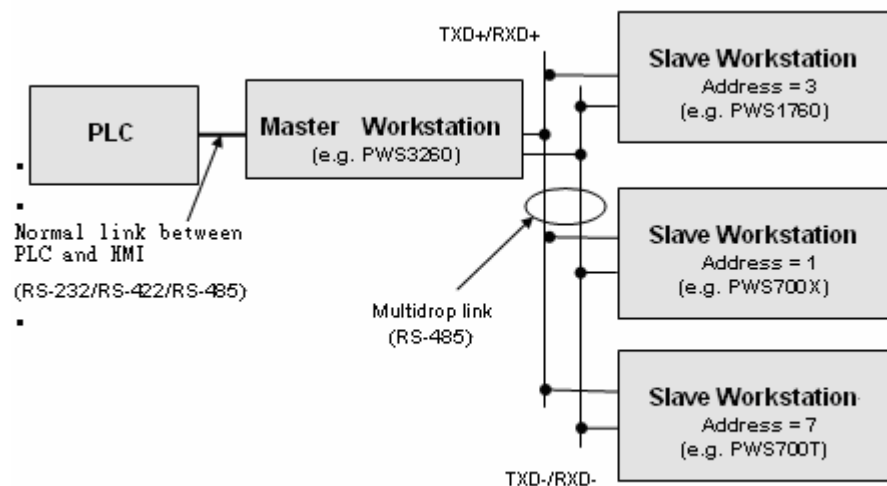


### 5. Multi-link: Normal Connection Port

The multi-link provides users an economical and convenient way to link several HMIs and communicate with a single PLC connection port. User needs one master HMI and others are slaves. The **master** is the only HMI that is physically connected to a PLC and this HMI is responsible for the exchange of the data between the PLC and the slaves. Each of the **slaves** HMI must be assigned to an unique address so that the master HMI is able to identify which slave to send the data to.

The following picture shows the setup for four HMIs with one PLC. Note that the RS-485 cable must be used for the connection between the master and the slaves and each of the slaves must be assigned to an unique address.



The cable and the connection between the master and the PLC is the same as the normal 1-to-1 application. The RS-485 cable must be used for the connection between the master and the slaves. Additionally, each of the slaves must be assigned to an unique address. This multi-link function is only supported by version ADP 3.0 or later. Besides, all the PLC models in ADP 6.0 support this function.

Moreover, Multi-link can be connected through Ethernet. For the communication and application of Ethernet, please refer to [Chapter 6](#) for the complete details.

### 5.1. Communication Parameters

The steps to set up communication parameters are shown in the following:

2. For setting up the Master - the HMI communicates with PLC :
  - (i) Select [Application]/[Workstation Setup], check the [This PWS is a multi-link master] box. Next enter the addresses and sizes in the [Common Register Block], [Common On/Off Block], [CRB Size] and [COB Size] box. See Figure 206.

For the function of CRB and COB, please refer to next chapter for the complete details.

- (ii) Download the edited application to the master HMI.

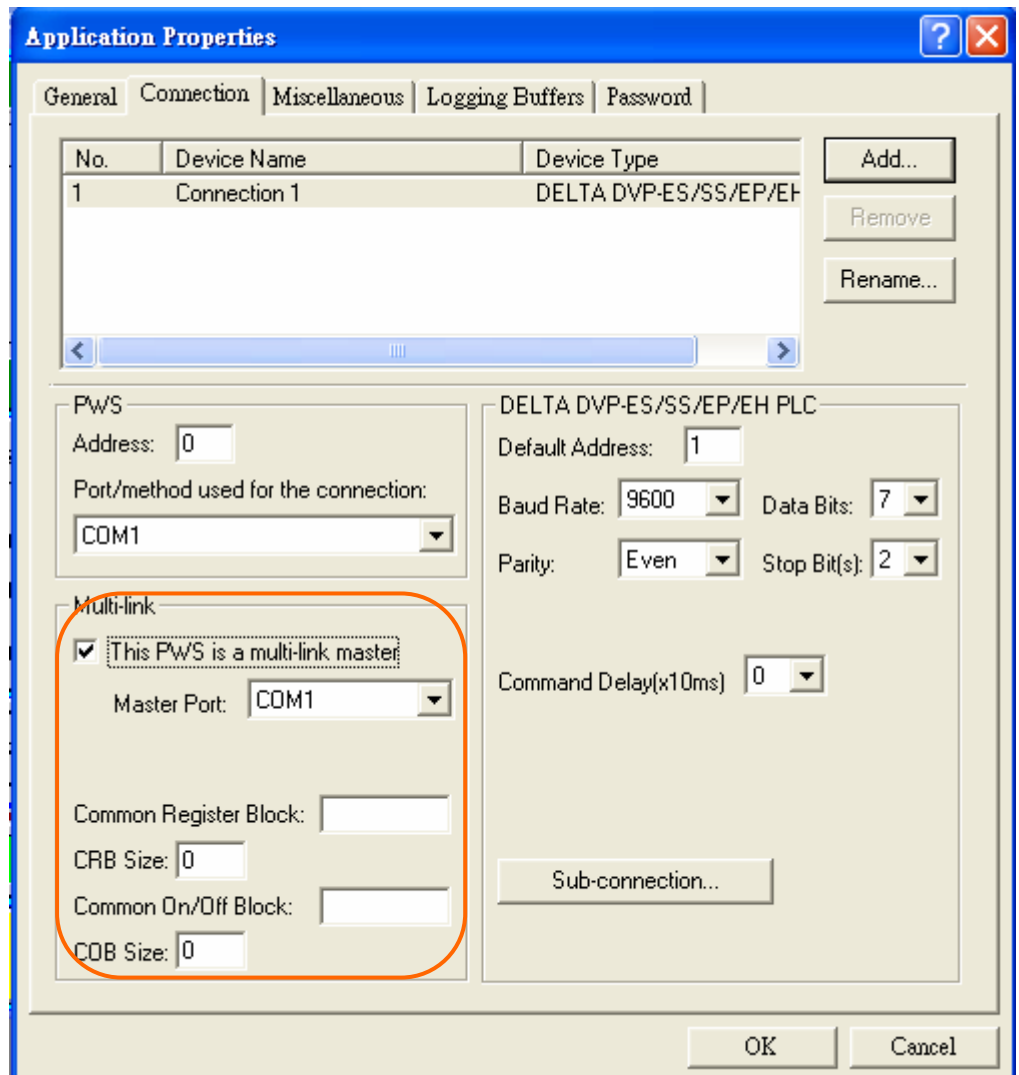


Figure 206. Set up the Parameters for the Master HMI

## 5. Multi-link: Normal Connection Port

3. For setting up the Slave - the HMIs do not communicate with PLC:

- (i) Select [Application]/[Workstation Setup]. On the [Connection] tab, select [COM1] port used for the connection and enter the addresses and sizes in the [Common Register Block], [Common On/Off Block], [CRB Size] and [COB Size] box. See Figure 207.

Note that the CRB, COB, data format, starting address and data size must be the same between master HMI and slave HMIs.

- (ii) Setup [Default Address] :

If the slave HMI dip switch#5 set OFF, the HMI will read the communication parameters from ADP. A user must enter the unique address (2-10) in [Default Address]. See Figure 207. Remember to compile and download applications each time after making any changes to the address.

If the slave HMI dip switch#5 set ON, the HMI will read the parameters from hardware. A user must set up the address (1-15) in Workstation Node Address.

- (iii) Download the edited application to the slave HMIs.

## 5. Multi-link: Normal Connection Port

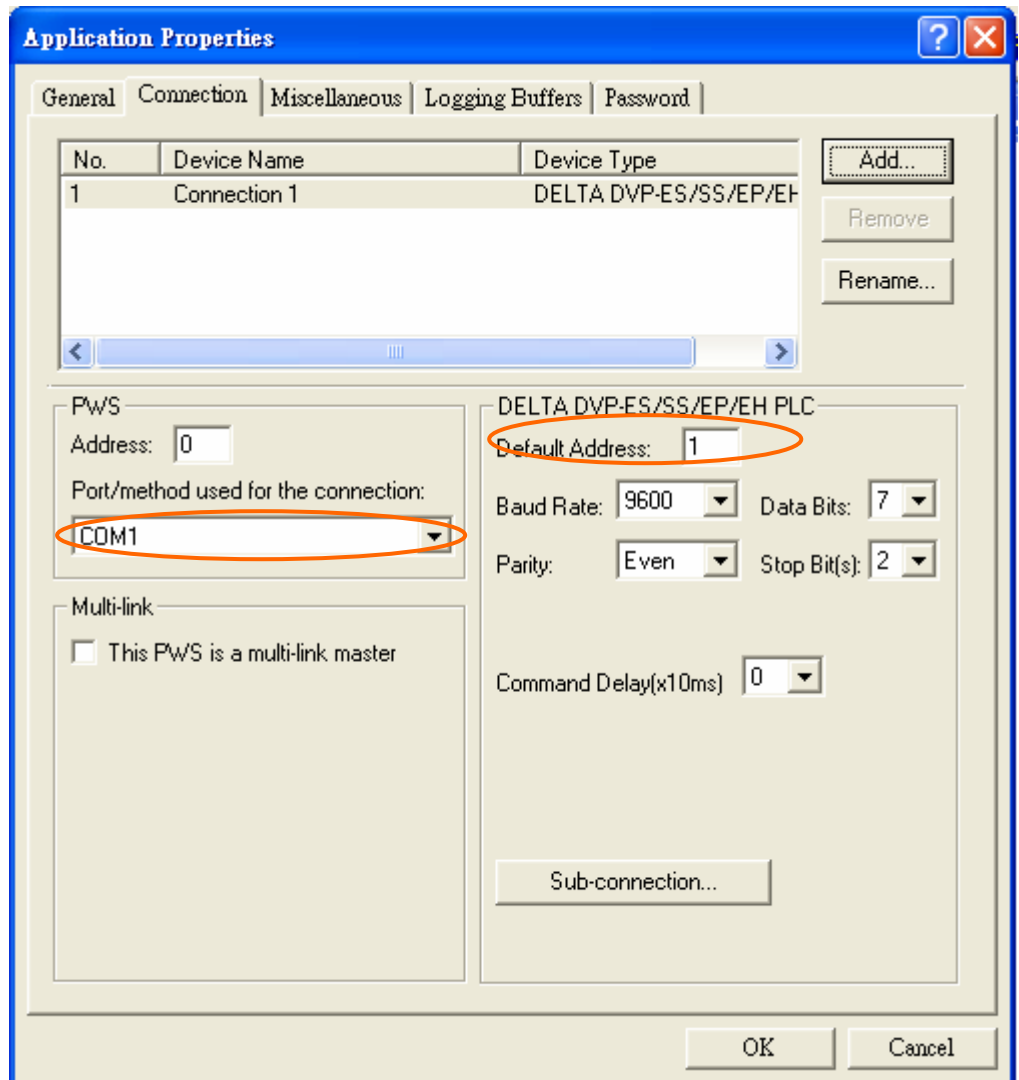


Figure 207. Set up the Parameters for the Slave HMIs

Please note that the address number of master HMI will not affect the communication with the slave HMI. Besides, it is not necessary to set up the baud rate or data type for the slave HMI. The point to set up the slave HMI is to make sure the connect port with the master HMI.

### 5.2. Communication Efficiency

In ADP, it allows you to specify **Common Register Block (CRB)** and **Common On/Off Block (COB)** for HMIs. CRB is a block of registers and COB is a block of On/Off locations in PLC. In every read cycle, the master Workstation reads the data from both CRB and COB. Then the master sends the data of the CRB and COB to all the slaves.

CRB and COB allow a user to set the maximum size up to 128 words and 256 words. In multi-link, user has to specify the CRB and COB with the same size and format for each of the HMIs. Hence, the slaves are not requested to read the data from CRB or COB directly. The slaves read the data from the buffer where the data sent by the master are saved. CRB and COB play an important role in terms of communication efficiency since they can reduce the traffic in the multi-link as well as the link between the master and the PLC

For instance, arranging Control Blocks of the HMI in CRB and COB is one of the most effective ways to improve the performance. Arranging the variables which are common to some of the Workstations in CRB or COB will also improve the performance. In doing so, one will be able to see a high refresh rate for the variables arranged in CRB and COB since the variables are refreshed in every read cycle.

In addition to CRB and COB, remember to make use of the register blocks and on/off blocks for screens since this will lessen the burden of the HMI by reducing the number of read commands.

Note that one is advised to specify CRB and COB with contiguous locations as designing a screen.

### 5.3. Important Notes

When used the Multi-link, please note the following points:

1. The RS-485 connection method is suggested for the multi-link. And the RS232 connection method is suggested for only one slave HMI.

PWS-COM2 Port 25-pin female-----CABLE-----		PWS- COM2 Port -----25-pin female	
TXD+/RXD+ 14	----- 14	TXD+/RXD+	
TXD- /RXD- 15	----- 15	TXD-/RXD-	
GND 7	----- 7	GND	

2. Each slave must have its unique address.
3. The HMIs on the same multi-link must have the same CRB and COB.
4. The master HMI should only start after all the slaves have displayed their first screens. To delay the start-up of the master, select the [Miscellaneous] tab in the [Application Properties] dialog box. Then set the time from the [Start Up Delay (Sec.)] list. See below.

## 5. Multi-link: Normal Connection Port

The screenshot shows the 'Application Properties' dialog box with the 'Connection' tab selected. The 'Start Up Delay (Sec.)' is set to 3 and is circled in orange. The 'Display Countdown' checkbox is checked. The 'While opening a screen, do not display the data until all of them have been read' checkbox is unchecked.

**Application Properties**

General | **Connection** | Miscellaneous | Logging Buffers | Password

☒ Read/write recipes from/to PLC  
Address: w500 ...  
Recipe size: 100  
Number of recipes: 10  
Edit Field Definition...

☐ Write time and date to PLC  
Address: ...

☐ Synchronize time and date with PLC

☐ While opening a screen, do not display the data until all of them have been read

Touch Screen/External Keys  
Buzzer Acting Time (Sec.): 0.20  
Auto Repeat Delay (Sec.): 1.0  
Auto Repeat Rate (Hz): 2  
**Start Up Delay (Sec.): 3**  
☒ Display Countdown

OK Cancel