					
Product	DVP	Type/Series	DVPSCM12-SL	Appl. Note Nr. 007	Delta DVP Communication Module
Issued by	DEN	Author	Victor Ogedegbe	Release Date	December , 2018
Title	DVPSCm12 as a master and a slave setup guide				

Devices and special tools/equipment

- ✓ Delta DOP-B/DOP-100 + PC
- ✓ DVP28SV2 PLC
- ✓ VFD
- ✓ DCISoft –SCMSOft is built-in DCISoft
- ✓ SCMSOft – Configuring software for DVPSCM12-SL

- ✓ DOPSOft – Software to program DOP Series

Test setup

N/A

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1. Introduction

DVPSCM12-SL is a serial communication module. It supports Modbus RS-422, RS-485, and can be used as RS-422 communication port or RS-485 communication port to upload or download WPLSoft/ISPSoft.

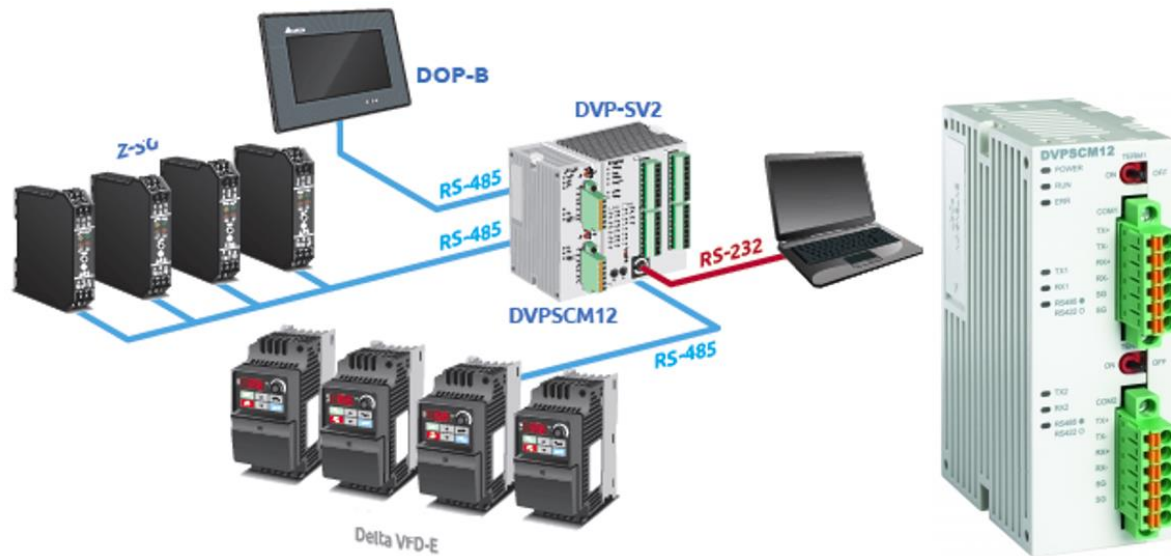


Figure 1: DVPSCM12 Module

Functions

- It provides RS-422 and RS-485 communication ports (COM1 & COM2).
- Each communication port can connect to at most 32 devices.
- It can be used as PLC COM3 to upload or download WPLSoft.
- It has Modbus RS-422 data exchange and RS-485 data exchange (MODBUS Advance)

2. Software setup

SCMSOft, the setting software of DVPSCM12-SL, is built in Delta Communication software DCISoft.

Please download the latest DCISoft from Delta website: <http://www.deltaww.com/DownloadCenter>



Figure 2: Delta DCISoft

3. DVPSCM12-SL as Modbus Master

With DVPSCM12-SL as Modbus Master each communication port can connect to at most 32 devices.



Figure 3: DVPSCM12-SL as Modbus Master and VFD-C2000 as slaves

Example: DVPSCM12-SL as Modbus Master and VFD-C2000 as slaves

DVPSCM12-SL can connect to other Delta industrial products such as the human-machine interfaces, the text panels, the PLCs, the motor drives, and the servo motors through the standard Modbus as illustrated in the connection diagram above.

Below is the setting we will apply for the DVPSCM12-SL as master and VFD-C2000 as slaves in this example.

Master/Slave station	Station address	Communication format
Master (DVPSCM12SL)	Set the station address to 5 (D1121=K5)	ASCII, 9600, 7, E, 1 (D1120=H'86)
Slaves (VFD-C2000)	Set the station address of the 5 slaves to 2, 3, 4, 5, 6 respectively	ASCII, 9600, 7, E, 1

Follow the steps below to set up DVPSCM12-SL as DVPSCM12-SL as master and VFD-C2000 as slaves

1. Start up DCISoft

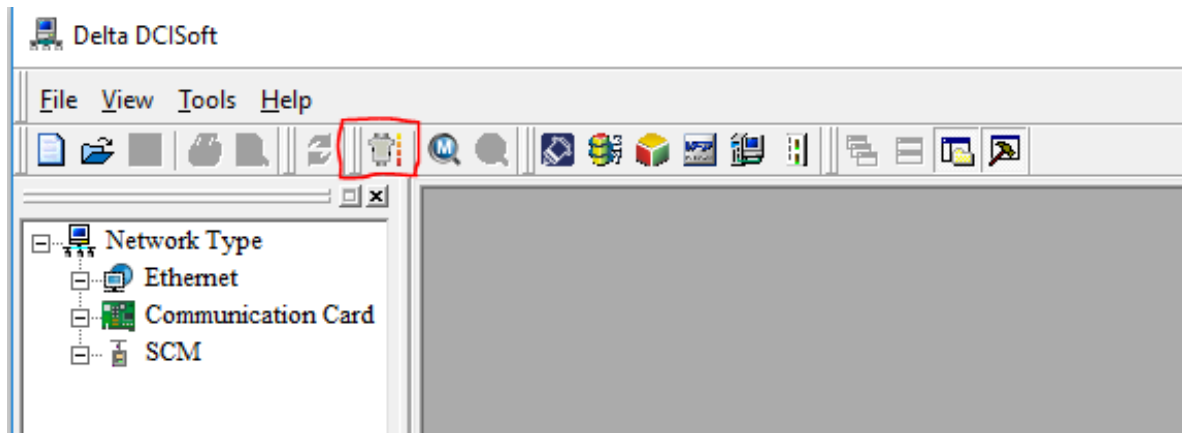


Figure 4: DCISoft setup

Open DCISoft, click “Tools” and choose “Communication Setting” as above. Then set the communication between your PC and the DVPSCM12-SL module. The user can choose the Communication type, and set the related parameter. If an Ethernet module is used with DVPSCM-SL module, the user can choose “Ethernet” for the upload/download of the configuration as in the figure below

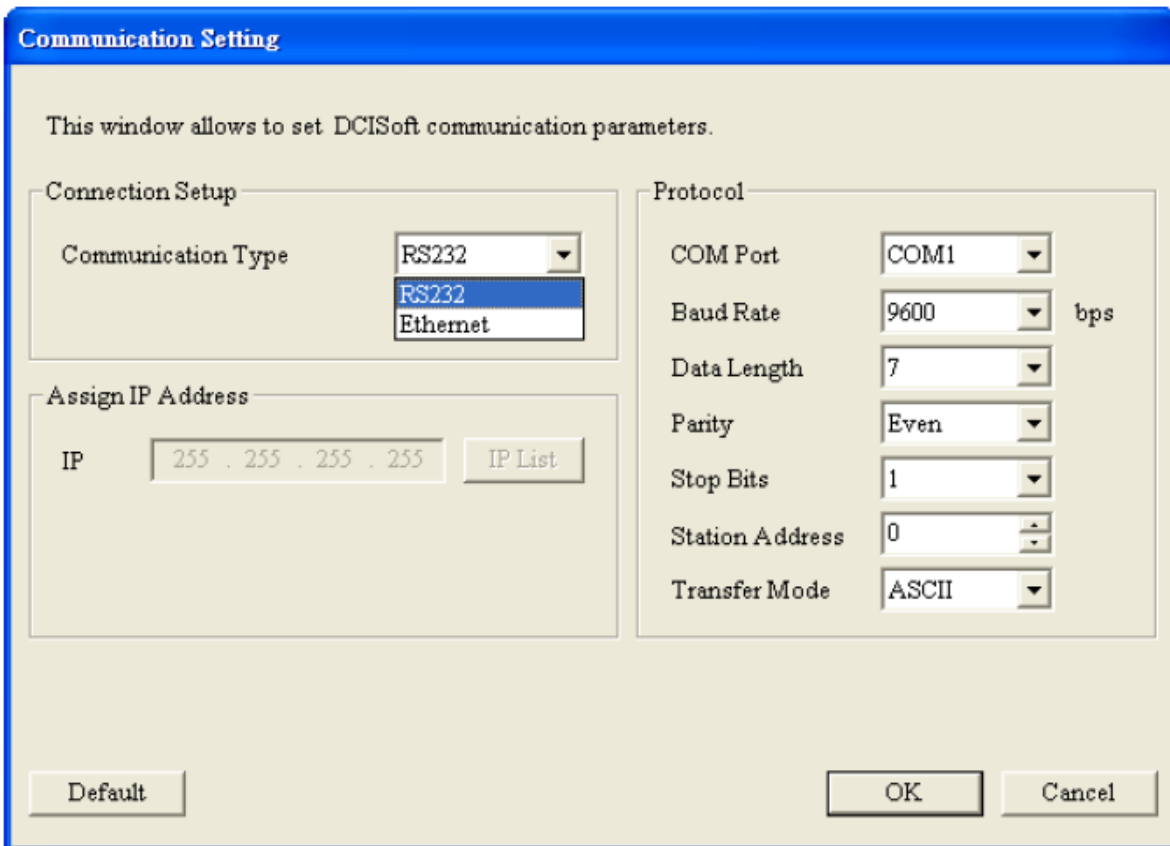


Figure 5: Communication setting between PC and the DVPSCM12-SL module

2. Create SCM project

Click “SCMSoft” in DCISoft to open the setting page of SCMSoft.

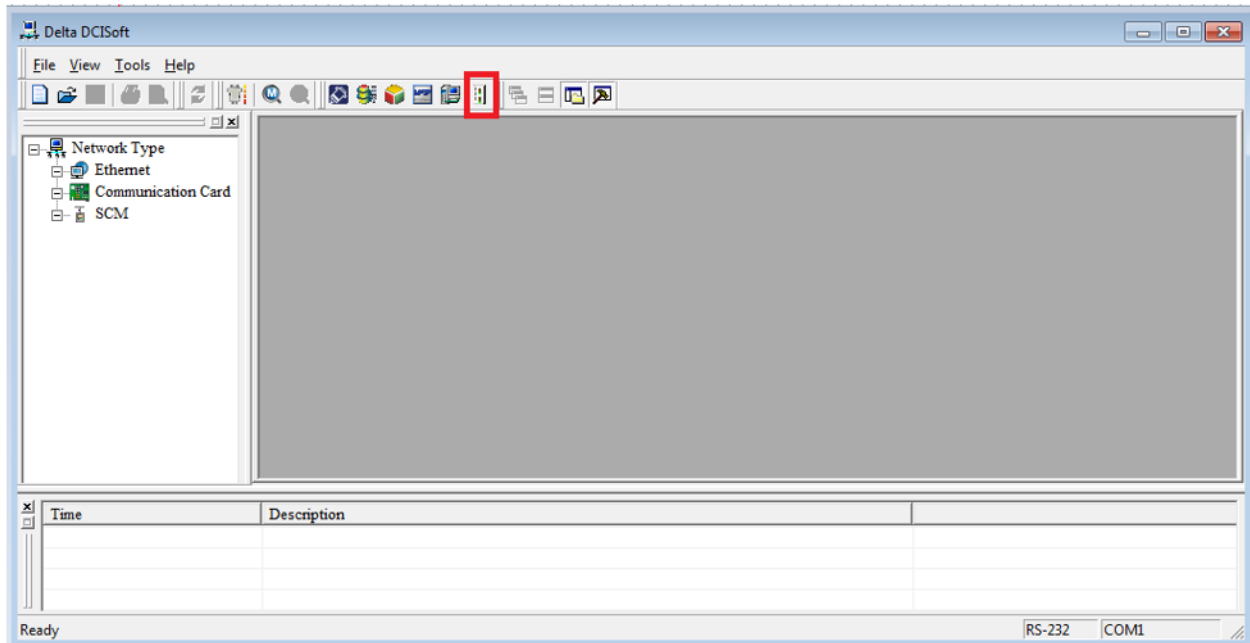


Figure 6: Start up SCMSoft

Then, click “New Project” in SCMSoft to establish a SCM project as below.

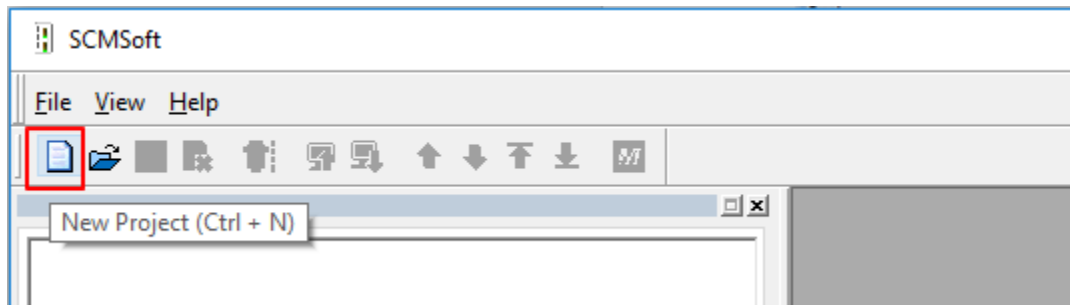


Figure 7: Creating New Project in SCMSoft

The screen below will appear

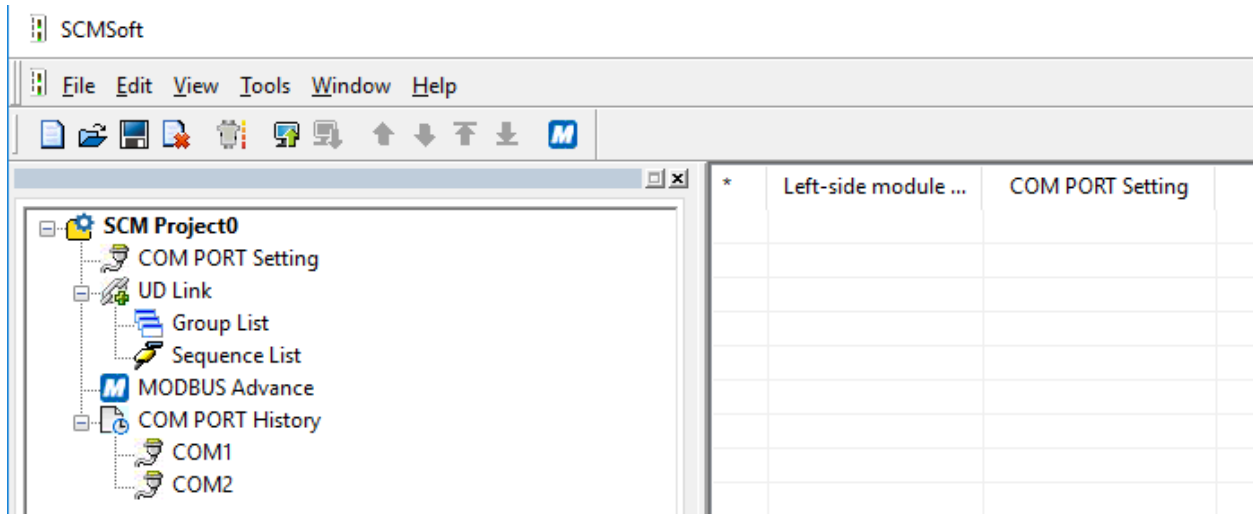
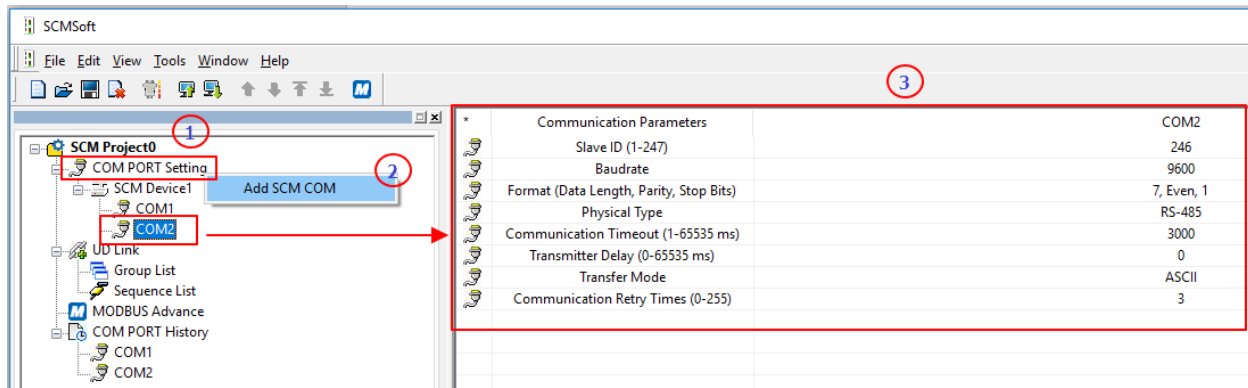


Figure 8: New project page in SCMSoft

3. Set the communication Parameter of SCM COM2

Once you have created a new project;



1. Right click COM PORT setting:
2. Click “Add SCM COM”
3. Then click COM2 and Set the communication parameters of COM 2 of the SCM module. This is the Port we will connect the VFD-C2000 (slaves) to as in the figure below.

*	Communication Parameters	COM2
	Slave ID (1-247)	246
	Baudrate	9600
	Format (Data Length, Parity, Stop Bits)	7, Even, 1
	Physical Type	RS-485
	Communication Timeout (1-65535 ms)	3000
	Transmitter Delay (0-65535 ms)	0
	Transfer Mode	ASCII
	Communication Retry Times (0-255)	3

Figure 9: Setting the communication parameters of COM2: station number 246 (default), Modbus ASCII, 9600, 7, Even, 1 of the DVPSCM12

4. Data exchange setup between DVPSCM12 as Master and VFD C2000 as slaves.

Ensure you have set the Communication parameter of COM 2 as already explained above. Finally, click “Modbus Advance Wizard” in SCMSoft to open the setting page for the reading/writing. In Modbus Advance Wizard setting page, you only need to designate or assign the registers for the data sending and data receiving. When you are through with the settings, download the setting to the SCM module through the communication port chosen by you. After the data exchange flag is enabled, the designated reading and writing are complete. The following are the steps of setting the Modbus Advance wizard.

Step 1: Modbus Advance Read/Write Setting

Refer to the figure below:

1. Right click Modbus Advance
2. Click on Add Modbus Advance

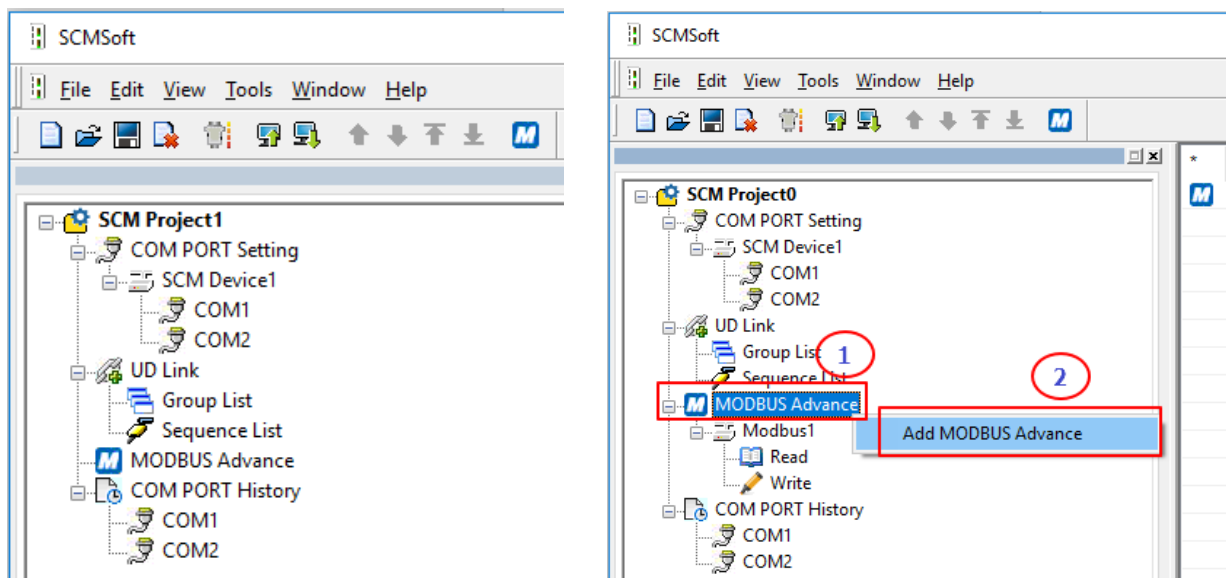


Figure 10: Adding Modbus Advance setting page

After Adding the Modbus Advance setting page, you can Set “Read Bit”/“Read Word” and “Write Bit”/“Write Word of the slaves.

Step 2: Set the data exchange registers for reading from the slaves:

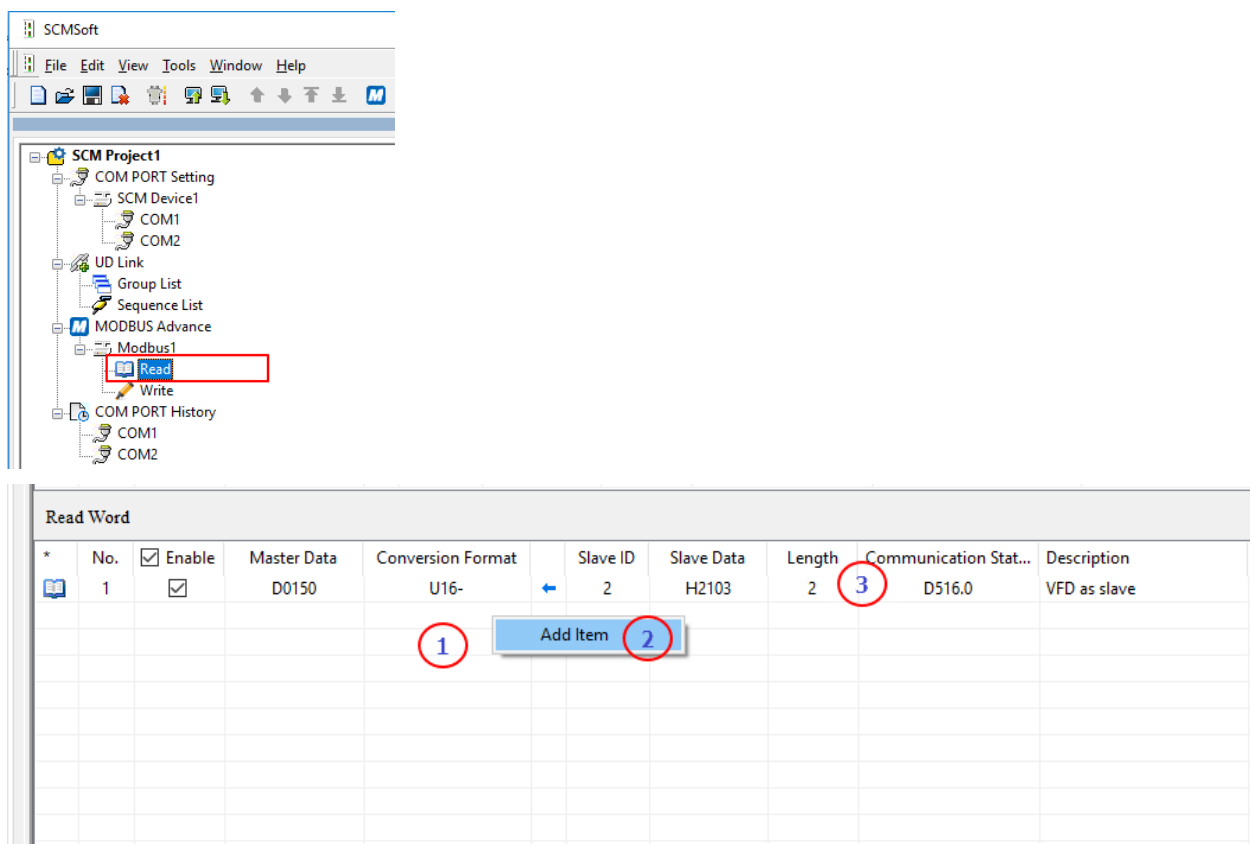


Figure 11: Setting up the Address for reading from the Slave

1. Right click on Read word setting space
2. Click on the Add item:
3. Click the added item twice to set the reading Information/data in the slave.

Edit the data exchange parameters as below. DVPSCM12 as Master will use D150-D151 to read 2103H-2104H of VFD as slave (**D150-D151** <- **2103H- 2104H**). You can repeat this for the other VFD- C2000 Slaves.

The image shows a 'Parameter Edit' dialog box with two main sections: 'Master' and 'Slave'. A large blue arrow points from the Master section to the Slave section.

Master Section:

- PLC Type:** A text box containing 'EH2L/SV'.
- Data:** A sub-section containing 'Start Address' with a dropdown set to 'D' and a text box containing '0150'.
- Description:** A text box containing 'VFD as slave'.

Slave Section:

- Slave ID:** A text box containing '2'.
- Device Type:** A dropdown menu set to 'MODBUS Device'.
- Length (Word):** A text box containing '2'.
- Data:** A sub-section containing 'Data Type' (dropdown set to '(0x03) Read Holding Registers') and 'Start Address' (text box containing '2103').

At the bottom right are 'OK' and 'Cancel' buttons. In the center, between the sections, are 'Conversion Format' and 'U16-' buttons.

Figure 12: Specify the Address for reading from the Slave (D150- D151 in Master will read from H2103-H2104 in VFD-C2000

Below is information about the various parameter field in figure 12 and 14.

Master:

PLC Type: It displays the PLC type that the DVPSCM12-SL is connected to. The user can click “Tools” in SCMSOft to change the PLC type.

Data: Enter the address of the D register in the PLC that will be used to store the value read from the slave.

Description: Enter the description of the device. The maximum length is 30 bytes.

Salve:

Slave ID: The station address of the slave device from which the data is read

Device Type: The user can choose the Delta PLC type. If the PLC used is not a Delta PLC, please leave the column blank. Select the device type that you are connecting to. In this example we used “MODBUS Device”

Length (Word): It indicates the length of the data being read. The maximum length is 100.

Data Type: The user can choose either “Hex” or “Modbus 6 Digit”. “Hex” represents 6 hexadecimal digits, and “Modbus 6 Digit” represents 6 decimal digits. If the device type is a Delta PLC type, the data type in this column will automatically become the D register.

Start Address The start address of the data of in the slave to read or write.

Step 3: Set the data exchange registers for Writing to the slaves:

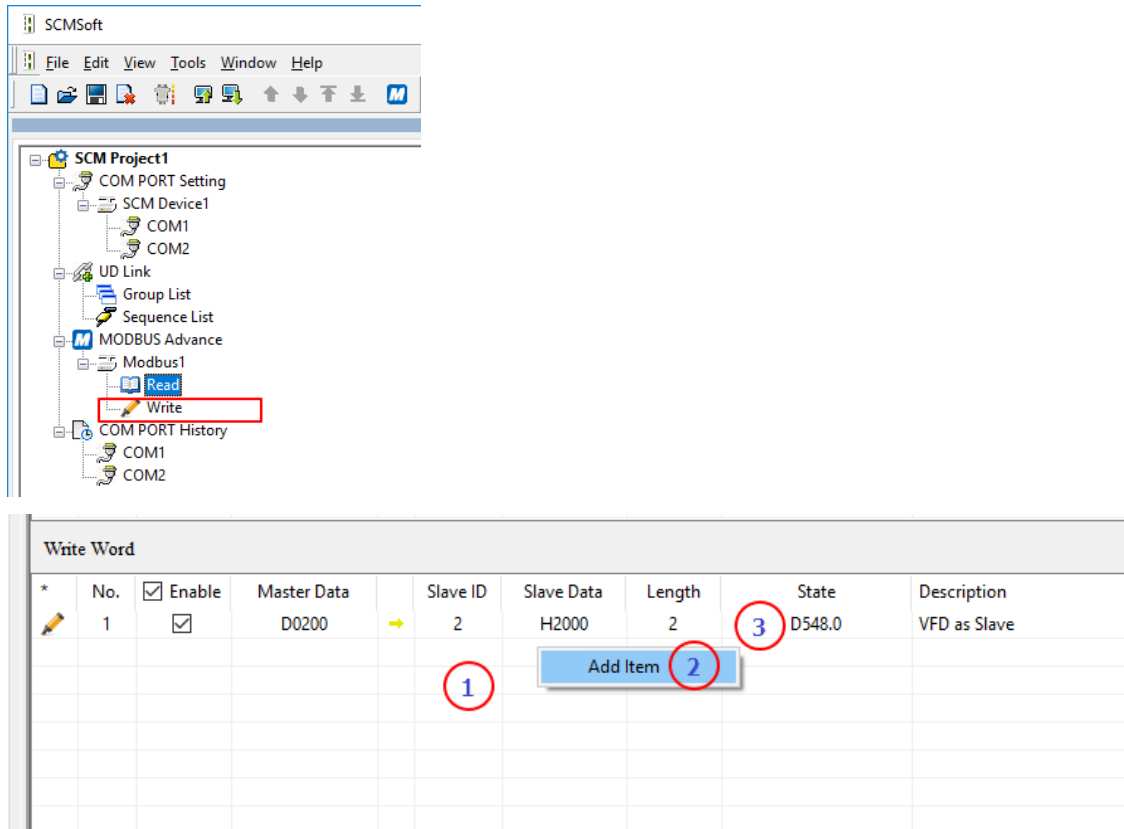


Figure 13: Setting up the Address for writing to the Slave

1. Right click on Read word setting space
2. Click on the Add item
3. Click the added item twice to set the writing Information in the slave.

Edit the data exchange parameters as below DVPSCM12 as Master will use D200-D201 to write 2000H-2001H of VFD-C2000 as slave (**D200, D2001->H2000, H2001**)

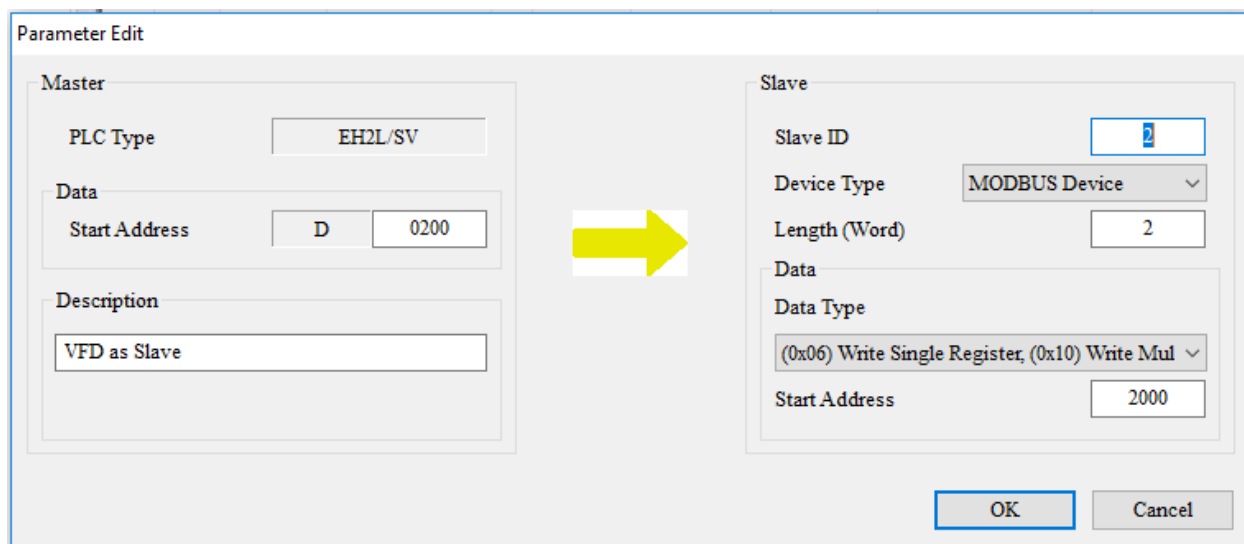


Figure 14: Specify the Address for Writing from the Master (D200- D201) will write data into H2103-H2104 of the VFD-C2000

Repeat this for the rest VFD-C2000 Slaves, ensure the station address of the “Slave ID” are different

Step 4: Assign the Data exchange already setup to the COM 2 of the DVPSCM12 Module:

After the setting is complete, the user can designate the communication port used in Modbus Advance —COM port 2 on left-side module number 1.

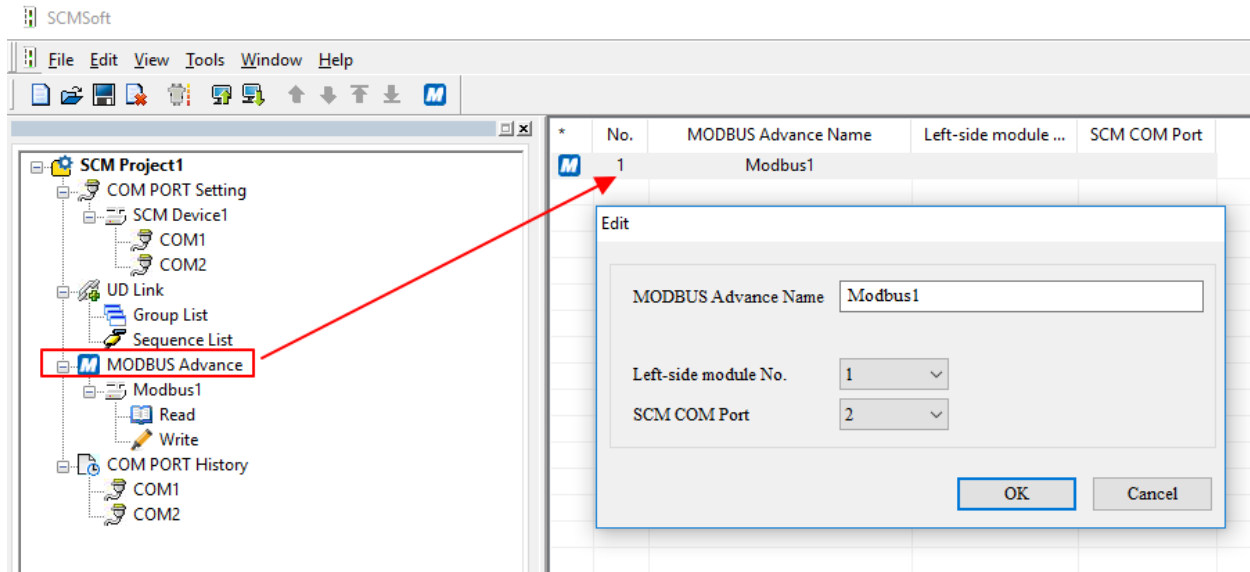


Figure 15: designating the communication port used in Modbus Advance COM port 2 on left-side module number 1

Step 4: Download the Configuration to the SCM module

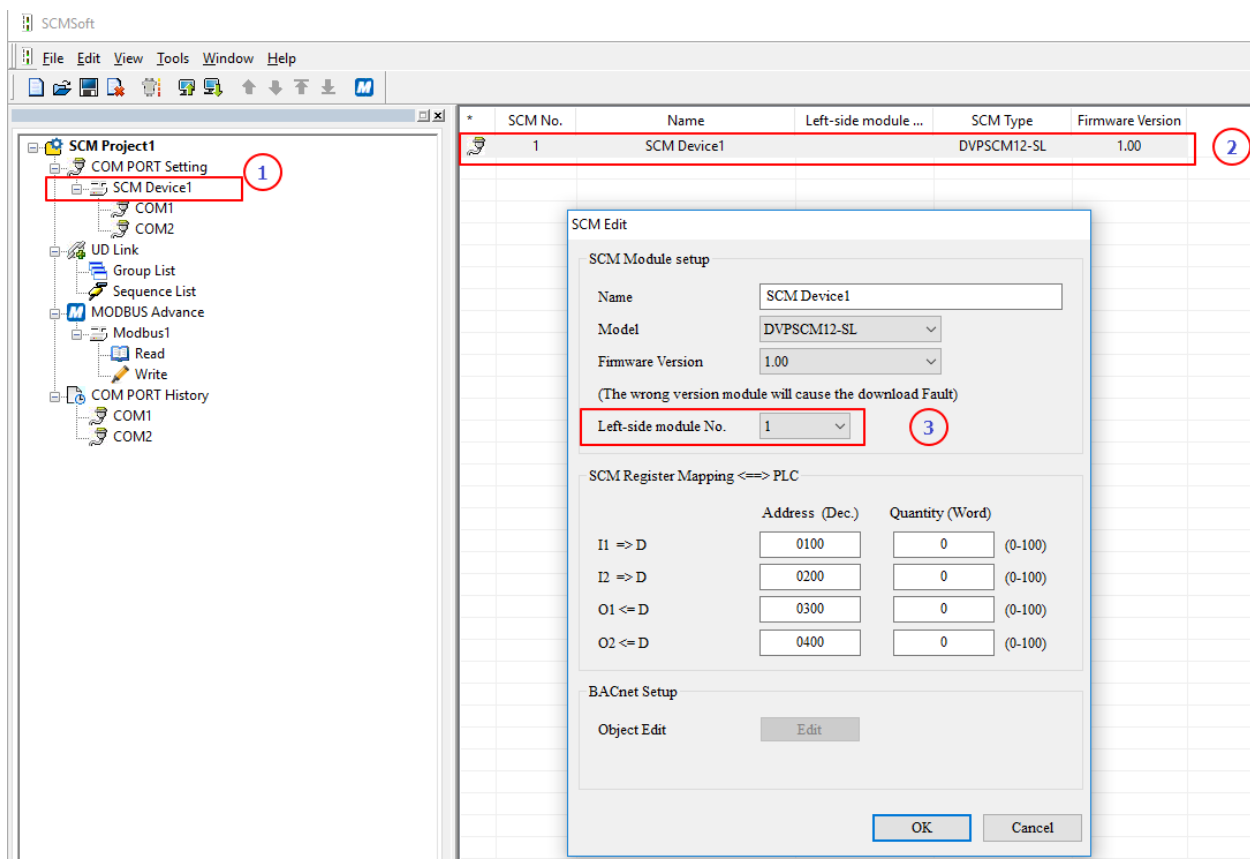


Figure 16: Specify the Position the SCM module on the DVP PLC CPU before downloading

Choose the left-side module which will be downloaded, and click “OK”. If only one device is connected, click “OK” directly.

After the setting is complete, check whether the other parameter settings conform to the slave setting.

Then, click “Download”.

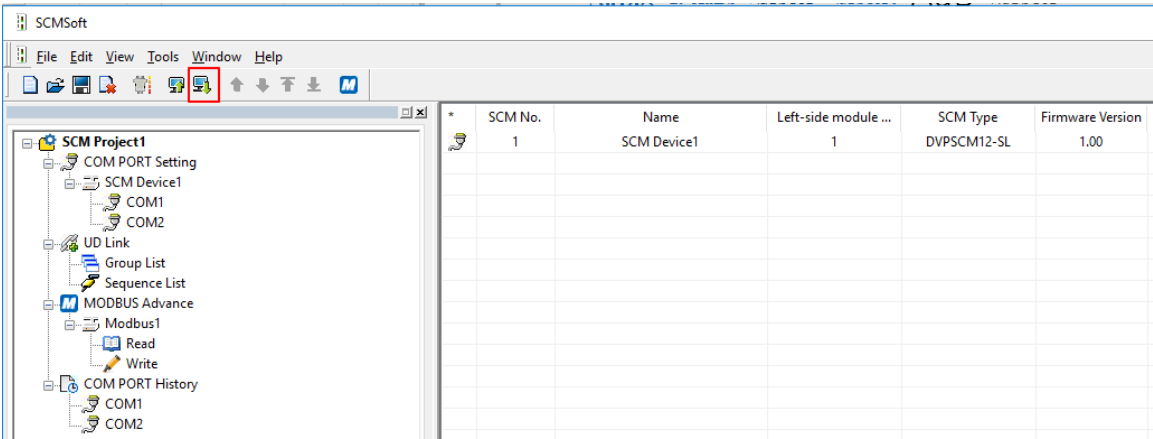


Figure 17: Download Tab

Then Click on the SCM module as below to select it.

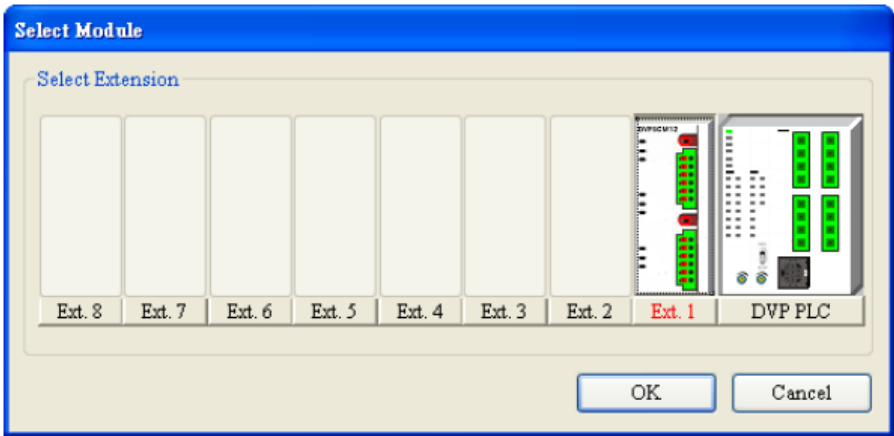


Figure 18: Select the SCM module

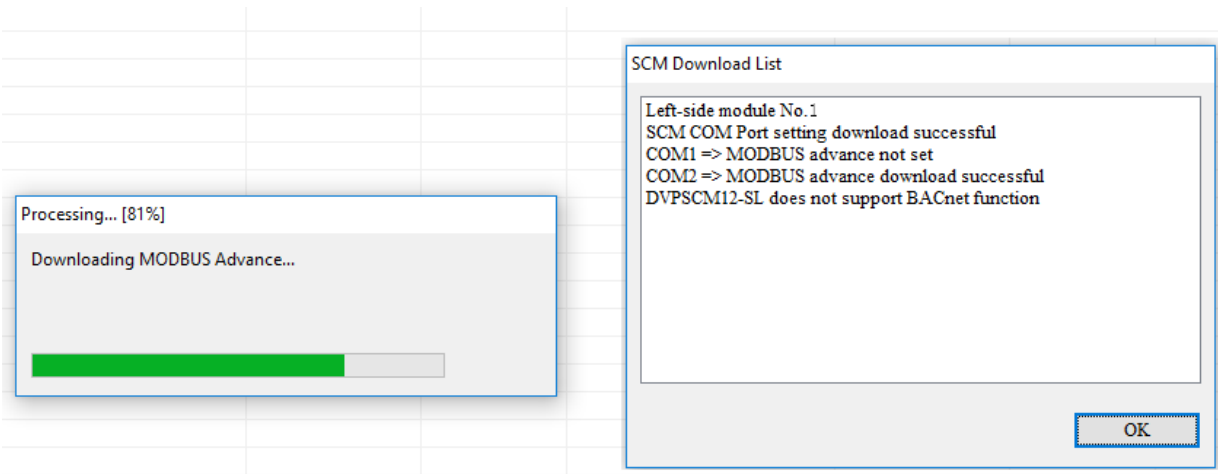


Figure 19: Downloading progress Window

Step 5: Enable data exchange

Using “TO” instruction Write “2” to the DVPSCM12 Control register (CR#31~CR#34) to enable data exchange. After the data exchange flag is enabled, the designated reading and writing setup are complete then you can now read bits/read words/write bits/write. See the ladder program in the next page.

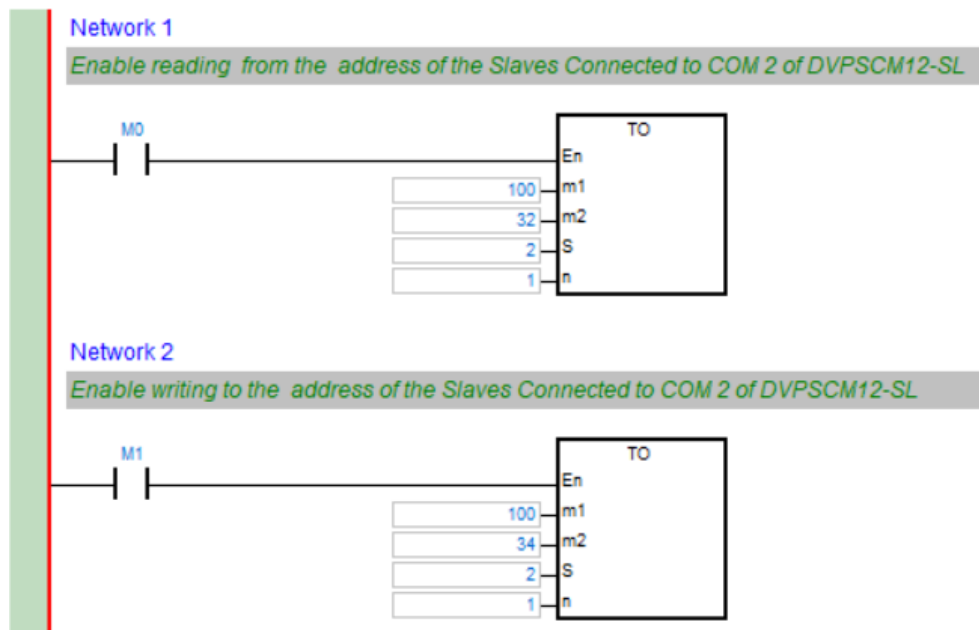


Figure 20: enabling data exchange for DVPSCM12-SL module

- After M0 is triggered, the data will be read from the slave address which has been set through COM2 on SCM module. If you want to keep executing the word-reading, the user can enter K2 into CR#32. If the user want to execute the word-reading once, the user can enter K1 into CR#32
- After M1 is triggered, the data will be written into the slave address which has been set through COM2 on SCM module. If you want to keep executing the word-writing, the user can enter K2 into CR#34. If the user wants to execute the word-writing once, the user can enter K1 into CR#34.

Data Exchange enable Control Registers in DVSCM12-SL

CR#	Attribute	Control Registers in DVSCM12-SL	Explanation
31	R/W	Triggering the data exchange through COM1 to read bits or words	High byte: bit; Low byte: word 0: Not triggered; 1: Triggered once; 2: Always triggered
32	R/W	Triggering the data exchange through COM2 to read bits or words	High byte: bit; Low byte: word 0: Not triggered; 1: Triggered once; 2: Always triggered
33	R/W	Triggering the data exchange through COM1 to write bits or words.	High byte: bit; Low byte: word 0: Not triggered; 1: Triggered once; 2: Always triggered
34	R/W	Triggering the data exchange through COM2 to write bits or words	High byte: bit; Low byte: word 0: Not triggered; 1: Triggered once; 2: Always triggered

Figure 21: DVPSCM12-SL Data exchange enable control register

Below is the Summary of Data exchange table between DVPSCM12 as Master and VFD-C2000 as Slaves based on our example and explanation above.

DVPSCM12 (Master)		VFD-C2000 (Slave)
D150 –D151	← Read	H2103-H2104
D200- D201	→ Write	H2000-H2001

Figure 22: Data Exchange table of DVPSCM12-SL as master and VFD-C2000 as Slave

4. Slave Communication status Monitor

SCM module provides the communication state/status monitor of Modbus Advance item of the slaves. There are four sections for Modbus advance items: — Read Bit, Read Word, Write Bit, and Write Word as in the figure below.

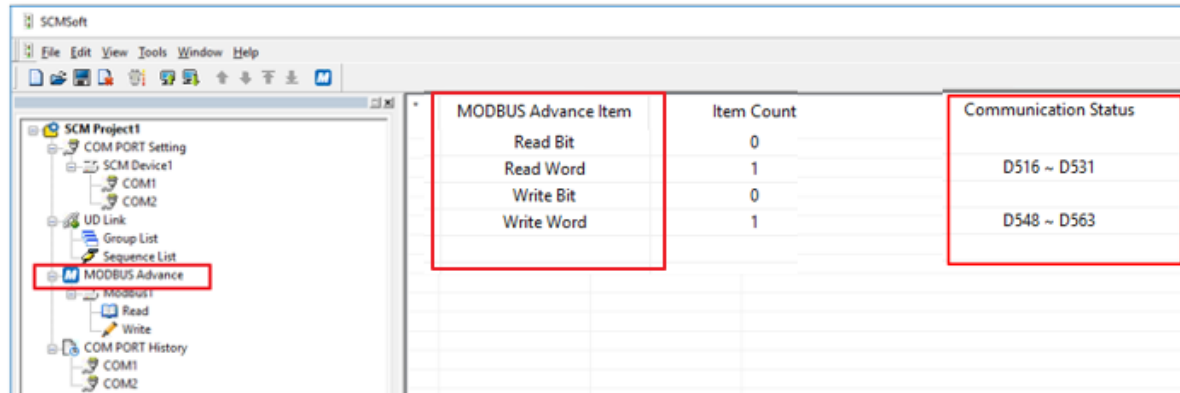


Figure 23: Modbus Advance Item and Communication status Monitor indication

When the Data exchange is started, the execution/ communication status in each item/line is stored in the bits in the register of each section. For example if D548 is the start address for the communication status of the slaves “Write word” item, When data is written successfully to slave 1, the communication/execution status of the data exchange in No.1 (salve 1) will be displayed in the first bit (b0) in D548 so bit 0 of D548 will be ON and D548 will show “1”, and by analogy, the execution status of the data exchange in No.2 (salve 2) will be displayed in the second bit (b1) in D548 so bit 1 of D548 will be ON and D548 will show “2”. This continues until the number of salves setup. As in the figure below 5 slaves is setup. Maximum of 32 slaves each can be connected to COM 1 and COM 2.

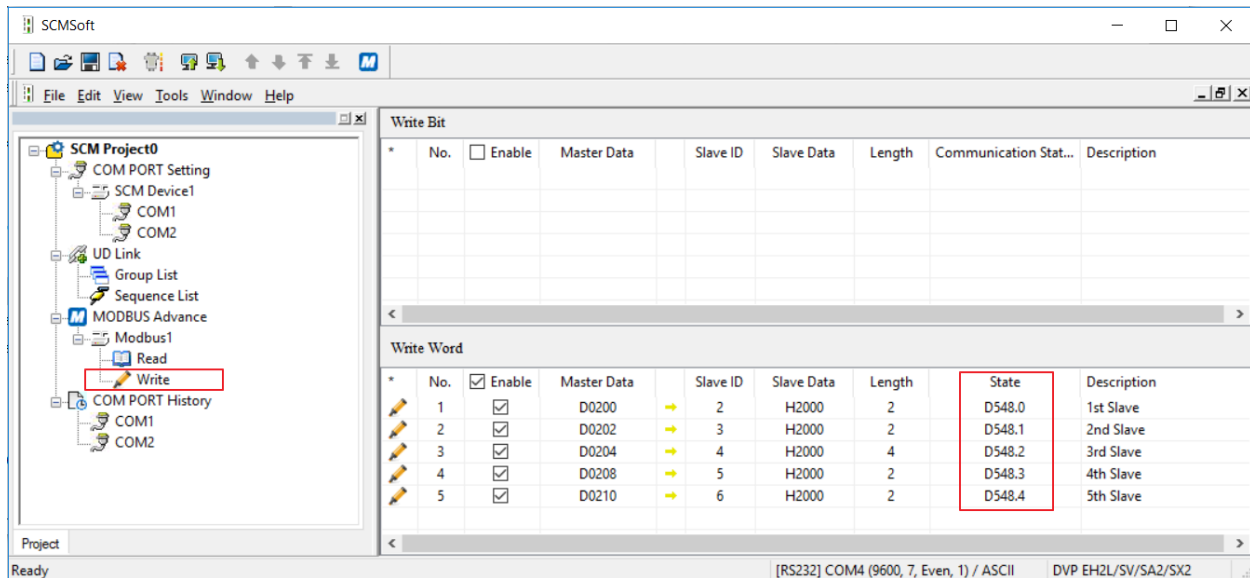


Figure 24: Indication of communication status of each slaves set up for data Exchange

So when data is written to slave 1, you can read the status in D548, bit 0 of D548 will be ON.

This analogies continues for the remaining slaves. It also applies monitoring the communication status of reading from slave.

Dn																
Bit	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
No.	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

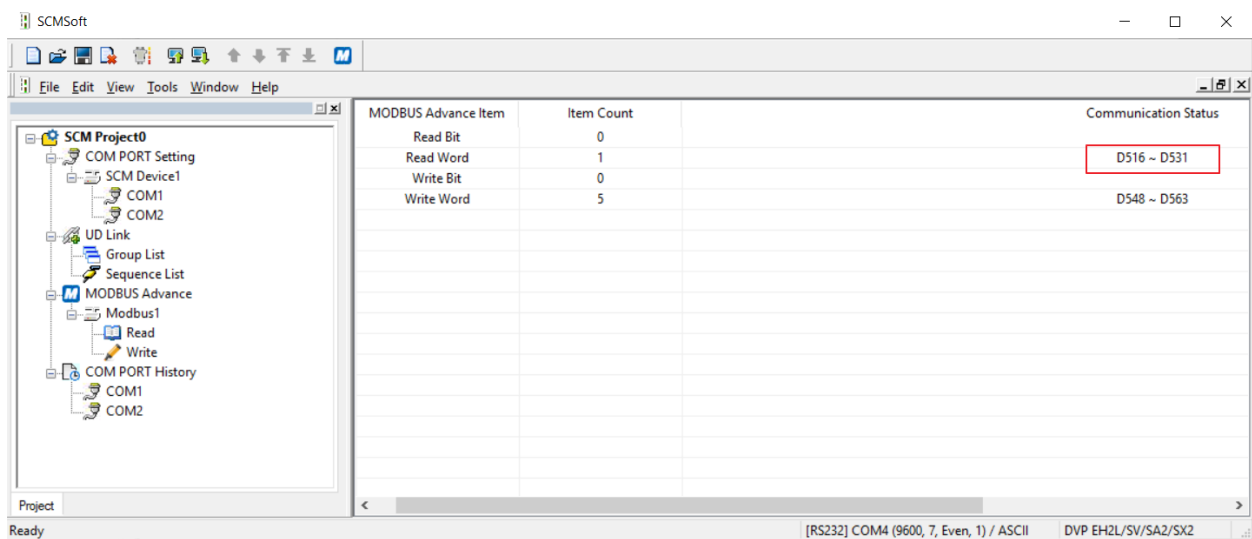
D (n+1)																
Bit	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
No.	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17

Figure 25: Illustration of communication status monitoring of the slaves corresponding to the bit of D548/D516

According to our settings in figure 23, D516 will show the communication status of reading from the slaves

The default address is D516 for monitoring the communication status of the slave when reading data from the slaves. While the default address is D548 for monitoring the communication status of the slaves when writing data to the slaves.

The user can change this default/start communication status address in Modbus Advance when you double click on the communication status start address as address below.



In the window below Change the default communication status register to the register you desire and click Ok.

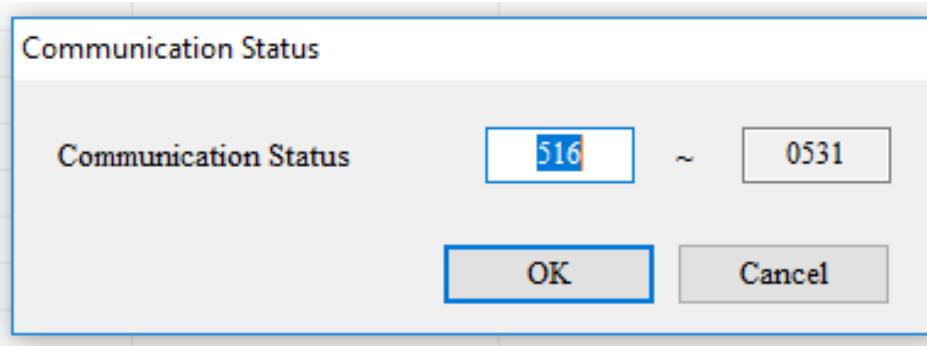


Figure 26: Customizing the address for Communication status Monitor of the slaves

5. DVPSCM12-SL as Modbus Slave

DVPSCM12-SL can easily be connected as a Modbus slave to other Delta products.

Example: DVPSCM12-SL as a Modbus slave and HMI (DOP-100WV) as the Master

For DVPSCM12-SL as the Modbus slave, the user only has to set the parameters such as the station Address and the baud rate to allow the connection with the master. Such as the human-machine interfaces, the text panels, the PLCs,

In this example we used DVPSCM12-SL as a slave and DOP-100WV HMI as the master.

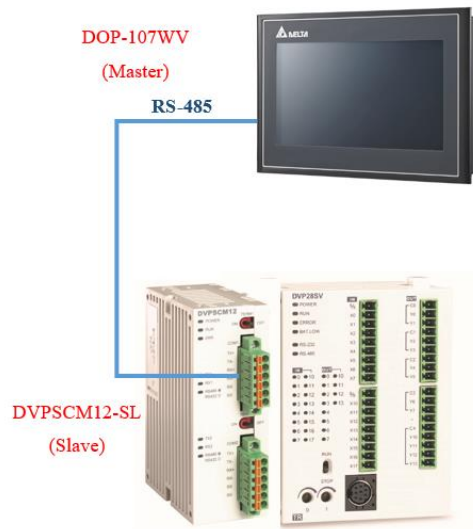


Figure 27: DVPSCM12-SL as a Modbus slave and HMI (DOP-100WV) as the Master

The user can set the slave IDs of COM1 and COM2. The superior (Master) device connects to SCM module through the slave ID. The default slave ID of COM1 is 247, and that of COM2 is 246.

Follow the steps below to set up DVPSCM12-SL as a slave to DOP-100WV.

1. Start up DCISoft

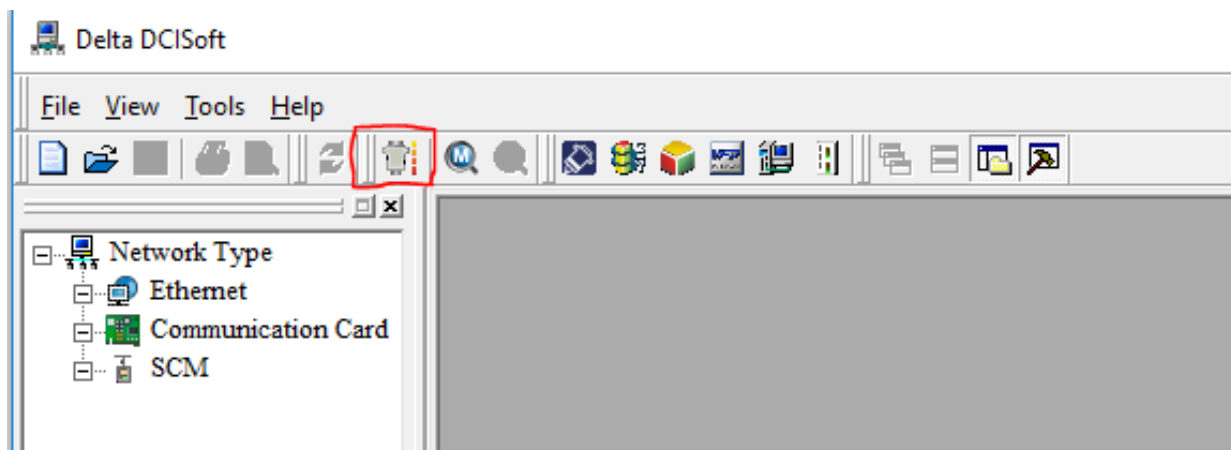


Figure 28: DCISoft setup

Open DCISoft, click “Tools” and choose “Communication Setting” as above. Then set the communication between your PC and the DVPSCM12-SL module. The user can choose the Communication port, and set

the information related to RS-232. If an Ethernet module is used with DVPSCM-SL module, the user can choose “Ethernet” in “Transfer Mode” column to upload/download the program as in the figure below

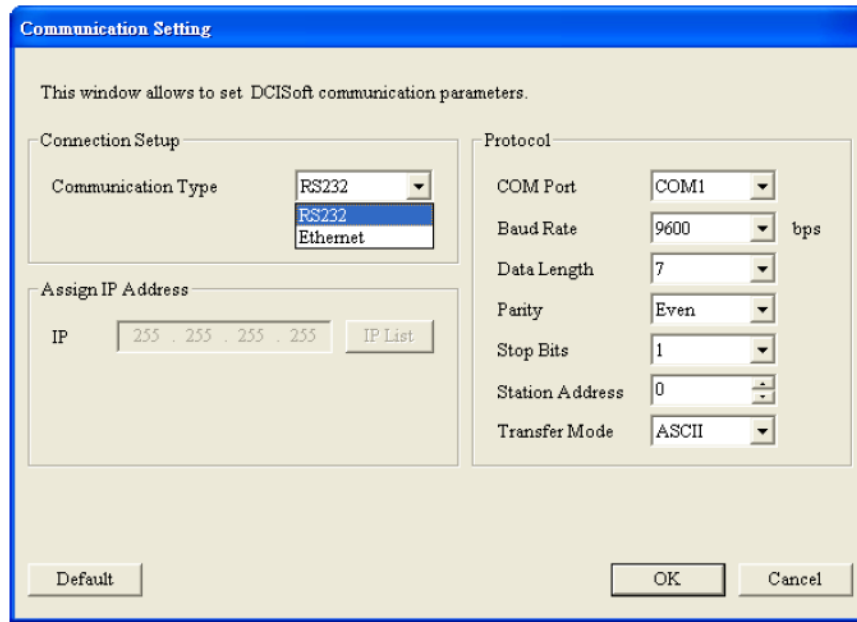
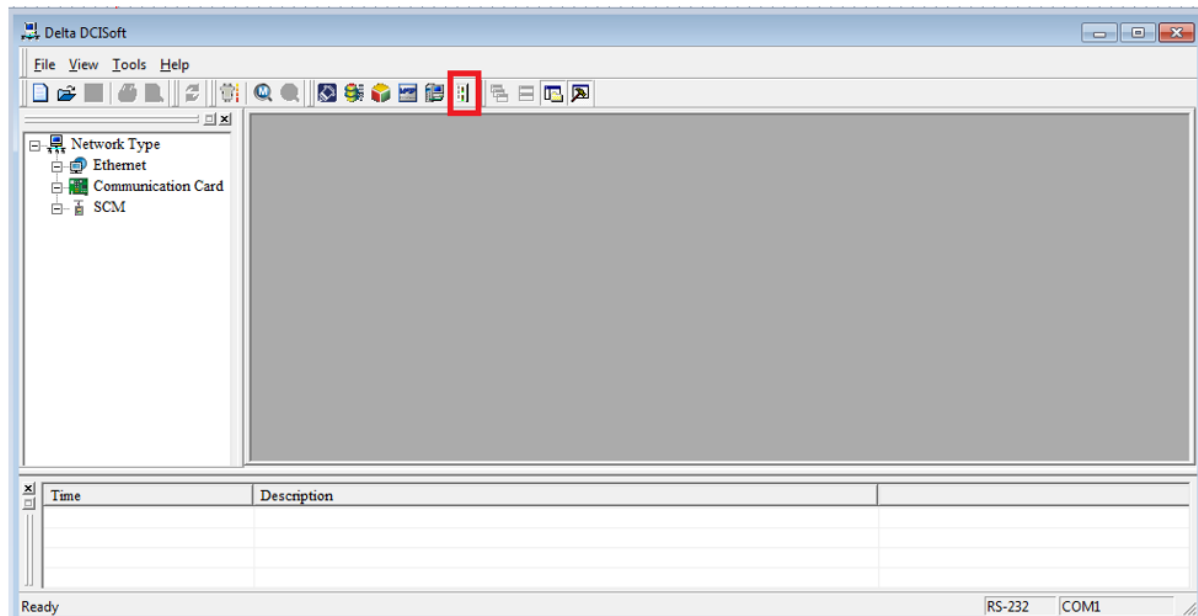


Figure 29: Communication setting between PC and the DVPSCM12-SL module

2. Create SCM project

Click “SCMSoft” in DCISoft to open the setting page of SCMSoft.



Then, click “New Project” in SCMSoft to establish a SCM project as below.

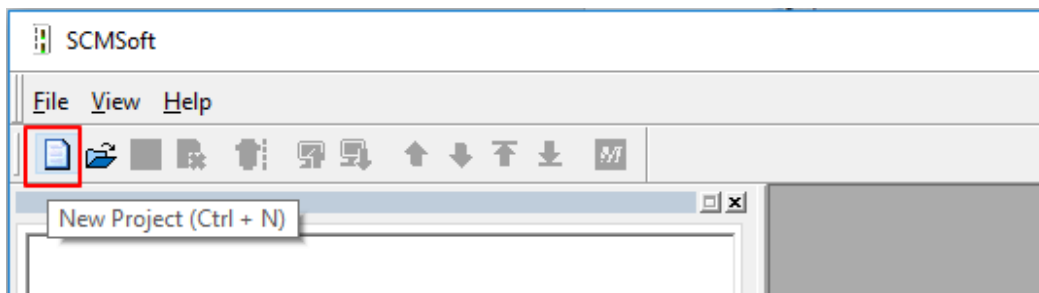


Figure 30: Creating New Project in SCMSoft

The screen below will appear

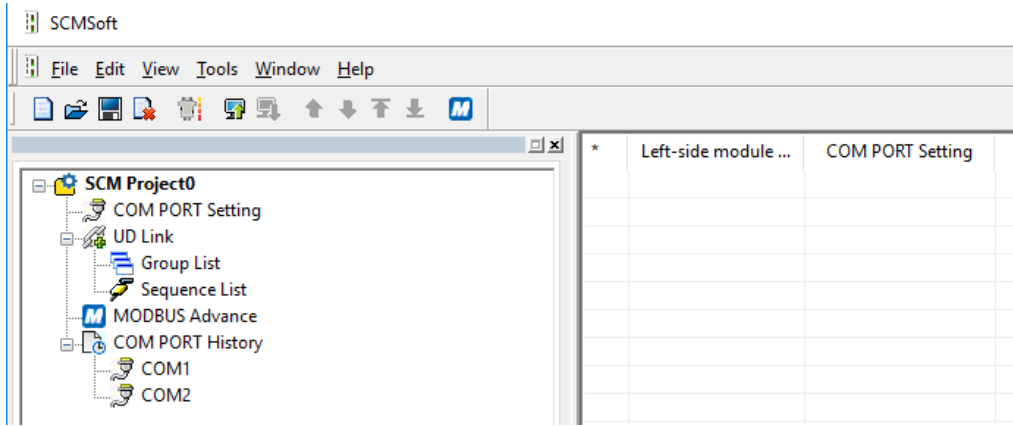
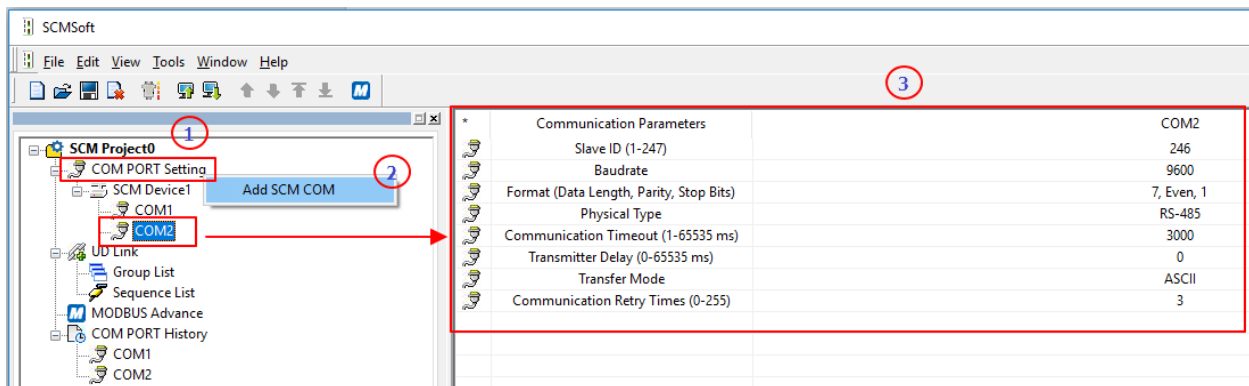


Figure 31: New project page in SCMSoft

3. Set the communication Parameter of SCM COM2

Once you have created a new project,



1. Right click COM PORT setting:
2. Click “Add SCM COM”
3. Then click COM2 and Set the communication parameters of COM 1 of the SCM module. This is the Port we connect the DOP-100WV (Master) to as in the figure below.

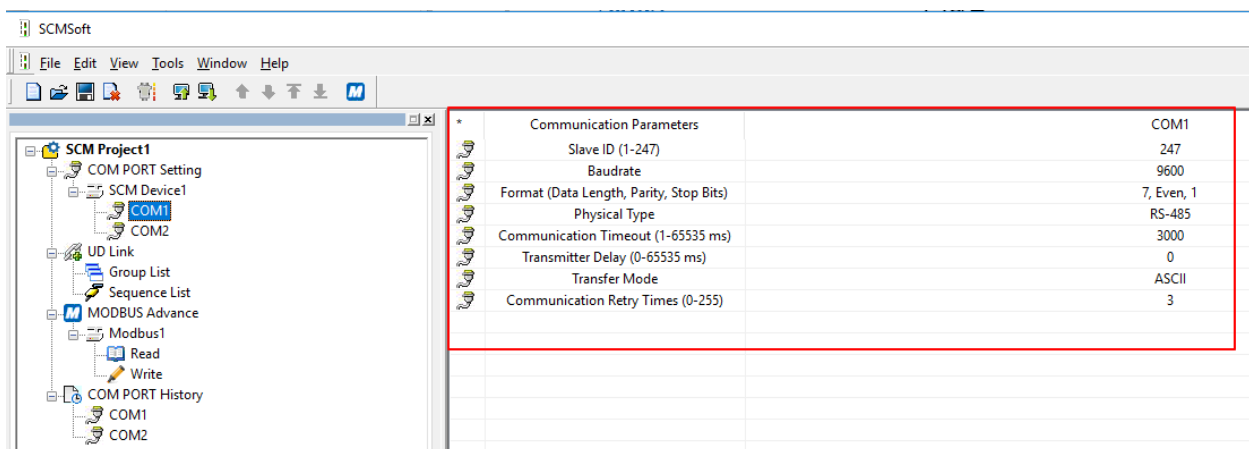


Figure 32: Setting the communication parameters of COM1: station number 247, Modbus ASCII, 9600, 7, Even, 1 of the DVPSCM12

4. DOP-100 communication Parameter setting

Step 1: Create a project. Select 107WV as shown below and then click on **Next** to complete the Serial communication parameter settings

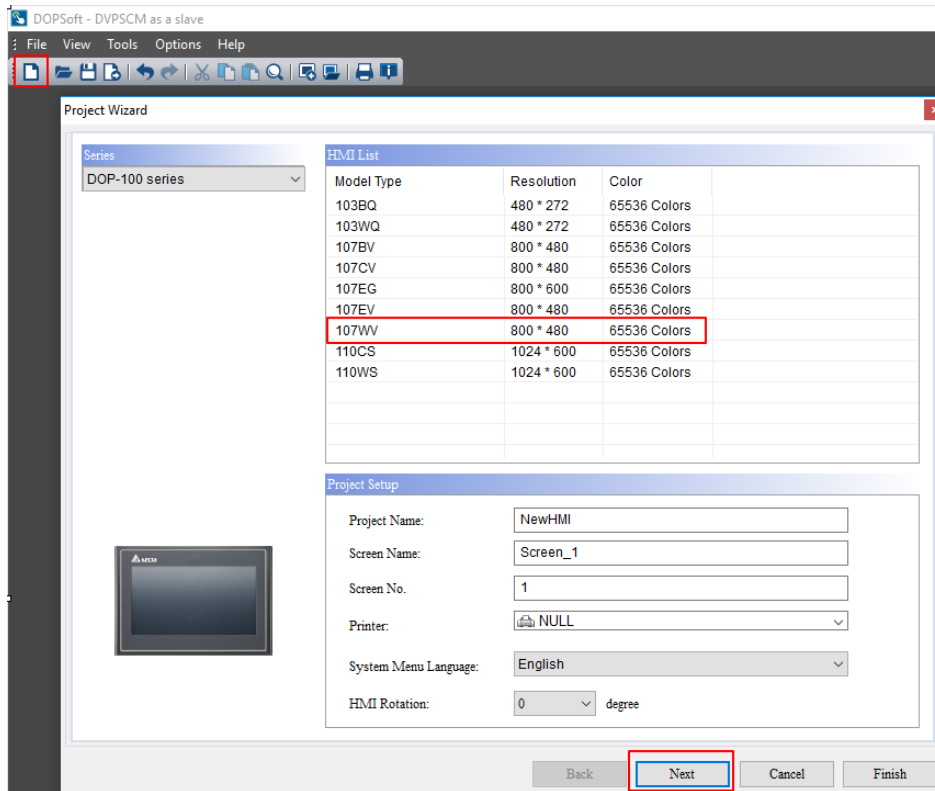


Figure 33: Create new project in DOPSoft

Step 2: Complete the serial communication parameters settings of the DOP-107WV (Modbus ASCII, 9600, 7, Even, 1)

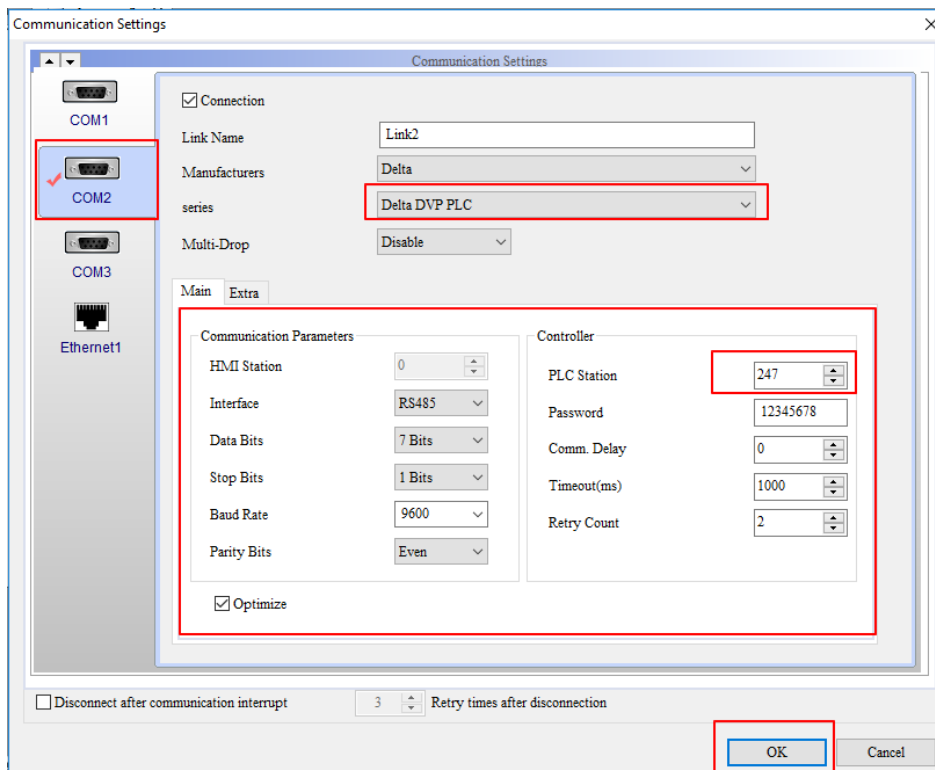


Figure 34: Communication Parameter setting

Step 3: Create Numeric Element

To test the writing/reading of the DVPSCM12-SL (salve) from DOP-107WV as the master, create a Numeric element. Pressing on this element when the HMI is running, you can write and read from to registers of the DVPSCM12-SL

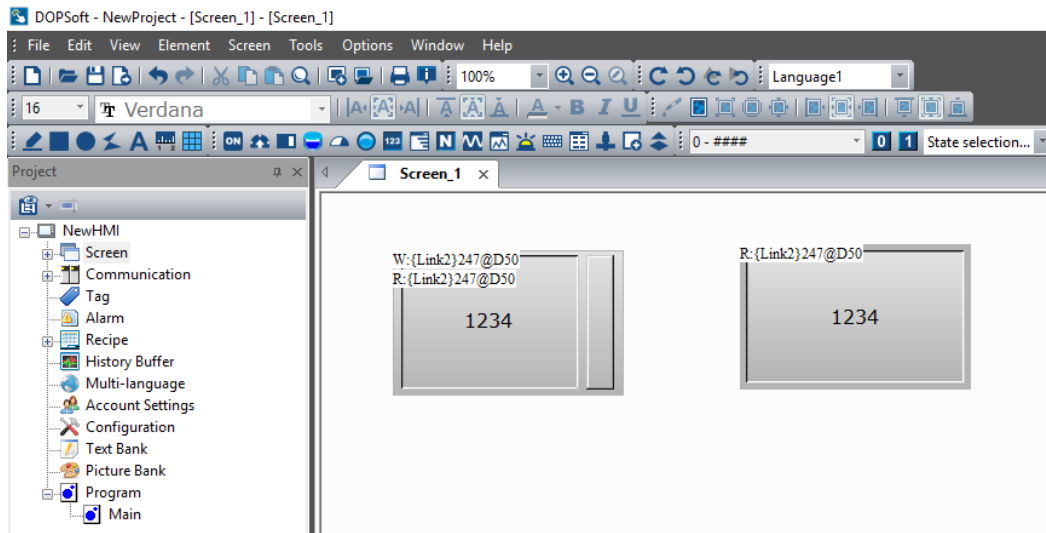


Figure 35: Create Numeric Element

Step 3: Create a Macro to automatically increase the value in DVPSCM12-SL by +1. After downloading this program to the DOP-17WV and connecting the DVPSCM12-SL to it, you can now read and write the DVPSCM12-SL.

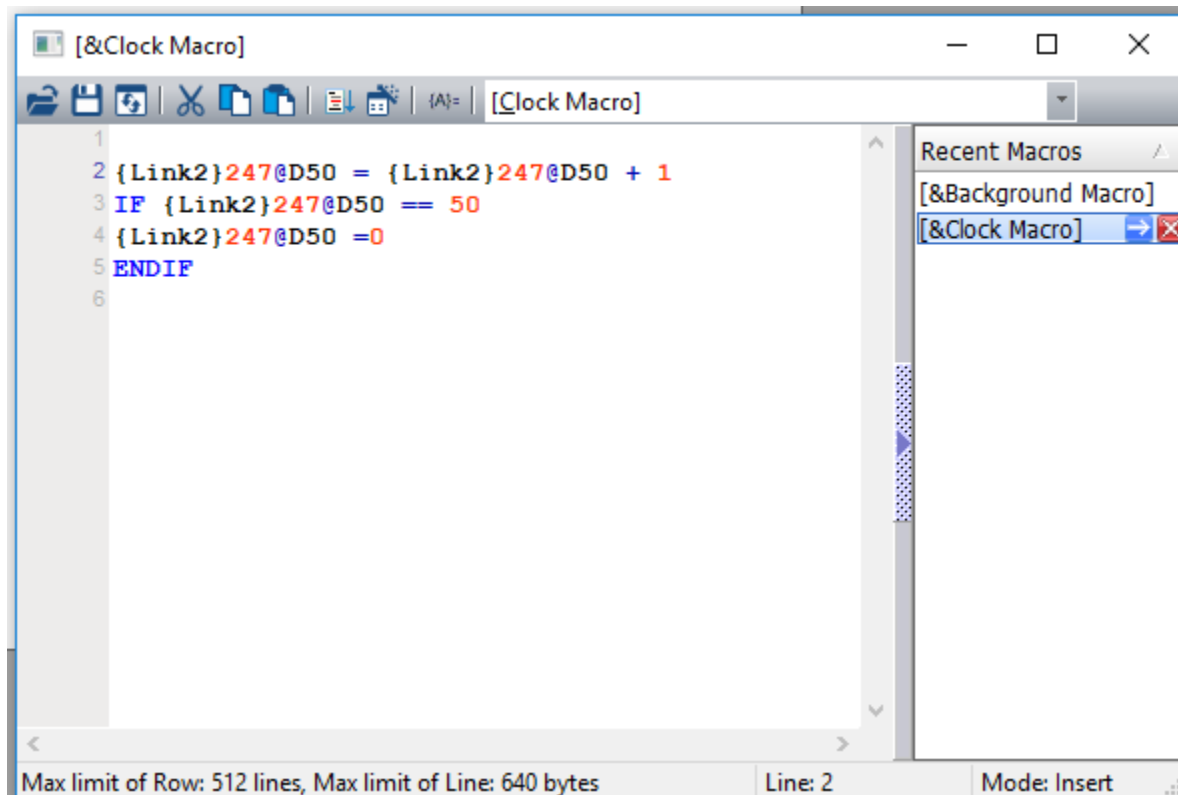


Figure 36: Create a Macro to implement a Counter

You have been able to control the DVPSCM12-SL as a slave from the DOP-100WV as a Master. For more information refer to the DVPSCM12-SL operation manual