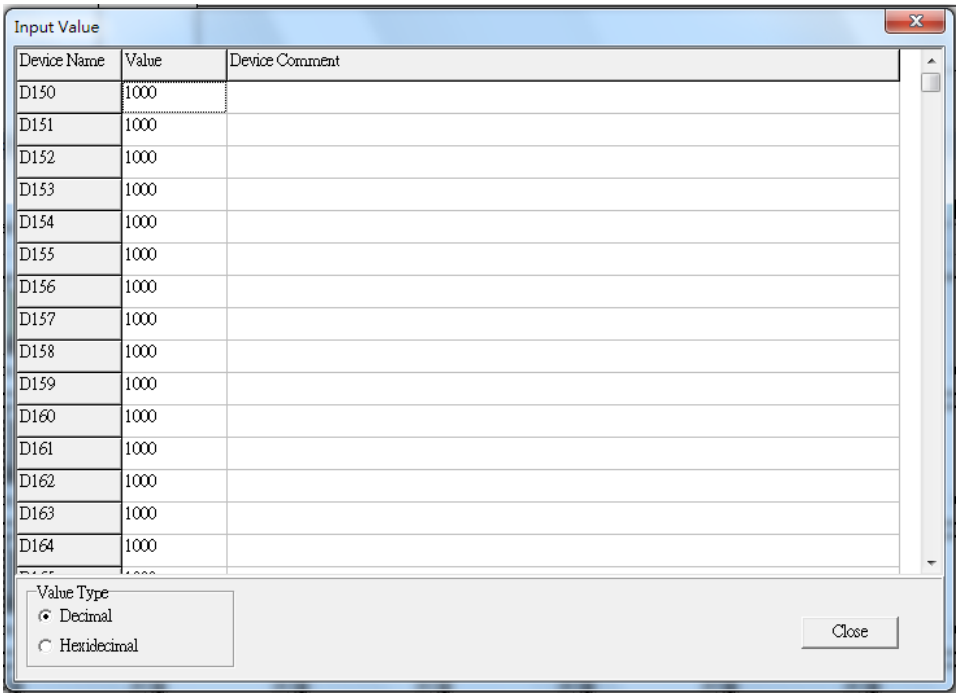
Step 13: The state of the PLC link executed is shown in the **Linked Machines Status** window. The master PLC can exchange data with the slave stations through a program or the PLC link wizard.

Reading/Writing data through the PLC link wizard: Right-click slave station (1)  /slave station (2)  , and click **Write Register**/**Read Register** on the context menu which appears.

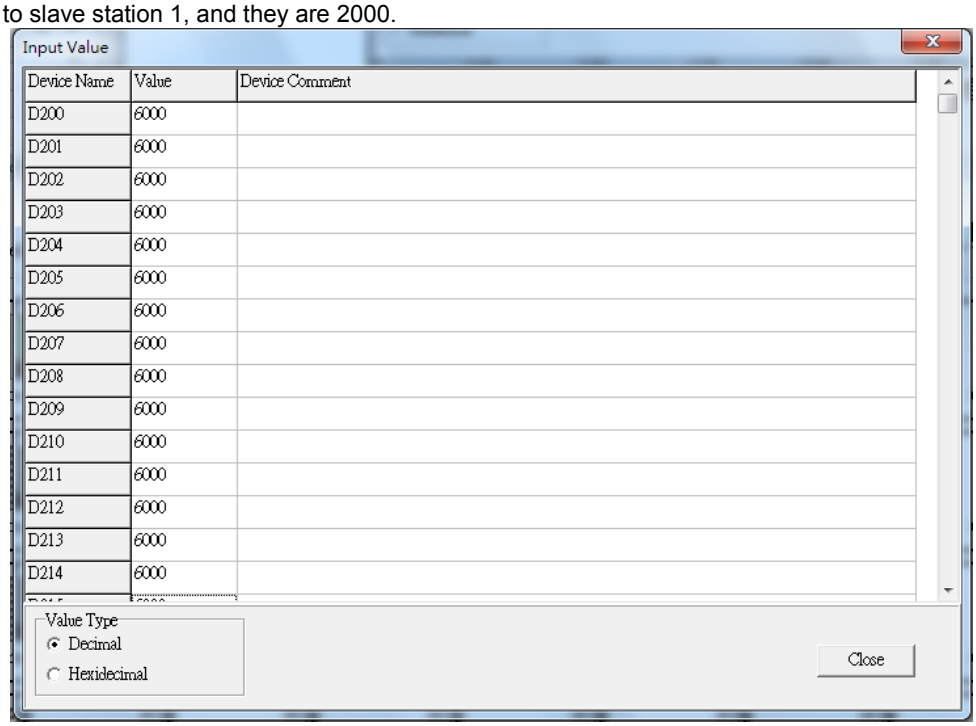


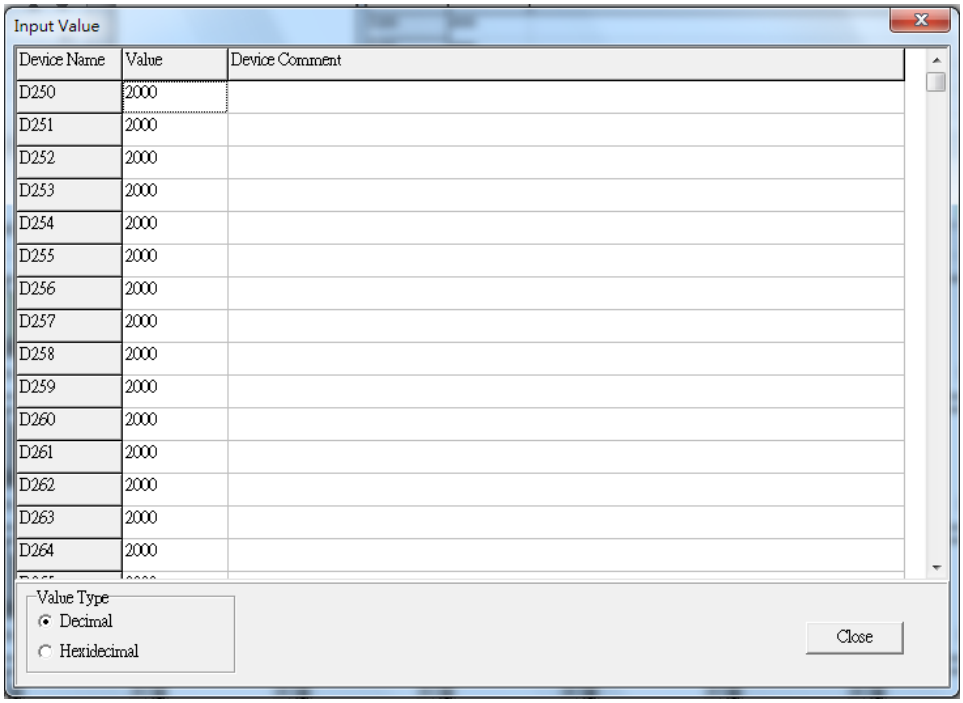
Step 14: The values in D100~D115 are values read from slave 1, and they are 5000. The values in D150~D165 are values written to slave station 1, and they are 1000.



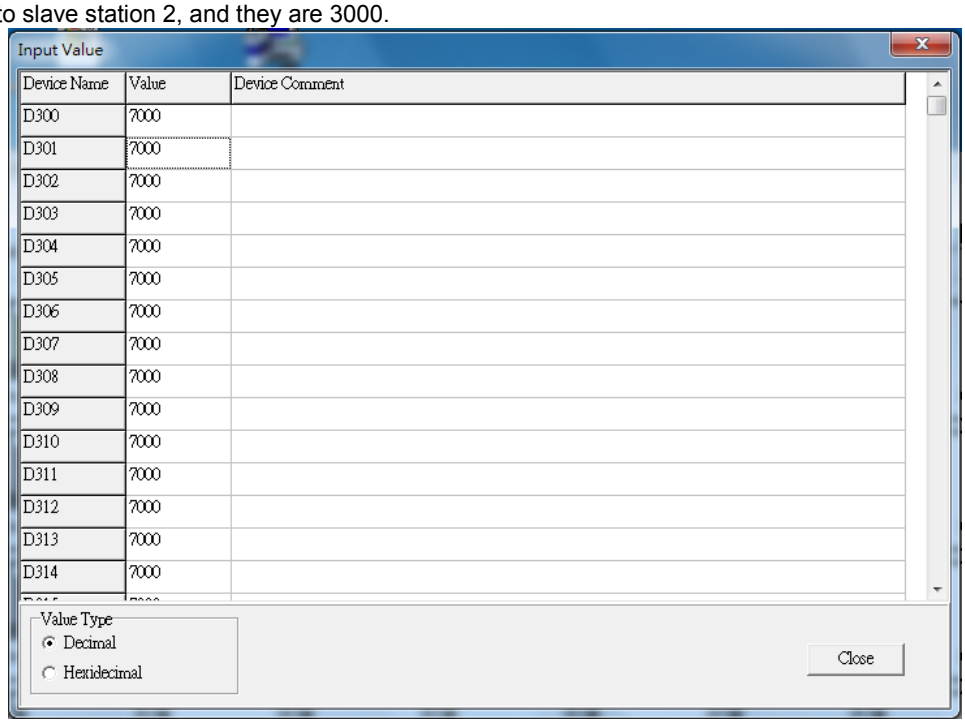


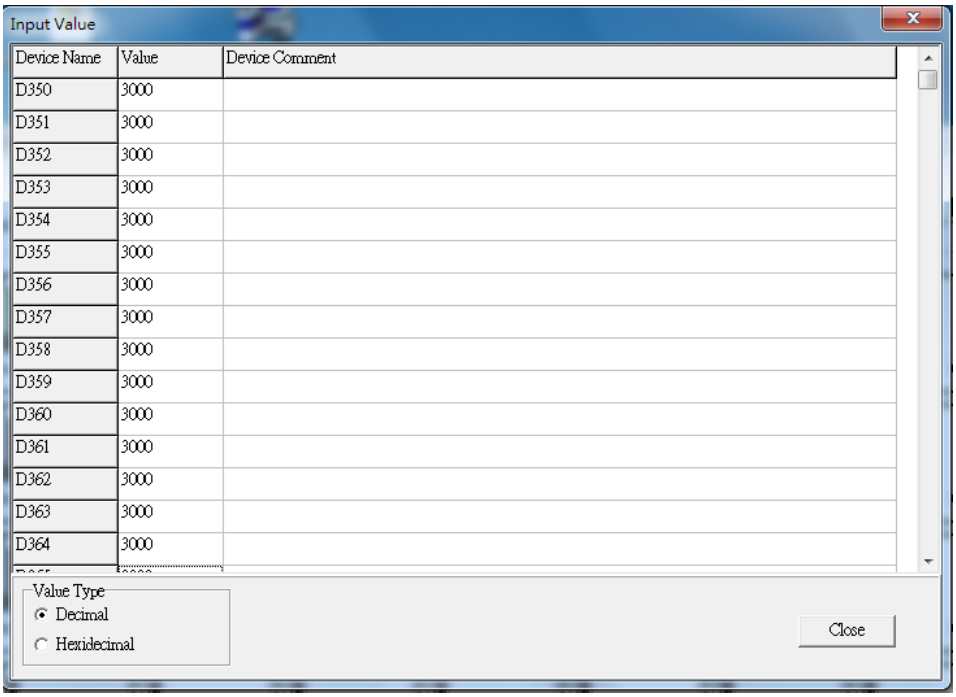
Step 15: The values in D200~D215 are values read from slave 1, and they are 6000. The values in D250~D265 are values written to slave station 1, and they are 2000.



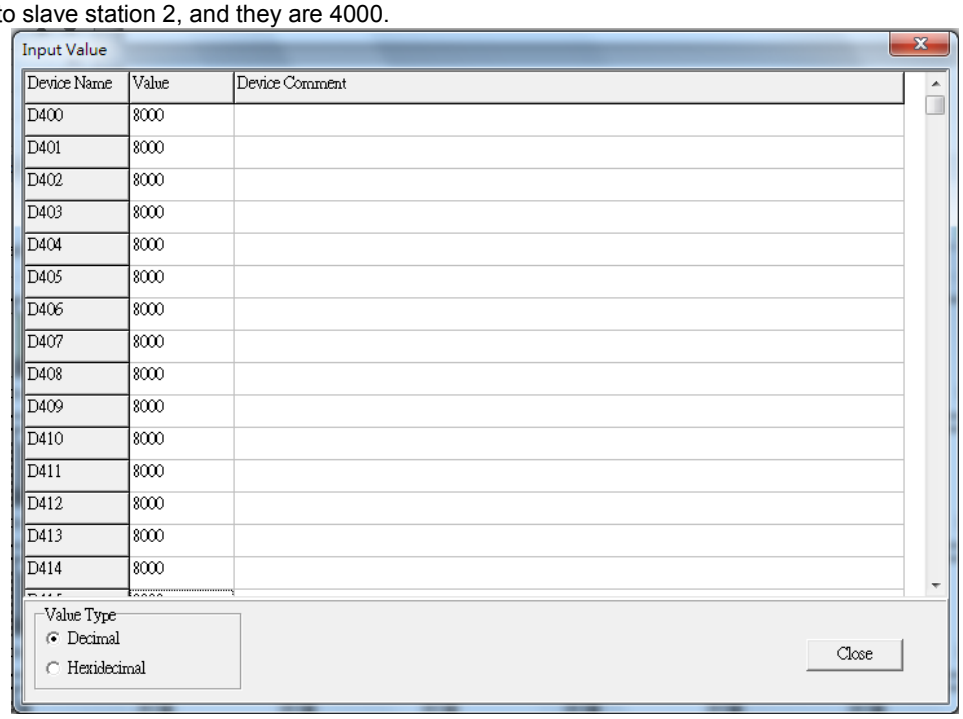


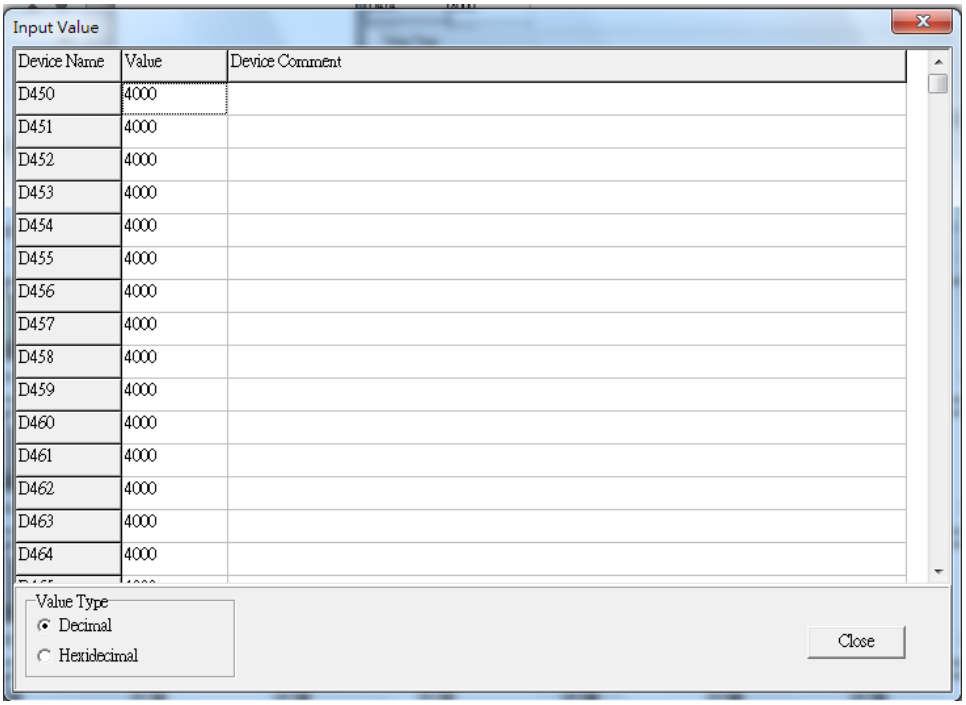
Step 16: The values in D300~D315 are values read from slave 2, and they are 7000. The values in D350~D365 are values written to slave station 2, and they are 3000.



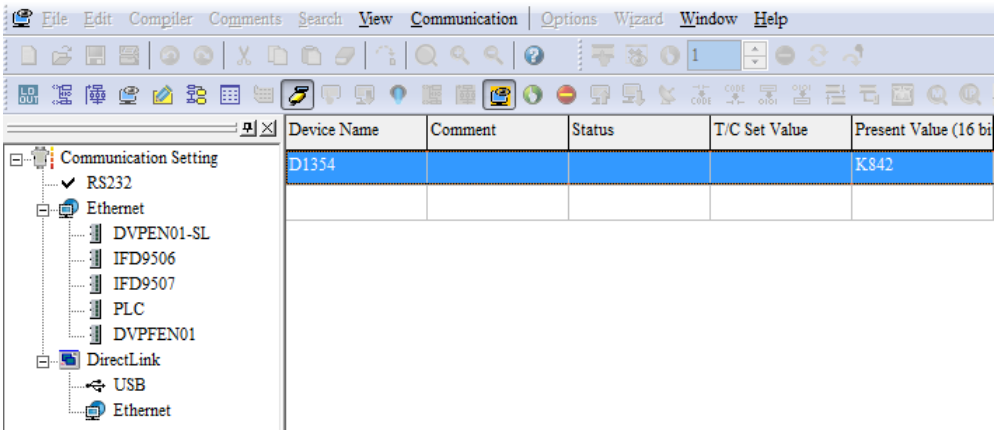


Step 17: The values in D400~D415 are values read from slave 2, and they are 8000. The values in D450~D465 are values written to slave station 2, and they are 4000.





Step 18: Close the **Linked Machines Status** window, click  , click  , and type “D1354”. The value in D1354 indicates PLC link scan time.



【Description of control】

- The values in D1900~D1903 in the master PLC are taken as slave station addresses. (The value in D1900 is 2, the value in D1901 is 2, the value in D1902 is 3, and the value in D1903 is 3.)
- The master station exchanges data with different communication addresses in the two slave stations by means of a PLC link. The values in D100~D115 in slave station 1 are written to D100~D115 in the master station, and the values in D150~D165 in the master station are written to D150~D165 in slave station 1. The values in D200~D215 in slave station 1 are written to D200~D215 in the master station, and the values in D250~D265 in the master station are written to D250~D265 in slave station 1. The values in D300~D315 in slave station 2 are written to D300~D315 in the master station, and the values in D350~D365 in the master station are written to D350~D365 in slave station 2. The values in D400~D415 in slave station 2 are written to D400~D415 in the master station, and the values in D450~D465 in the master station are written to D450~D465 in slave station 2.

Master PLC (1 PLC)		Slave PLC (2 PLCs)
D100~D115	Reading ←	D100~D115 in the slave PLC whose station address is K2
D150~D165	Writing →	D150~D165 in the slave PLC whose station address is K2
D200~D215	Reading ←	D200~D215 in the slave PLC whose station address is K2
D250~D265	Writing →	D250~D265 in the slave PLC whose station address is K2
D300~D315	Reading ←	D300~D315 in the slave PLC whose station address is K3
D350~D365	Writing →	D350~D365 in the slave PLC whose station address is K3
D400~D415	Reading ←	D400~D415 in the slave PLC whose station address is K3
D450~D465	Writing →	D450~D465 in the slave PLC whose station address is K3

- When M1350 is Off, the values in the data registers used for data exchange in the master station and the slave stations are the ones shown below.

Master PLC	Value	Slave PLC	Value
D100~D115	All are 0.	D100~D115 in slave station 1	All are 5000.
D150~D165	All are 1000.	D150~D165 in slave station 1	All are 0.
D200~D215	All are 0.	D200~D215 in slave station 1	All are 6000.
D250~D265	All are 2000.	D250~D265 in slave station 1	All are 0.
D300~D315	All are 0.	D300~D315 in slave station 2	All are 7000.
D350~D365	All are 3000.	D350~D365 in slave station 2	All are 0.

Master PLC	Value	Slave PLC	Value
D400~D415	All are 0.	D400~D415 in slave station 2	All are 8000.
D450~D465	All are 4000.	D450~D465 in slave station 2	All are 0.

After M1350 is set to ON, the values in the data registers used for data exchange in the master station and the slave stations will become the ones shown below.

Master PLC	Value	Slave PLC	Value
D100~D115	All are 5000.	D100~D115 in slave station 1	All are 5000.
D150~D165	All are 1000.	D150~D165 in slave station 1	All are 1000.
D200~D215	All are 6000.	D200~D215 in slave station 1	All are 6000.
D250~D265	All are 2000.	D250~D265 in slave station 1	All are 2000.
D300~D315	All are 7000.	D300~D315 in slave station 2	All are 7000.
D350~D365	All are 3000.	D350~D365 in slave station 2	All are 3000.
D400~D415	All are 8000.	D400~D415 in slave station 2	All are 8000.
D450~D465	All are 4000.	D450~D465 in slave station 2	All are 4000.

5.2 Using the PLC Link Wizard in ISPSoft (ASCII/RTU Mode)

【Control requirement】
A master station (A DVP-EH3 series PLC) individually exchanges sixteen pieces of data (sixteen words) with different communication addresses in the two slave stations (two DVP-EH3 series PLCs) manually specified through a PLC link.

【Setting station addresses of PLCs】

Master/Slave station	Station address	Communication format
Master PLC	K40 (D1121=K40)	1. ASCII, 9600, 7, E, 1 (D1120=H'86) 2. RTU, 9600, 8, E, 1 (D1120=H'87) The communication format of the slave PLCs needs to be the same as the communication format of the master PLC.
Slave PLC 1	K2 (D1121=K2)	
Slave PLC 2	K3 (D1121=K3)	

【Descriptions of devices】

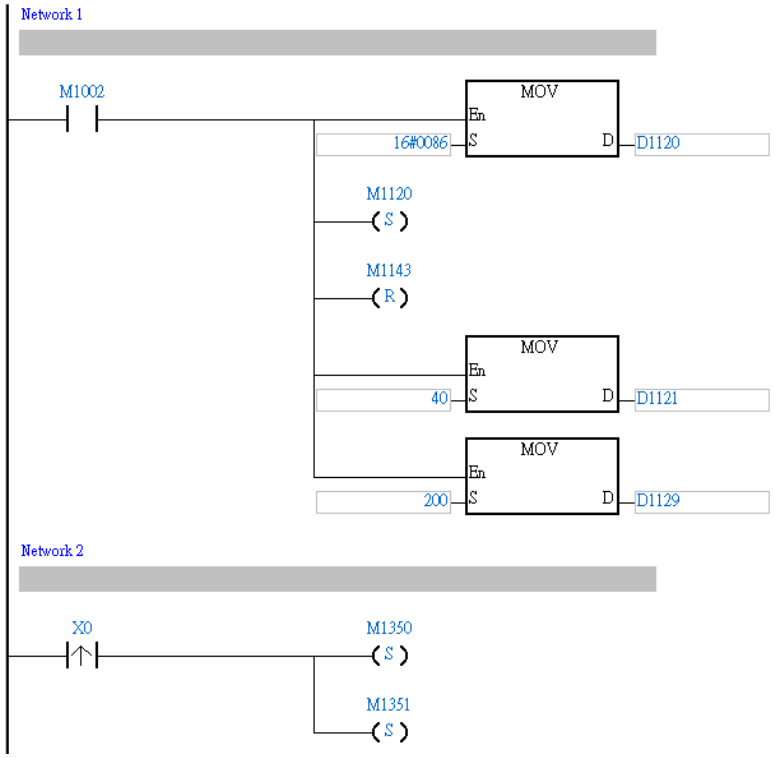
Device in a PLC	Description
X0	X0 functions as a conditional contact used to enable M1350 and M1351.
D1120	Communication protocol of COM2 (RS-485)
D1121	PLC Communication address
D1129	Abnormal communication timeout Time unit: ms
M1120	M1120 is used to retain the communication format of COM2 (RS-485).
M1143	M1143 is used to determine whether the communication format set for COM2 (RS-485) is an ASCII mode or an RTU mode. Off: ASCII mode On: RTU mode
M1350	M1350 is used to enable a PLC link.
M1351	If M1351 is ON, the PLC link executed will be an automatic mode.

【PLC link wizard】

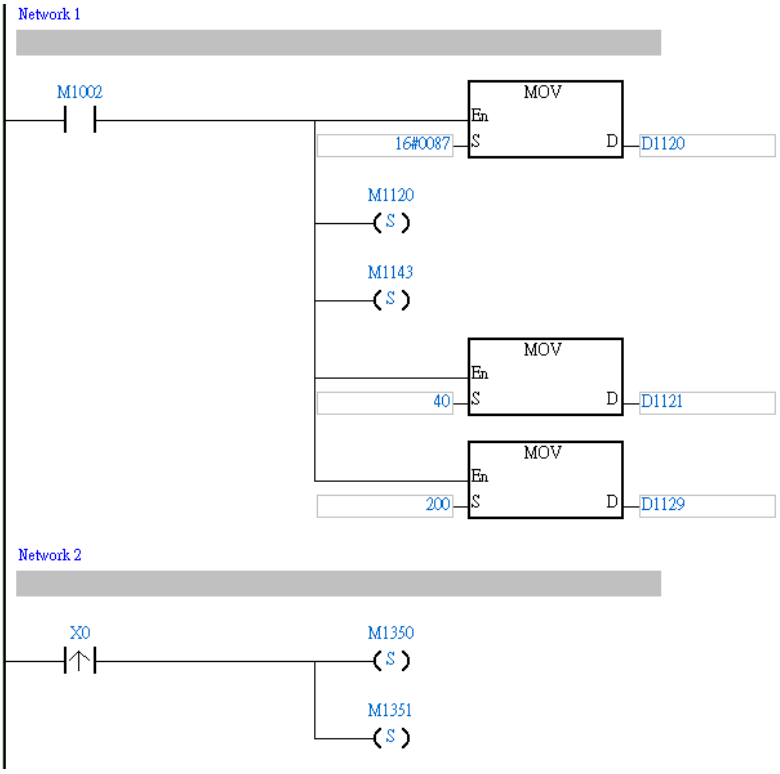
Step 1: Start ISPSoft, write a program to the master PLC connected, move the RUN/STOP switch on the PLC into the RUN position, and write related values to the PLC.

Owing to the fact that devices used to set related communication and a PLC link (M1350 and M1351) are not latching devices, they need to be set by means of a program. The PLC link wizard is used to manually specify the stations which need to be linked (M1355 is On).

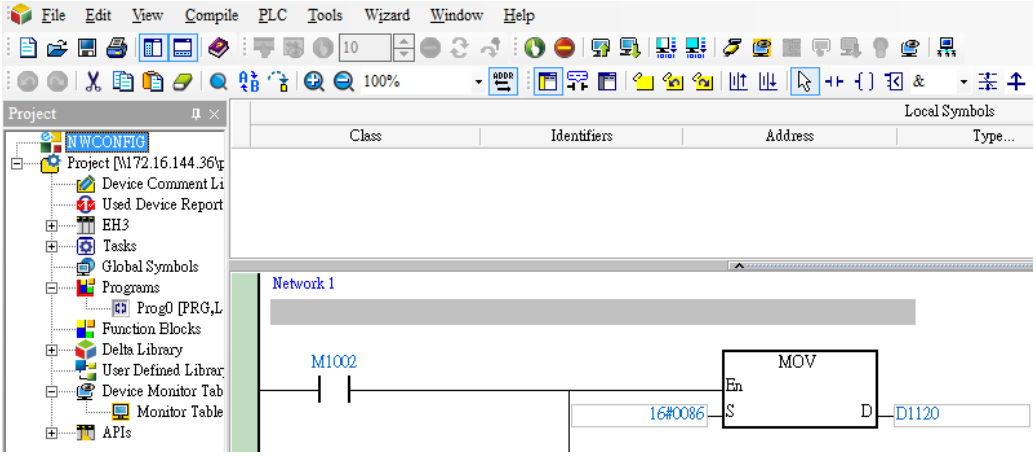
Program for ASCII communication:

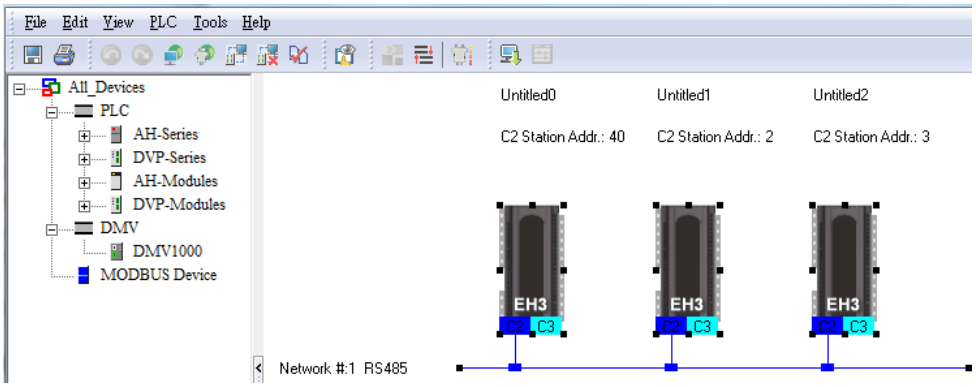


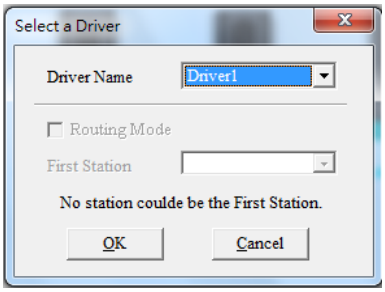
Program for RTU communication:



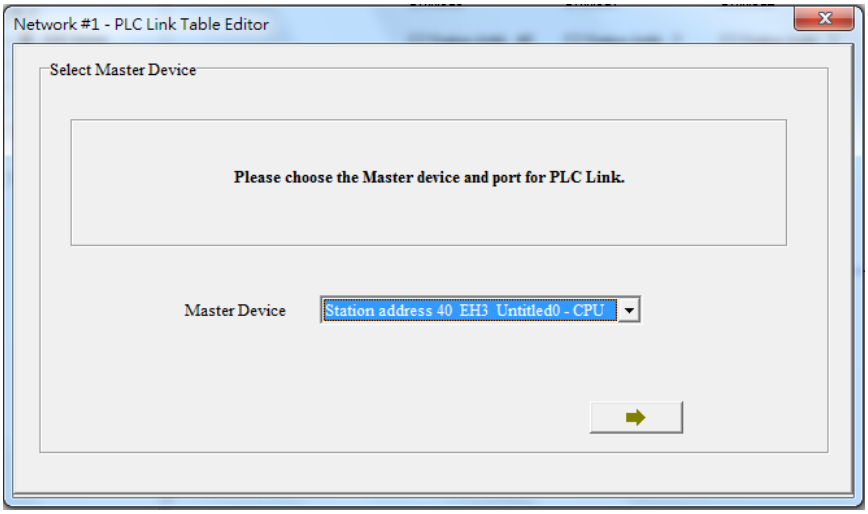
Step 2: Double-click **NWCONFIG** in the project management area, create a link, click , select **Driver 1** in the **Driver Name** drop-down list box, click **OK**, select the master station and the slave stations, and click .

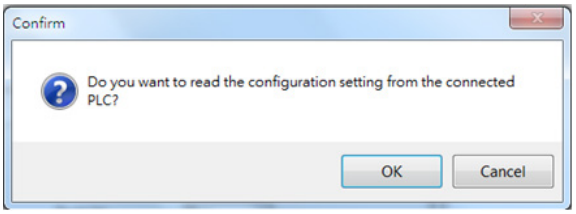




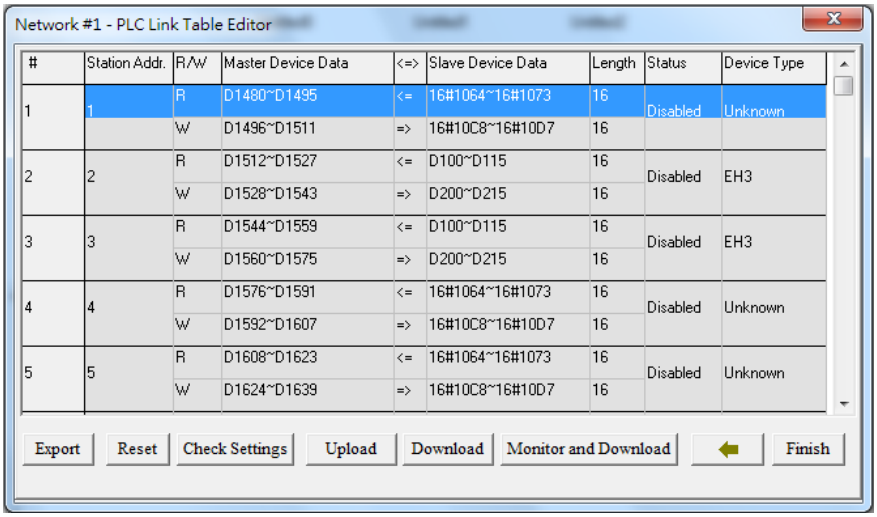


Step 3: Select a PLC in the **Master Device** drop-down list box, click  , and click **OK** in the window which appears.



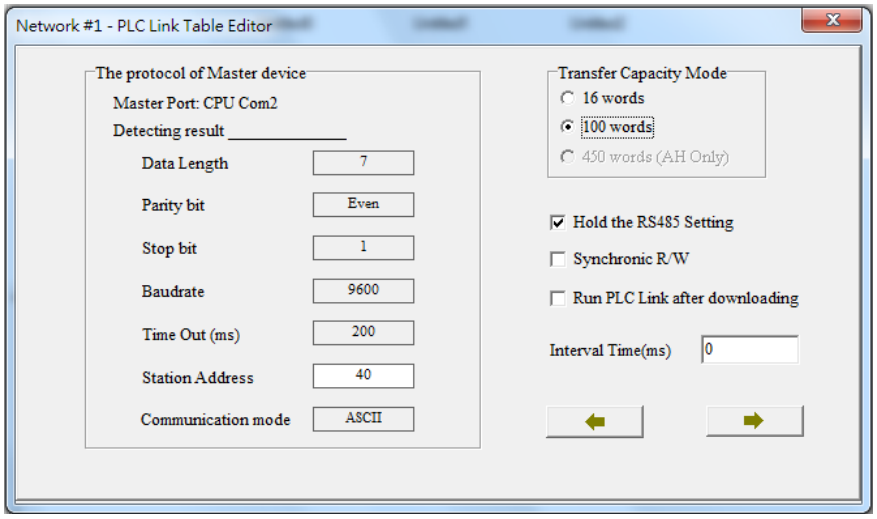


Step 4: Click  .

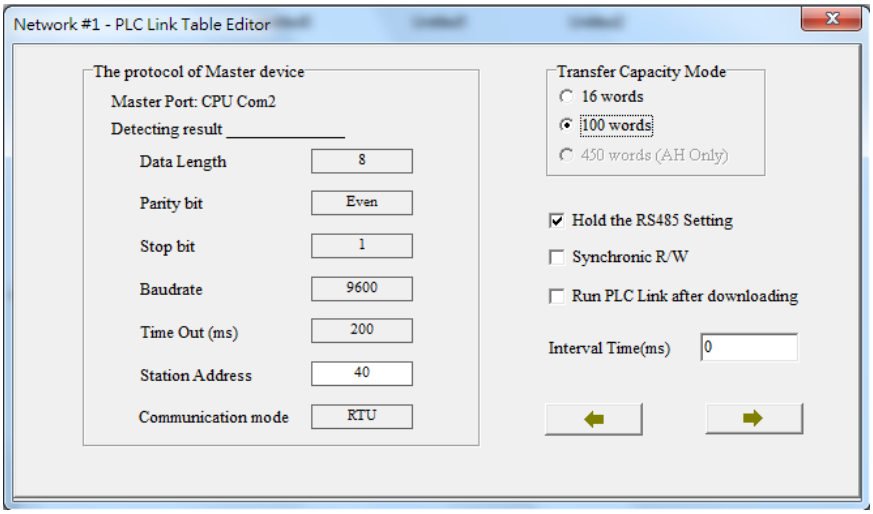


Step 5: The PLC link wizard reads values according to the communication format set for COM2 in the master PLC. Select the **100 words** option button in the **Transfer Capacity Mode** section, unselect the **Synchronic R/W** checkbox and the **Run PLC Link after downloading** checkbox, type “0” in the **Interval time** box, and click  .

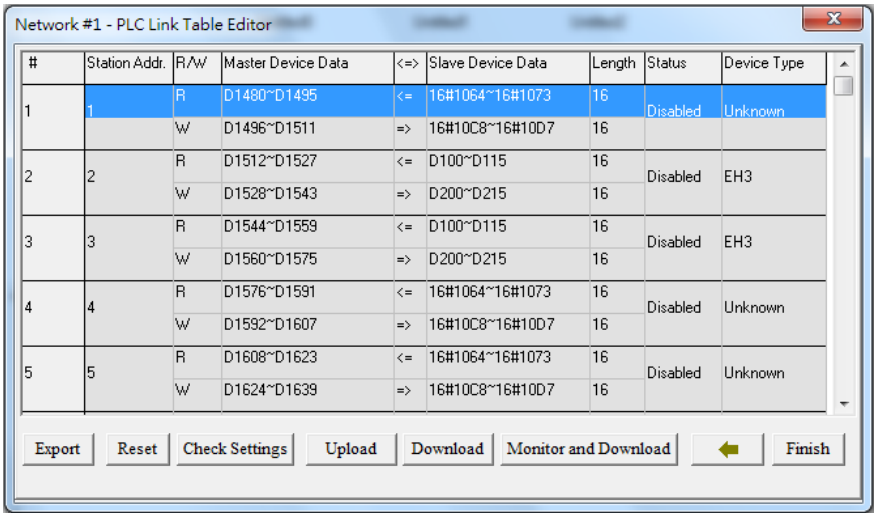
Window for ASCII communication:

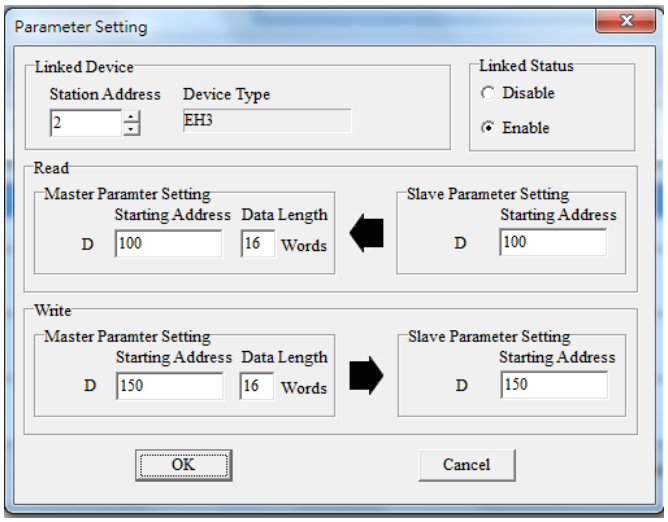


Window for RTU communication:

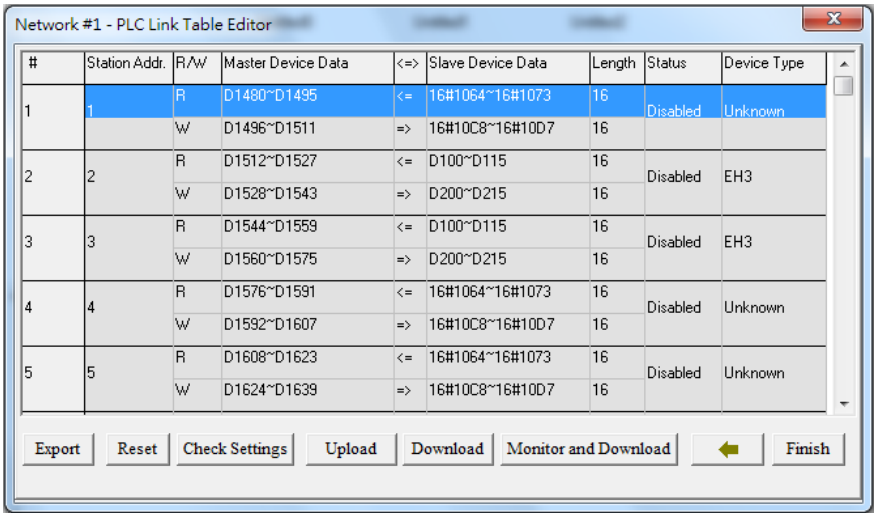


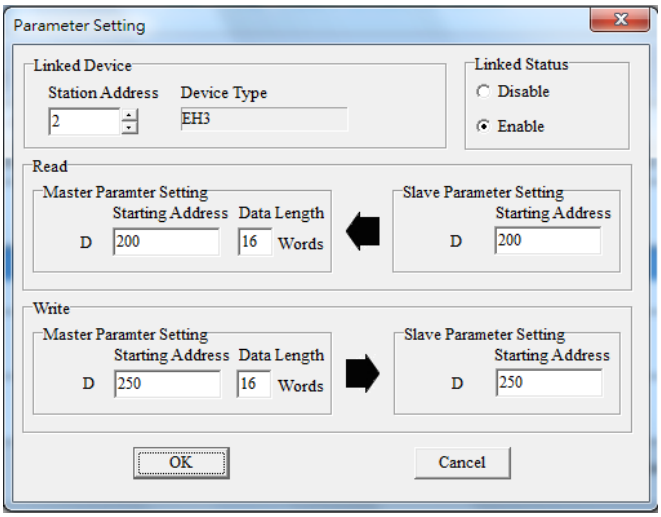
Step 6: Double-click the **1** block in the **PLC Link Table Editor** window, select **2** in the **Station Address** box, select the **Enable** option button in the **Linked Status** section (set M1360 to On), type “100” in the **Starting Address** box in the **Master Parameter Setting** section in the **Read** section, type “150” in the **Starting Address** box in the **Master Parameter Setting** section in the **Write** section, type “16” in the **Data Length** boxes in the **Master Parameter Setting** sections in the **Read** and **Write** sections, type “100” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Read** section, type “150” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.



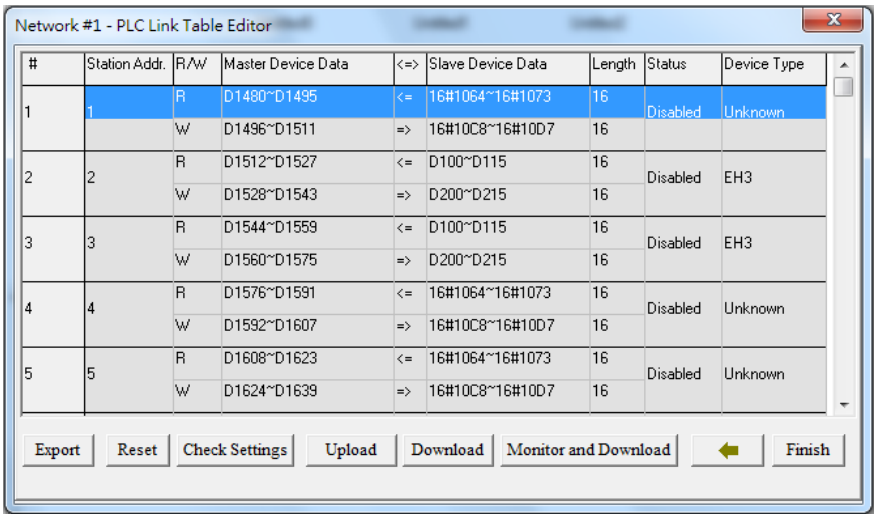


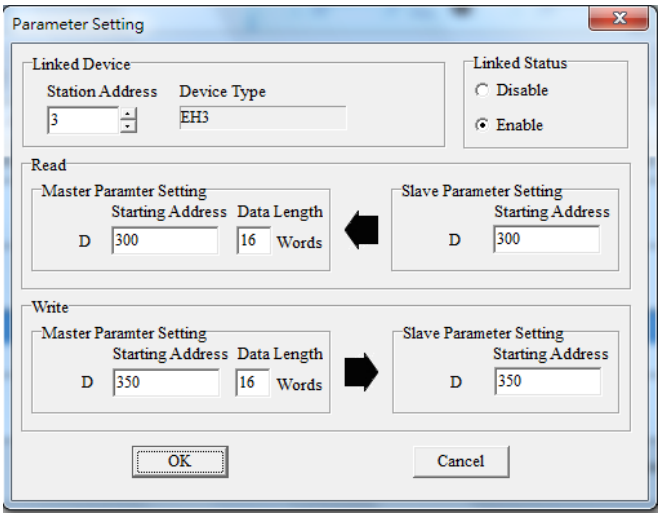
Step 7: Double-click the **2** block in the **PLC Link Table Editor** window, select **2** in the **Station Address** box, select the **Enable** option button in the **Linked Status** section (set M1360 to On), type “200” in the **Starting Address** box in the **Master Parameter Setting** section in the **Read** section, type “250” in the **Starting Address** box in the **Master Parameter Setting** section in the **Write** section, type “16” in the **Data Length** boxes in the **Master Parameter Setting** sections in the **Read** and **Write** sections, type “200” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Read** section, type “250” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.



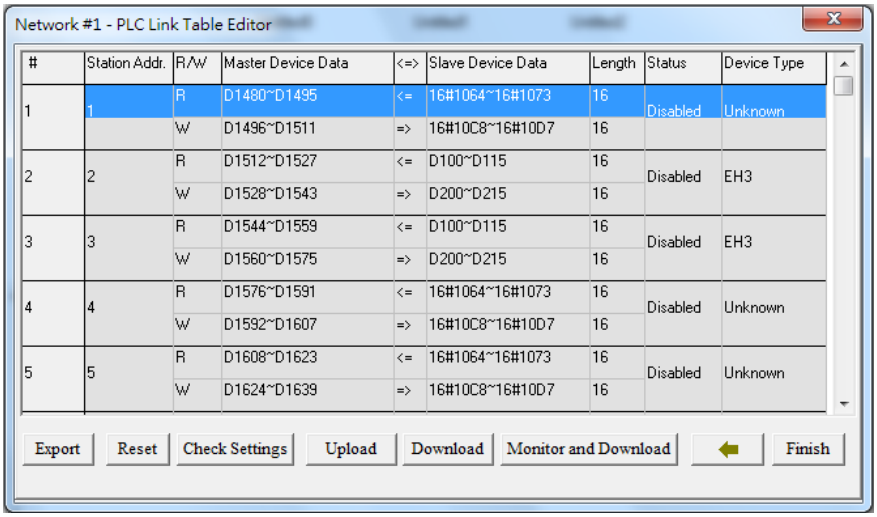


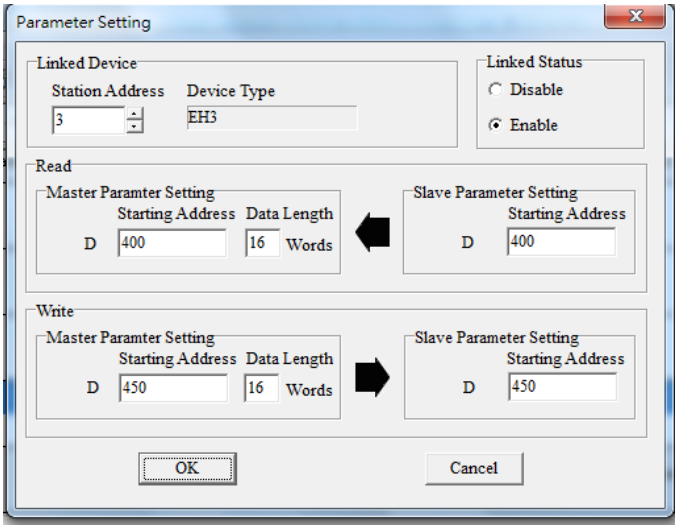
Step 8: Double-click the **3** block in the **PLC Link Table Editor** window, select **3** in the **Station Address** box, select the **Enable** option button in the **Linked Status** section (set M1361 to On), type “300” in the **Starting Address** box in the **Master Parameter Setting** section in the **Read** section, type “350” in the **Starting Address** box in the **Master Parameter Setting** section in the **Write** section, type “16” in the **Data Length** boxes in the **Master Parameter Setting** sections in the **Read** and **Write** sections, type “300” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Read** section, type “350” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.



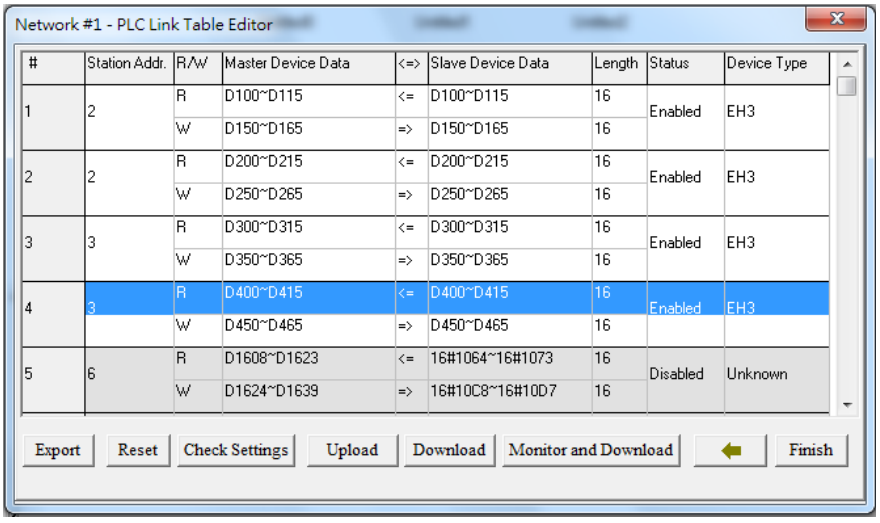


Step 9: Double-click the **4** block in the **PLC Link Table Editor** window, select **3** in the **Station Address** box, select the **Enable** option button in the **Linked Status** section (set M1361 to On), type “400” in the **Starting Address** box in the **Master Parameter Setting** section in the **Read** section, type “450” in the **Starting Address** box in the **Master Parameter Setting** section in the **Write** section, type “16” in the **Data Length** boxes in the **Master Parameter Setting** sections in the **Read** and **Write** sections, type “400” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Read** section, type “450” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.

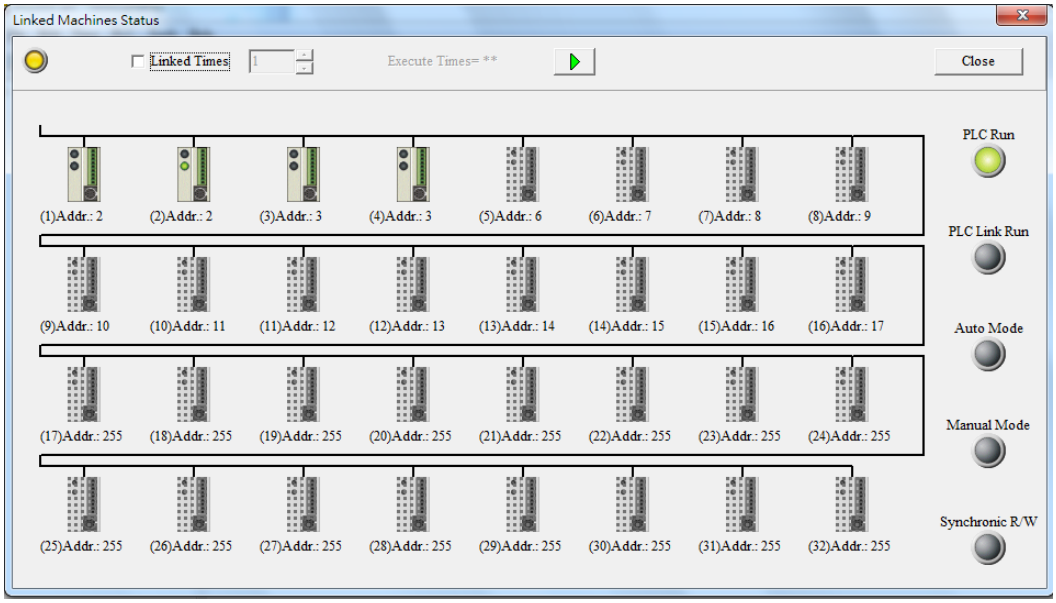




Step 10: Check whether the contents of the **1** block~the **2** block are correct, and then click **Monitor and Download**.

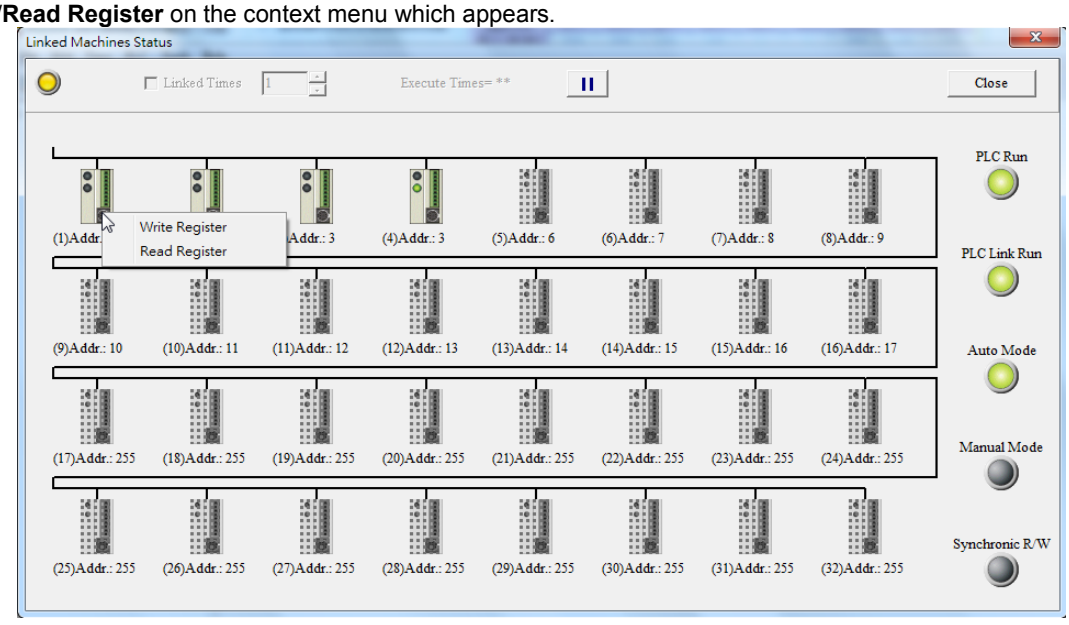


Step 11: Click  or set X0 to On.

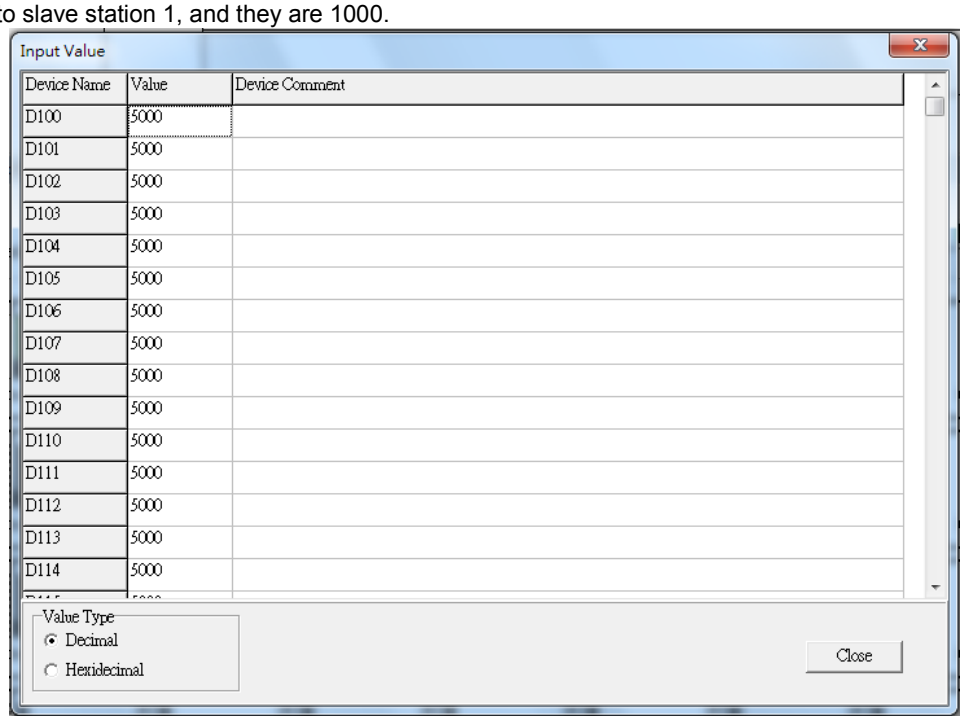


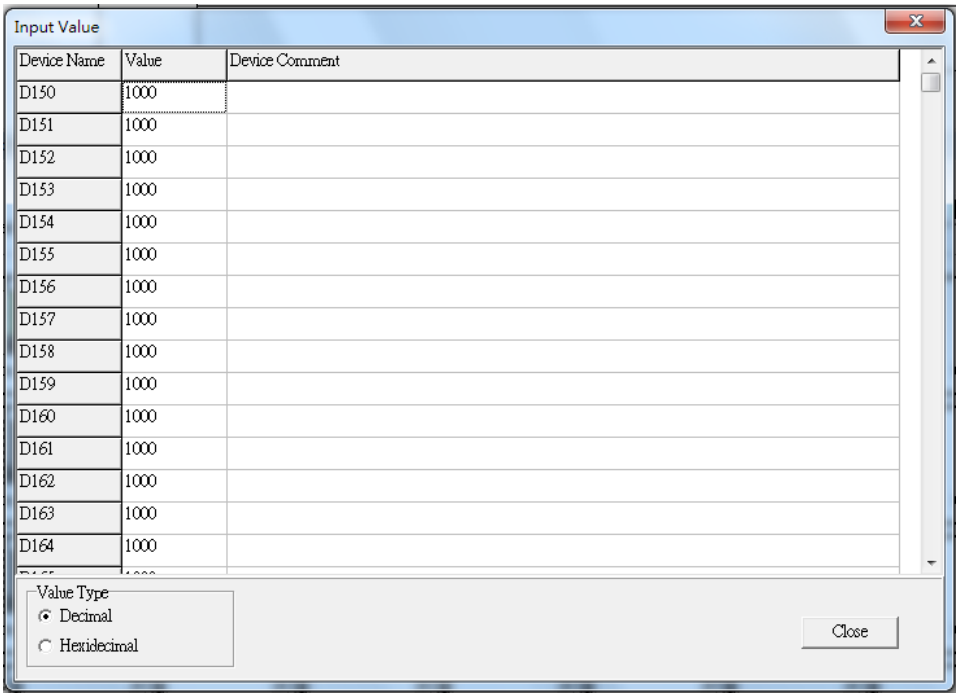
Step 12: The state of the PLC link executed is shown in the **Linked Machines Status** window. The master PLC can exchange data with the slave stations through a program or the PLC link wizard.

Reading/Writing data through the PLC link wizard: Right-click slave station (1)  /slave station (2)  , and click **Write Register**/**Read Register** on the context menu which appears.

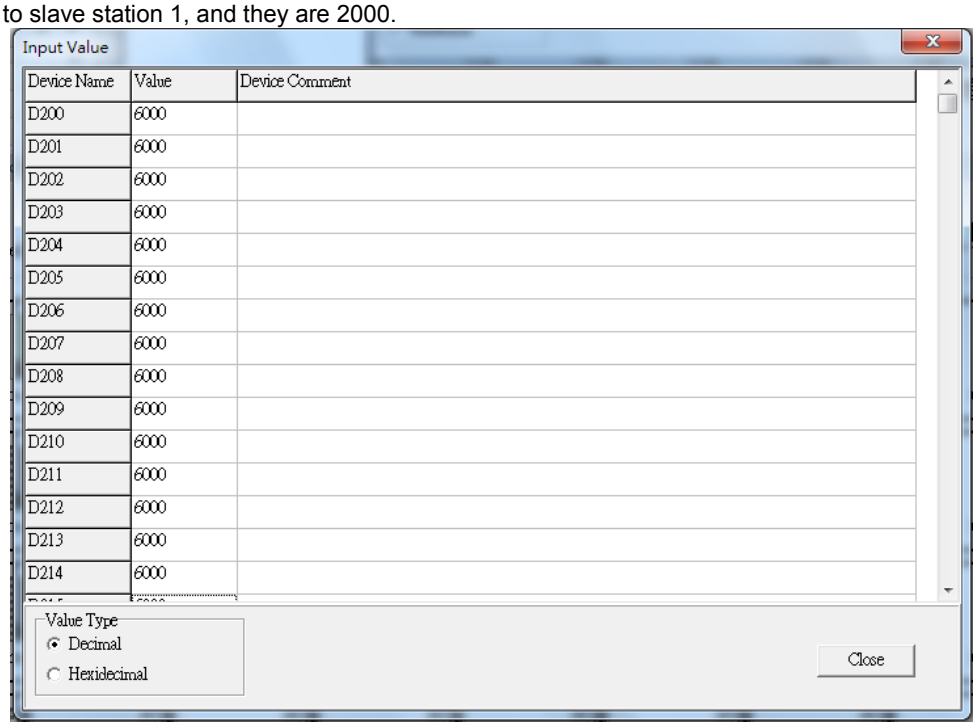


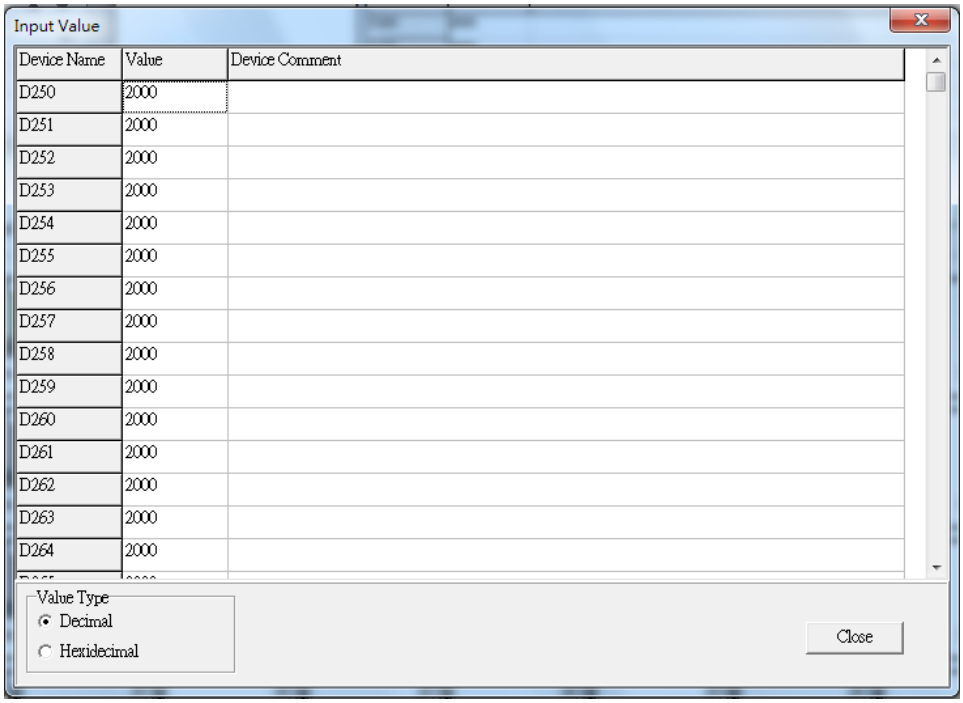
Step 13: The values in D100~D115 are values read from slave 1, and they are 5000. The values in D150~D165 are values written to slave station 1, and they are 1000.



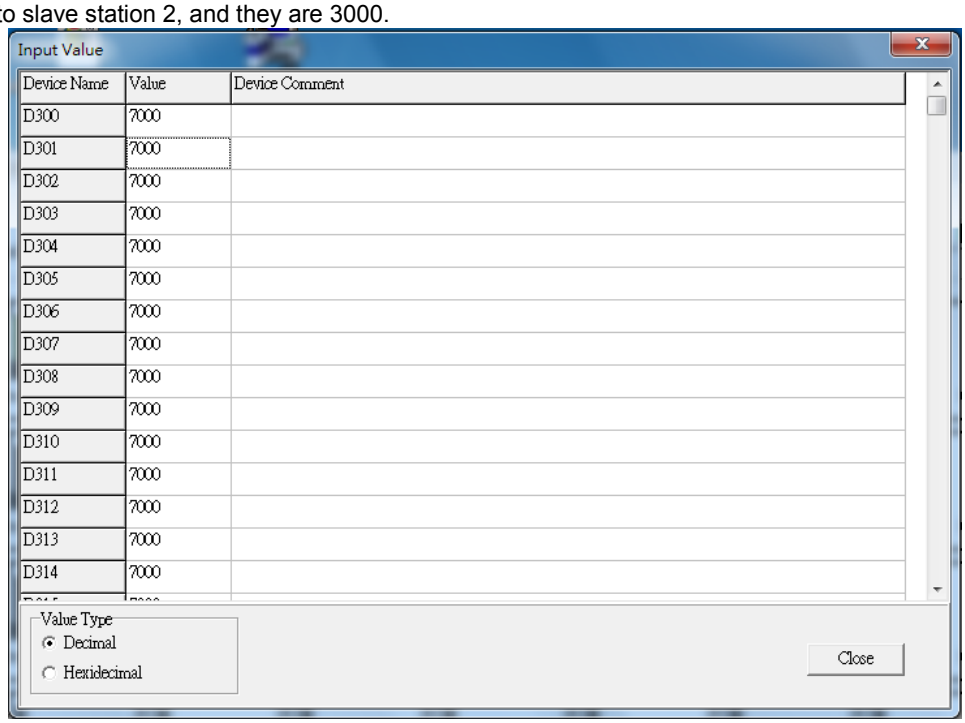


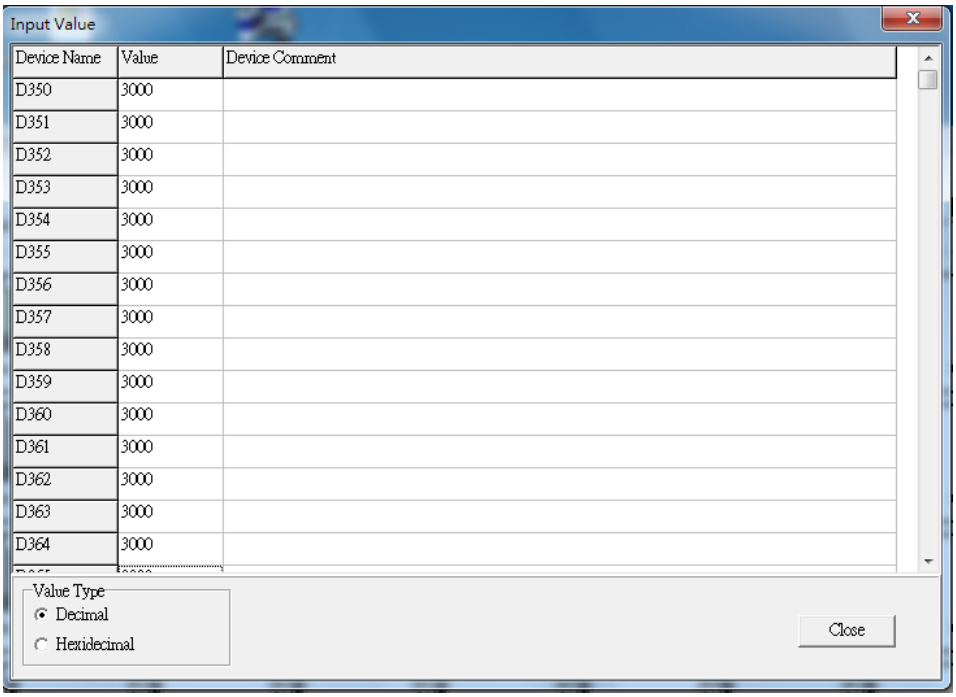
Step 14: The values in D200~D215 are values read from slave 1, and they are 6000. The values in D250~D265 are values written to slave station 1, and they are 2000.



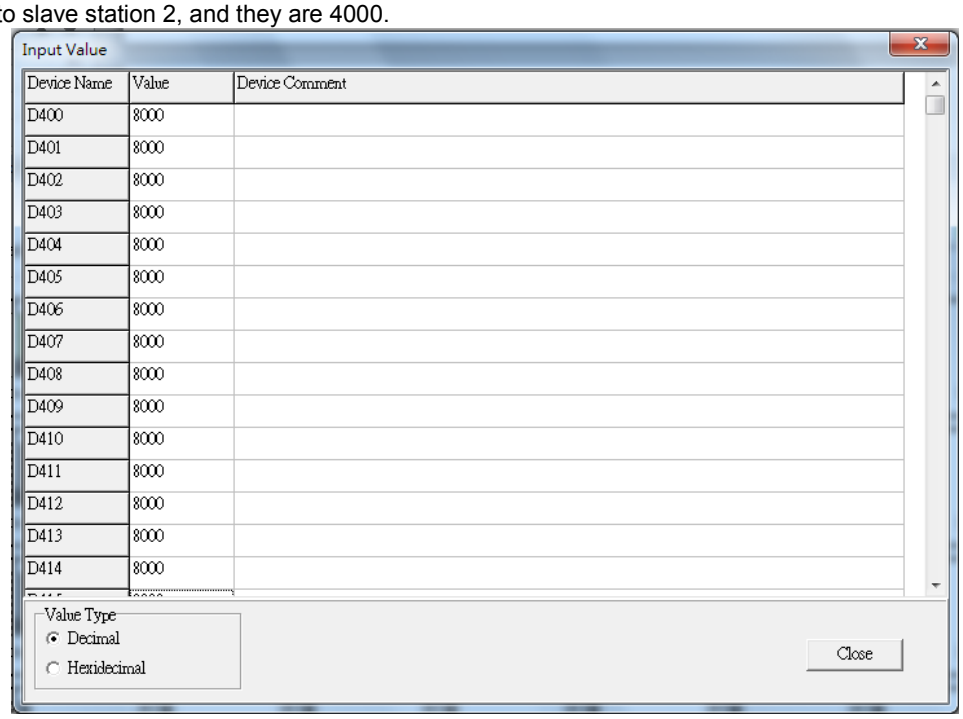


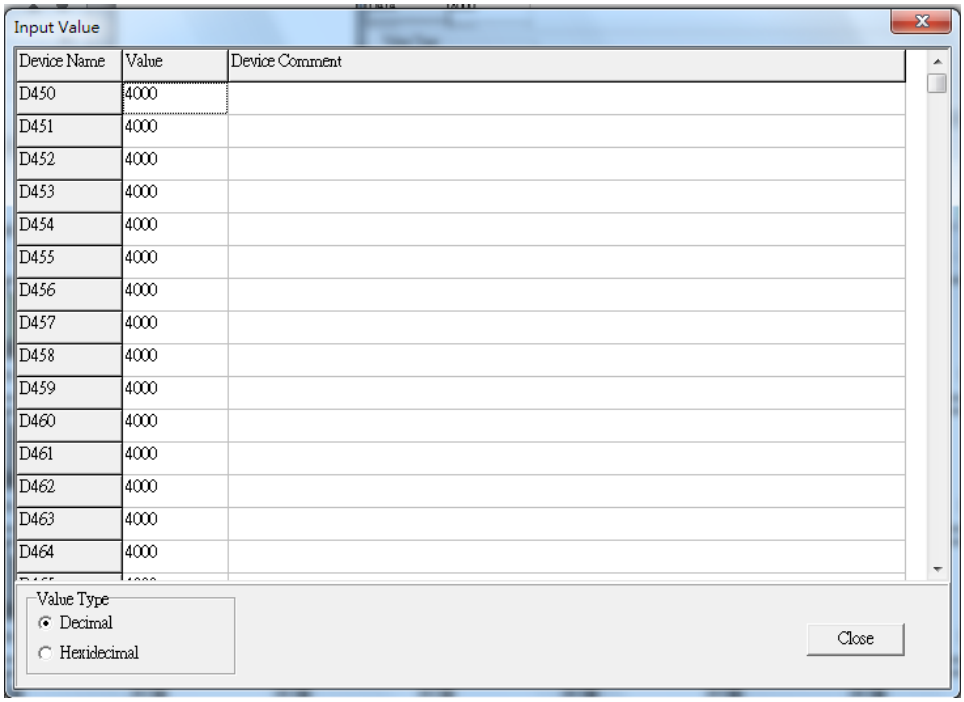
Step 15: The values in D300~D315 are values read from slave 2, and they are 7000. The values in D350~D365 are values written to slave station 2, and they are 3000.



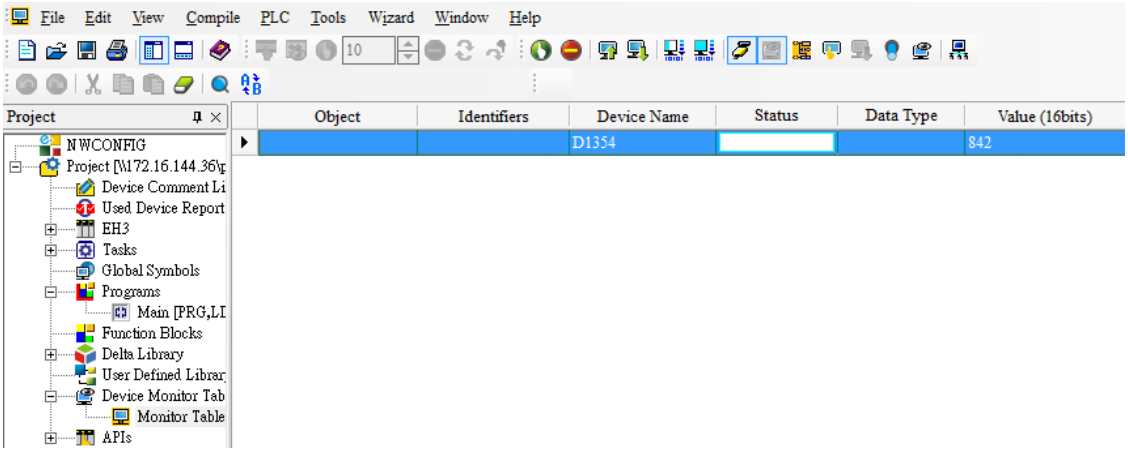


Step 16: The values in D400~D415 are values read from slave 2, and they are 8000. The values in D450~D465 are values written to slave station 2, and they are 4000.





Step 17: Close the **Linked Machines Status** window, create a device monitoring table by means of **Device Monitor Table** in the project management area, type “D1354” in the device monitoring table, and click . The value in D1354 indicates PLC link scan time.



【Description of control】

- The values in D1900~D1903 in the master PLC are taken as slave station addresses. (The value in D1900 is 2, the value in D1901 is 2, the value in D1902 is 3, and the value in D1903 is 3.)
- The master station exchanges data with different communication addresses in the two slave stations by means of a PLC link. The values in D100~D115 in slave station 1 are written to D100~D115 in the master station, and the values in D150~D165 in the master station are written to D150~D165 in slave station 1. The values in D200~D215 in slave station 1 are written to D200~D215 in the master station, and the values in D250~D265 in the master station are written to D250~D265 in slave station 1. The values in D300~D315 in slave station 2 are written to D300~D315 in the master station, and the values in D350~D365 in the master station are written to D350~D365 in slave station 2. The values in D400~D415 in slave station 2 are written to D400~D415 in the master station, and the values in D450~D465 in the master station are written to D450~D465 in slave station 2.

Master PLC (1 PLC)		Slave PLC (2 PLCs)
D100~D115	Reading ←	D100~D115 in the slave PLC whose station address is K2
D150~D165	Writing →	D150~D165 in the slave PLC whose station address is K2
D200~D215	Reading ←	D200~D215 in the slave PLC whose station address is K2
D250~D265	Writing →	D250~D265 in the slave PLC whose station address is K2
D300~D315	Reading ←	D300~D315 in the slave PLC whose station address is K3
D350~D365	Writing →	D350~D365 in the slave PLC whose station address is K3
D400~D415	Reading ←	D400~D415 in the slave PLC whose station address is K3
D450~D465	Writing →	D450~D465 in the slave PLC whose station address is K3

- When M1350 is Off, the values in the data registers used for data exchange in the master station and the slave stations are the ones shown below.

Master PLC	Value	Slave PLC	Value
D100~D115	All are 0.	D100~D115 in slave station 1	All are 5000.
D150~D165	All are 1000.	D150~D165 in slave station 1	All are 0.
D200~D215	All are 0.	D200~D215 in slave station 1	All are 6000.
D250~D265	All are 2000.	D250~D265 in slave station 1	All are 0.
D300~D315	All are 0.	D300~D315 in slave station 2	All are 7000.

Master PLC	Value	Slave PLC	Value
D350~D365	All are 3000.	D350~D365 in slave station 2	All are 0.
D400~D415	All are 0.	D400~D415 in slave station 2	All are 8000.
D450~D465	All are 4000.	D450~D465 in slave station 2	All are 0.

After M1350 is set to ON, the values in the data registers used for data exchange in the master station and the slave stations will become the ones shown below.

Master PLC	Value	Slave PLC	Value
D100~D115	All are 5000.	D100~D115 in slave station 1	All are 5000.
D150~D165	All are 1000.	D150~D165 in slave station 1	All are 1000.
D200~D215	All are 6000.	D200~D215 in slave station 1	All are 6000.
D250~D265	All are 2000.	D250~D265 in slave station 1	All are 2000.
D300~D315	All are 7000.	D300~D315 in slave station 2	All are 7000.
D350~D365	All are 3000.	D350~D365 in slave station 2	All are 3000.
D400~D415	All are 8000.	D400~D415 in slave station 2	All are 8000.
D450~D465	All are 4000.	D450~D465 in slave station 2	All are 4000.

6. Example 4—Reading and Writing Simultaneously in a Polling Cycle (M1354=On)

If M1354 is On, the Modbus function code H'17 (reading and writing simultaneously in a polling cycle through a PLC link) will be used to execute a PLC link. (The master station and the slave stations in the examples below are DVP-EH3 series PLCs.)

6.1 Using the PLC Link Wizard in WPLSoft (ASCII/RTU Mode)

【Control requirement】
A master station (A DVP-EH3 series PLC) individually exchanges sixteen pieces of data (sixteen words) with two slave stations (two DVP-EH3 series PLCs) in a polling cycle through a PLC link.

【Setting station addresses of PLCs】

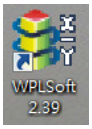
Master/Slave station	Station address	Communication format
Master PLC	K40 (D1121=K40)	1. ASCII, 9600, 7, E, 1 (D1120=H'86) 2. RTU, 9600, 8, E, 1 (D1120=H'87) The communication format of the slave PLCs needs to be the same as the communication format of the master PLC.
Slave PLC 1	K2 (D1121=K2)	
Slave PLC 2	K3 (D1121=K3)	

【Descriptions of devices】

Device in a PLC	Description
X0	X0 functions as a conditional contact used to enable M1350 and M1351.
D1120	Communication protocol of COM2 (RS-485)
D1121	PLC Communication address
D1129	Abnormal communication timeout Time unit: ms
M1120	M1120 is used to retain the communication format of COM2 (RS-485).
M1143	M1143 is used to determine whether the communication format set for COM2 (RS-485) is an ASCII mode or an RTU mode. Off: ASCII mode On: RTU mode
M1350	M1350 is used to enable a PLC link.
M1351	If M1351 is ON, the PLC link executed will be an automatic mode.

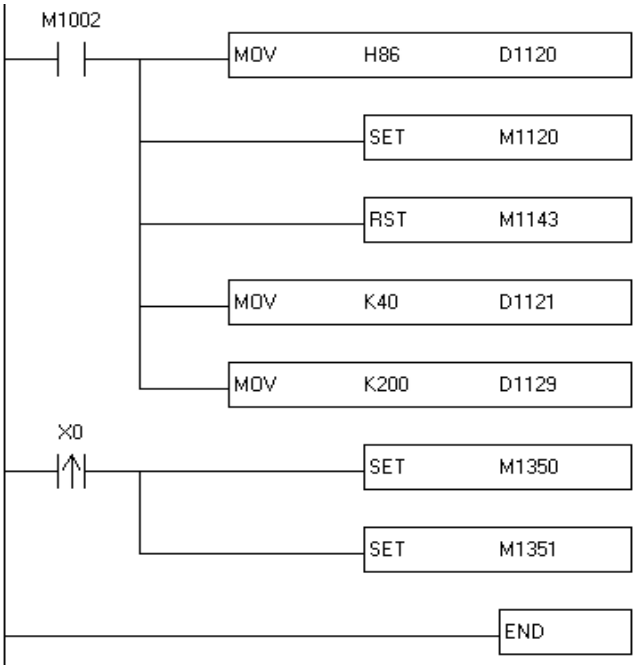
【PLC link wizard】

Step 1: Start WPLSoft, write a program to the master PLC connected, move the RUN/STOP switch on the PLC into the RUN position, and write related values to the PLC.

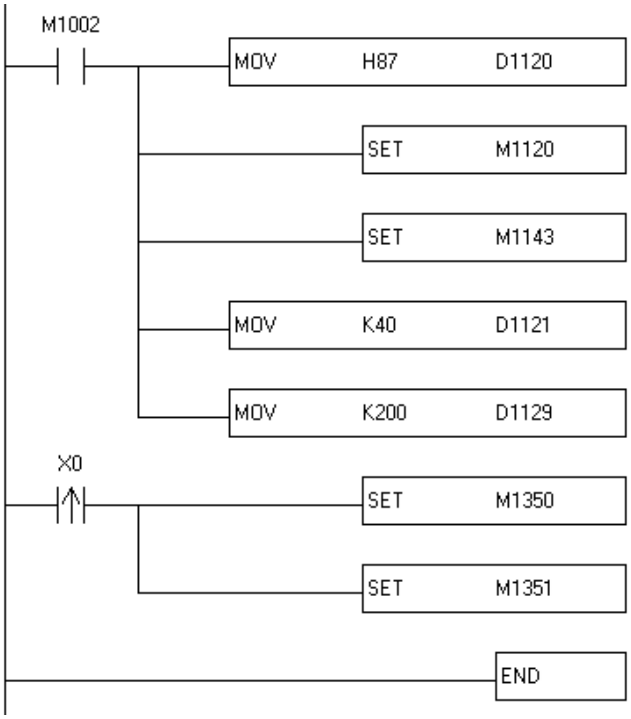


Owing to the fact that devices used to set related communication and a PLC link (M1350 and M1351) are not latching devices, they need to be set by means of a program. The PLC link wizard is used to specify the stations which need to be linked (M1355 is On).

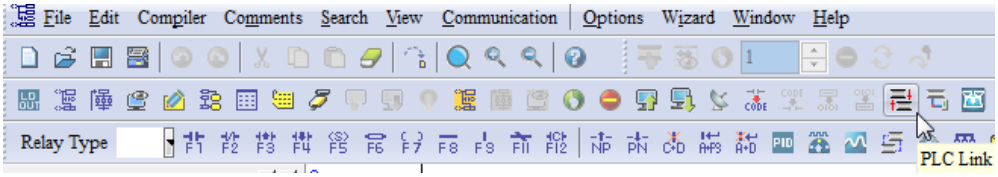
Program for ASCII communication:



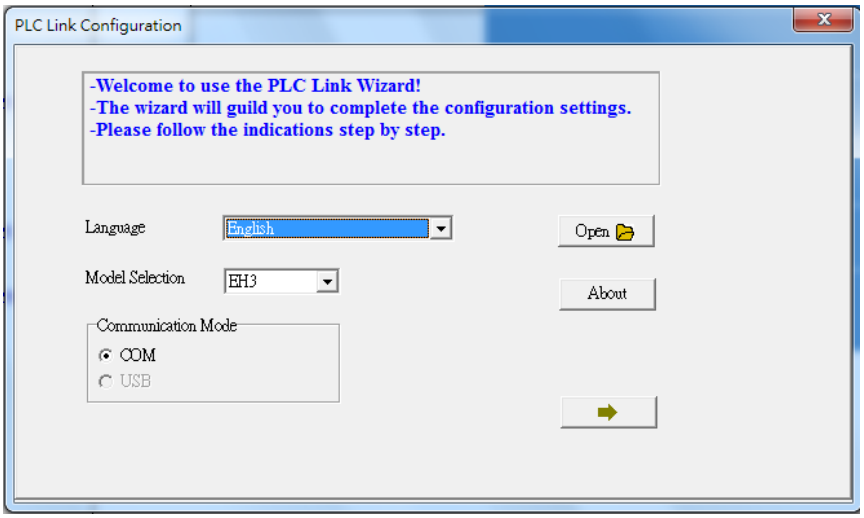
Program for RTU communication:



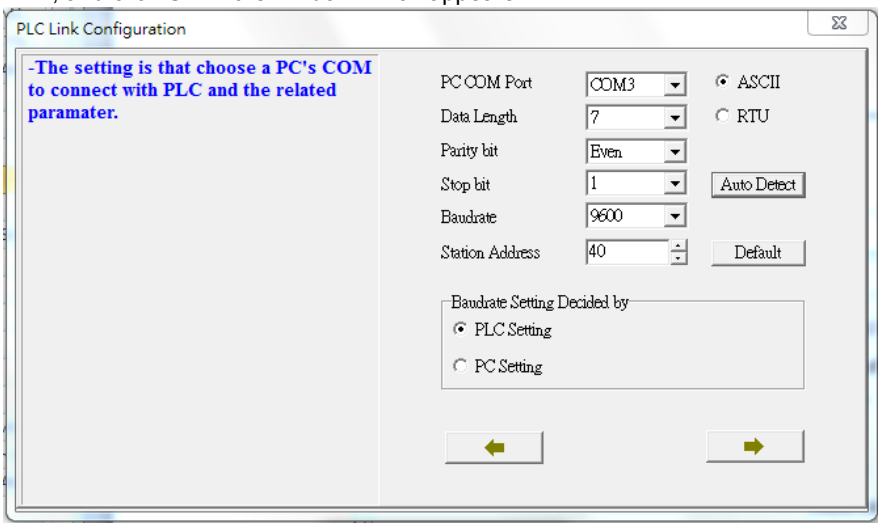
Step 2: Click the PLC link wizard in WPLSoft.

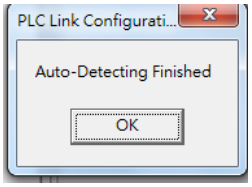


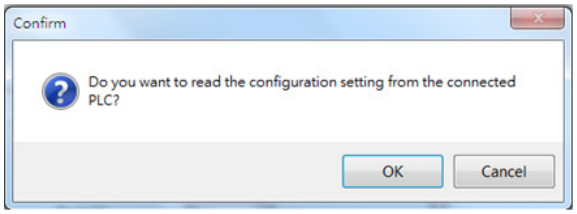
Step 3: Select a language in the **Language** drop-down list box, select a model in the **Model Selection** box, and click .



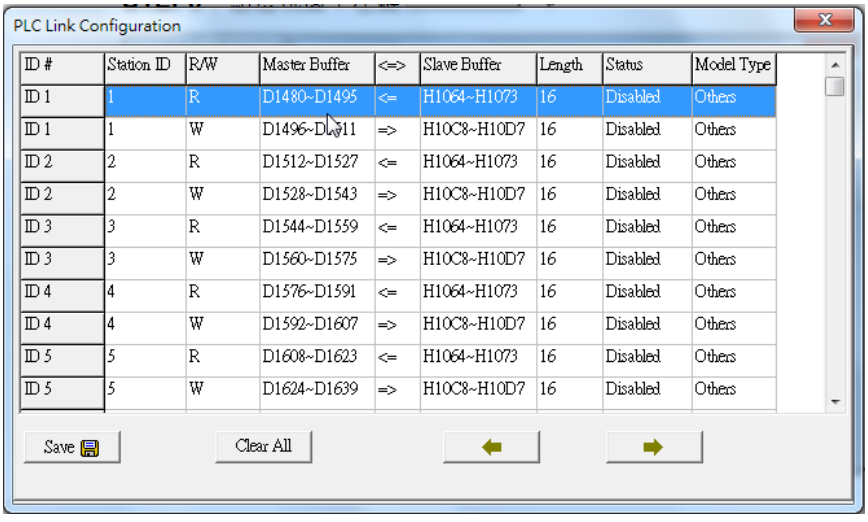
Step 4: Set a communication format for COM1 in the master PLC, click **Auto Detect**, click **OK** in the window which appears, click  , and click **OK** in the window which appears.





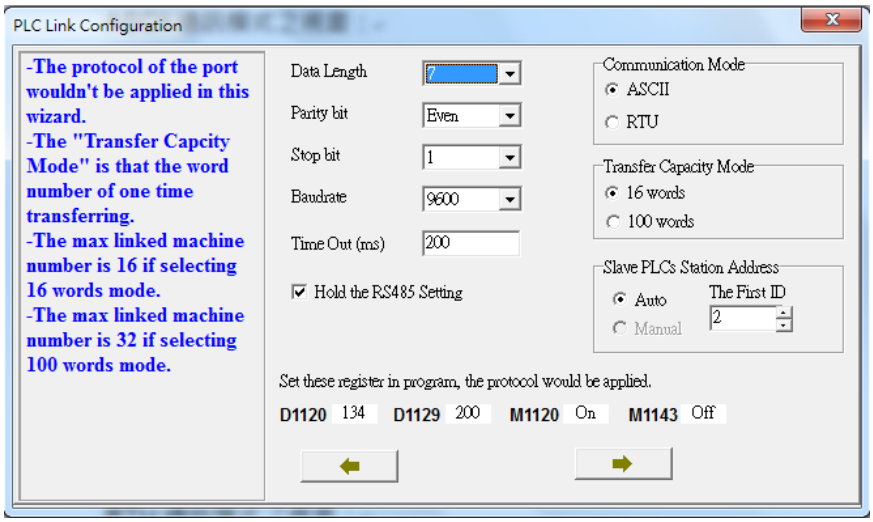


Step 5: Click  .

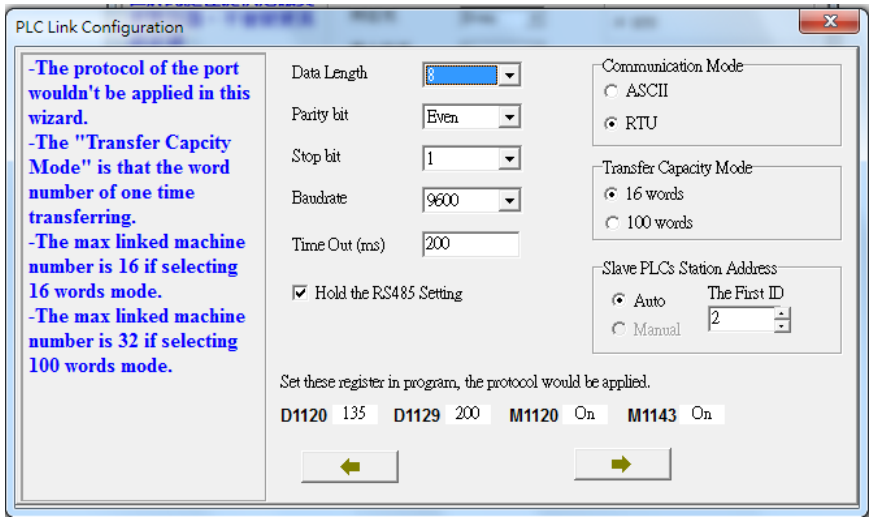


Step 6: The PLC link wizard reads values according to the communication format set for COM2 in the master PLC. Select the **16 words** option button in the **Transfer Capacity Mode** section, select the **Auto** option button, select **2** in the **The First ID** box in the **Slave PLCs Station Address** section, and click  .

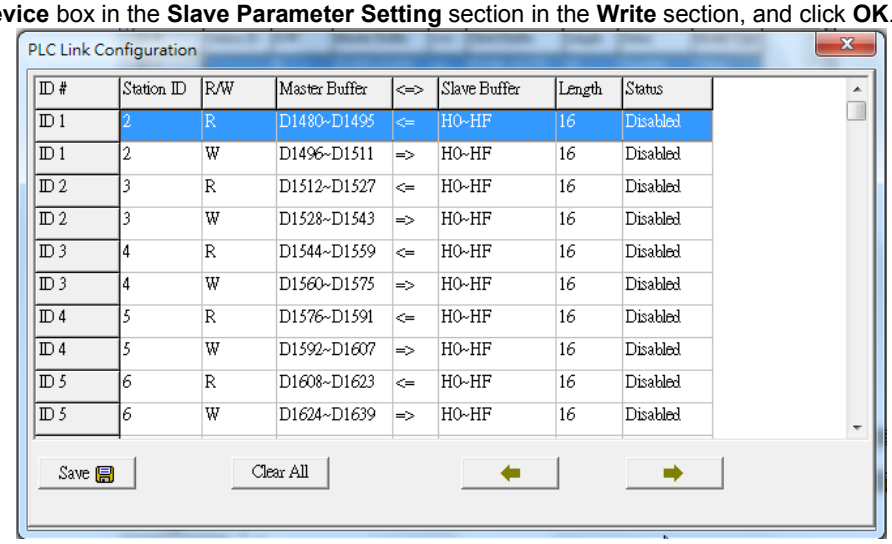
Window for ASCII communication:

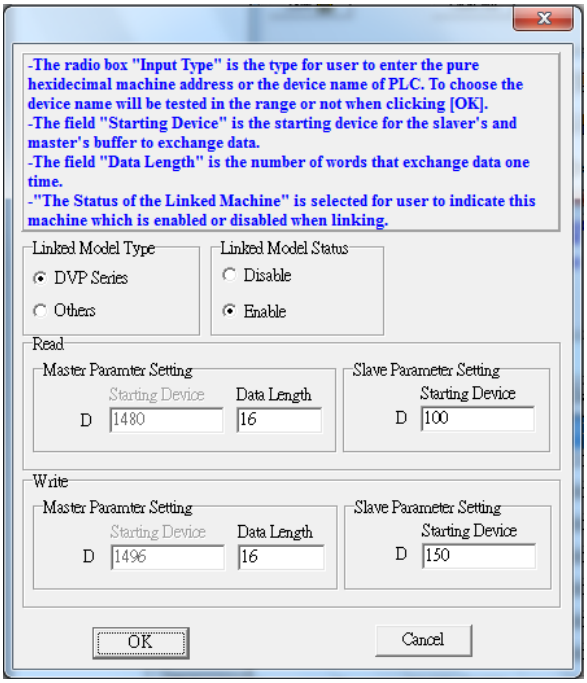


Window for RTU communication:

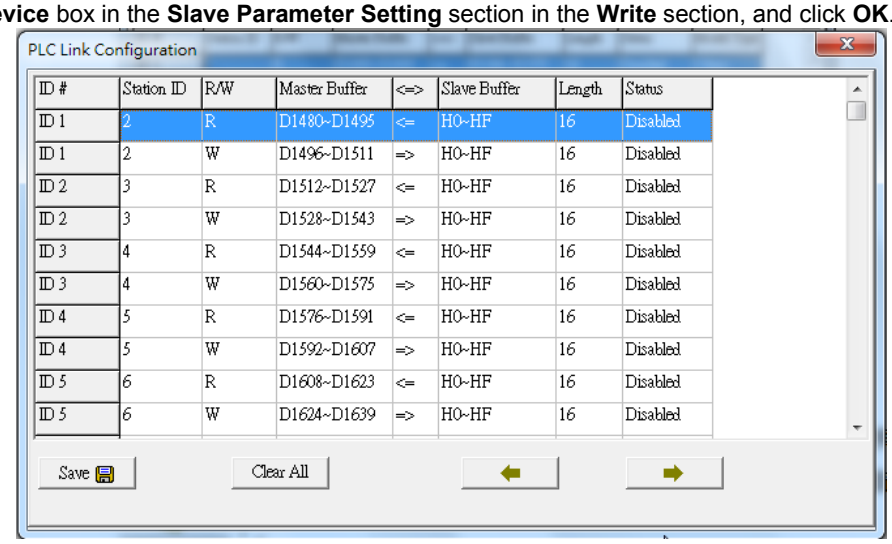


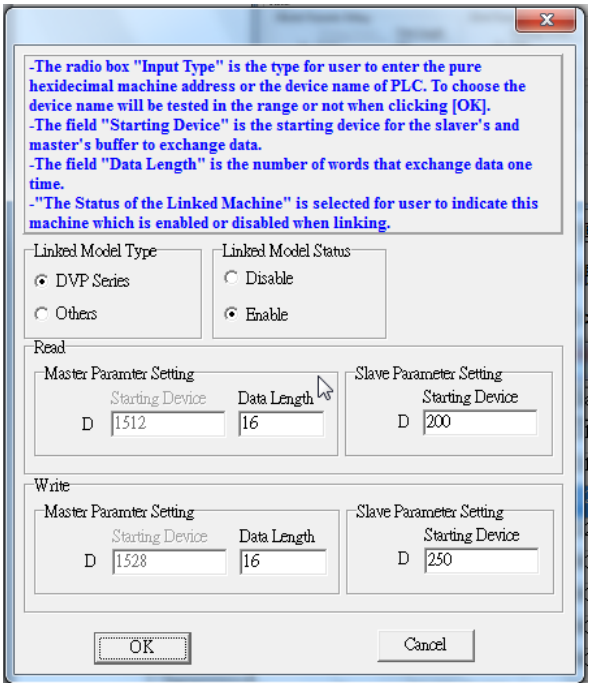
Step 7: Double-click the **ID 1** (**Station ID 2**) block in the **PLC Link Configuration** window, select the **DVP Series** option button in the **Linked Model Type** section, select the **Enable** option button in the **Linked Model Status** section (set M1360 to On), type “16” in the **Data Length** boxes in the **Master Parameter Setting** sections in the **Read** and **Write** sections, type “100” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Read** section, type “150” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.



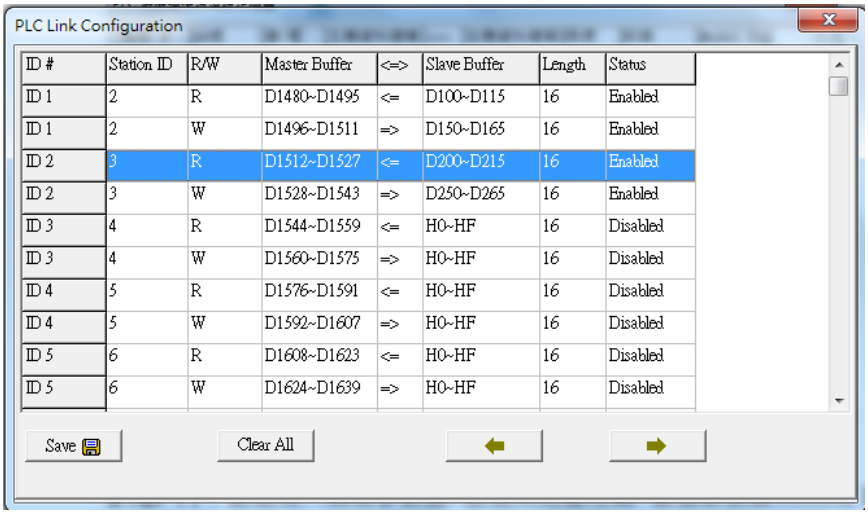


Step 8: Double-click the **ID 2** (**Station ID 3**) block in the **PLC Link Configuration** window, select the **DVP Series** option button in the **Linked Model Type** section, select the **Enable** option button in the **Linked Model Status** section (set M1361 to On), type “16” in the **Data Length** boxes in the **Master Parameter Setting** sections in the **Read** and **Write** sections, type “200” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Read** section, type “250” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.

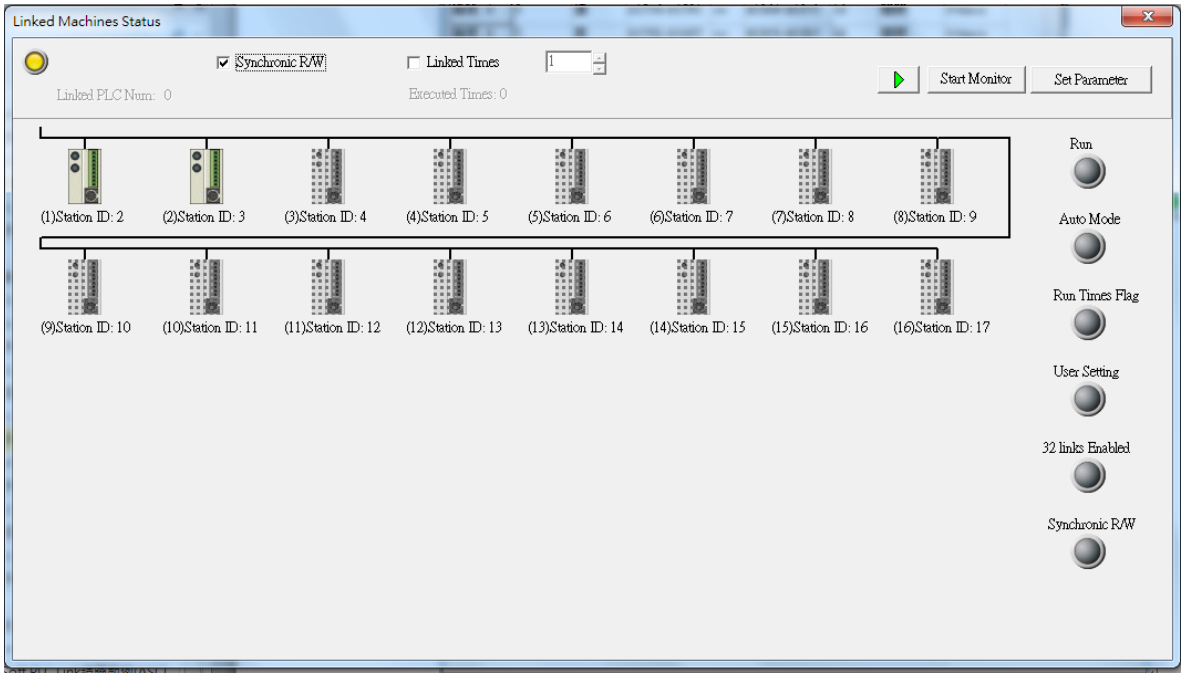




Step 9: Check whether the contents of the **ID 1** block~the **ID 4** block are correct, and then click  .

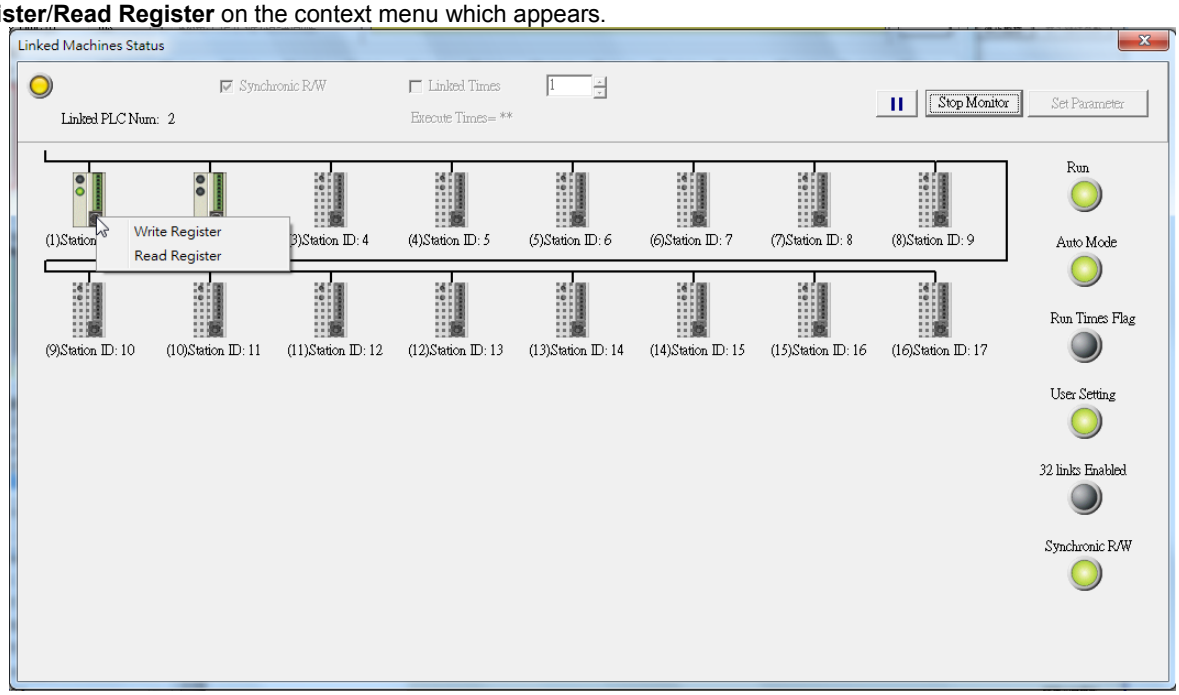


Step 10: Select the **Synchronic R/W** checkbox, click the **Set Parameter** button, click the Start Monitor button, and click  or set X0 to On.

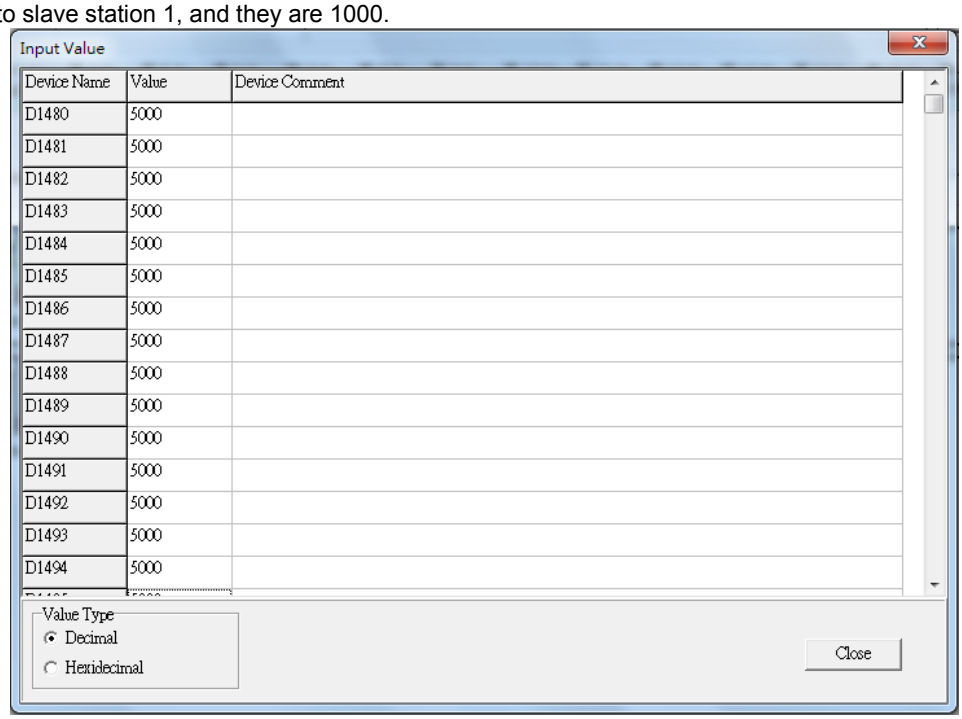


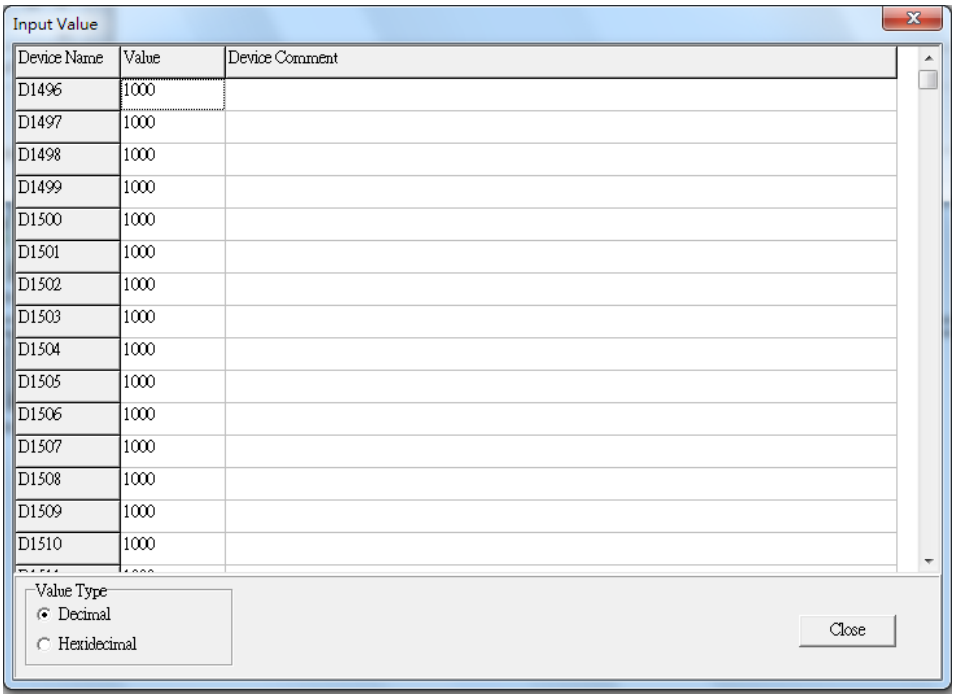
Step 11: The state of the PLC link executed is shown in the **Linked Machines Status** window. The master PLC can exchange data with the slave stations through a program or the PLC link wizard.

Reading/Writing data through the PLC link wizard: Right-click slave station (1) /slave station (2) , and click **Write Register**/**Read Register** on the context menu which appears.

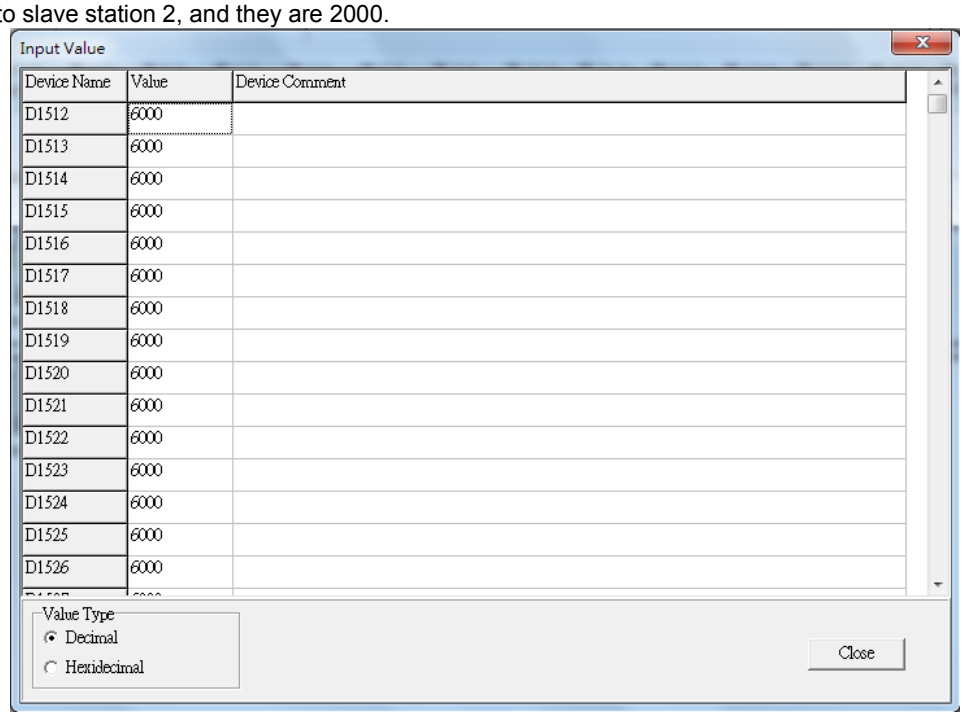


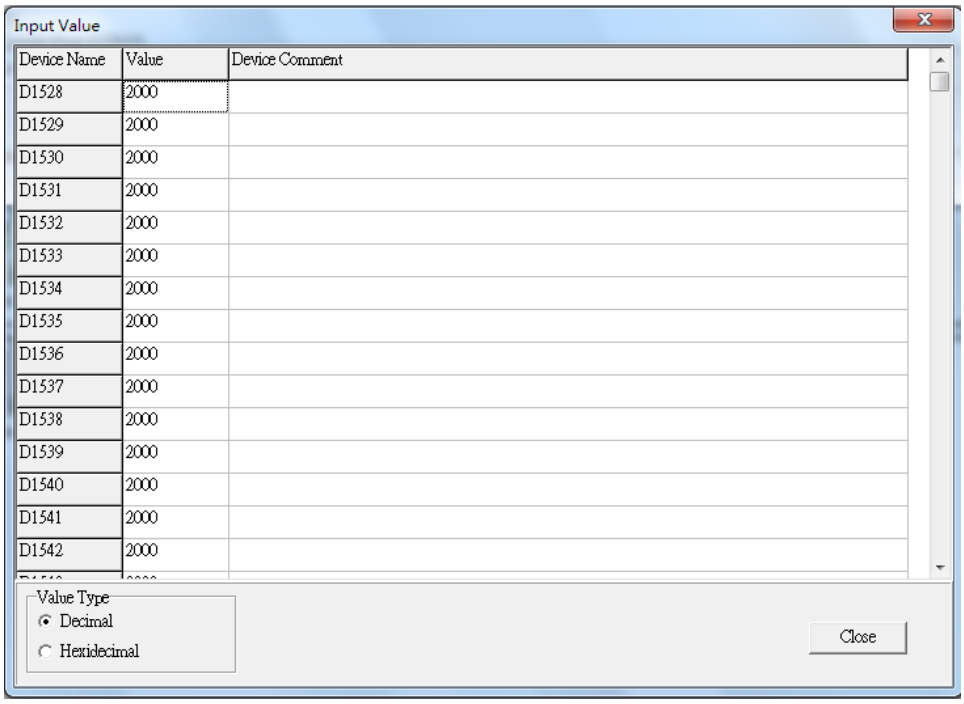
Step 12: The values in D1480~D1495 are values read from slave 1, and they are 5000. The values in D1496~D1511 are values written to slave station 1, and they are 1000.



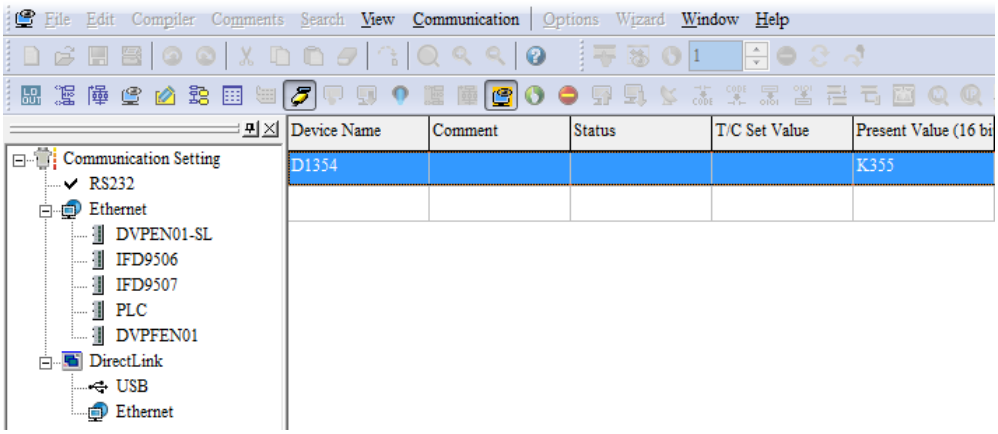


Step 13: The values in D1512~D1527 are values read from slave 2, and they are 6000. The values in D1528~D1543 are values written to slave station 2, and they are 2000.





Step 14: Close the **Linked Machines Status** window, click  , click  , and type “D1354”. The value in D1354 indicates PLC link scan time.



【Description of control】

- D1399 in the master PLC is used to set a start slave station address. The value in D1399 is K2, that is, the PLC whose station address is K2 is slave station 1, and the PLC whose station address is K3 is slave station 2.
- The master station exchanges data with the two slave stations by means of a PLC link. The values in D100~D115 in slave station 1 are written to D1480~D1495 in the master station, and the values in D1496~D1511 in the master station are written to D150~D165 in slave station 1. The values in D200~D215 in slave station 2 are written to D1512~D1527 in the master station, and the values in D1528~D1543 in the master station are written to D250~D265 in slave station 2.

Master PLC (1 PLC)		Slave PLC (2 PLCs)
D1480~D1495	Reading ←	D100~D115 in the slave PLC whose station address is K2
D1496~D1511	Writing →	D150~D165 in the slave PLC whose station address is K2
D1512~D1527	Reading ←	D200~D215 in the slave PLC whose station address is K3
D1528~D1543	Writing →	D250~D265 in the slave PLC whose station address is K3

- When M1350 is Off, the values in the data registers used for data exchange in the master station and the slave stations are the ones shown below.

Master PLC	Value	Slave PLC	Value
D1480~D1495	All are 0.	D100~D115 in slave station 1	All are 5000.
D1496~D1511	All are 1000.	D150~D165 in slave station 1	All are 0.
D1512~D1527	All are 0.	D200~D215 in slave station 2	All are 6000.
D1528~D1543	All are 2000.	D250~D265 in slave station 2	All are 0.

After M1350 is set to ON, the values in the data registers used for data exchange in the master station and the slave stations will become the ones shown below.

Master PLC	Value	Slave PLC	Value
D1480~D1495	All are 5000.	D100~D115 in slave station 1	All are 5000.
D1496~D1511	All are 1000.	D150~D165 in slave station 1	All are 1000.
D1512~D1527	All are 6000.	D200~D215 in slave station 2	All are 6000.
D1528~D1543	All are 2000.	D250~D265 in slave station 2	All are 2000.

6.2 Using the PLC Link Wizard in ISPSoft (ASCII/RTU Mode)

【Control requirement】
A master station (A DVP-EH3 series PLC) individually exchanges sixteen pieces of data (sixteen words) with two slave stations (two DVP-EH3 series PLCs) in a polling cycle through a PLC link.

【Setting station addresses of PLCs】

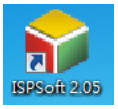
Master/Slave station	Station address	Communication format
Master PLC	K40 (D1121=K40)	3. ASCII, 9600, 7, E, 1 (D1120=H'86) 4. RTU, 9600, 8, E, 1 (D1120=H'87) The communication format of the slave PLCs needs to be the same as the communication format of the master PLC.
Slave PLC 1	K2 (D1121=K2)	
Slave PLC 2	K3 (D1121=K3)	

【Descriptions of devices】

Device in a PLC	Description
X0	X0 functions as a conditional contact used to enable M1350 and M1351.
D1120	Communication protocol of COM2 (RS-485)
D1121	PLC Communication address
D1129	Abnormal communication timeout Time unit: ms
M1120	M1120 is used to retain the communication format of COM2 (RS-485).
M1143	M1143 is used to determine whether the communication format set for COM2 (RS-485) is an ASCII mode or an RTU mode. Off: ASCII mode On: RTU mode
M1350	M1350 is used to enable a PLC link.
M1351	If M1351 is ON, the PLC link executed will be an automatic mode.

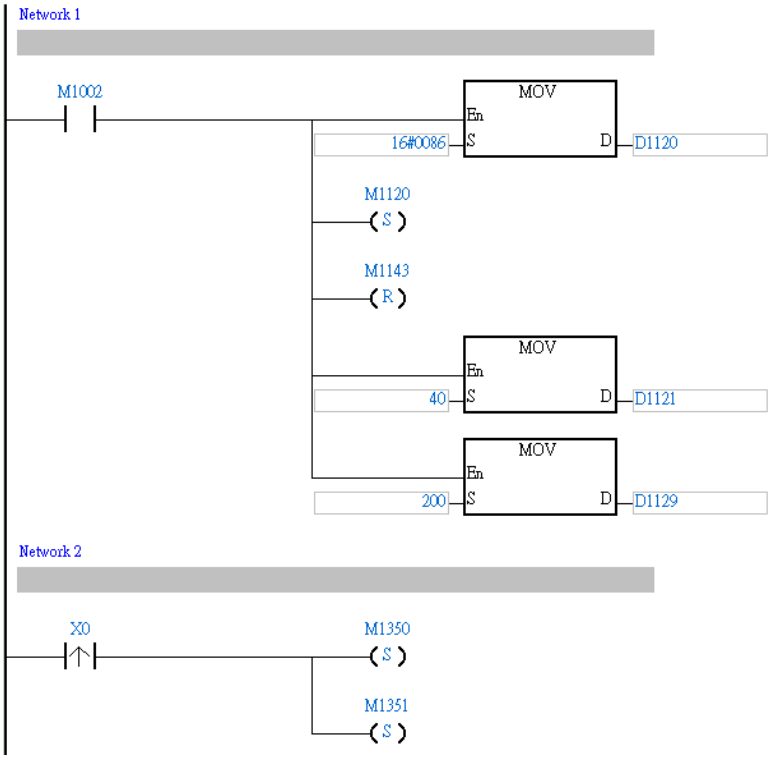
【PLC link wizard】

Step 1: Start ISPSoft, write a program to the master PLC connected, move the RUN/STOP switch on the PLC into the RUN position, and write related values to the PLC.

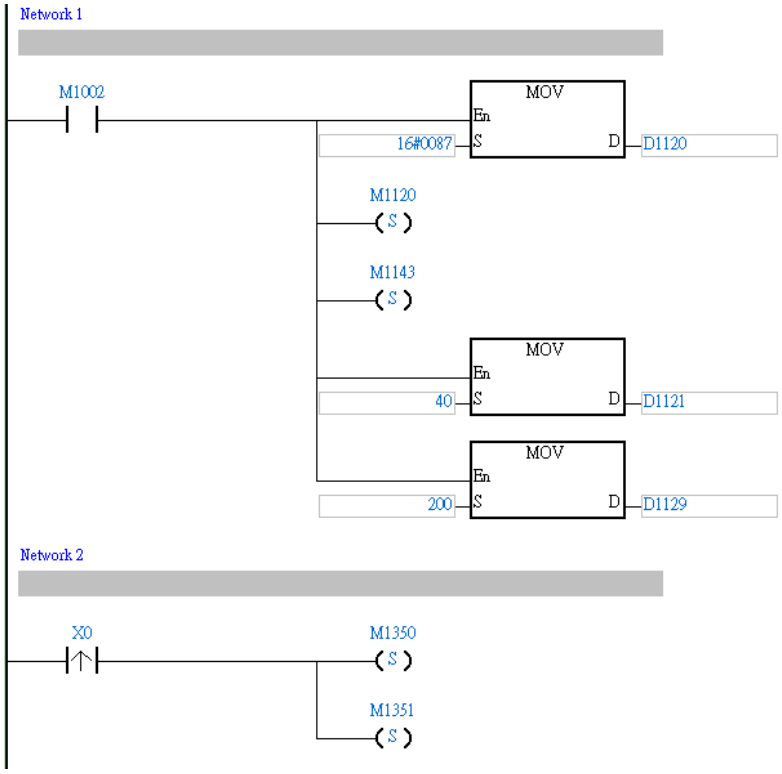


Owing to the fact that devices used to set related communication and a PLC link (M1350 and M1351) are not latching devices, they need to be set by means of a program. The PLC link wizard is used to manually specify the stations which need to be linked (M1355 is On).

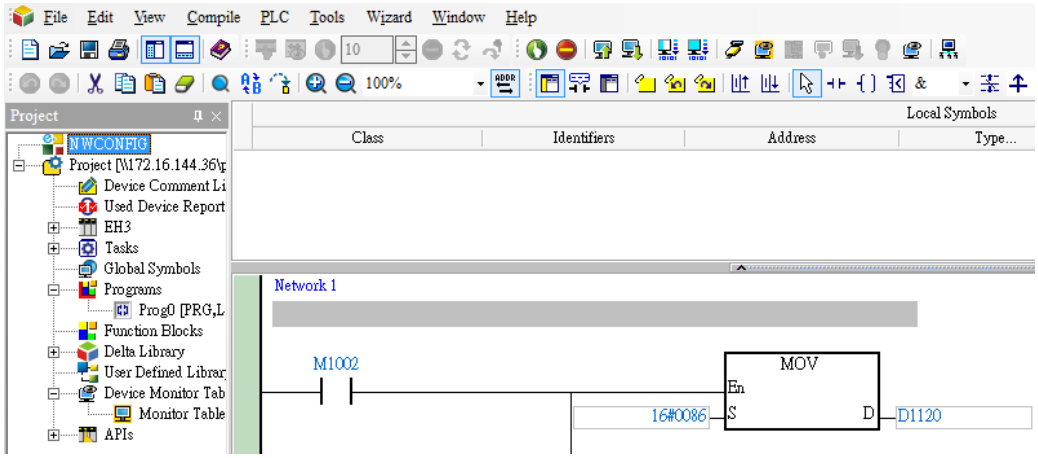
Program for ASCII communication:

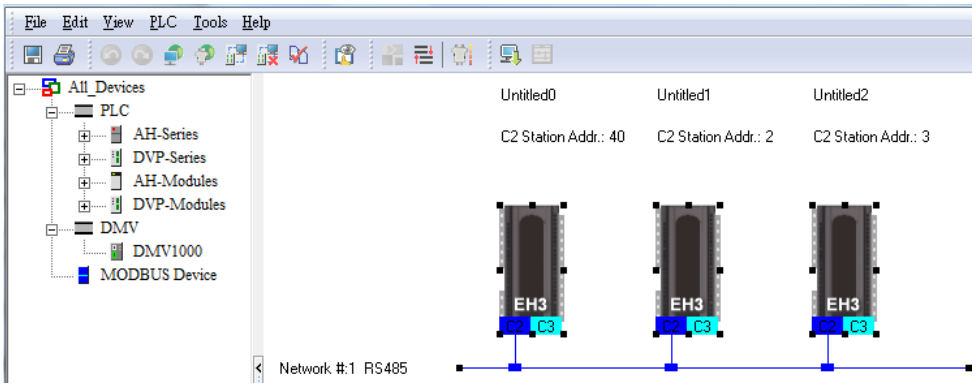


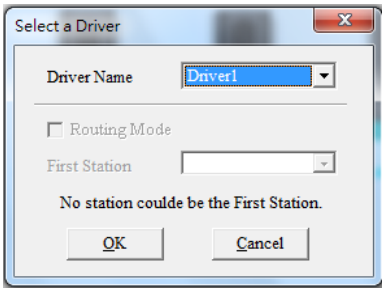
Program for RTU communication:



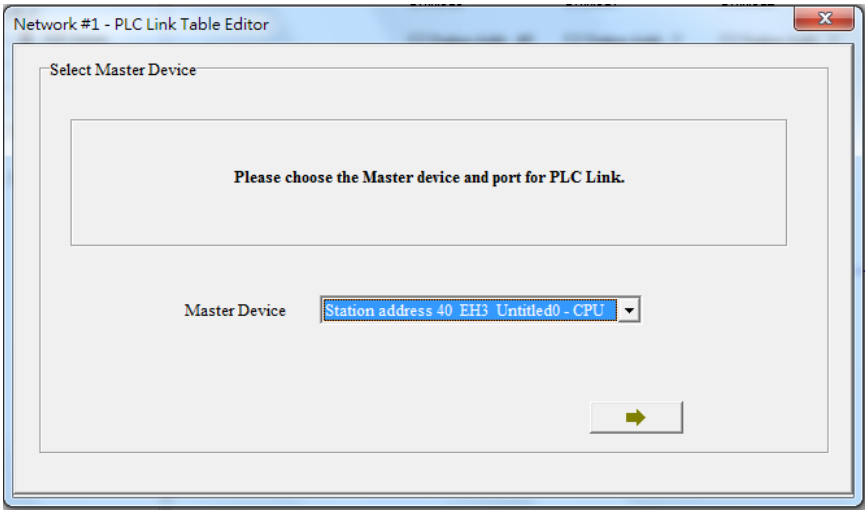
Step 2: Double-click **NWCONFIG** in the project management area, create a link, click  , select **Driver 1** in the **Driver Name** drop-down list box, click **OK**, select the master station and the slave stations, and click  .

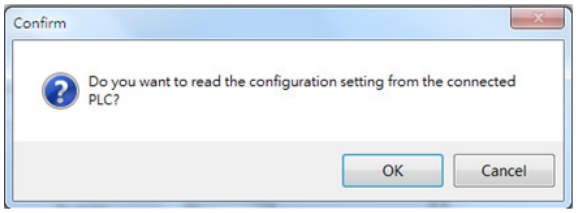




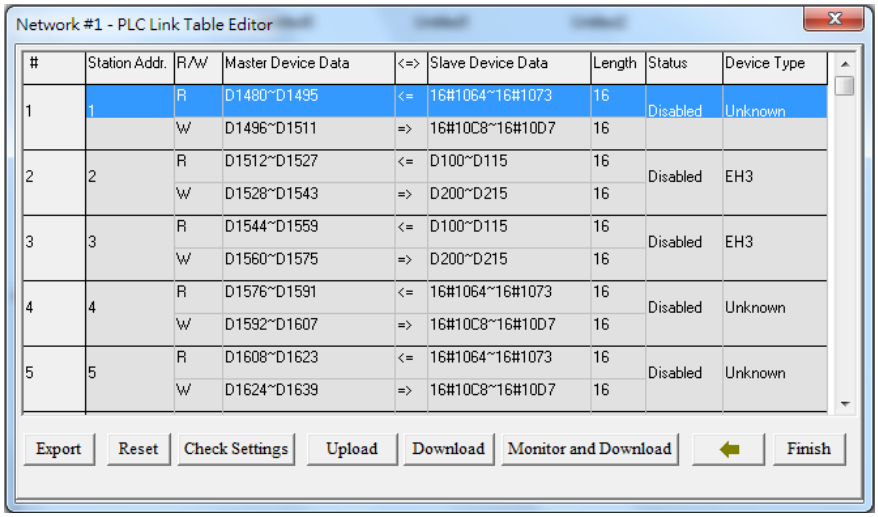


Step 3: Select a PLC in the **Master Device** drop-down list box, click  , and click **OK** in the window which appears.



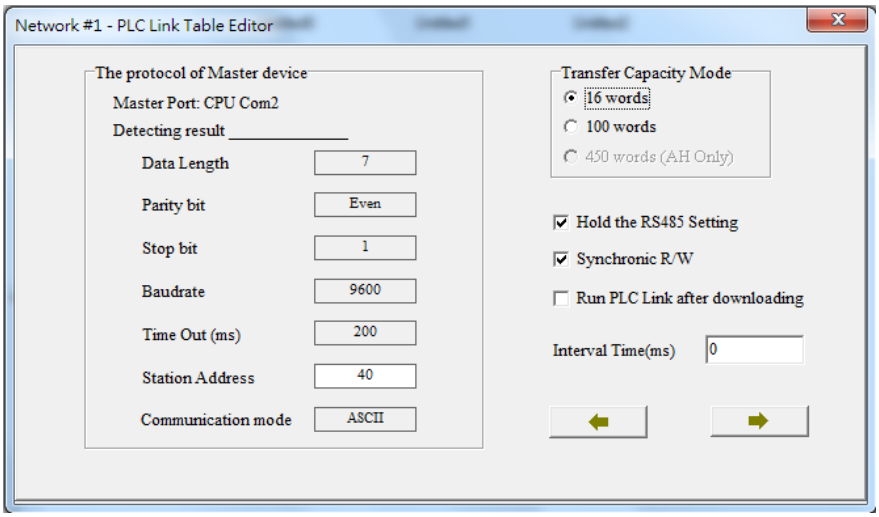


Step 4: Click  .

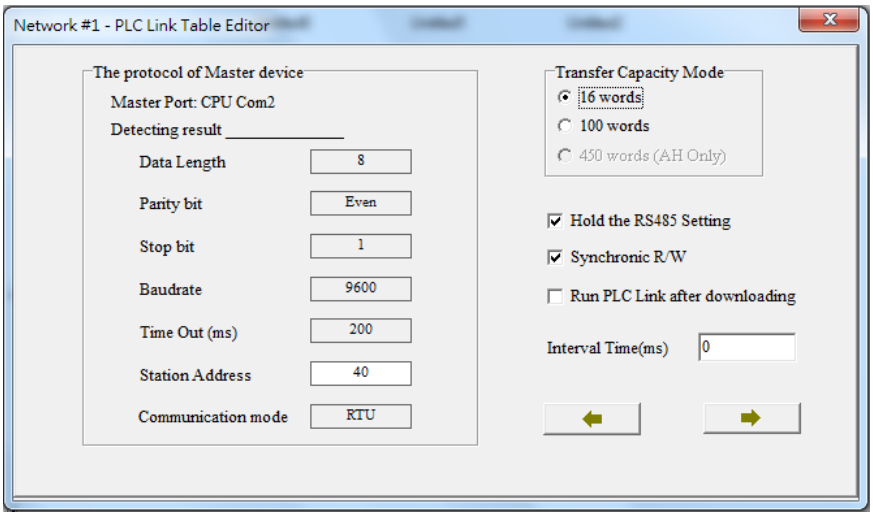


Step 5: The PLC link wizard reads values according to the communication format set for COM2 in the master PLC. Select the **16 words** option button in the **Transfer Capacity Mode** section, select the **Synchronic R/W** checkbox, unselect the **Run PLC Link after downloading** checkbox, type “0” in the **Interval Time** box, and click  .

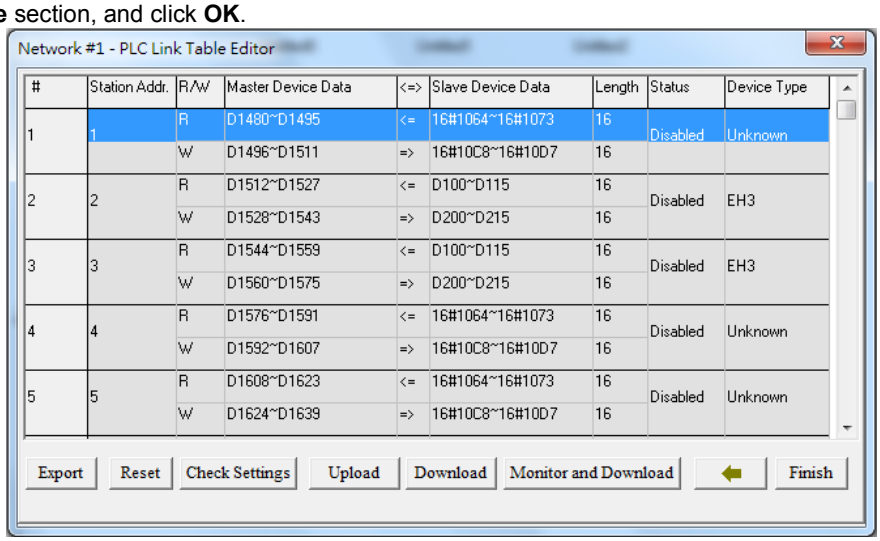
Window for ASCII communication:

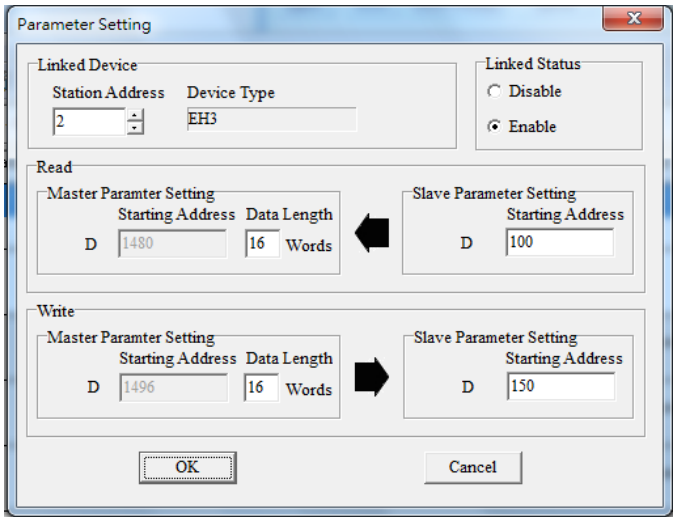


Window for RTU communication:

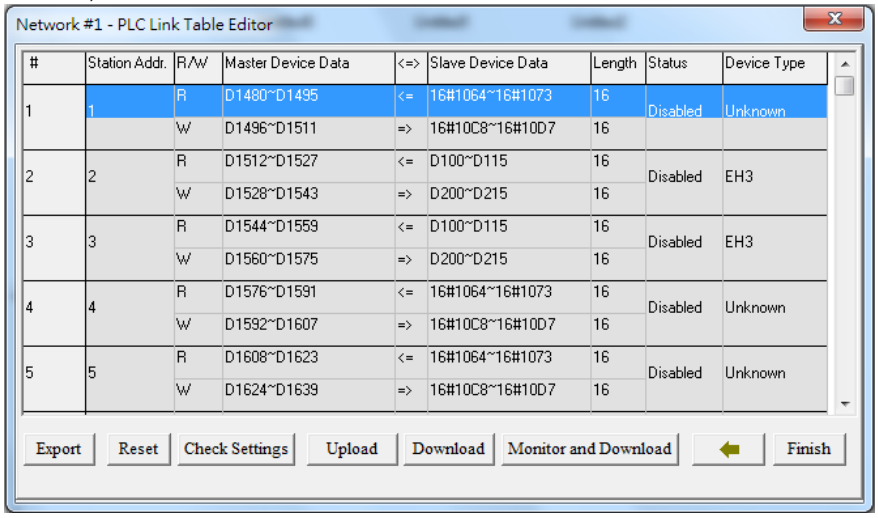


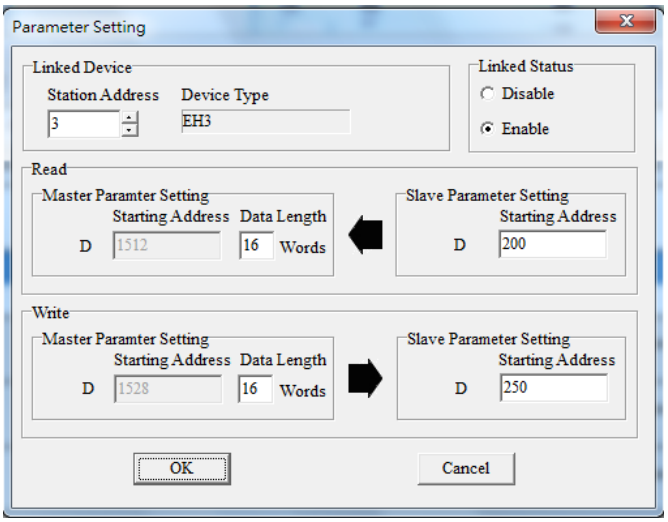
Step 6: Double-click the **1** block in the **PLC Link Table Editor** window, select **2** in the **Station Address** box, select the **Enable** option button in the **Linked Status** section (set M1360 to On), type “16” in the **Data Length** boxes in the **Master Parameter Setting** sections in the **Read** and **Write** sections, type “100” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Read** section, type “150” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.



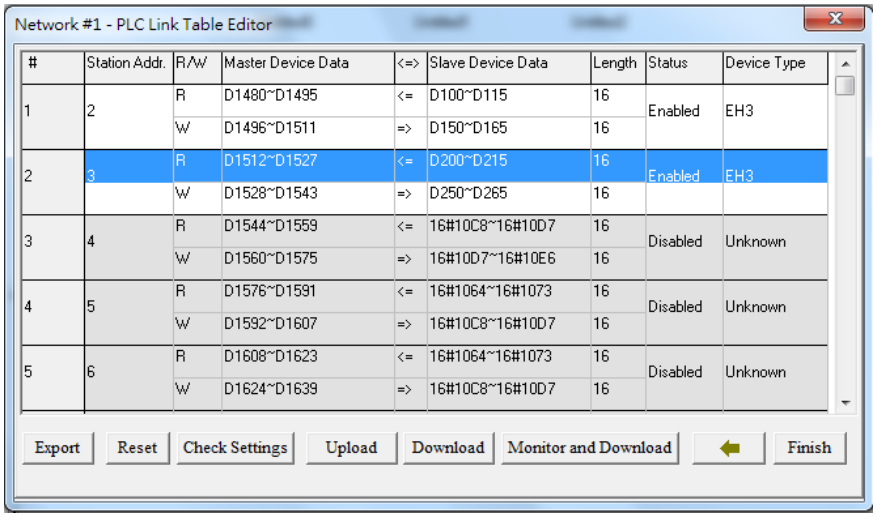


Step 7: Double-click the **2** block in the **PLC Link Table Editor** window, select **3** in the **Station Address** box, select the **Enable** option button in the **Linked Status** section (set M1361 to On), type “16” in the **Data Length** boxes in the **Master Parameter Setting** sections in the **Read** and **Write** sections, type “200” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Read** section, type “250” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.



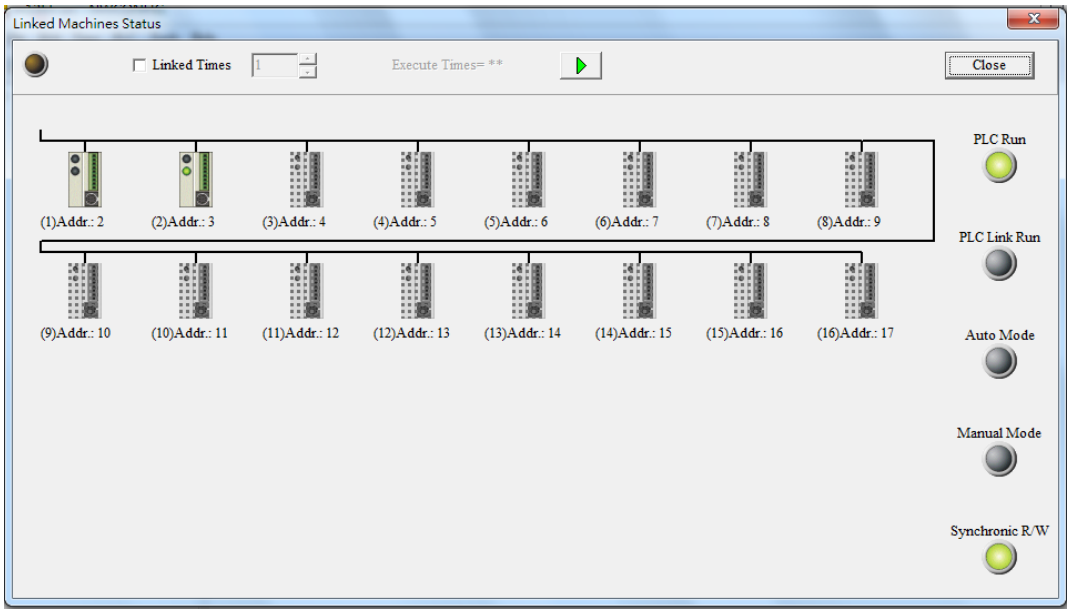


Step 8: Check whether the contents of the **1** block~the **2** block are correct, and then click **Monitor and Download**.



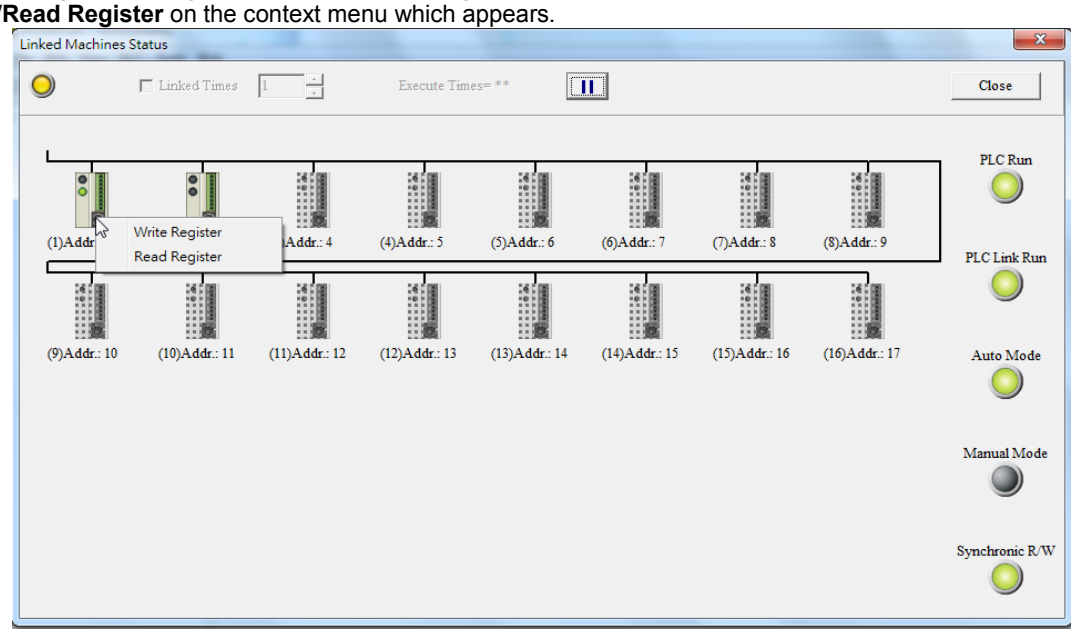
#	Station Addr.	R/W	Master Device Data	<=>	Slave Device Data	Length	Status	Device Type
1	2	R	D1480~D1495	<=	D100~D115	16	Enabled	EH3
		W	D1496~D1511	=>	D150~D165	16		
2	3	R	D1512~D1527	<=	D200~D215	16	Enabled	EH3
		W	D1528~D1543	=>	D250~D265	16		
3	4	R	D1544~D1559	<=	16#10C8~16#10D7	16	Disabled	Unknown
		W	D1560~D1575	=>	16#10D7~16#10E6	16		
4	5	R	D1576~D1591	<=	16#1064~16#1073	16	Disabled	Unknown
		W	D1592~D1607	=>	16#10C8~16#10D7	16		
5	6	R	D1608~D1623	<=	16#1064~16#1073	16	Disabled	Unknown
		W	D1624~D1639	=>	16#10C8~16#10D7	16		

Step 9: Click  or set X0 to On.

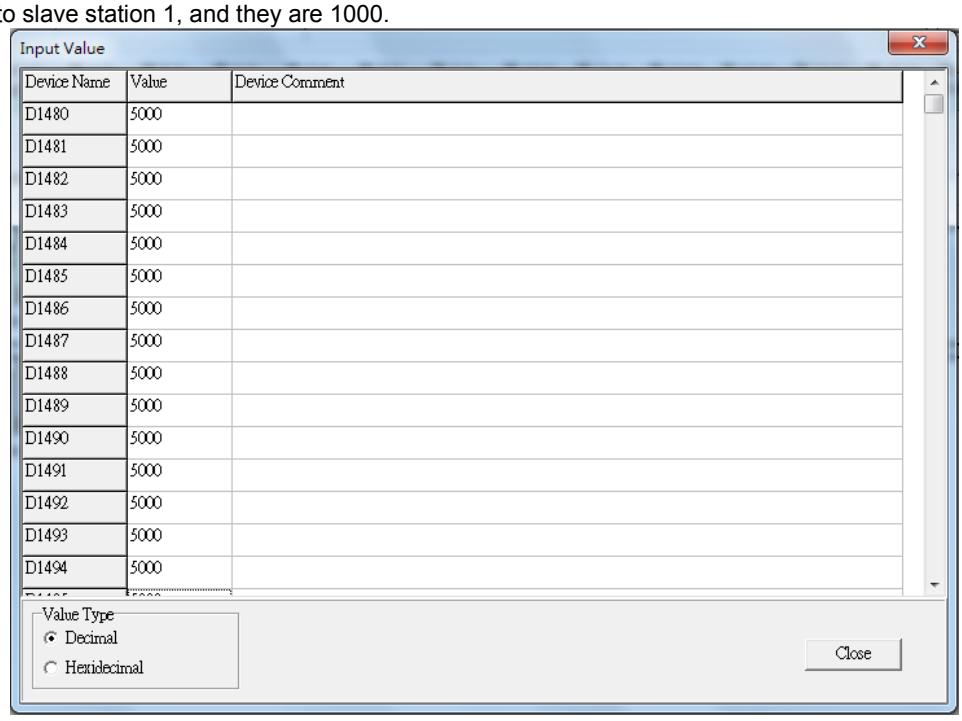


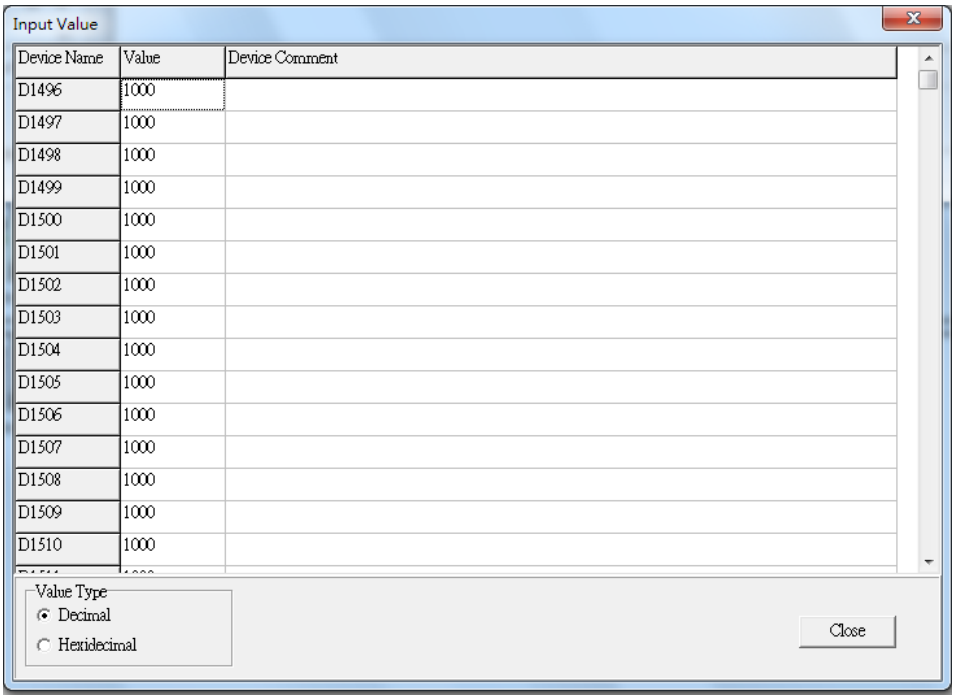
Step 10: The state of the PLC link executed is shown in the **Linked Machines Status** window. The master PLC can exchange data with the slave stations through a program or the PLC link wizard.

Reading/Writing data through the PLC link wizard: Right-click slave station (1)  /slave station (2)  , and click **Write Register**/**Read Register** on the context menu which appears.

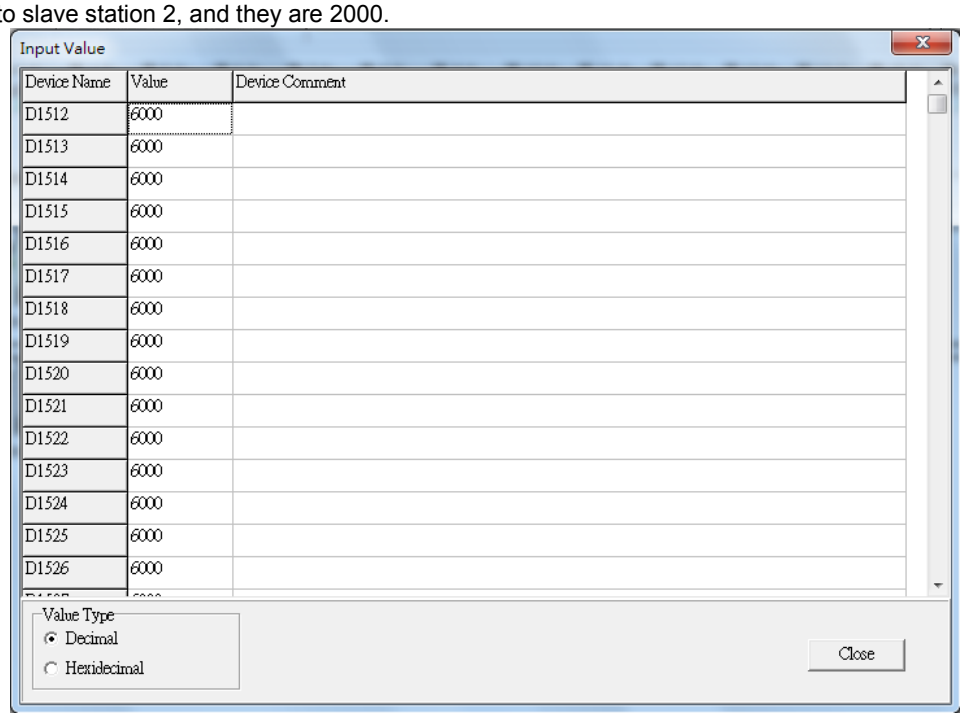


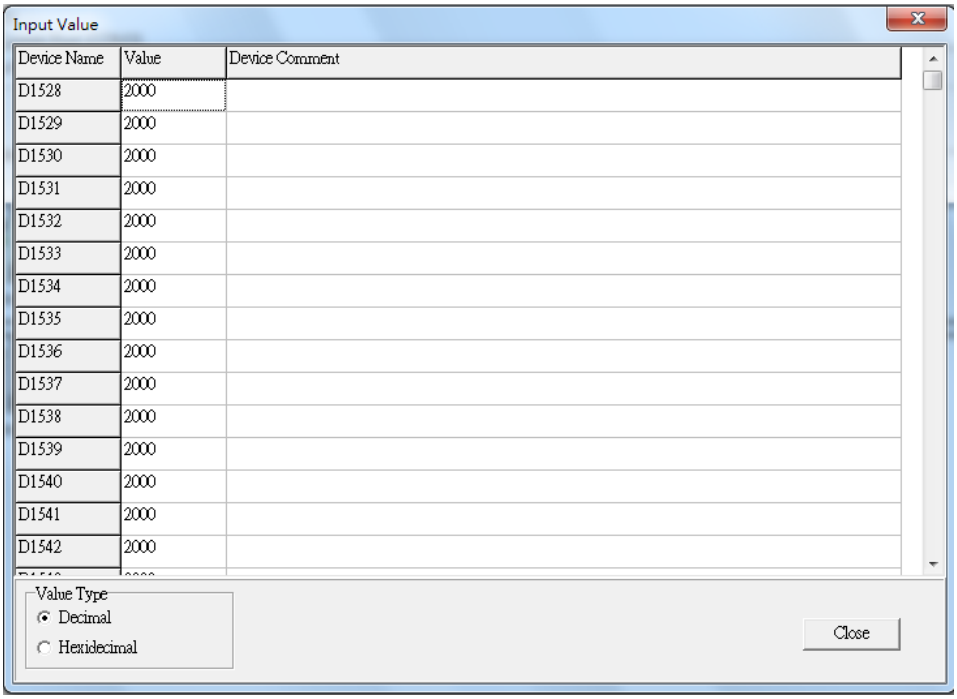
Step 11: The values in D1480~D1495 are values read from slave 1, and they are 5000. The values in D1496~D1511 are values written to slave station 1, and they are 1000.



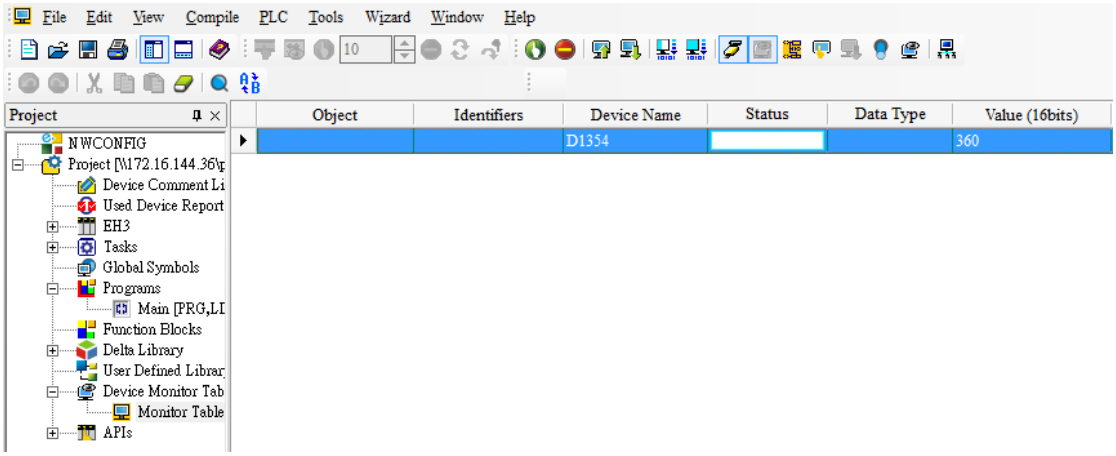


Step 12: The values in D1512~D1527 are values read from slave 2, and they are 6000. The values in D1528~D1543 are values written to slave station 2, and they are 2000.





Step 13: Close the **Linked Machines Status** window, create a device monitoring table by means of **Device Monitor Table** in the project management area, type “D1354” in the device monitoring table, and click . The value in D1354 indicates PLC link scan time.



【Description of control】

- D1399 in the master PLC is used to set a start slave station address. The value in D1399 is K2, that is, the PLC whose station address is K2 is slave station 1, and the PLC whose station address is K3 is slave station 2.
- The master station exchanges data with the two slave stations by means of a PLC link. The values in D100~D115 in slave station 1 are written to D1480~D1495 in the master station, and the values in D1496~D1511 in the master station are written to D150~D165 in slave station 1. The values in D200~D215 in slave station 2 are written to D1512~D1527 in the master station, and the values in D1528~D1543 in the master station are written to D250~D265 in slave station 2.

Master PLC (1 PLC)		Slave PLC (2 PLCs)
D1480~D1495	Reading ←	D100~D115 in the slave PLC whose station address is K2
D1496~D1511	Writing →	D150~D165 in the slave PLC whose station address is K2
D1512~D1527	Reading ←	D200~D215 in the slave PLC whose station address is K3
D1528~D1543	Writing →	D250~D265 in the slave PLC whose station address is K3

- When M1350 is Off, the values in the data registers used for data exchange in the master station and the slave stations are the ones shown below.

Master PLC	Value	Slave PLC	Value
D1480~D1495	All are 0.	D100~D115 in slave station 1	All are 5000.
D1496~D1511	All are 1000.	D150~D165 in slave station 1	All are 0.
D1512~D1527	All are 0.	D200~D215 in slave station 2	All are 6000.
D1528~D1543	All are 2000.	D250~D265 in slave station 2	All are 0.

After M1350 is set to ON, the values in the data registers used for data exchange in the master station and the slave stations will become the ones shown below.

Master PLC	Value	Slave PLC	Value
D1480~D1495	All are 5000.	D100~D115 in slave station 1	All are 5000.
D1496~D1511	All are 1000.	D150~D165 in slave station 1	All are 1000.
D1512~D1527	All are 6000.	D200~D215 in slave station 2	All are 6000.
D1528~D1543	All are 2000.	D250~D265 in slave station 2	All are 2000.

7. Example 5—Enabling the Function of Linking Thirty-two PLCs and Exchanging More than Sixteen Pieces of Data (M1353=On)

If M1353 is On, the maximum length of the data which can be read/written by a PLC link will be 100 words, and users can specify data registers in which data can be stored. (The master stations and the slave stations in the examples below are DVP-EH3 series PLCs.)

7.1 Using the PLC Link Wizard in WPLSoft (ASCII/RTU Mode)

【Control requirement】
A master station (A DVP-EH3 series PLC) individually exchanges one hundred pieces of data (one hundred words) with two slave stations (two DVP-EH3 series PLCs) through a PLC link which enables the function of linking thirty-two PLCs and exchanging more than sixteen pieces of data.

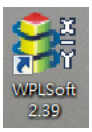
【Setting station addresses of PLCs】

Master/Slave station	Station address	Communication format
Master PLC	K40 (D1121=K40)	1. ASCII, 9600, 7, E, 1 (D1120=H'86) 2. RTU, 9600, 8, E, 1 (D1120=H'87) The communication format of the slave PLCs needs to be the same as the communication format of the master PLC.
Slave PLC 1	K2 (D1121=K2)	
Slave PLC 2	K3 (D1121=K3)	

【Descriptions of devices】

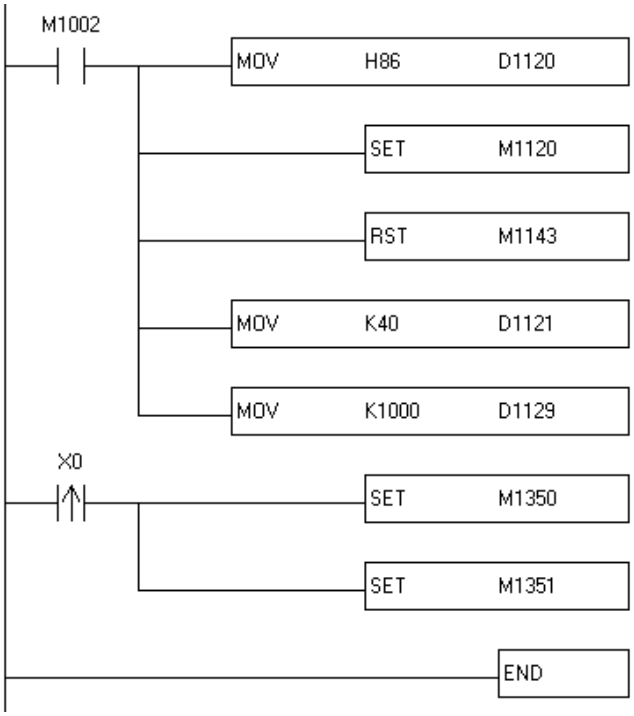
Device in a PLC	Description
X0	X0 functions as a conditional contact used to enable M1350 and M1351.
D1120	Communication protocol of COM2 (RS-485)
D1121	PLC Communication address
D1129	Abnormal communication timeout Time unit: ms
M1120	M1120 is used to retain the communication format of COM2 (RS-485).
M1143	M1143 is used to determine whether the communication format set for COM2 (RS-485) is an ASCII mode or an RTU mode. Off: ASCII mode On: RTU mode
M1350	M1350 is used to enable a PLC link.
M1351	If M1351 is ON, the PLC link executed will be an automatic mode.

【PLC link wizard】
Step 1: Start WPLSoft, write a program to the master PLC connected, move the RUN/STOP switch on the PLC into the RUN position, and write related values to the PLC.

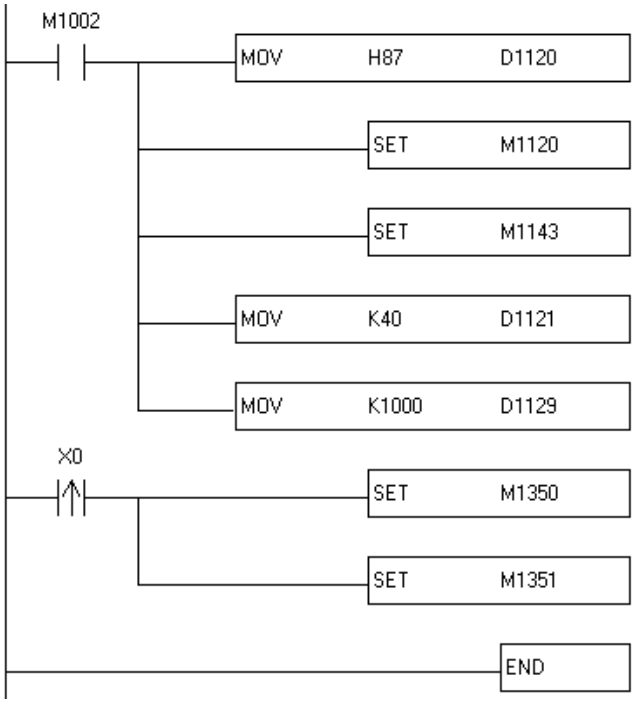


Owing to the fact that devices used to set related communication and a PLC link (M1350 and M1351) are not latching devices, they need to be set by means of a program. The PLC link wizard is used to specify the stations which need to be linked (M1355 is On).

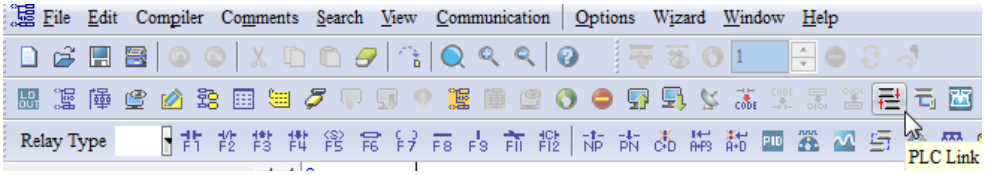
Program for ASCII communication:



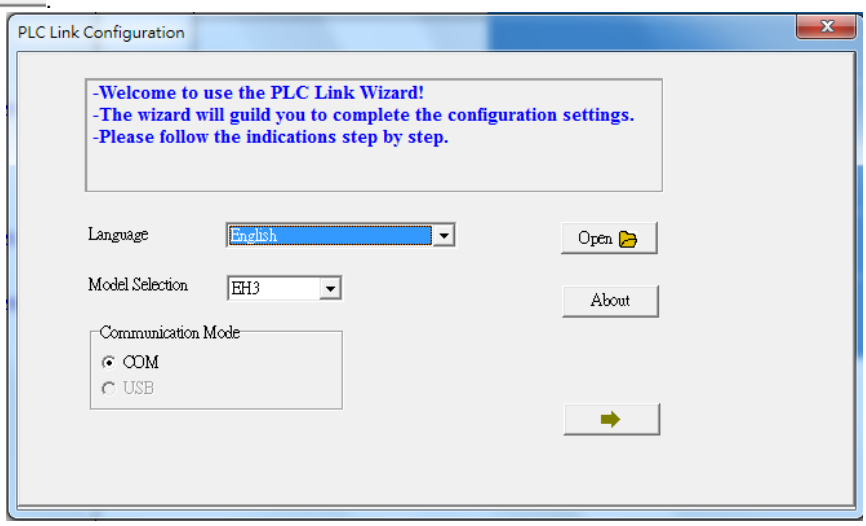
Program for RTU communication:



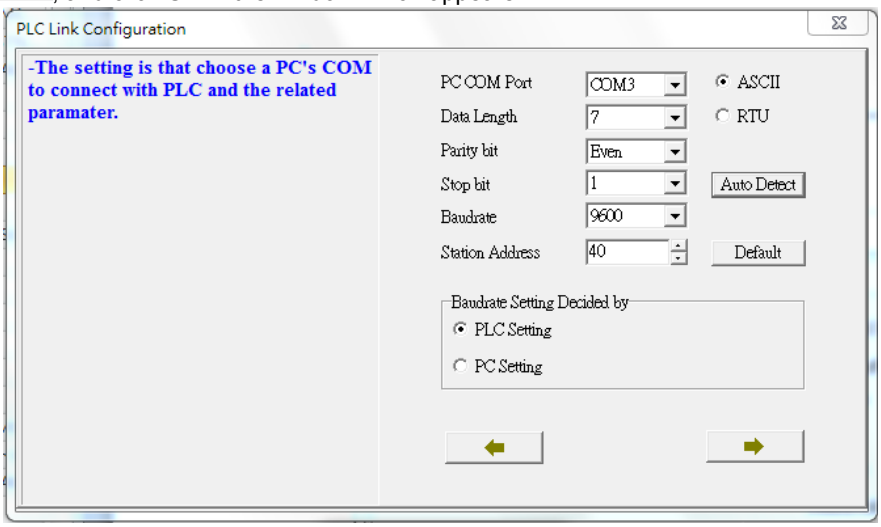
Step 2: Click the PLC link wizard in WPLSoft.

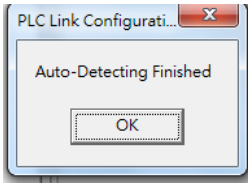


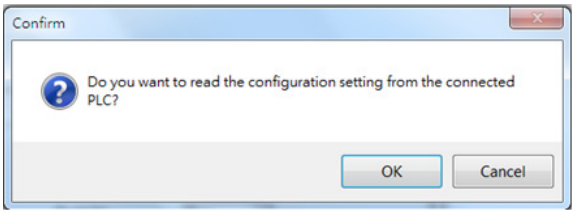
Step 3: Select a language in the **Language** drop-down list box, select a model in the **Model Selection** drop-down list box, and click .



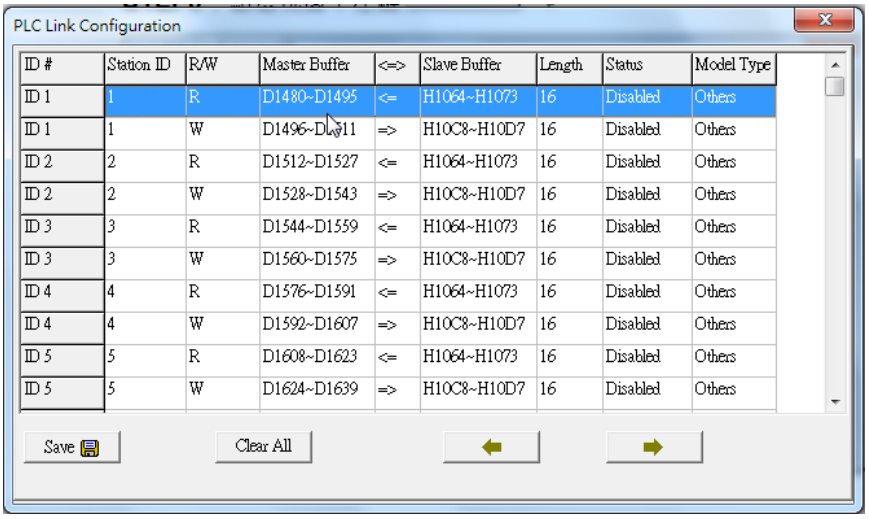
Step 4: Set a communication format for COM1 in the master PLC, click **Auto Detect**, click **OK** in the window which appears, click , and click **OK** in the window which appears.





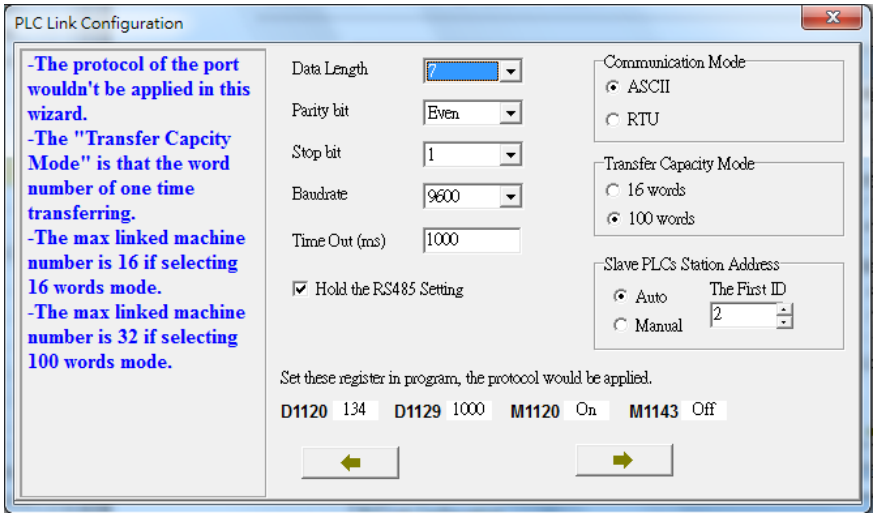


Step 5: Click  .

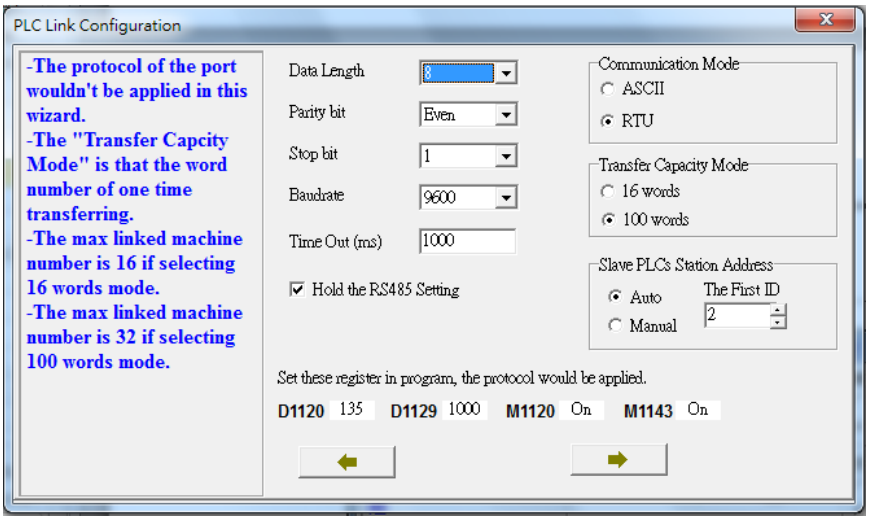


Step 6: The PLC link wizard reads values according to the communication format set for COM2 in the master PLC. Select the **100 words** option button in the **Transfer Capacity Mode** section, select the **Auto** option button, select **2** in the **The First ID** box, and click  .

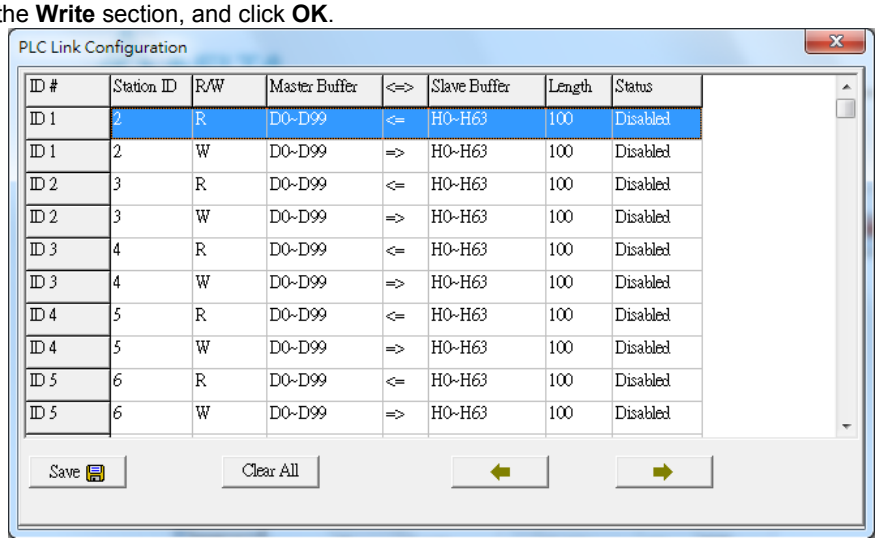
Window for ASCII communication:

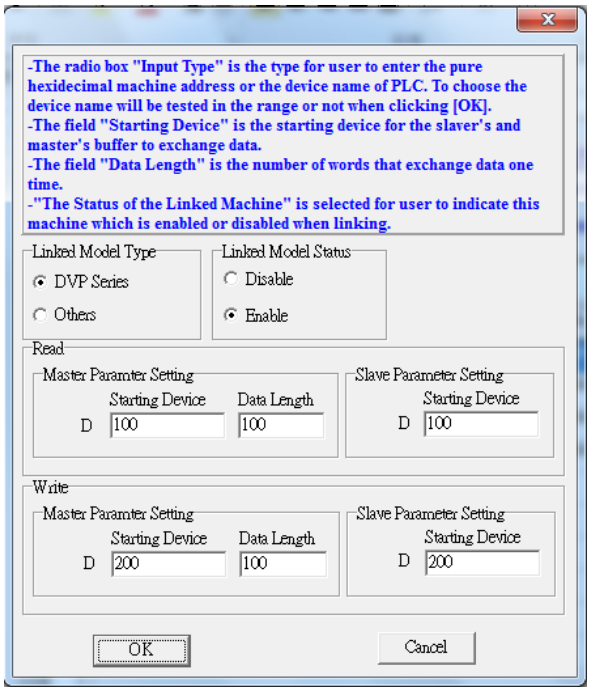


Window for RTU communication:

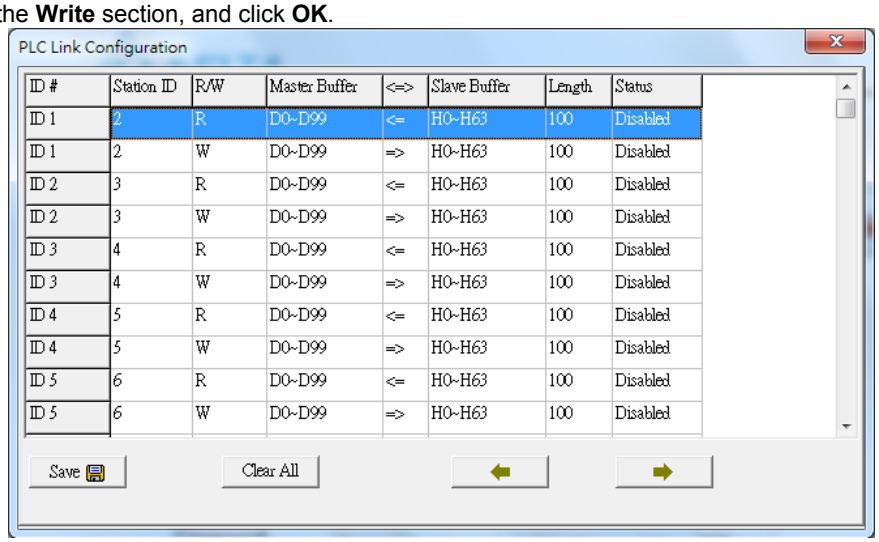


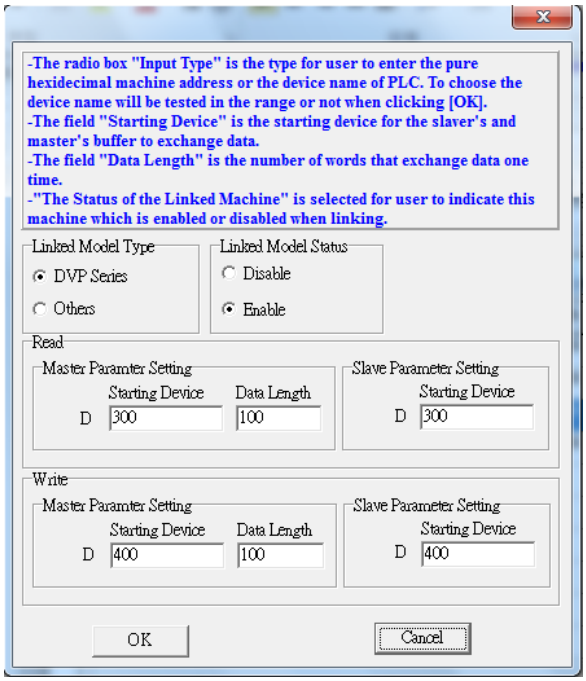
Step 7: Double-click the **ID 1** block in the **PLC Link Configuration** window, select the **DVP Series** option button in the **Linked Model Type** section, select the **Enable** option button in the **Linked Model Status** section (set M1360 to On), type “100” in the **Starting Device** box in the **Mater Parameter Setting** section in the **Read** section, type “200” in the **Starting Device** box in the **Mater Parameter Setting** section in the **Write** section, type “100” in the **Data Length** boxes in the **Mater Parameter Setting** sections in the **Read** and **Write** sections, type “100” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Read** section, type “200” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.



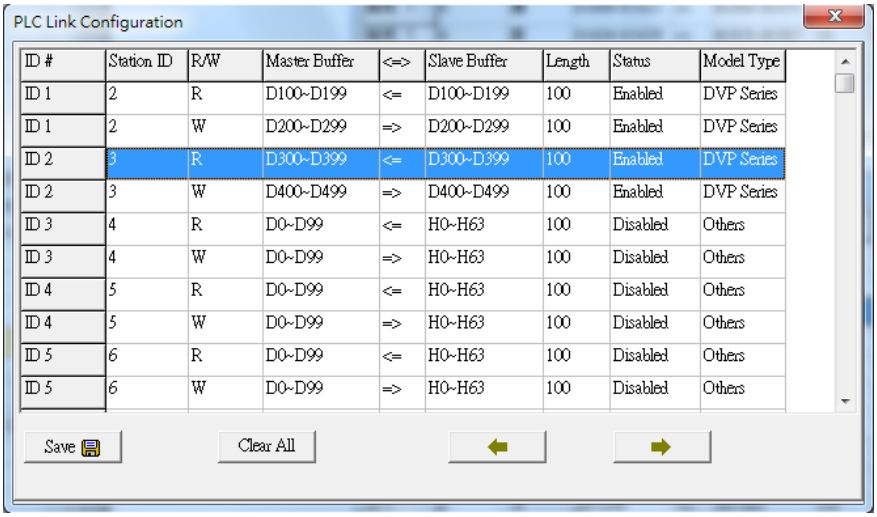


Step 8: Double-click the **ID 2** block in the **PLC Link Configuration** window, select the **DVP Series** option button in the **Linked Model Type** section, select the **Enable** option button in the **Linked Model Status** section (set M1361 to On), type “300” in the **Starting Device** box in the **Master Parameter Setting** section in the **Read** section, type “450” in the **Starting Device** box in the **Master Parameter Setting** section in the **Write** section, type “100” in the **Data Length** boxes in the **Master Parameter Setting** sections in the **Read** and **Write** sections, type “300” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Read** section, type “400” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.

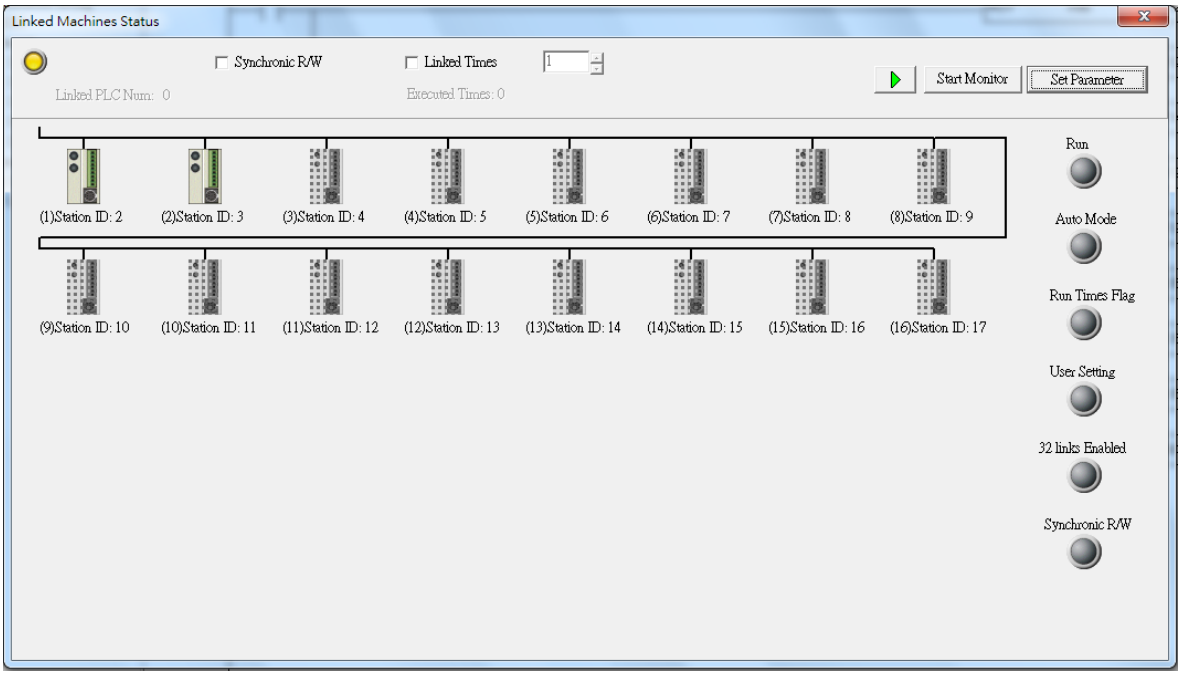




Step 9: Check whether the contents of the **ID 1** block~the **ID 2** block are correct, and then click  .

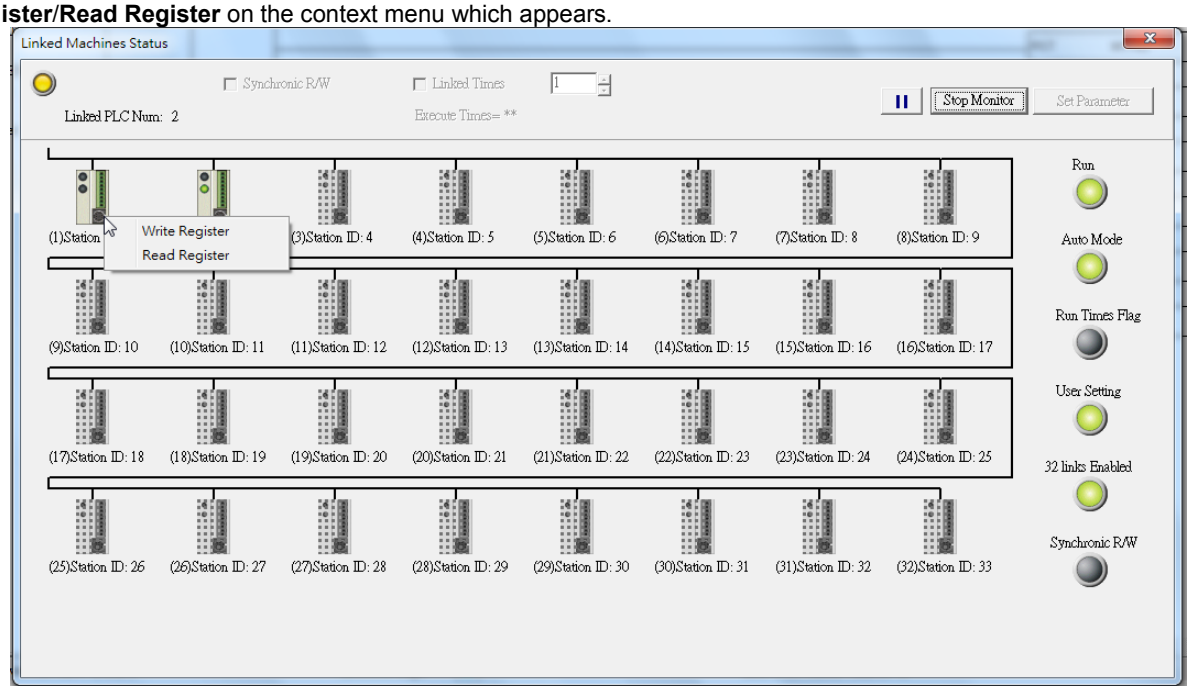


Step 10: Click the **Set Parameter** button, click the **Start Monitor** button, and click  or set X0 to On.

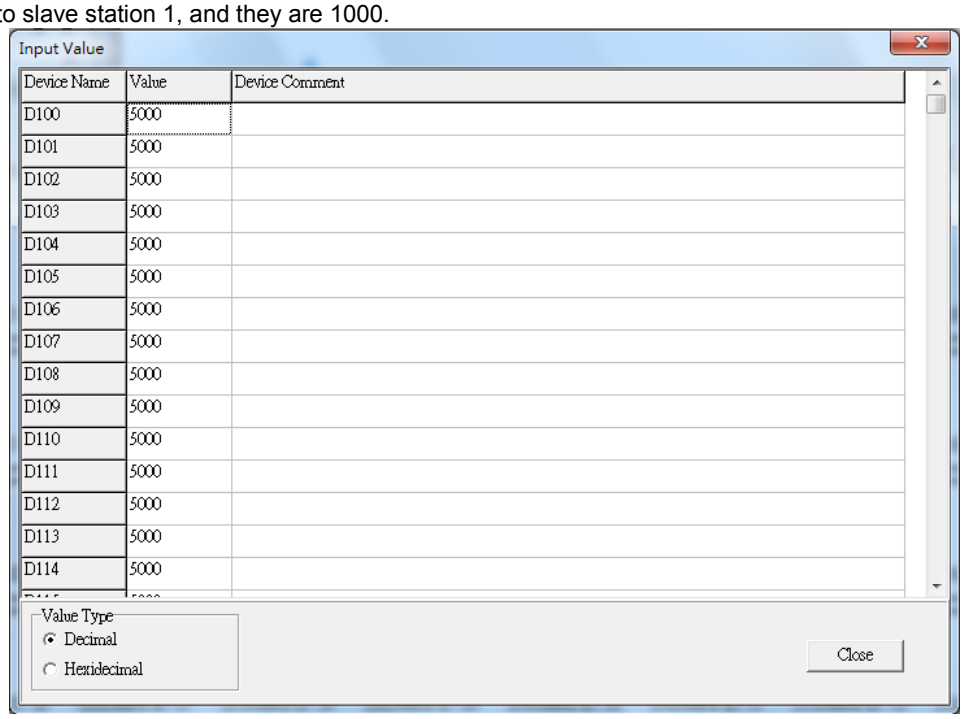


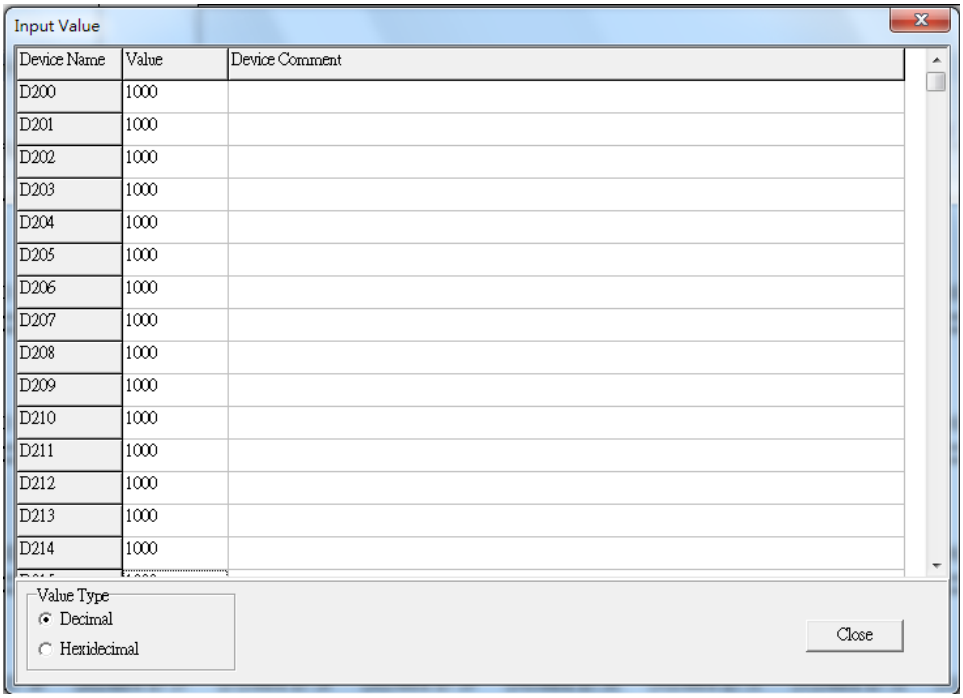
Step 11: The state of the PLC link executed is shown in the **Linked Machines Status** window. The master PLC can exchange data with the slave stations through a program or the PLC link wizard.

Reading/Writing data through the PLC link wizard: Right-click slave station (1)  /slave station (2)  , and click **Write Register**/**Read Register** on the context menu which appears.

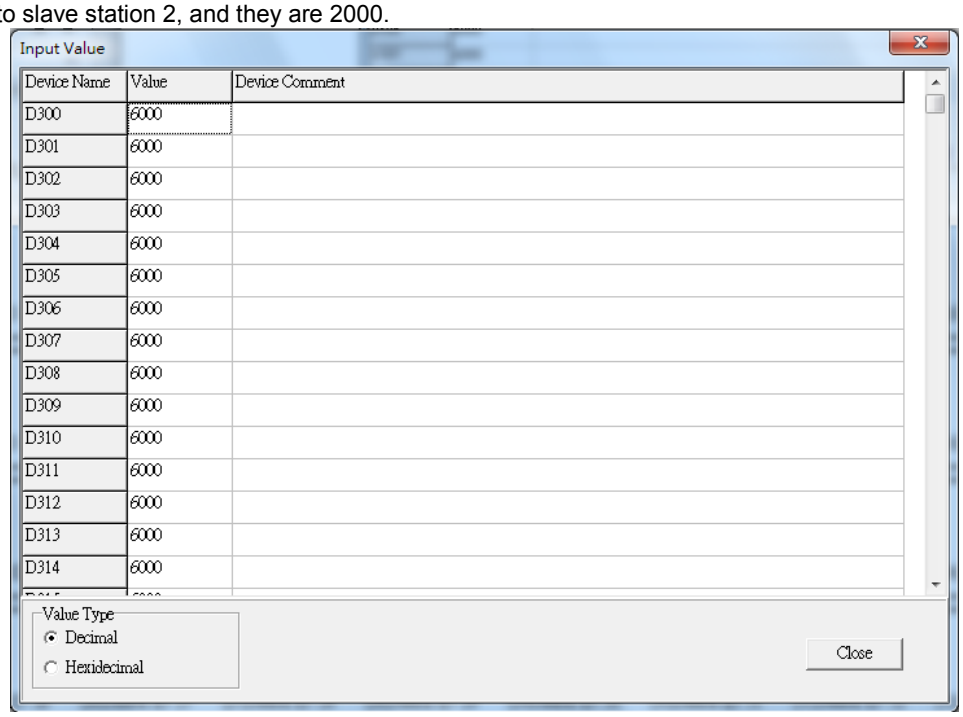


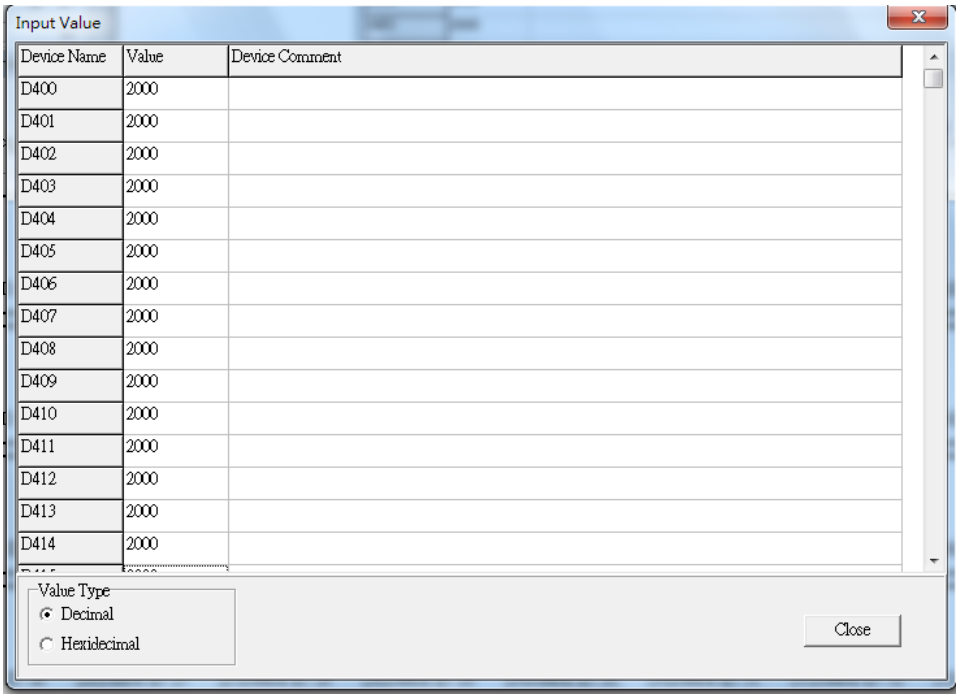
Step 14: The values in D100~D199 are values read from slave 1, and they are 5000. The values in D200~D299 are values written to slave station 1, and they are 1000.



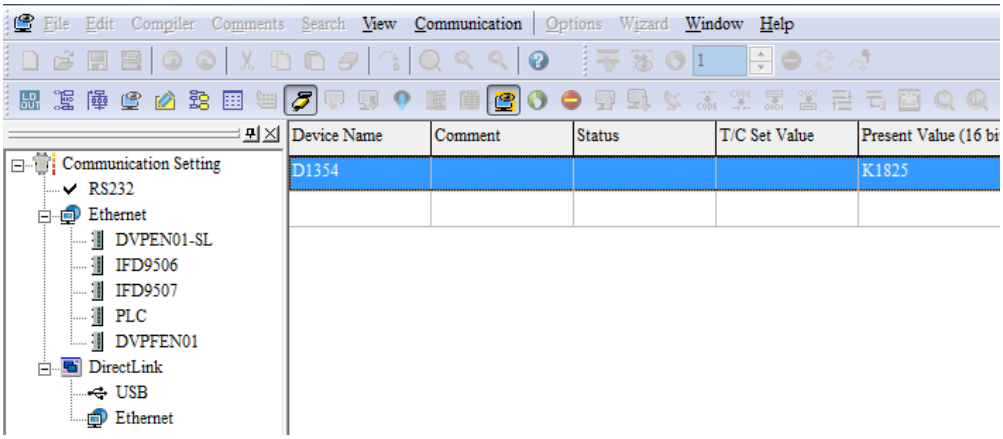


Step 13: The values in D300~D399 are values read from slave 2, and they are 6000. The values in D400~D499 are values written to slave station 2, and they are 2000.





Step 14: Close the **Linked Machines Status** window, click  , click  , and type “D1354”. The value in D1354 indicates PLC link scan time.



【Description of control】

- D1399 in the master PLC is used to set a start slave station address. The value in D1399 is K2, that is, the PLC whose station address is K2 is slave station 1, and the PLC whose station address is K3 is slave station 2.
- The master station exchanges data with the two slave stations by means of a PLC link. The values in D100~D199 in slave station 1 are written to D100~D199 in the master station, and the values in D200~D299 in the master station are written to D200~D299 in slave station 1. The values in D300~D399 in slave station 2 are written to D300~D399 in the master station, and the values in D400~D499 in the master station are written to D400~D499 in slave station 2.

Master PLC (1 PLC)		Slave PLC (2 PLCs)
D100~D199	Reading ←	D100~D199 in the slave PLC whose station address is K2
D200~D299	Writing →	D200~D299 in the slave PLC whose station address is K2
D300~D399	Reading ←	D300~D399 in the slave PLC whose station address is K3
D400~D499	Writing →	D400~D499 in the slave PLC whose station address is K3

- When M1350 is Off, the values in the data registers used for data exchange in the master station and the slave stations are the ones shown below.

Master PLC	Value	Slave PLC	Value
D100~D199	All are 0.	D100~D199 in slave station 1	All are 5000.
D200~D299	All are 1000.	D200~D299 in slave station 1	All are 0.
D300~D399	All are 0.	D300~D399 in slave station 2	All are 6000.
D400~D499	All are 2000.	D400~D499 in slave station 2	All are 0.

After M1350 is set to ON, the values in the data registers used for data exchange in the master station and the slave stations will become the ones shown below.

Master PLC	Value	Slave PLC	Value
D100~D199	All are 5000.	D100~D199 in slave station 1	All are 5000.
D200~D299	All are 1000.	D200~D299 in slave station 1	All are 1000.
D300~D399	All are 6000.	D300~D399 in slave station 2	All are 6000.
D400~D499	All are 2000.	D400~D499 in slave station 2	All are 2000.

7.2 Using the PLC Link Wizard in ISPSoft (ASCII/RTU Mode)

【Control requirement】
A master station (A DVP-EH3 series PLC) individually exchanges one hundred pieces of data (one hundred words) with two slave stations (two DVP-EH3 series PLCs) through a PLC link which enables the function of linking thirty-two PLCs and exchanging more than sixteen pieces of data.

【Setting station addresses of PLCs】

Master/Slave station	Station address	Communication format
Master PLC	K40 (D1121=K40)	3. ASCII, 9600, 7, E, 1 (D1120=H'86) 4. RTU, 9600, 8, E, 1 (D1120=H'87) The communication format of the slave PLCs needs to be the same as the communication format of the master PLC.
Slave PLC 1	K2 (D1121=K2)	
Slave PLC 2	K3 (D1121=K3)	

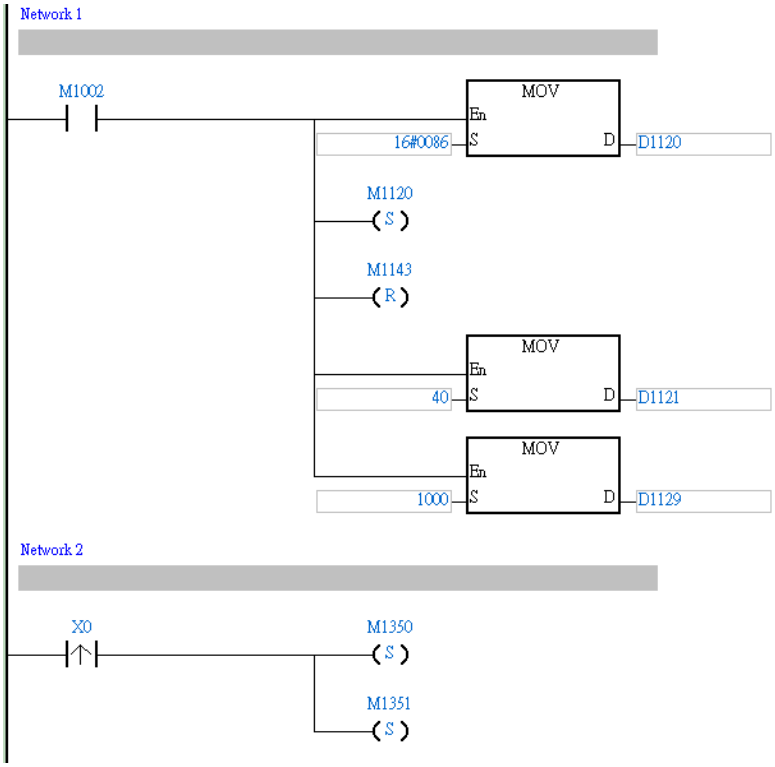
【Descriptions of devices】

Device in a PLC	Description
X0	X0 functions as a conditional contact used to enable M1350 and M1351.
D1120	Communication protocol of COM2 (RS-485)
D1121	PLC Communication address
D1129	Abnormal communication timeout Time unit: ms
M1120	M1120 is used to retain the communication format of COM2 (RS-485).
M1143	M1143 is used to determine whether the communication format set for COM2 (RS-485) is an ASCII mode or an RTU mode. Off: ASCII mode On: RTU mode
M1350	M1350 is used to enable a PLC link.
M1351	If M1351 is ON, the PLC link executed will be an automatic mode.

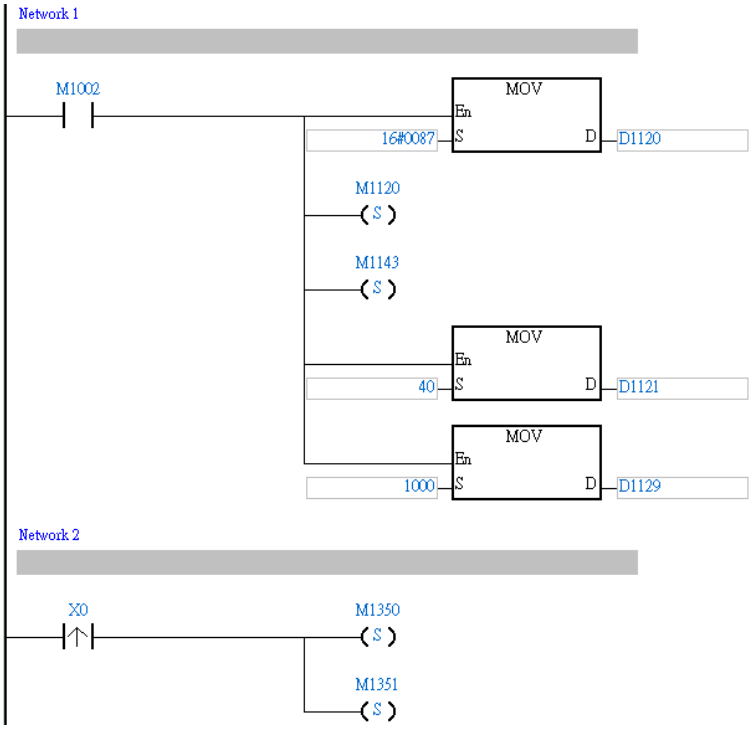
【PLC link wizard】
Step 1: Start ISPSoft, write a program to the master PLC connected, move the RUN/STOP switch on the PLC into the RUN position, and write related values to the PLC.

Owing to the fact that devices used to set related communication and a PLC link (M1350 and M1351) are not latching devices, they need to be set by means of a program. The PLC link wizard is used to manually specify the stations which need to be linked (M1355 is On).

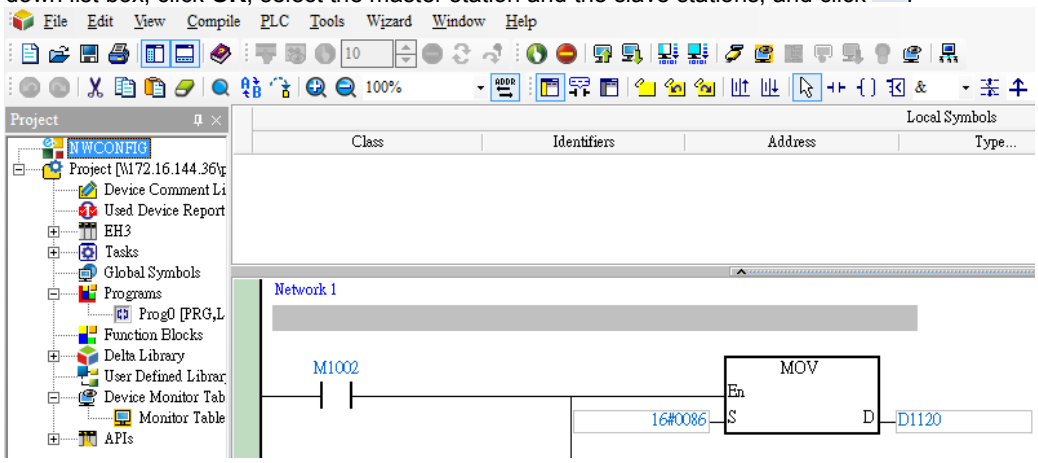
Program for ASCII communication:

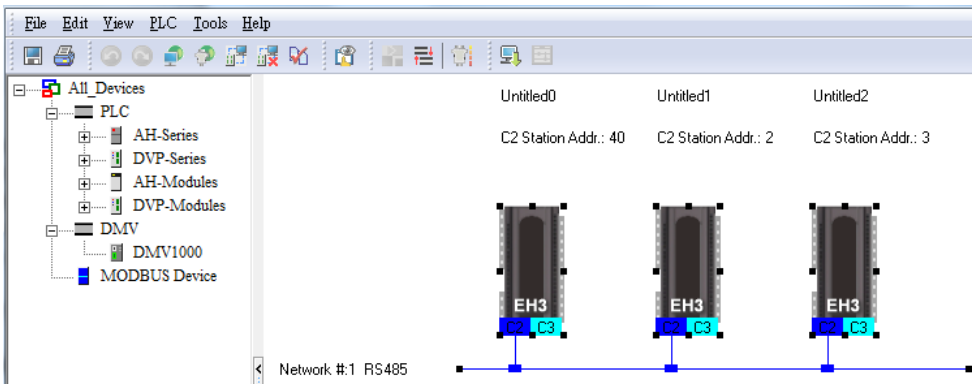


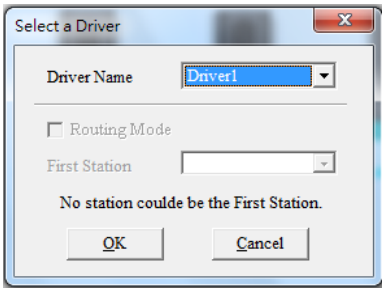
Program for RTU communication:



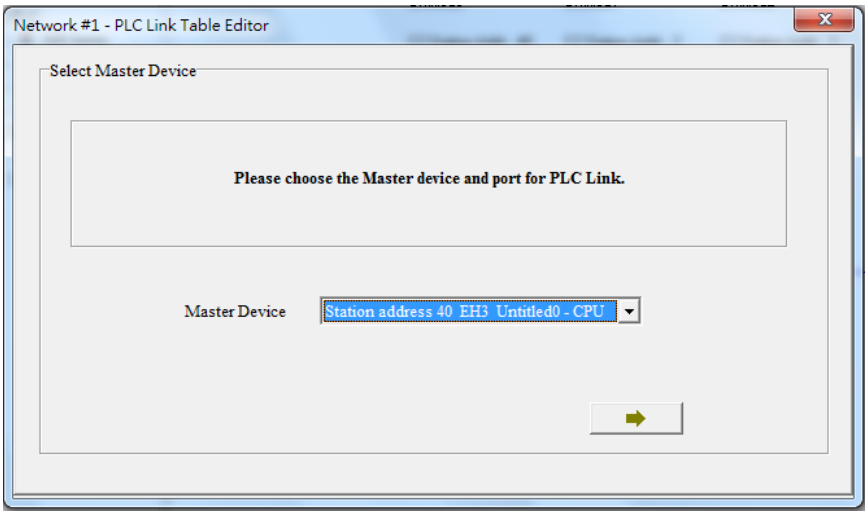
Step 2: Double-click **NWCONFIG** in the project management area, create a link, click  , select **Driver 1** in the **Driver Name** drop-down list box, click **OK**, select the master station and the slave stations, and click  .

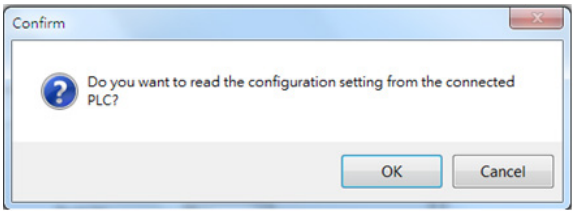




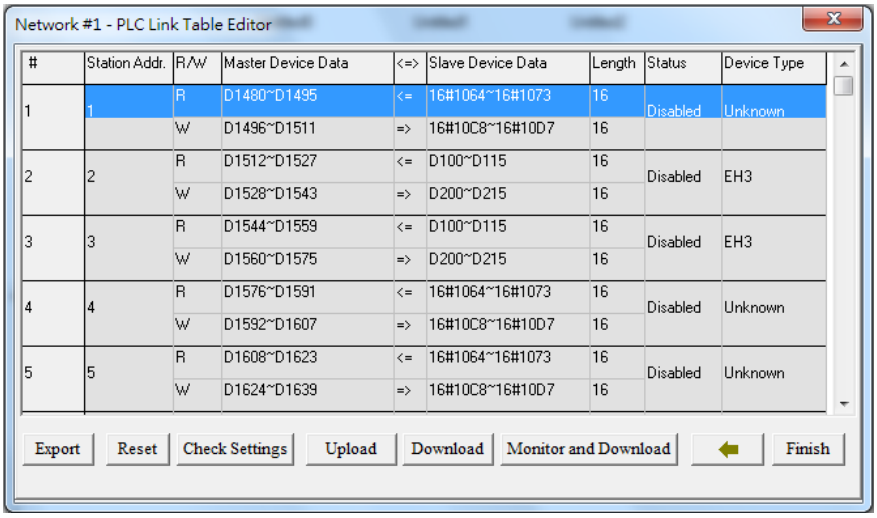


Step 3: Select a PLC in the **Master Device** drop-down list box, click  , and click **OK** in the window which appears.





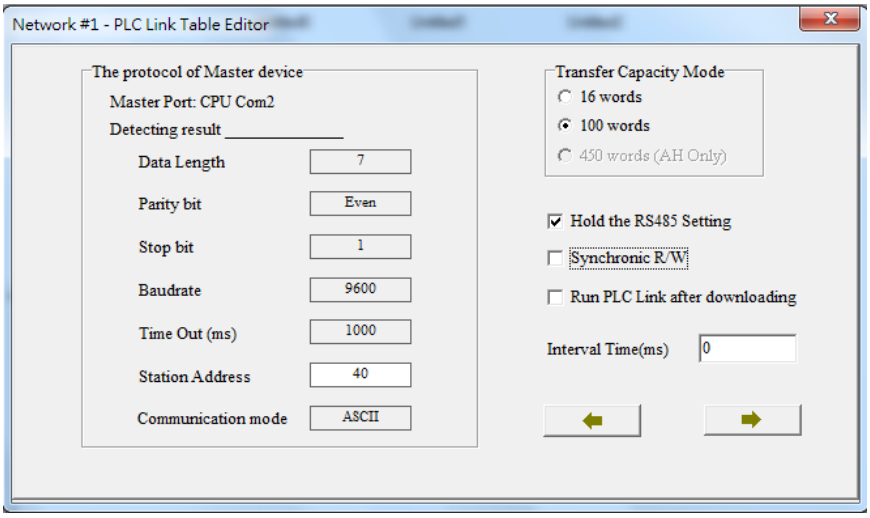
Step 4: Click  .



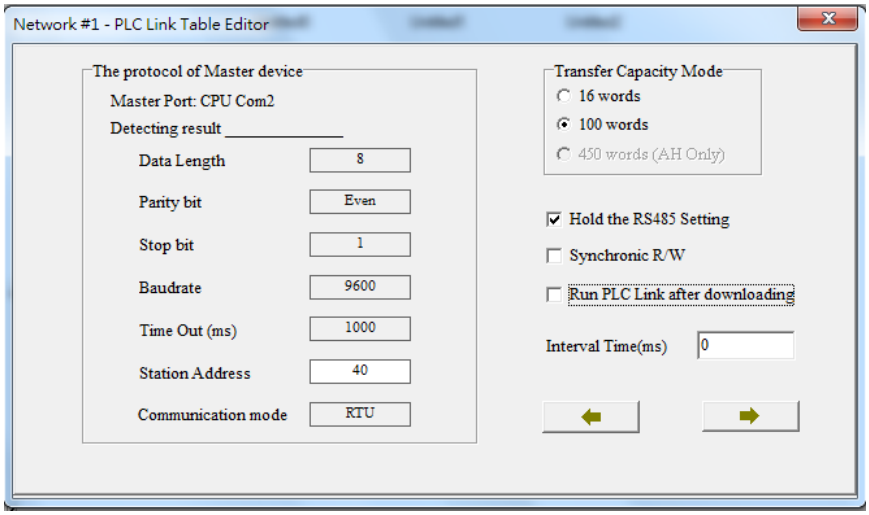
#	Station Addr.	R/W	Master Device Data	<=>	Slave Device Data	Length	Status	Device Type
1	1	R	D1480~D1495	<=	16#1064~16#1073	16	Disabled	Unknown
		W	D1496~D1511	=>	16#10C8~16#10D7	16		
2	2	R	D1512~D1527	<=	D100~D115	16	Disabled	EH3
		W	D1528~D1543	=>	D200~D215	16		
3	3	R	D1544~D1559	<=	D100~D115	16	Disabled	EH3
		W	D1560~D1575	=>	D200~D215	16		
4	4	R	D1576~D1591	<=	16#1064~16#1073	16	Disabled	Unknown
		W	D1592~D1607	=>	16#10C8~16#10D7	16		
5	5	R	D1608~D1623	<=	16#1064~16#1073	16	Disabled	Unknown
		W	D1624~D1639	=>	16#10C8~16#10D7	16		

Step 5: The PLC link wizard reads values according to the communication format set for COM2 in the master PLC. Select the **100 words** option button in the **Transfer Capacity Mode** section, unselect the **Synchronic R/W** checkbox and the **Run PLC Link after downloading** checkbox, type “0” in the **Interval Time** box, and click ____.

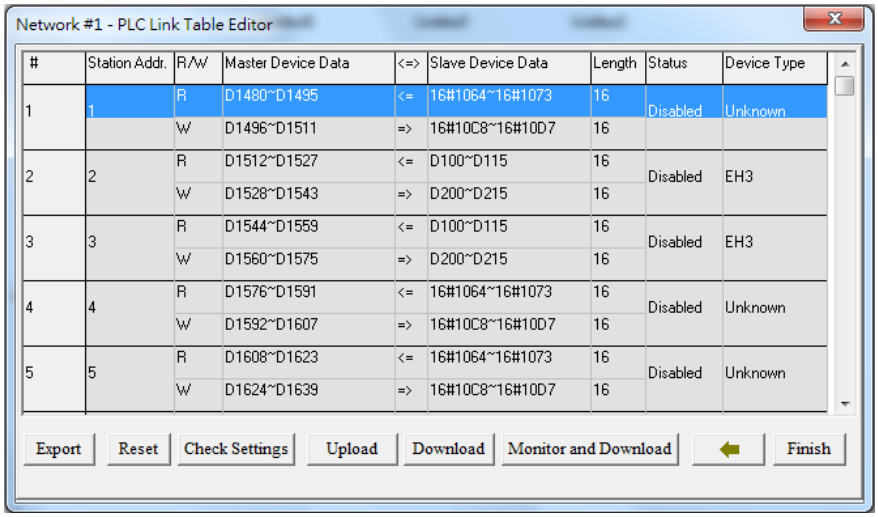
Window for ASCII communication:

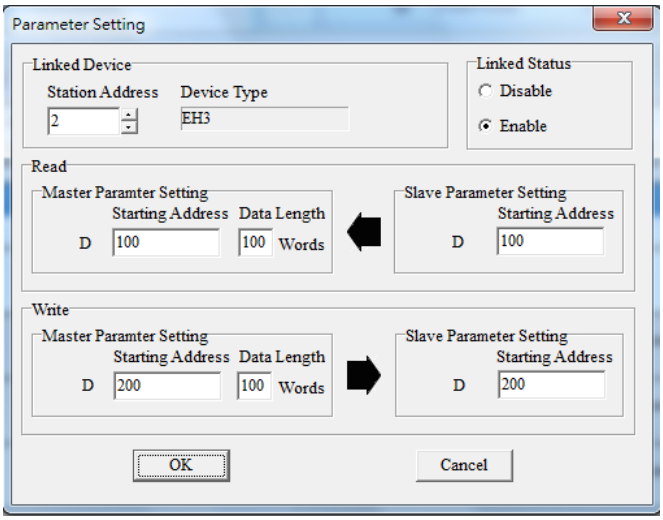


Window for RTU communication:

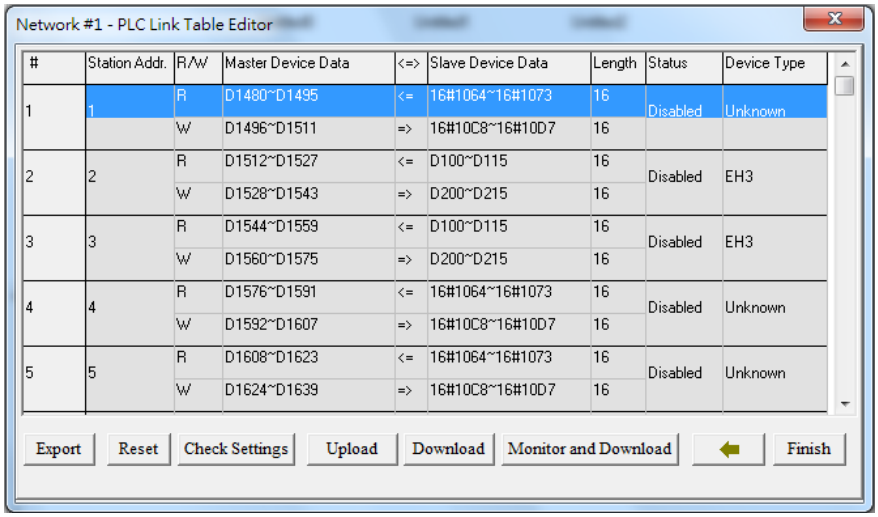


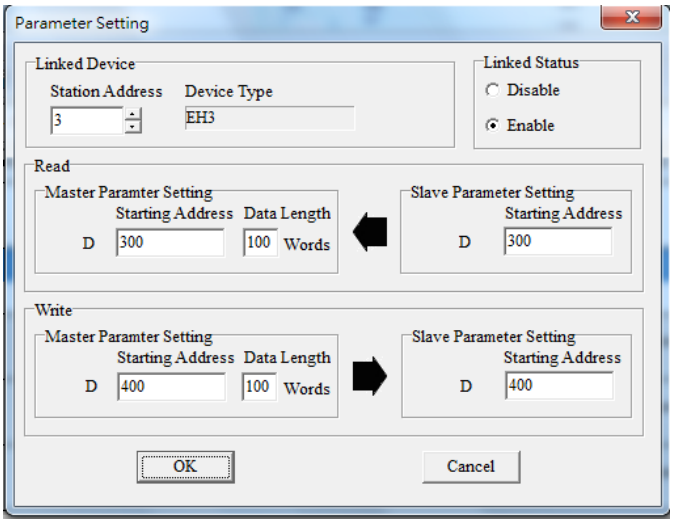
Step 6: Double-click the **1** block in the **PLC Link Table Editor** window, select **2** in the **Station Address** box, select the **Enable** option button in the **Linked Status** section (set M1360 to On), type “100” in the **Starting Address** box in the **Master Parameter Setting** section in the **Read** section, type “200” in the **Starting Address** box in the **Master Parameter Setting** section in the **Write** section, type “100” in the **Data Length** boxes in the **Master Parameter Setting** sections in the **Read** and **Write** sections, type “100” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Read** section, type “200” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.



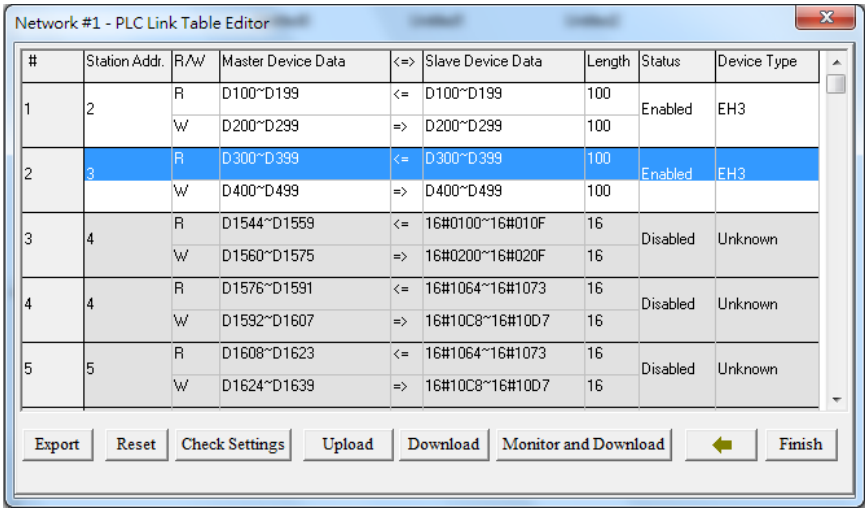


Step 7: Double-click the **2** block in the **PLC Link Table Editor** window, select **3** in the **Station Address** box, select the **Enable** option button in the **Linked Status** section (set M1361 to On), type “300” in the **Starting Address** box in the **Master Parameter Setting** section in the **Read** section, type “400” in the **Starting Address** box in the **Master Parameter Setting** section in the **Write** section, type “100” in the **Data Length** boxes in the **Master Parameter Setting** sections in the **Read** and **Write** sections, type “300” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Read** section, type “400” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.



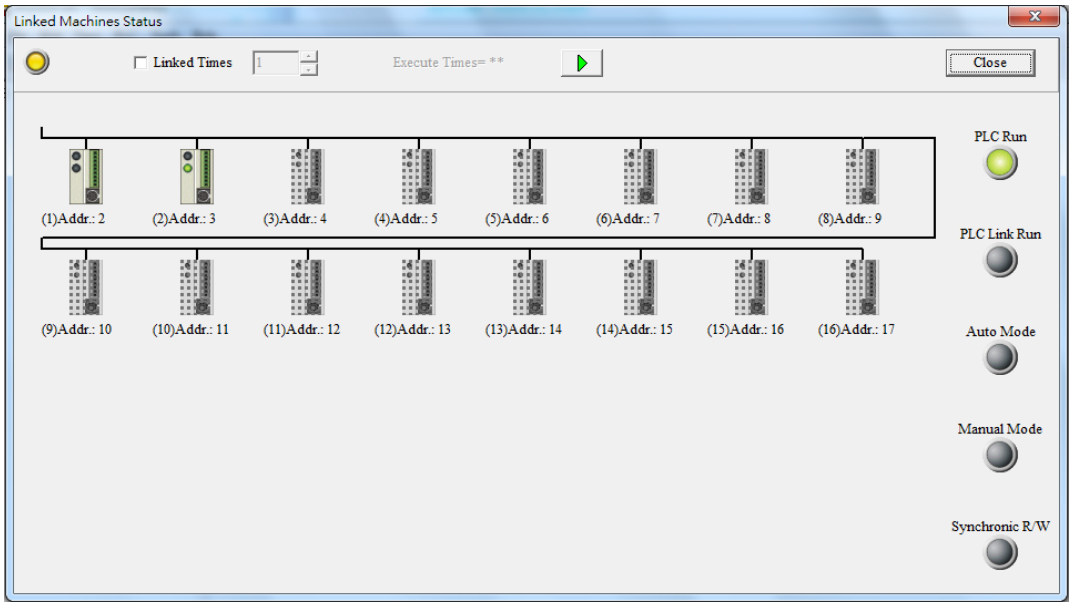


Step 8: Check whether the contents of the **1** block~the **2** block are correct, and then click **Monitor and Download**.



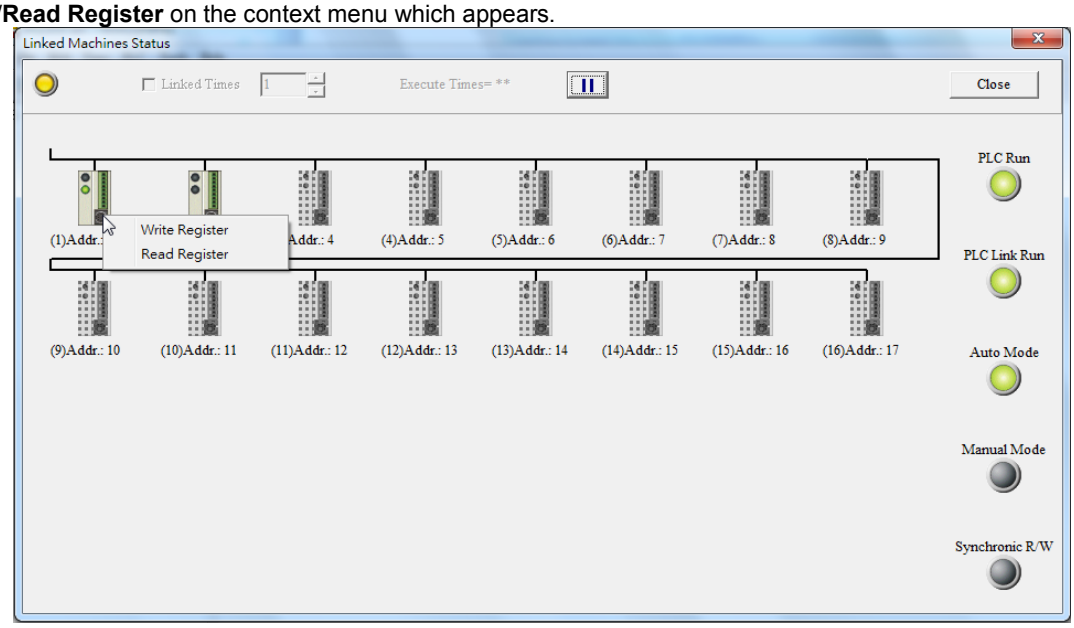
#	Station Addr.	R/W	Master Device Data	<=>	Slave Device Data	Length	Status	Device Type
1	2	R	D100~D199	<=	D100~D199	100	Enabled	EH3
		W	D200~D299	=>	D200~D299	100		
2	3	R	D300~D399	<=	D300~D399	100	Enabled	EH3
		W	D400~D499	=>	D400~D499	100		
3	4	R	D1544~D1559	<=	16#0100~16#010F	16	Disabled	Unknown
		W	D1560~D1575	=>	16#0200~16#020F	16		
4	4	R	D1576~D1591	<=	16#1064~16#1073	16	Disabled	Unknown
		W	D1592~D1607	=>	16#10C8~16#10D7	16		
5	5	R	D1608~D1623	<=	16#1064~16#1073	16	Disabled	Unknown
		W	D1624~D1639	=>	16#10C8~16#10D7	16		

Step 9: Click  or set X0 to On.

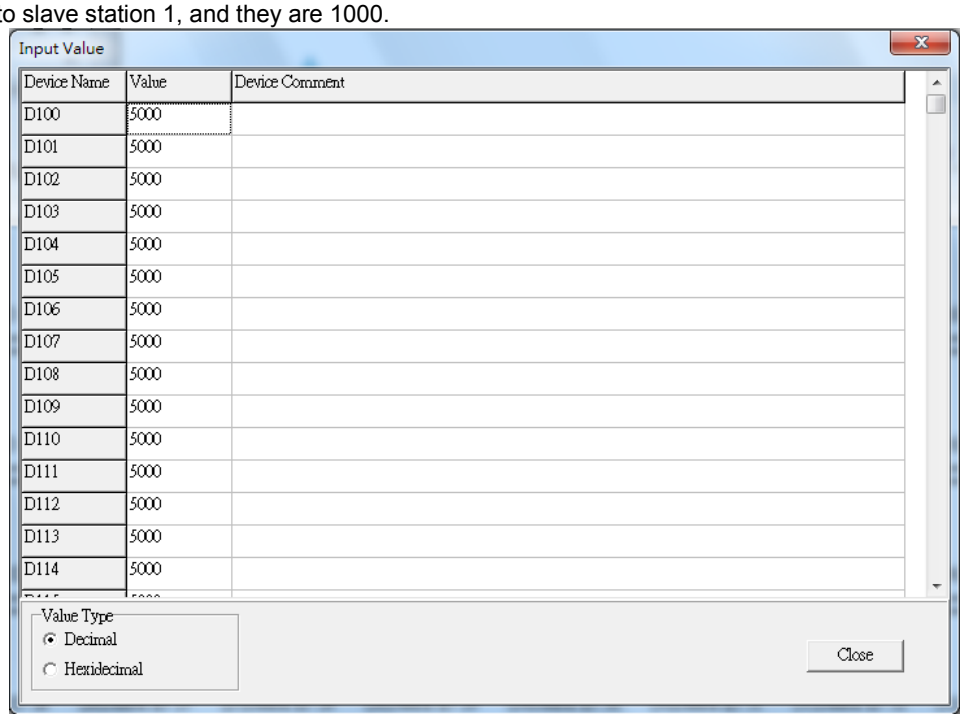


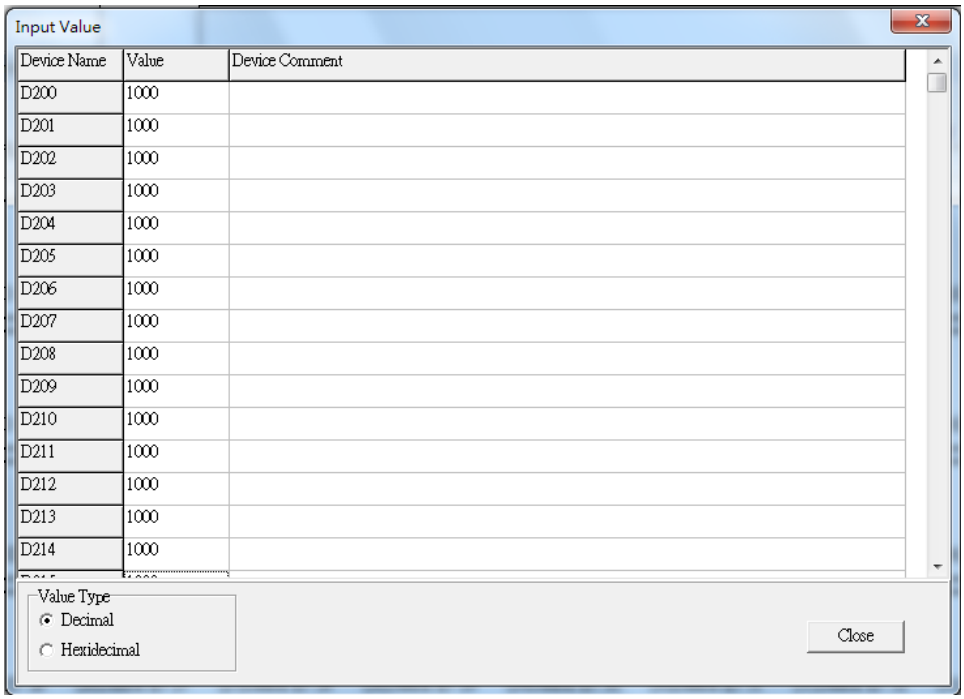
Step 10: The state of the PLC link executed is shown in the **Linked Machines Status** window. The master PLC can exchange data with the slave stations through a program or the PLC link wizard.

Reading/Writing data through the PLC link wizard: Right-click slave station (1) /slave station (2) , and click **Write Register**/**Read Register** on the context menu which appears.

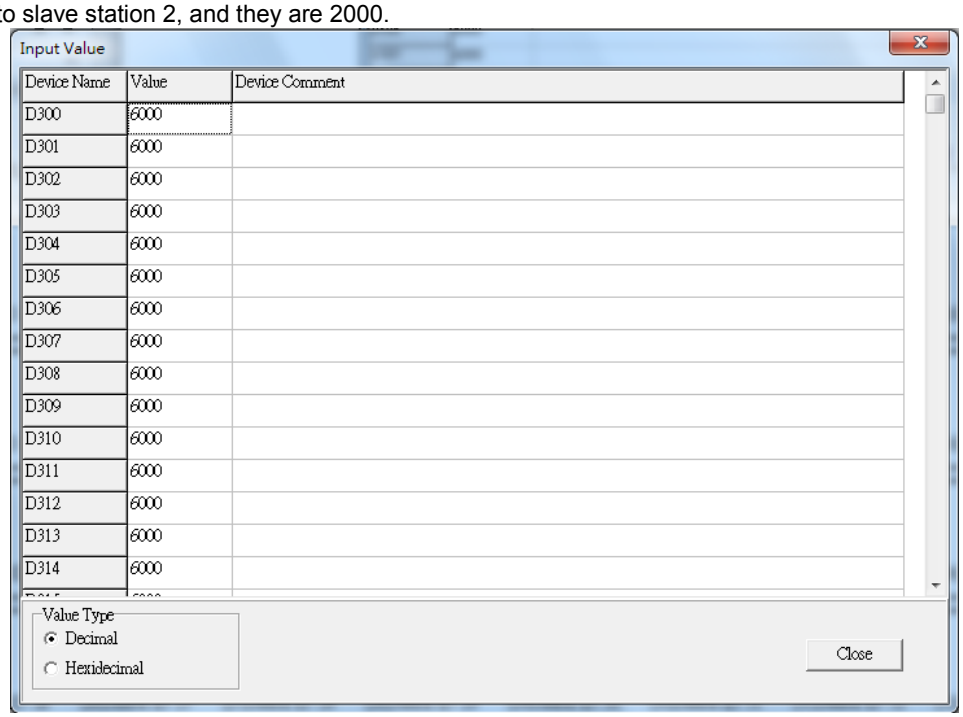


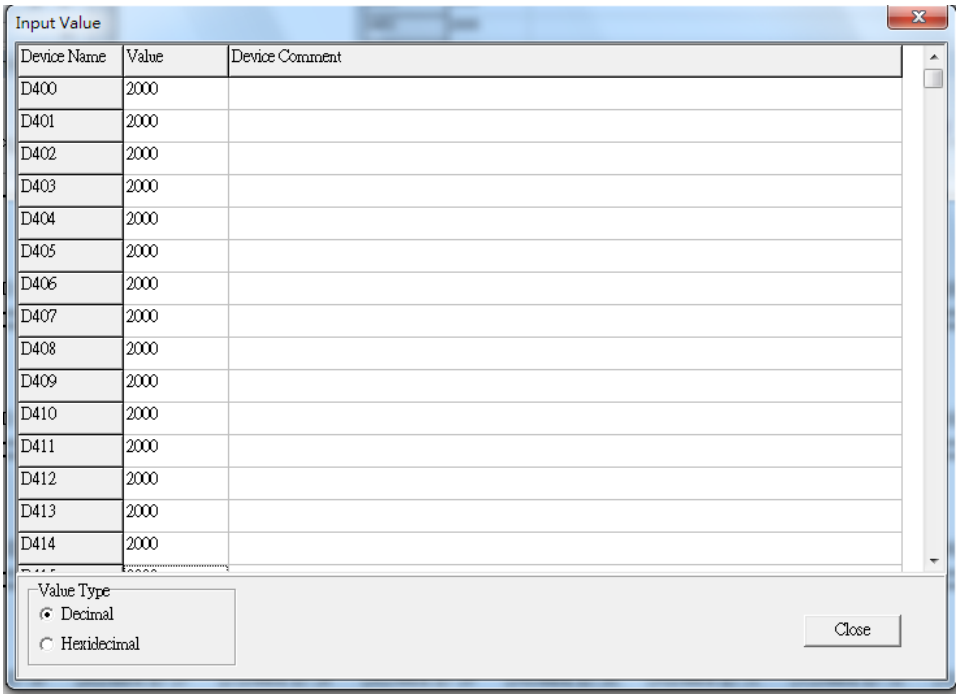
Step 11: The values in D100~D199 are values read from slave 1, and they are 5000. The values in D200~D299 are values written to slave station 1, and they are 1000.



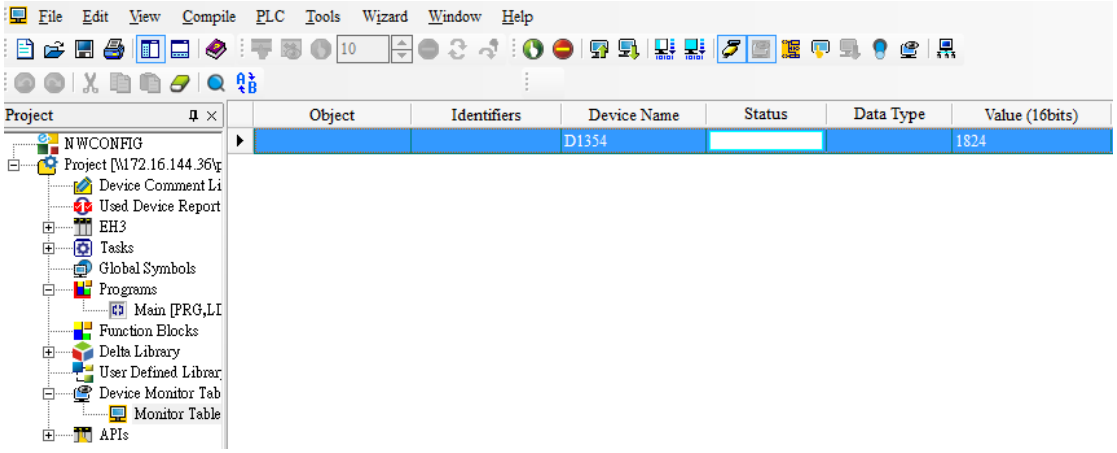


Step 14: The values in D300~D399 are values read from slave 2, and they are 6000. The values in D400~D499 are values written to slave station 2, and they are 2000.





Step 13: Close the **Linked Machines Status** window, create a device monitoring table by means of **Device Monitor Table** in the project management area, type “D1354” in the device monitoring table, and click  . The value in D1354 indicates PLC link scan time.



【Description of control】

- D1399 in the master PLC is used to set a start slave station address. The value in D1399 is K2, that is, the PLC whose station address is K2 is slave station 1, and the PLC whose station address is K3 is slave station 2.
- The master station exchanges data with the two slave stations by means of a PLC link. The values in D100~D199 in slave station 1 are written to D100~D199 in the master station, and the values in D200~D299 in the master station are written to D200~D299 in slave station 1. The values in D300~D399 in slave station 2 are written to D300~D399 in the master station, and the values in D400~D499 in the master station are written to D400~D499 in slave station 2.

Master PLC (1 PLC)		Slave PLC (2 PLCs)
D100~D199	Reading ←	D100~D199 in the slave PLC whose station address is K2
D200~D299	Writing →	D200~D299 in the slave PLC whose station address is K2
D300~D399	Reading ←	D300~D399 in the slave PLC whose station address is K3
D400~D499	Writing →	D400~D499 in the slave PLC whose station address is K3

- When M1350 is Off, the values in the data registers used for data exchange in the master station and the slave stations are the ones shown below.

Master PLC	Value	Slave PLC	Value
D100~D199	All are 0.	D100~D199 in slave station 1	All are 5000.
D200~D299	All are 1000.	D200~D299 in slave station 1	All are 0.
D300~D399	All are 0.	D300~D399 in slave station 2	All are 6000.
D400~D499	All are 2000.	D400~D499 in slave station 2	All are 0.

After M1350 is set to ON, the values in the data registers used for data exchange in the master station and the slave stations will become the ones shown below.

Master PLC	Value	Slave PLC	Value
D100~D199	All are 5000.	D100~D199 in slave station 1	All are 5000.
D200~D299	All are 1000.	D200~D299 in slave station 1	All are 1000.
D300~D399	All are 6000.	D300~D399 in slave station 2	All are 6000.
D400~D499	All are 2000.	D400~D499 in slave station 2	All are 2000.

8. Example 6—Sending a Write Command after the Change of Values

During the execution of a PLC link, the master station continuously sends a read command (function code H'03) to a slave station, and does not send any write command. If values in the master station are changed, and need to be written to a slave station, a write command (function code H'10) will be sent. (The master stations and the slave stations in the examples below are DVP-EH3 series PLCs.)

8.1 Using the PLC Link Wizard in WPLSoft (ASCII/RTU Mode)

【Control requirement】
A master station (A DVP-EH3 series PLC) reads sixteen pieces of data (sixteen words) in a slave station (a DVP-EH3 series PLC) through a PLC link. If three values (three words) in the master station are changed, the master station will send a write command to the slave station.

【Setting station addresses of PLCs】

Master/Slave station	Station address	Communication format
Master PLC	K40 (D1121=K40)	1. ASCII, 9600, 7, E, 1 (D1120=H'86) 2. RTU, 9600, 8, E, 1 (D1120=H'87) The communication format of the slave PLCs needs to be the same as the communication format of the master PLC.
Slave PLC 1	K2 (D1121=K2)	

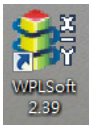
【Descriptions of devices】

Device in a PLC	Description
X0	X0 functions as a conditional contact used to enable M1350 and M1351.
D1120	Communication protocol of COM2 (RS-485)
D1121	PLC Communication address
D1129	Abnormal communication timeout

Device in a PLC	Description
	Time unit: ms
M1120	M1120 is used to retain the communication format of COM2 (RS-485).
M1143	M1143 is used to determine whether the communication format set for COM2 (RS-485) is an ASCII mode or an RTU mode. Off: ASCII mode On: RTU mode
M1350	M1350 is used to enable a PLC link.
M1351	If M1351 is ON, the PLC link executed will be an automatic mode.
M10~M12	They are used to enable timers, and write 0 to D1450.
T0~T2	They are used to set M10~M12 to Off.
D0~D2	The values in D0~D2 are the previous values in D1496~D1498.
D50~D65	The values in D50~D65 are the values in D1480~D1495.
D1450	The value in D1450 indicates the length of the data written to slave PLC 1.
D1496~D1498	The values in D1496~D1498 are values written to D150~D152 in slave PLC 1.

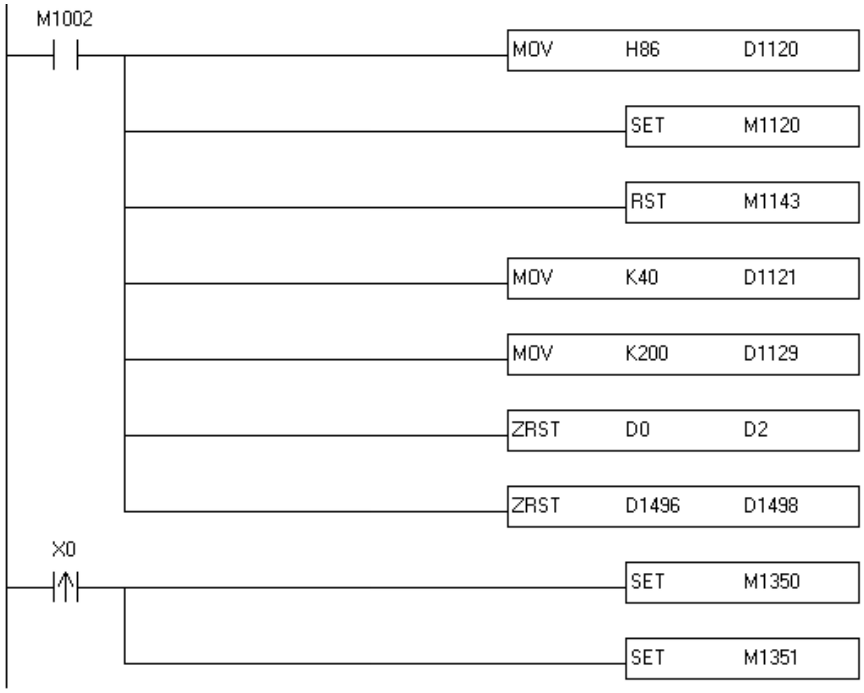
【PLC link wizard】

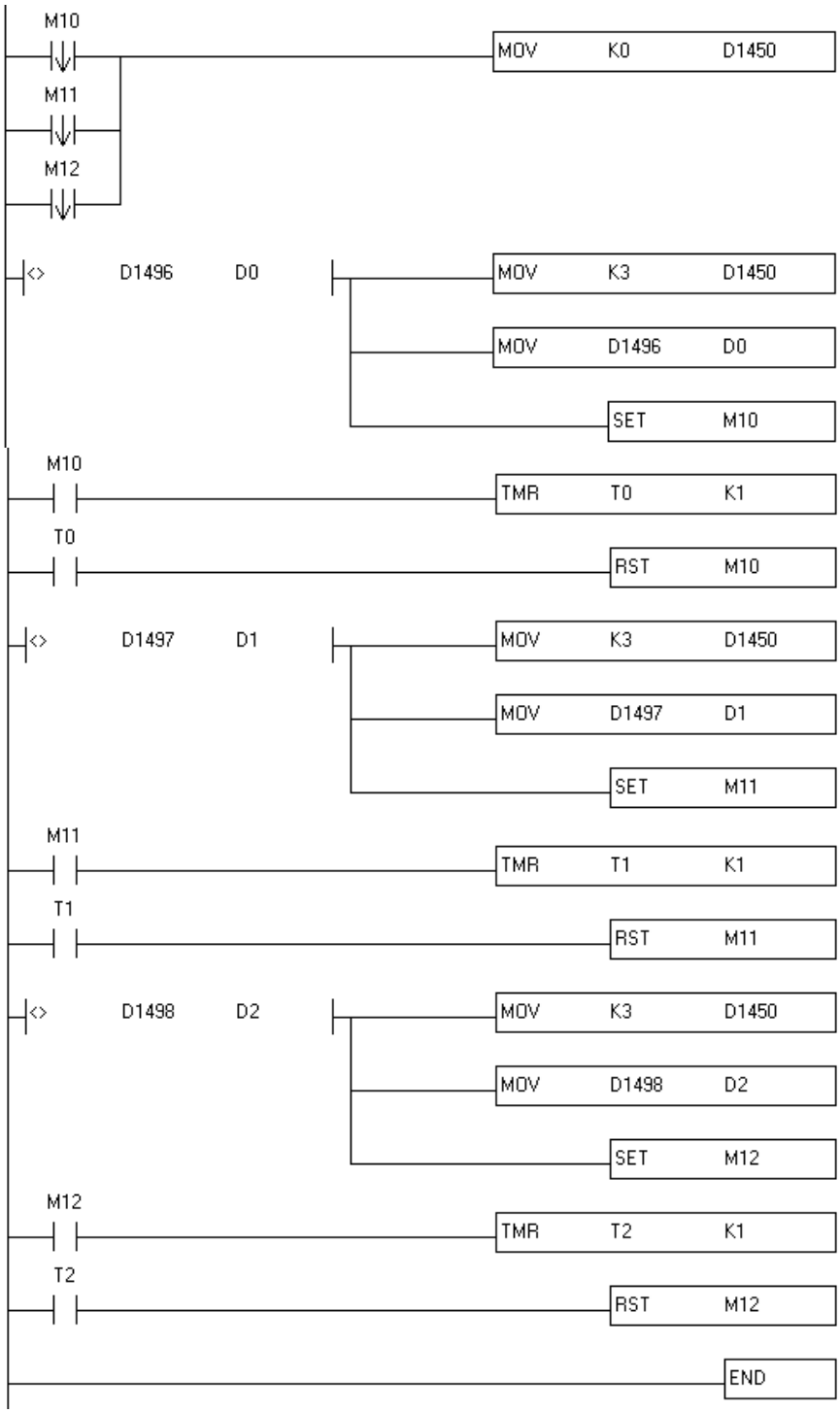
Step 1: Start WPLSoft, write a program to the master PLC connected, move the RUN/STOP switch on the PLC into the RUN position, and write related values to the PLC.



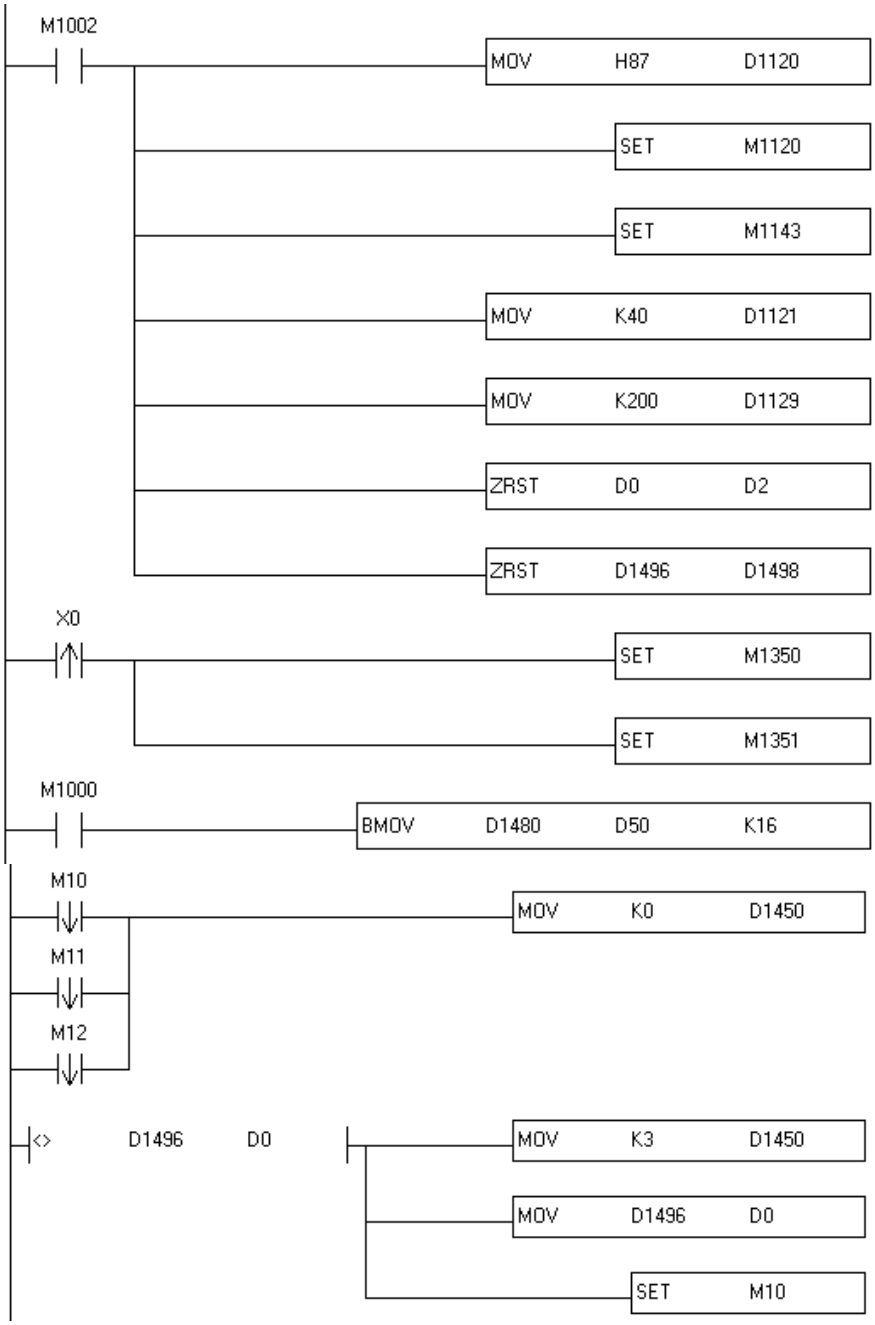
Owing to the fact that devices used to set related communication and a PLC link (M1350 and M1351) are not latching devices, they need to be set by means of a program. The PLC link wizard is used to specify the stations which need to be linked (M1355 is On).

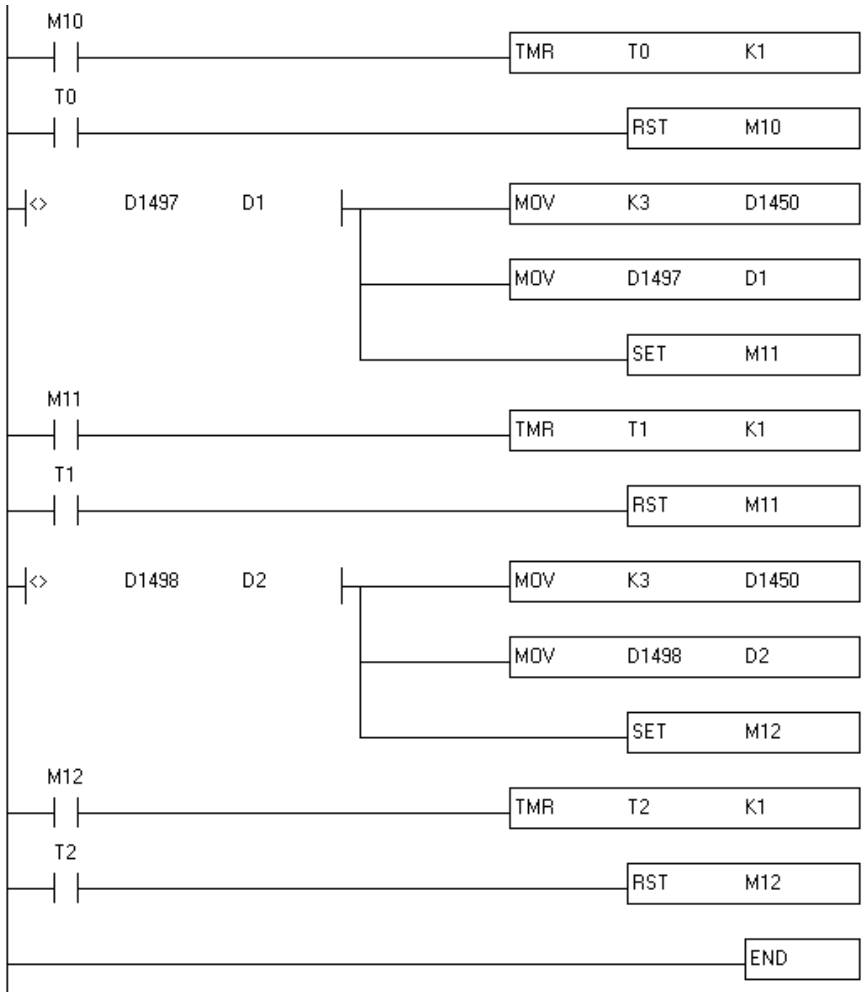
Program for ASCII communication:



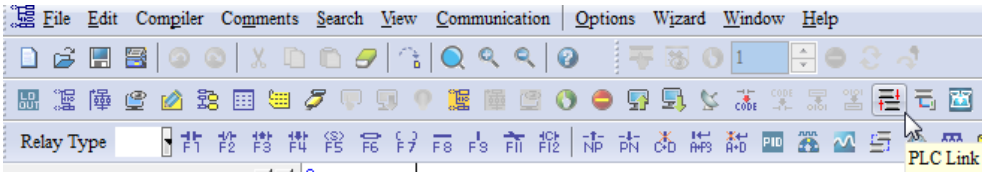

M10
M11
M12
MOV K0 D1450
<> D1496 D0
MOV K3 D1450
MOV D1496 D0
SET M10
M10
TMR T0 K1
T0
RST M10
<> D1497 D1
MOV K3 D1450
MOV D1497 D1
SET M11
M11
TMR T1 K1
T1
RST M11
<> D1498 D2
MOV K3 D1450
MOV D1498 D2
SET M12
M12
TMR T2 K1
T2
RST M12
END

Program for RTU communication:

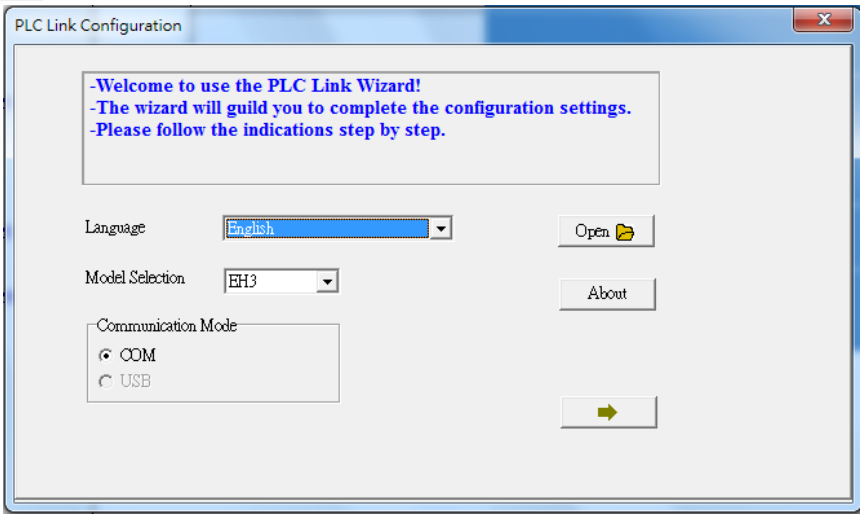




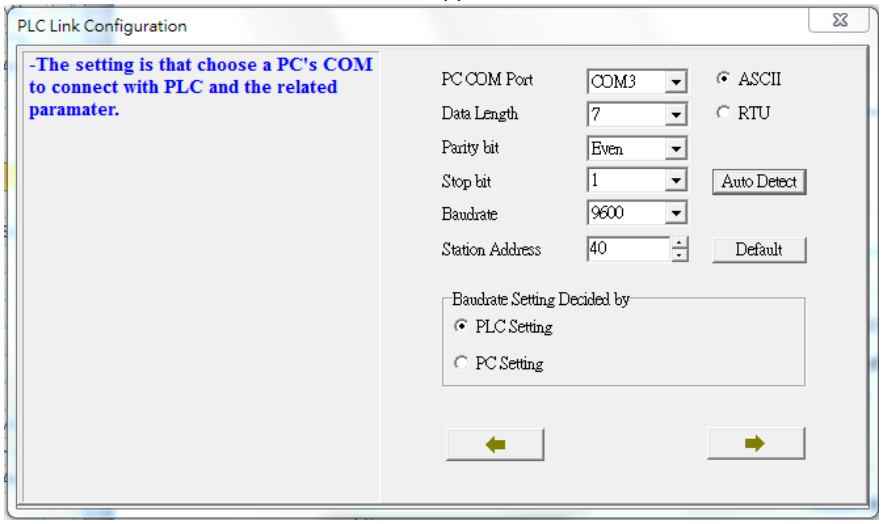
Step 2: Click the PLC link wizard  in WPLSoft.

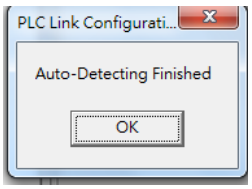


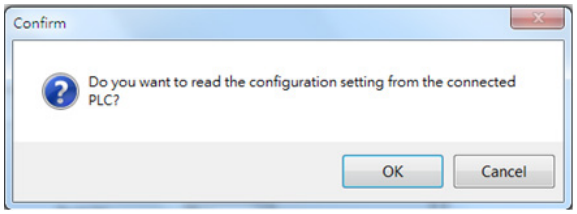
Step 3: Select a language in the **Language** drop-down list box, select a model in the **Model Selection** drop-down list box, and click .



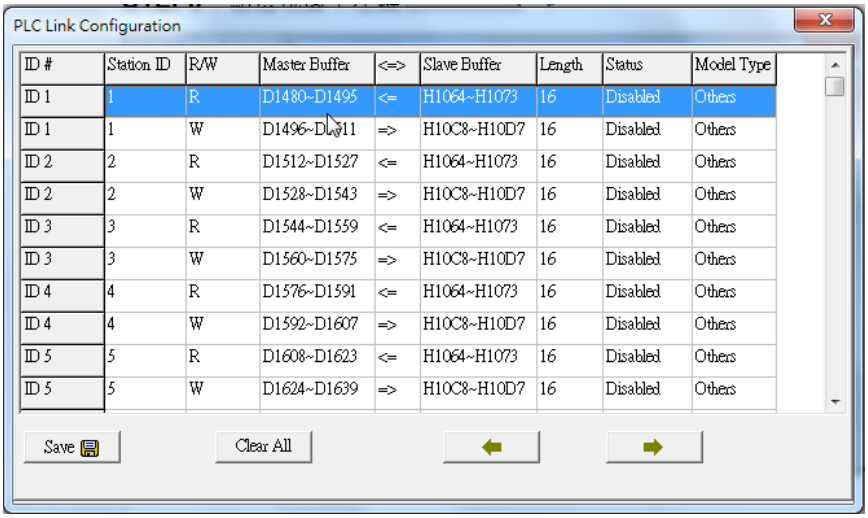
Step 4: Set a communication format for COM1 in the master PLC, click **Auto Detect**, click **OK** in the window which appears, click , and click **OK** in the window which appears.





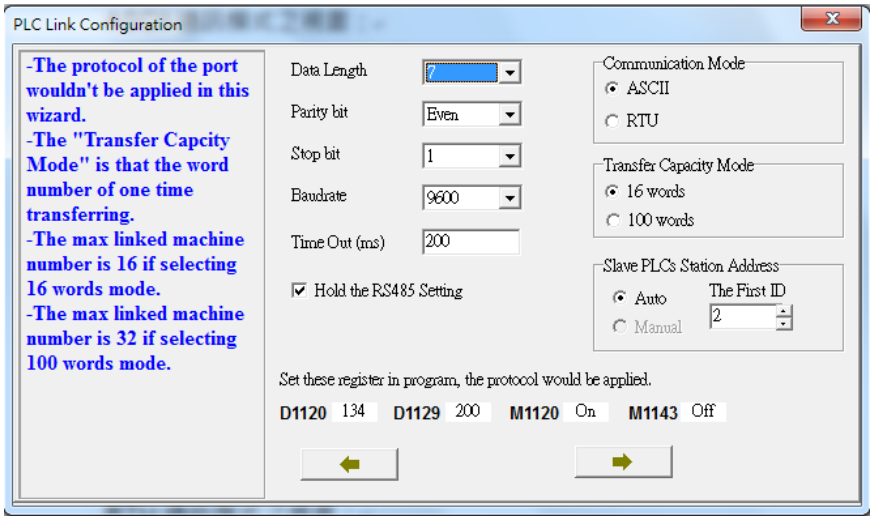


Step 5: Click  .

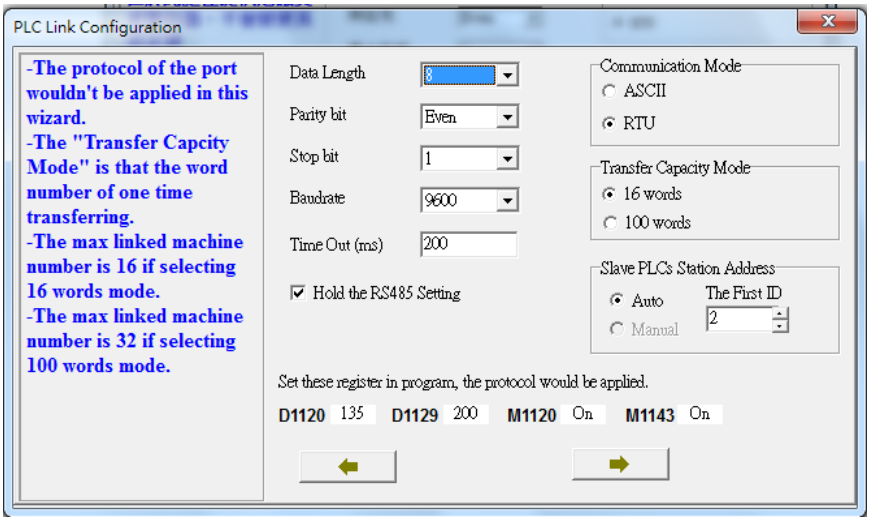


Step 6: The PLC link wizard reads values according to the communication format set for COM2 in the master PLC. Select the **16 words** option button in the **Transfer Capacity Mode** section, select the **Auto** option button, select **2** in the **The First ID** box in the **Slave PLCs Station Address** section, and click  .

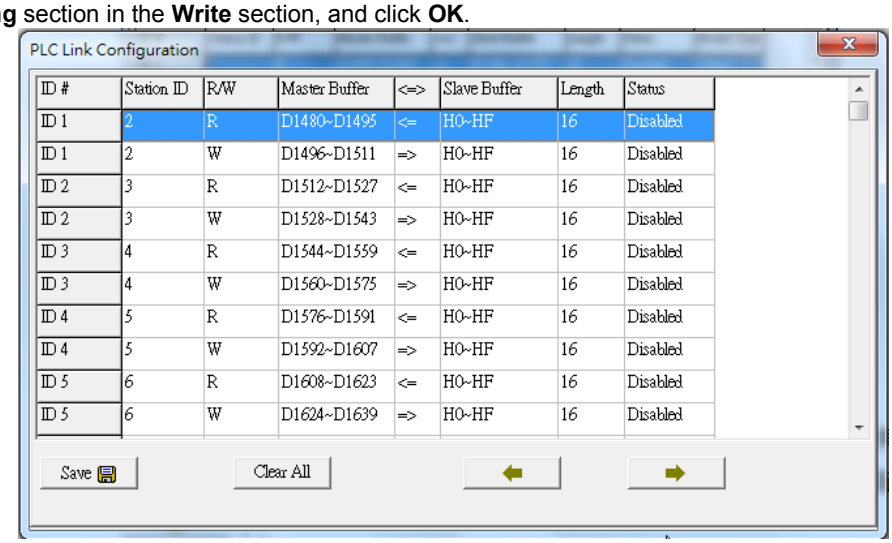
Window for ASCII communication:

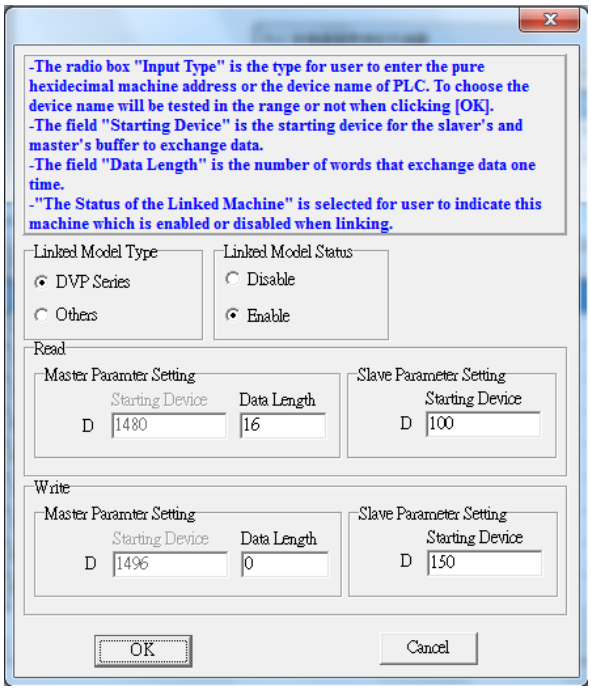


Window for RTU communication:

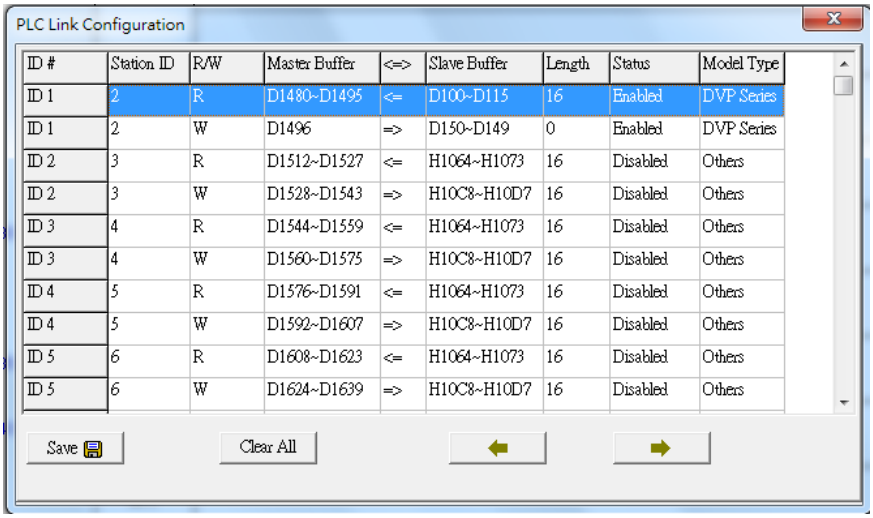


Step 7: Double-click the **ID 1** (**Station ID 2**) block in the **PLC Link Configuration** window, select the **DVP Series** option button in the **Linked Model Type** section, select the **Enable** option button in the **Linked Model Status** section (set M1360 to On), type “16” in the **Data Length** box in the **Master Parameter Setting** section in the **Read** section, type “0” in the **Data Length** box in the **Master Parameter Setting** section in the **Write** section, type “100” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Read** section, type “150” in the **Starting Device** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.

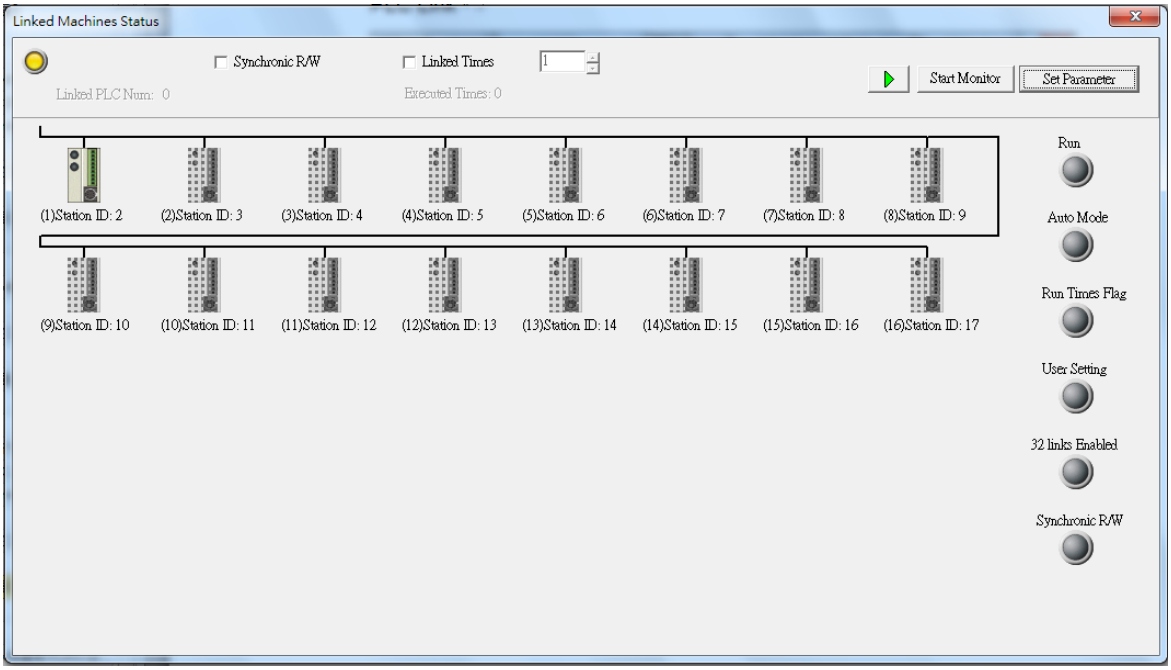




Step 8: Check whether the contents of the **ID 1** block are correct, and then click  .



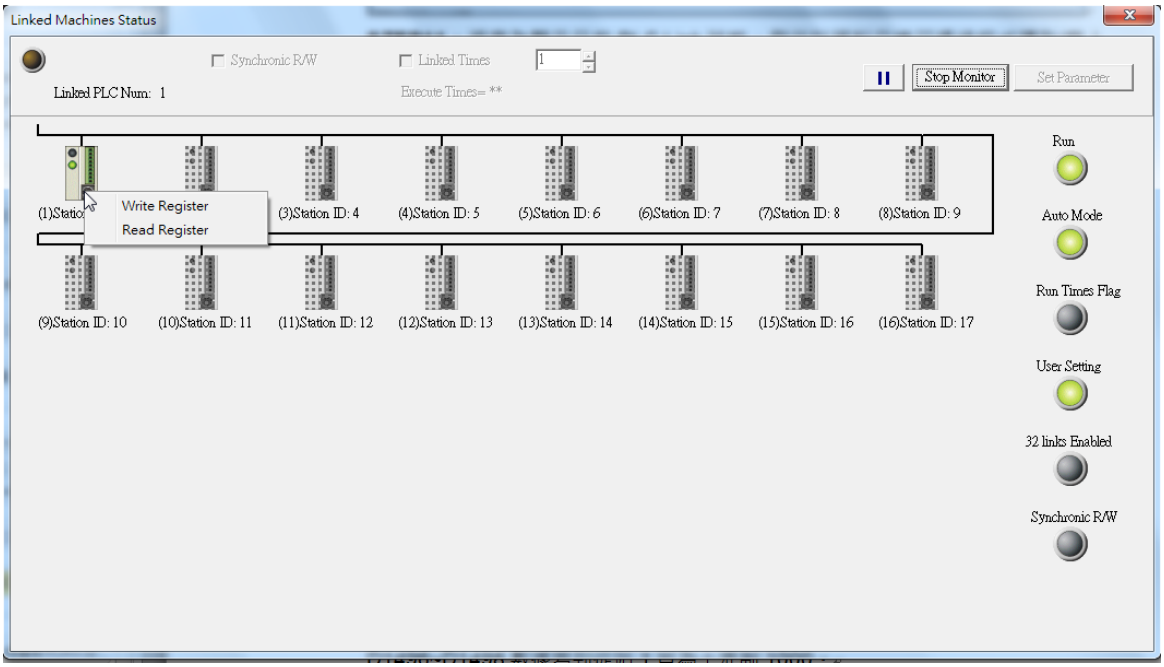
Step 9: Click the **Set Parameter** button, click the **Start Monitor** button, and click  or set X0 to On.



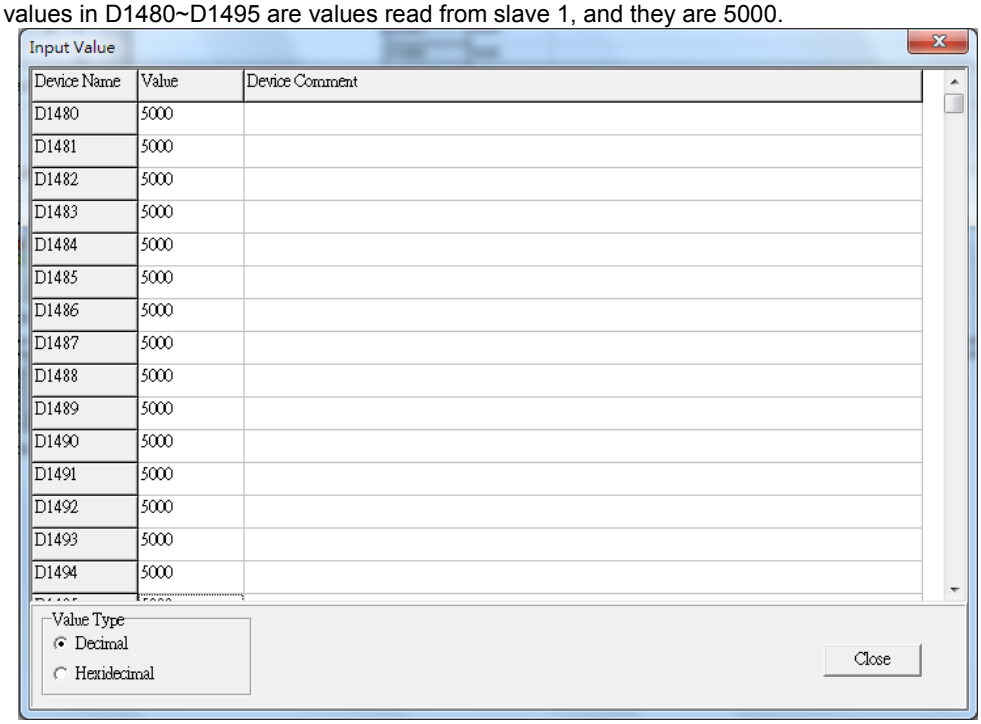
Step 10: The state of the PLC link executed is shown in the **Linked Machines Status** window. The master PLC can exchange data with the slave station through a program or the PLC link wizard.

Reading data through the PLC link wizard: Right-click slave station (1)  , and click **Read Register** on the context menu which appears.

Writing data through the PLC link wizard: Owing to the fact that “0” is typed in the **Data Length** box in the **Master Parameter Setting** section in the **Write** section (D1450=0), the PLC link wizard can not be used to write any data to slave 1.

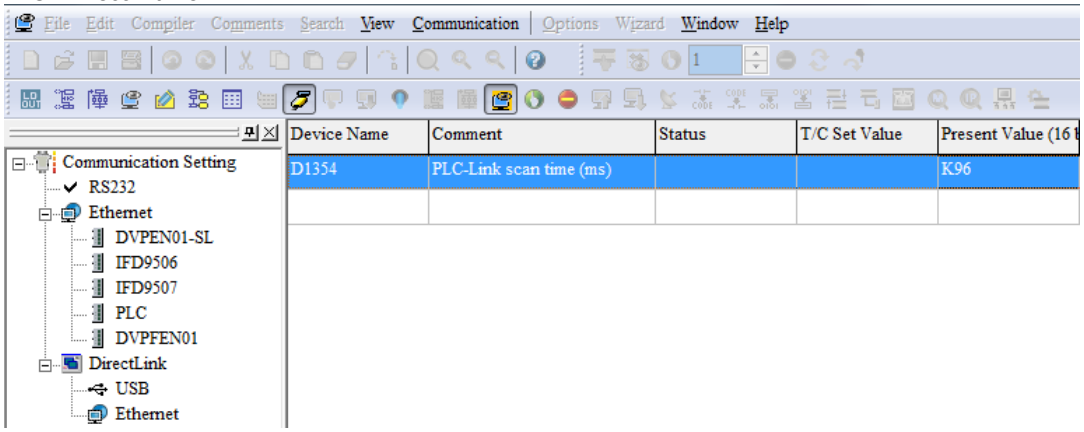


Step 11: The values in D1480~D1495 are values read from slave 1, and they are 5000.



Step 12: If any values in D1496~D1498 in the master PLC are changed, the value in D1450 in the master PLC will become 3, and the values in D1496~D1498 in the master PLC will be written to D150~D152 in slave 1.

Step 13: Close the **Linked Machines Status** window, click  , click  , and type “D1354”. The value in D1354 indicates PLC link scan time.



【Description of control】

- D1399 in the master PLC is used to set a start slave station address. The value in D1399 is K2, that is, the PLC whose station address is K2 is slave station 1.
- The master station reads 16 pieces of data in slave 1 (D1434=16), and writes 0 pieces of data to slave 1 (D1450=0). If any values in D1496~D1498 in the master PLC are changed, the value in D1450 in the master PLC will become 3, the values in D1496~D1498 in the master PLC will be written to D150~D152 in slave 1, and the value in D1450 will become 0 after 100 milliseconds.
- The master station exchanges data with the slave station by means of a PLC link. The values in D100~D115 in the slave station are written to D1480~D1495 in the master station, and the values in D1496~D1498 in the master station are written to D150~D152 in the slave station.

Master PLC (1 PLC)		Slave PLC (1 PLC)
D1480~D1495	Reading ←	D100~D115 in the slave PLC whose station address is K2
D1496~D1498	Writing →	D150~D152 in the slave PLC whose station address is K2

- When M1350 is Off, the values in the data registers used for data exchange in the master station and the slave station are the ones shown below.

Master PLC	Value	Slave PLC	Value
D1480~D1495	All are 0.	D100~D115 in slave station 1	All are 5000.
D1496~D1498	All are 0.	D150~D152 in slave station 1	All are 0.

After M1350 is set to ON, the values in the data registers used for data exchange in the master station and the slave station will become the ones shown below.

Master PLC	Value	Slave PLC	Value
D1480~D1495	All are 5000.	D100~D115 in slave station 1	All are 5000.
D1496~D1498	All are 0. (Unchanged)	D150~D152 in slave station 1	All are 0.

If any values in D1496~D1498 in the master PLC are changed, the values in the data registers used for data exchange in the master station and the slave station will become the ones shown below.

Master PLC	Value	Slave PLC	Value
D1480~D1495	All are 5000.	D100~D115 in slave station 1	All are 5000.
D1496~D1498	All are 1000. (Changed)	D150~D152 in slave station 1	All are 1000.

8.2 Using the PLC Link Wizard in ISPSoft (ASCII/RTU Mode)

【Control requirement】
A master station (A DVP-EH3 series PLC) reads sixteen pieces of data (sixteen words) in a slave station (a DVP-EH3 series PLC) through a PLC link. If three values (three words) in the master station are changed, the master station will send a write command to the slave station.

【Setting station addresses of PLCs】

Master/Slave station	Station address	Communication format
Master PLC	K40 (D1121=K40)	3. ASCII, 9600, 7, E, 1 (D1120=H'86) 4. RTU, 9600, 8, E, 1 (D1120=H'87) The communication format of the slave PLCs needs to be the same as the communication format of the master PLC.
Slave PLC 1	K2 (D1121=K2)	

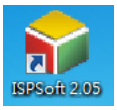
【Descriptions of devices】

Device in a PLC	Description
X0	X0 functions as a conditional contact used to enable M1350 and M1351.
D1120	Communication protocol of COM2 (RS-485)
D1121	PLC Communication address
D1129	Abnormal communication timeout Time unit: ms
M1120	M1120 is used to retain the communication format of COM2 (RS-485).
M1143	M1143 is used to determine whether the communication format set for COM2 (RS-485) is an ASCII mode or an RTU mode. Off: ASCII mode

Device in a PLC	Description
	On: RTU mode
M1350	M1350 is used to enable a PLC link.
M1351	If M1351 is ON, the PLC link executed will be an automatic mode.
M10~M12	They are used to enable timers, and write 0 to D1450.
T0~T2	They are used to set M10~M12 to Off.
D0~D2	The values in D0~D2 are the previous values in D1496~D1498.
D50~D65	The values in D50~D65 are the values in D1480~D1495.
D1450	The value in D1450 indicates the length of the data written to slave PLC 1.
D1496~D1498	The values in D1496~D1498 are values written to D150~D152 in slave PLC 1.

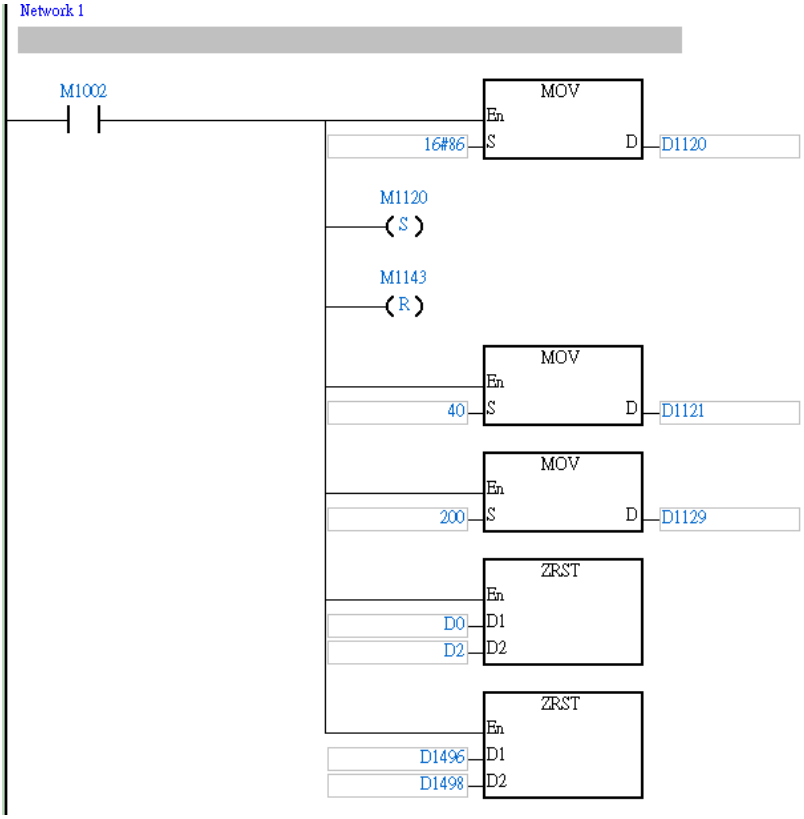
【PLC link wizard】

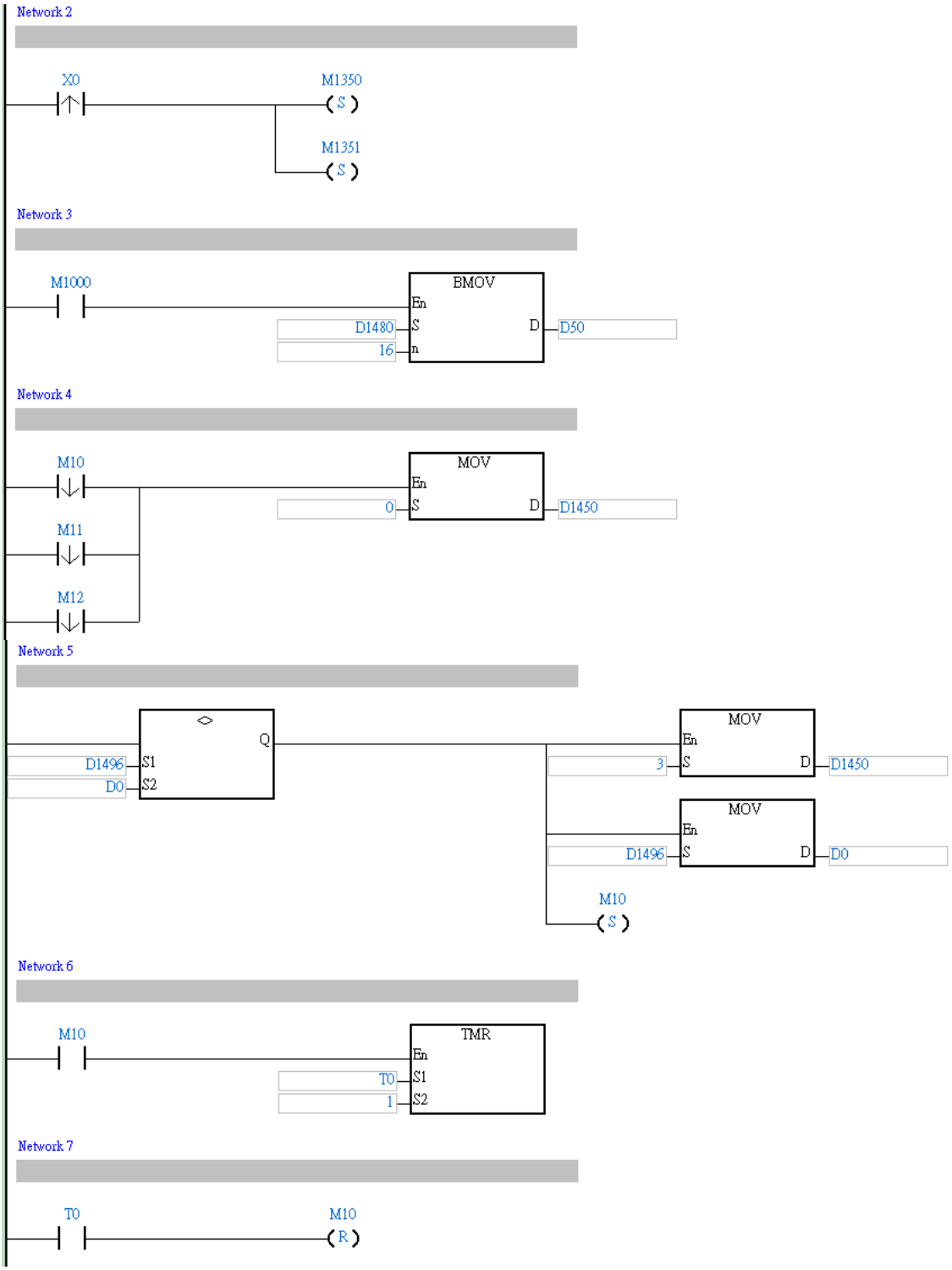
Step 1: Start ISPSoft, write a program to the master PLC connected, move the RUN/STOP switch on the PLC into the RUN position, and write related values to the PLC.

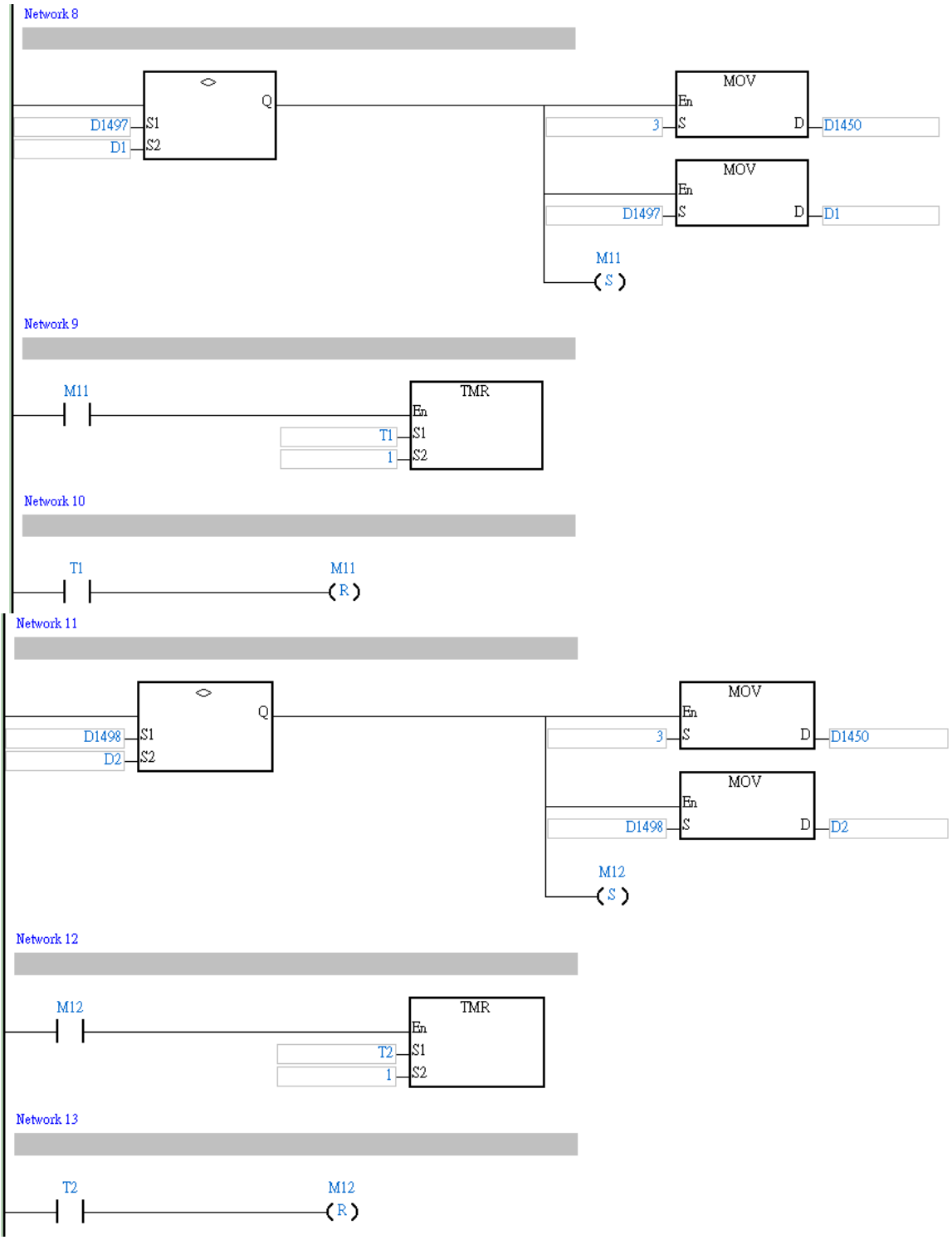


Owing to the fact that devices used to set related communication and a PLC link (M1350 and M1351) are not latching devices, they need to be set by means of a program. The PLC link wizard is used to manually specify the stations which need to be linked (M1355 is On).

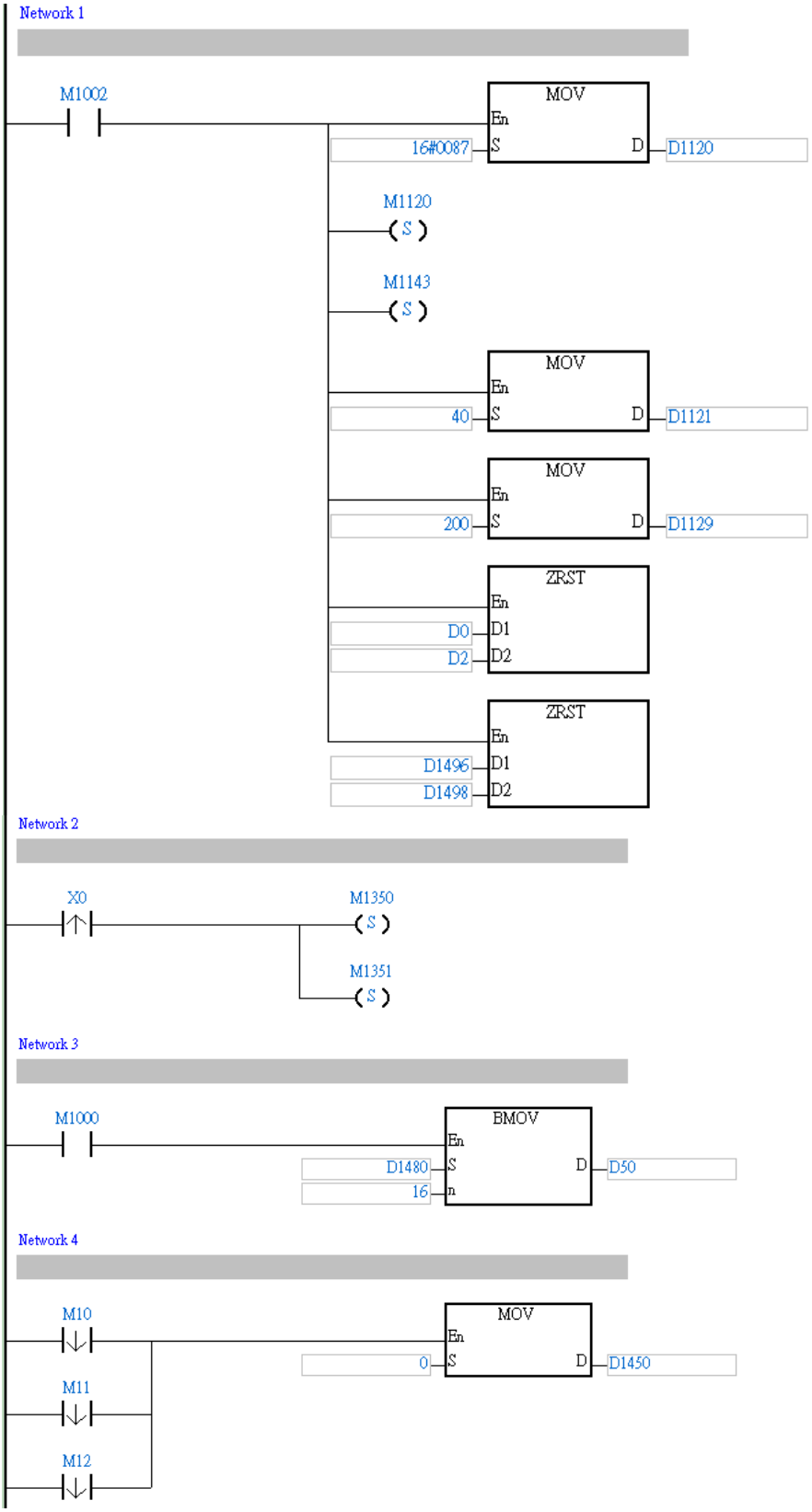
Program for ASCII communication:

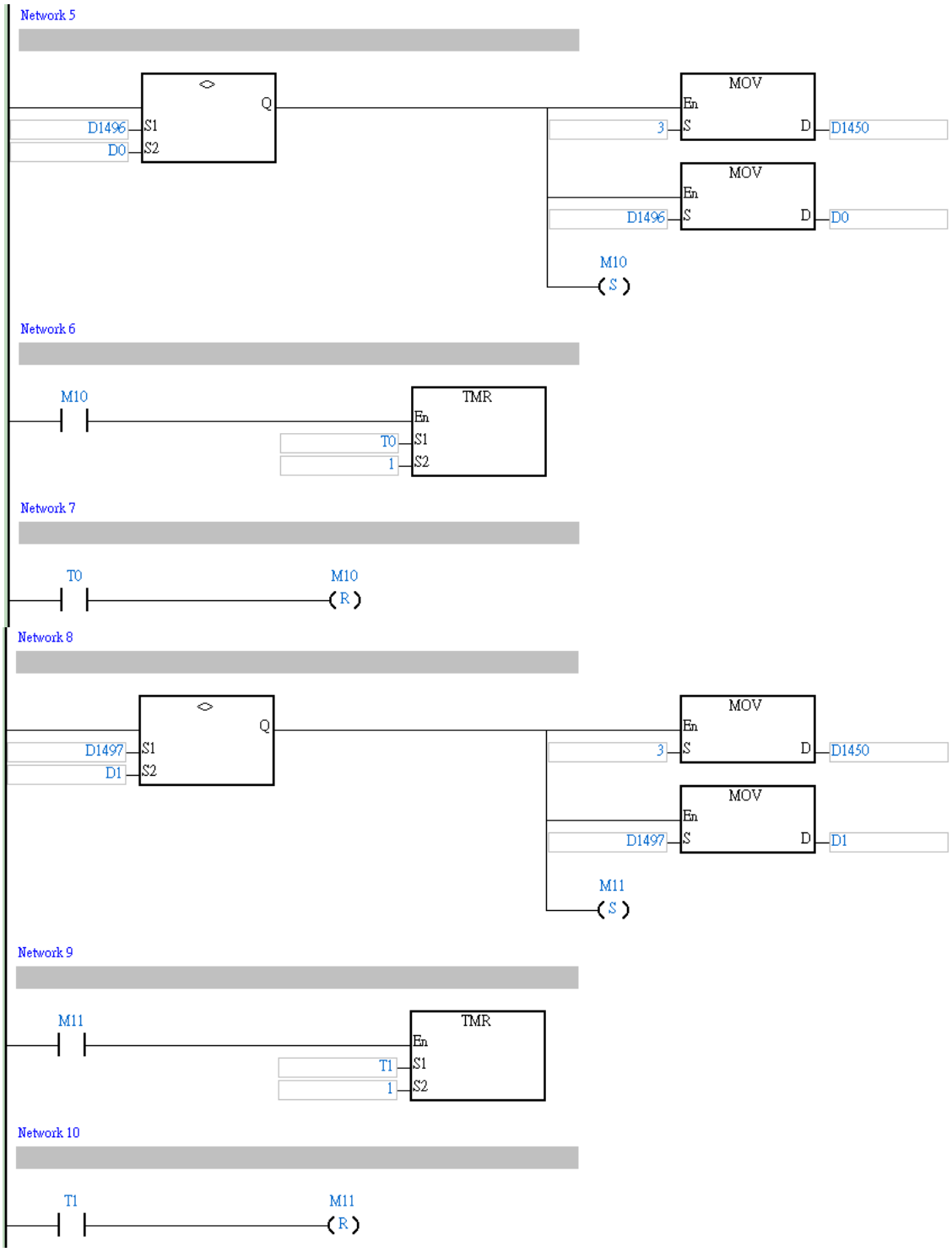


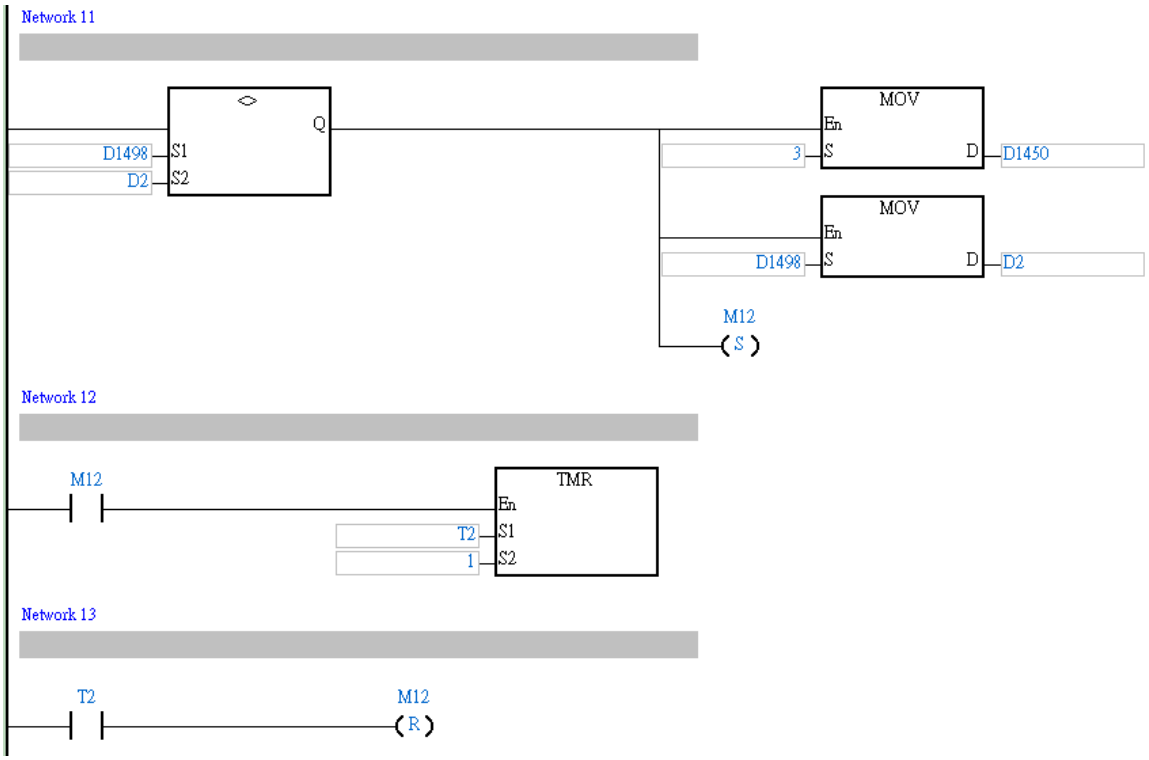

Network 2
X0
M1350
S
M1351
S
Network 3
M1000
BMOV
En
D1480
S
D
D50
16
n
Network 4
M10
M11
M12
MOV
En
0
S
D
D1450
Network 5
Q
D1496
S1
D0
S2
MOV
En
3
S
D
D1450
MOV
En
D1496
S
D
D0
M10
S
Network 6
M10
TMR
En
T0
S1
1
S2
Network 7
T0
M10
R


Network 8
Q
D1497
S1
D1
S2
MOV
En
3
S
D
D1450
MOV
En
D1497
S
D
D1
M11
S
Network 9
M11
TMR
En
T1
S1
1
S2
Network 10
T1
M11
R
Network 11
Q
D1498
S1
D2
S2
MOV
En
3
S
D
D1450
MOV
En
D1498
S
D
D2
M12
S
Network 12
M12
TMR
En
T2
S1
1
S2
Network 13
T2
M12
R

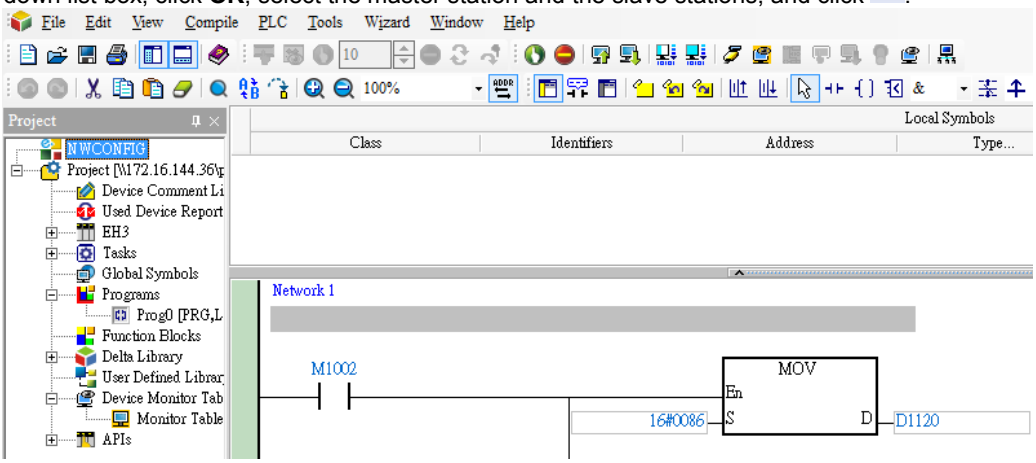
Program for RTU communication:

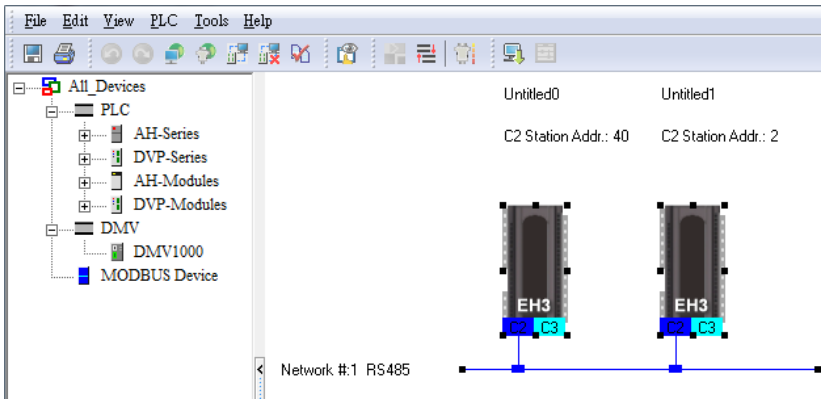


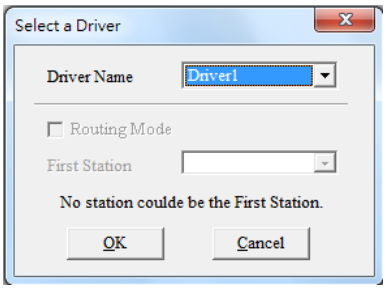

Network 5
D1496
D0
S1
S2
Q
MOV
En
S
D
3
D1450
MOV
En
S
D
D1496
D0
M10
S
Network 6
M10
TMR
En
T0
S1
1
S2
Network 7
T0
M10
R
Network 8
D1497
D1
S1
S2
Q
MOV
En
S
D
3
D1450
MOV
En
S
D
D1497
D1
M11
S
Network 9
M11
TMR
En
T1
S1
1
S2
Network 10
T1
M11
R



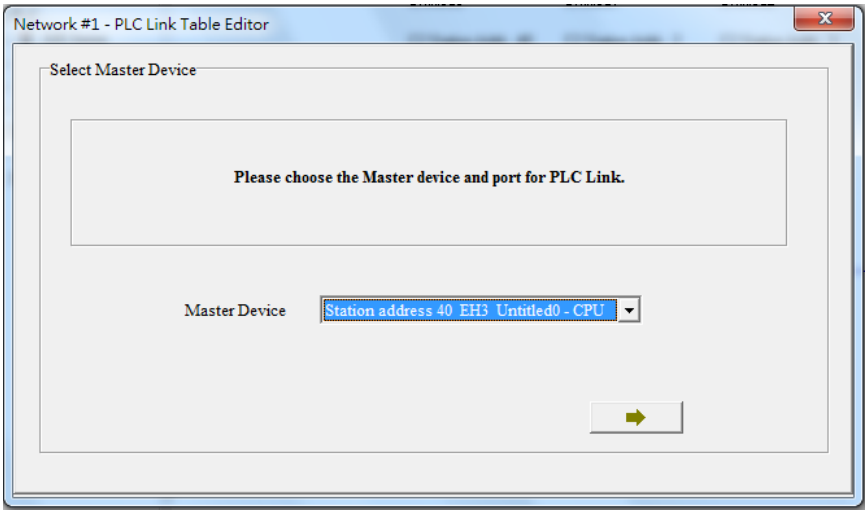
Step 2: Double-click **NWCONFIG** in the project management area, create a link, click , select **Driver 1** in the **Driver Name** drop-down list box, click **OK**, select the master station and the slave stations, and click .

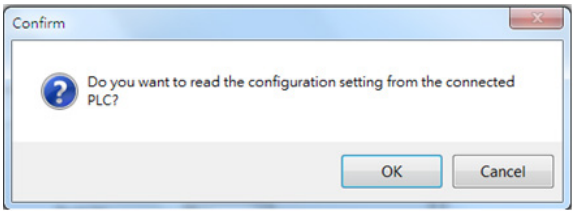




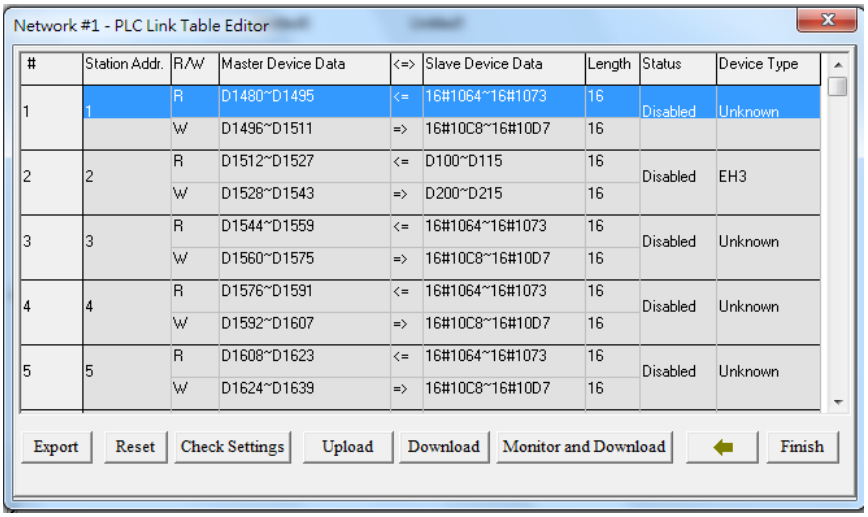


Step 3: Select a PLC in the **Master Device** drop-down list box, click ➡, and click **OK** in the window which appears.



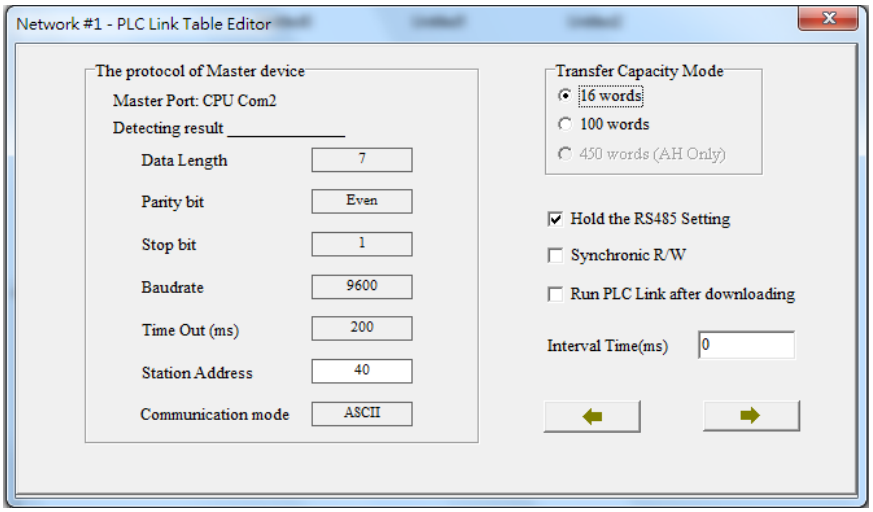


Step 4: Click .

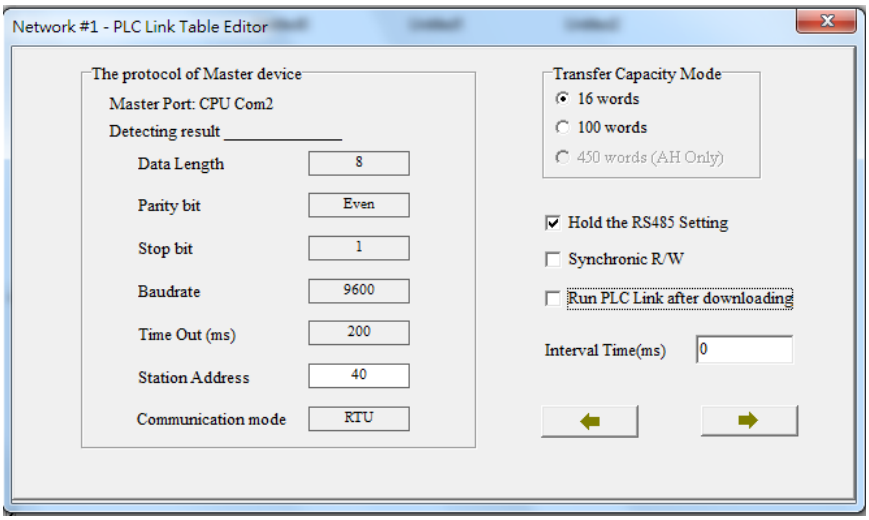


Step 5: The PLC link wizard reads values according to the communication format set for COM2 in the master PLC. Select the **16 words** option button in the **Transfer Capacity Mode** section, unselect the **Synchronic R/W** checkbox and the **Run PLC Link after downloading** checkbox, type “0” in the **Interval Time** box, and click .

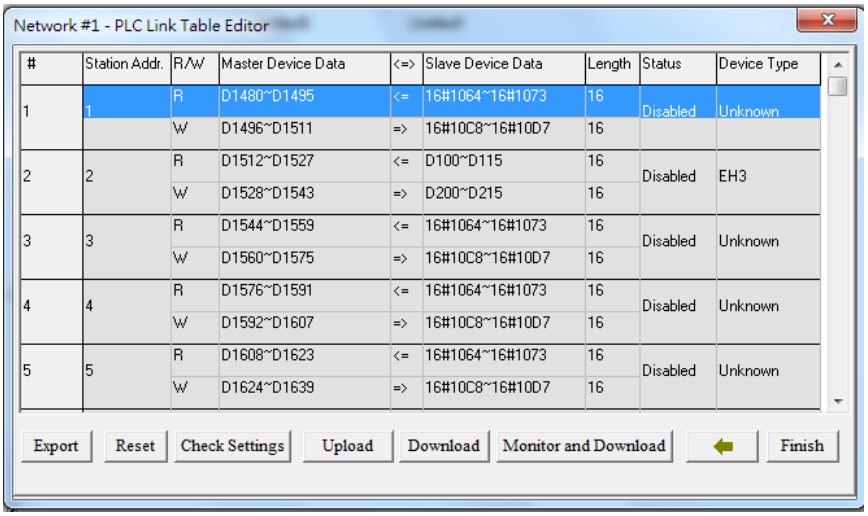
Window for ASCII communication:

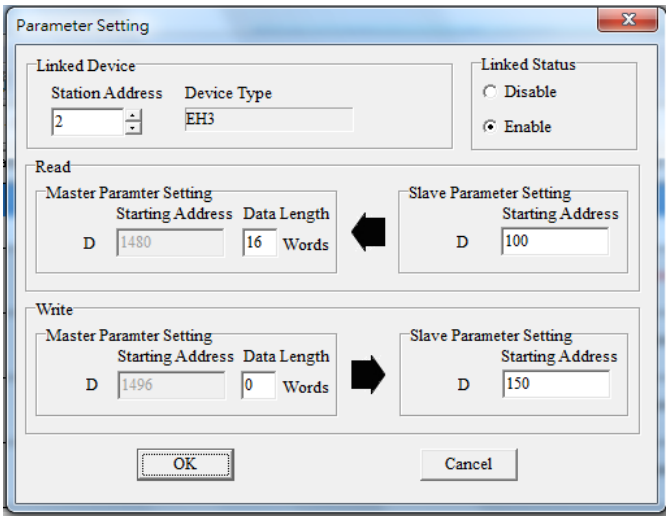


Window for RTU communication:

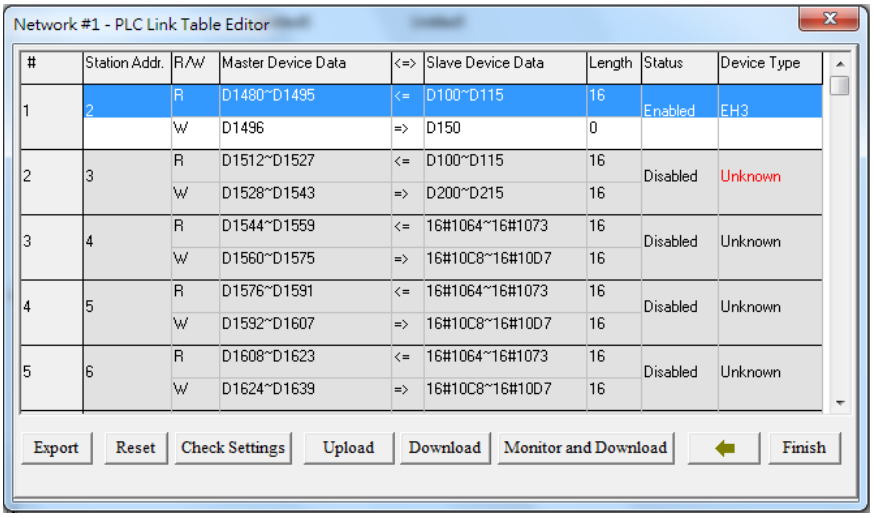


Step 6: Double-click the **1** block in the **PLC Link Table Editor** window, select **2** in the **Station Address** box, select the **Enable** option button in the **Linked Status** section (set M1360 to On), type “16” in the **Data Length** box in the **Master Parameter Setting** section in the **Read** section, type “0” in the **Data Length** box in the **Master Parameter Setting** section in the **Write** section, type “100” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Read** section, type “150” in the **Starting Address** box in the **Slave Parameter Setting** section in the **Write** section, and click **OK**.

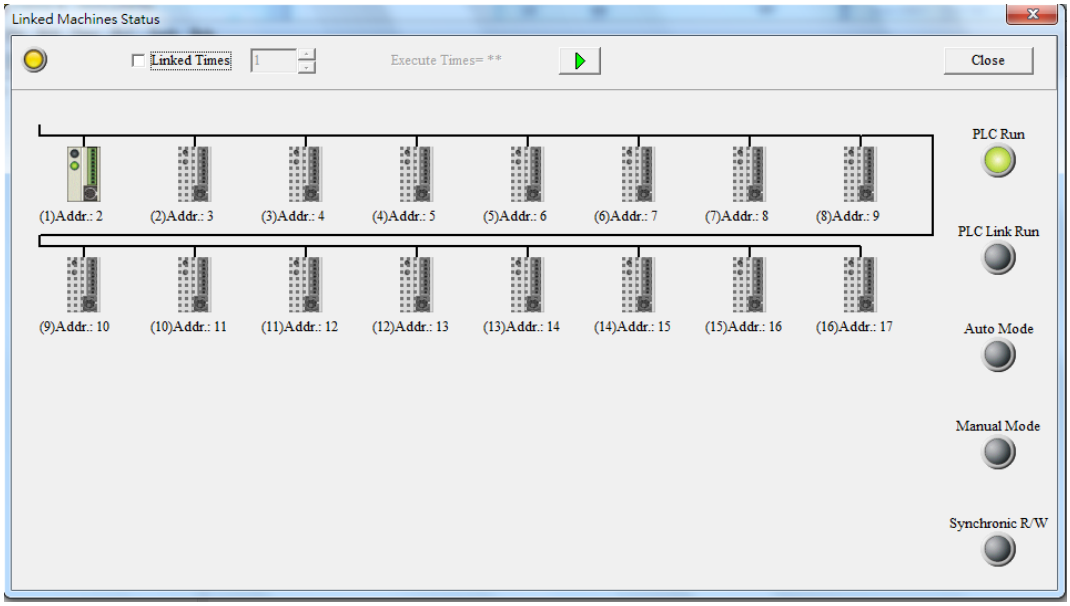




Step 7: Check whether the contents of the **1** block are correct, and then click **Monitor and Download**.

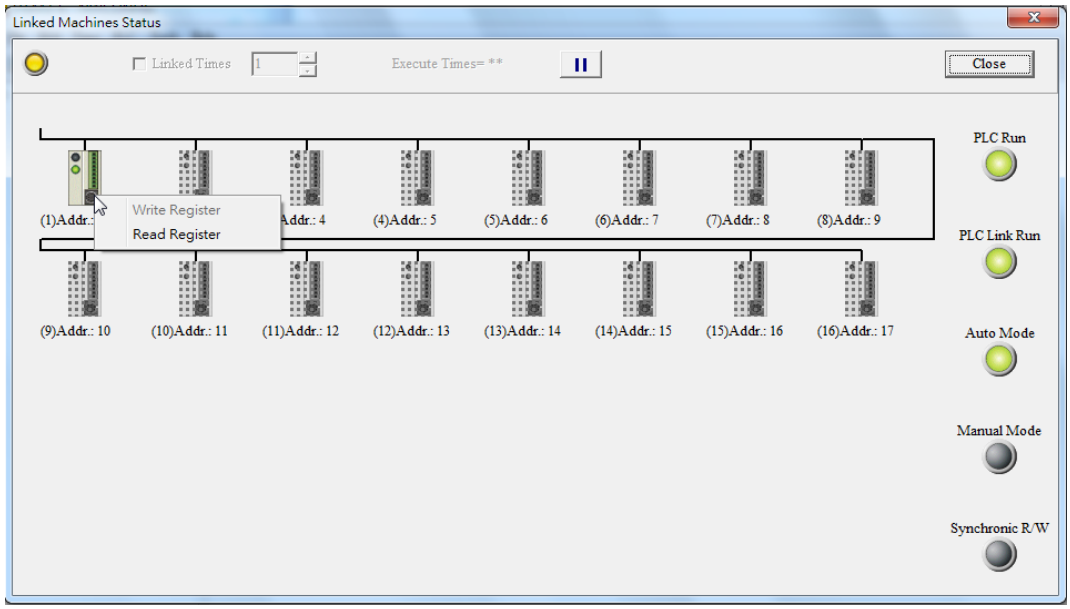


Step 8: Click  or set X0 to On.

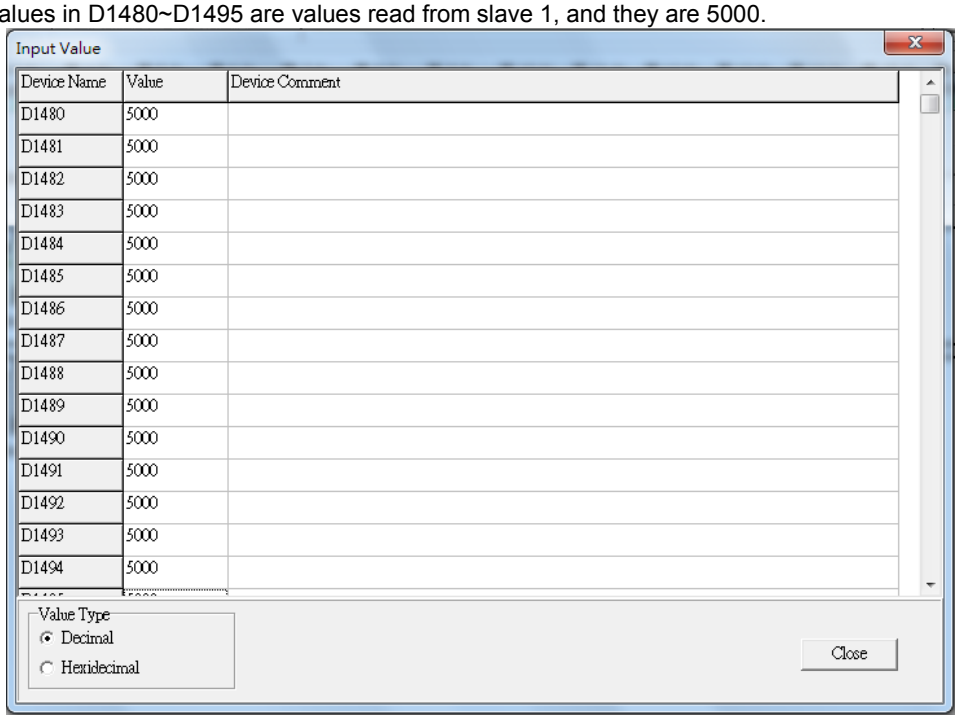


Step 9: The state of the PLC link executed is shown in the **Linked Machines Status** window. The master PLC can exchange data with the slave stations through a program or the PLC link wizard.

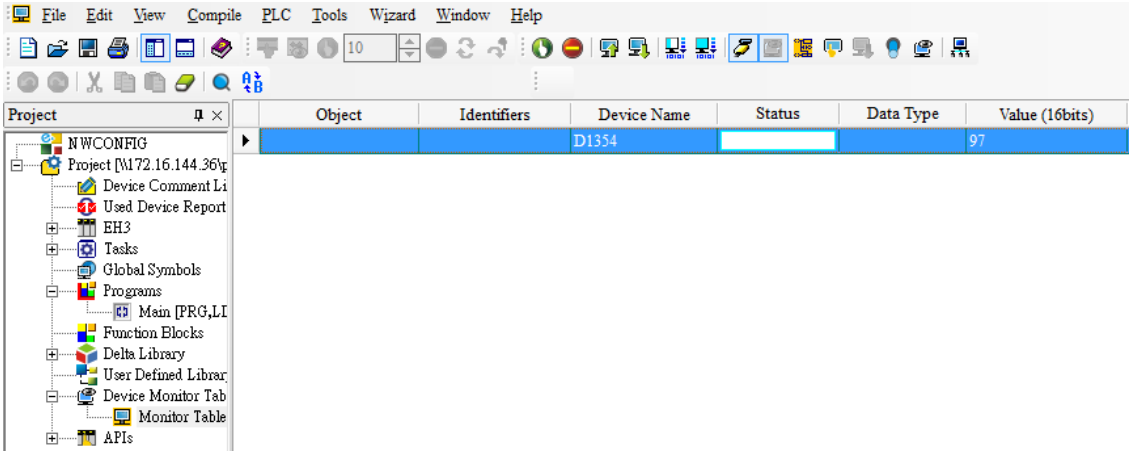
Reading data through the PLC link wizard: Right-click slave station (1)  , and click **Read Register** on the context menu which appears.
Writing data through the PLC link wizard: Owing to the fact that “0” is typed in the **Data Length** box in the **Master Parameter Setting** section in the **Write** section (D1450=0), the PLC link wizard can not be used to write any data to slave 1.



Step 10: The values in D1480~D1495 are values read from slave 1, and they are 5000.



Step 11: If any values in D1496~D1498 in the master PLC are changed, the value in D1450 in the master PLC will become 3, and the values in D1496~D1498 in the master PLC will be written to D150~D152 in slave 1.
Step 12: Close the **Linked Machines Status** window, create a device monitoring table by me  of **Device Monitor Table** in the project management area, type “D1354” in the device monitoring table, and click . The value in D1354 indicates PLC link scan time.



【Description of control】

- D1399 in the master PLC is used to set a start slave station address. The value in D1399 is K2, that is, the PLC whose station address is K2 is slave station 1.
- The master station reads 16 pieces of data in slave 1 (D1434=16), and writes 0 pieces of data to slave 1 (D1450=0). If any values in D1496~D1498 in the master PLC are changed, the value in D1450 in the master PLC will become 3, the values in D1496~D1498 in the master PLC will be written to D150~D152 in slave 1, and the value in D1450 will become K0 after 100 milliseconds.
- The master station exchanges data with the slave station by means of a PLC link. The values in D100~D115 in the slave station are written to D1480~D1495 in the master station, and the values in D1496~D1498 in the master station are written to D150~D152 in the slave station.

Master PLC (1 PLC)		Slave PLC (1 PLC)
D1480~D1495	Reading ←	D100~D115 in the slave PLC whose station address is K2
D1496~D1498	Writing →	D150~D152 in the slave PLC whose station address is K2

- When M1350 is Off, the values in the data registers used for data exchange in the master station and the slave station are the ones shown below.

Master PLC	Value	Slave PLC	Value
D1480~D1495	All are 0.	D100~D115 in slave station 1	All are 5000.
D1496~D1498	All are 0.	D150~D152 in slave station 1	All are 0.

After M1350 is set to ON, the values in the data registers used for data exchange in the master station and the slave station will become the ones shown below.

Master PLC	Value	Slave PLC	Value
D1480~D1495	All are 5000.	D100~D115 in slave station 1	All are 5000.
D1496~D1498	All are 0. (Unchanged)	D150~D152 in slave station 1	All are 0.

If any values in D1496~D1498 in the master PLC are changed, the values in the data registers used for data exchange in the master station and the slave station will become the ones shown below.

Master PLC	Value	Slave PLC	Value
D1480~D1495	All are 5000.	D100~D115 in slave station 1	All are 5000.
D1496~D1498	All are 1000. (Changed)	D150~D152 in slave station 1	All are 1000.