VIM Network Gateway Quick Start Guide
Modbus TCP Master Driver (IOD-4101)

Configuring the VIM in the VIMNet Explorer

1. Double-click on **VIMNet Explorer.msi** to install the VIMNet Explorer on the PC that is connected the VIM.

2. Launch the **VIMNet Explorer** by going to **Start->Programs->VIMNet Explorer->VIMNet Explorer** or PPV.exe

3. The following window will be displayed. You will be prompted to **enter the IP Address** of the network communicating with the VIM. Change the default IP address to that of the NIC and click OK.

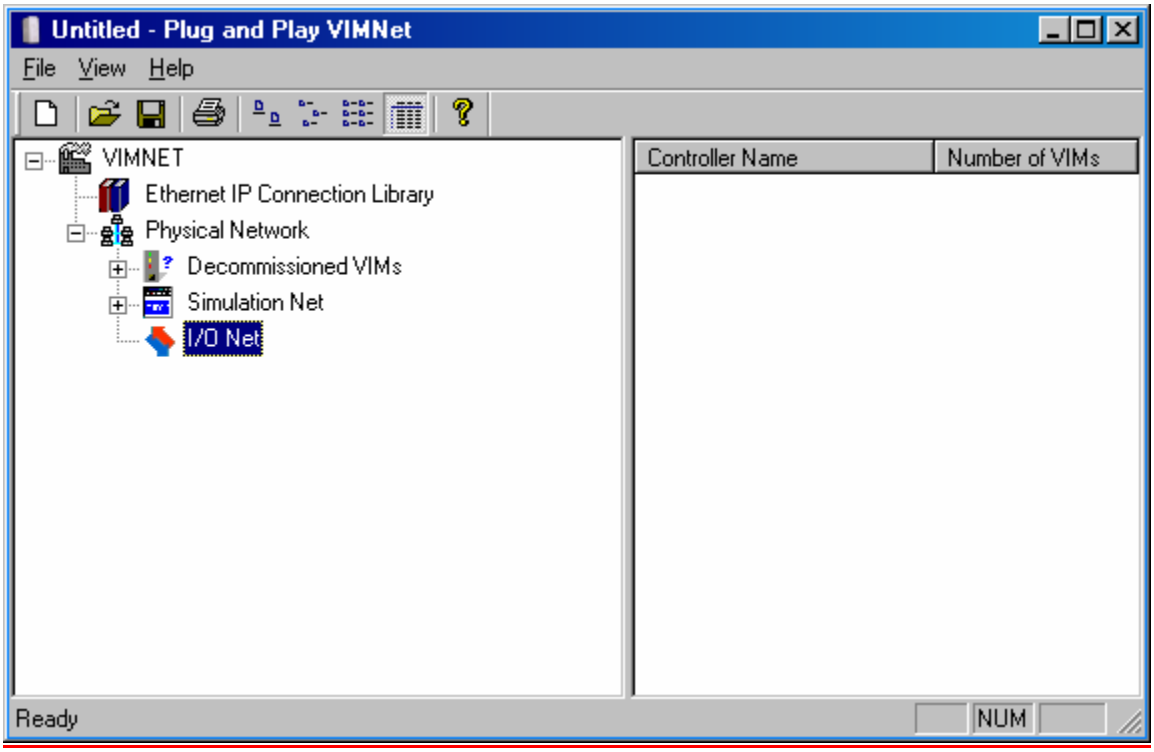

Figure 1: VIMNet Explorer

4. Right-click on I/O Net and **select New Controller** menu option to add a controller object, which you can rename or leave as default, e.g. Node1.

5. Right-click on the controller to **Add Virtual I/O Module or VIM**. This will open up a new dialog box shown below:

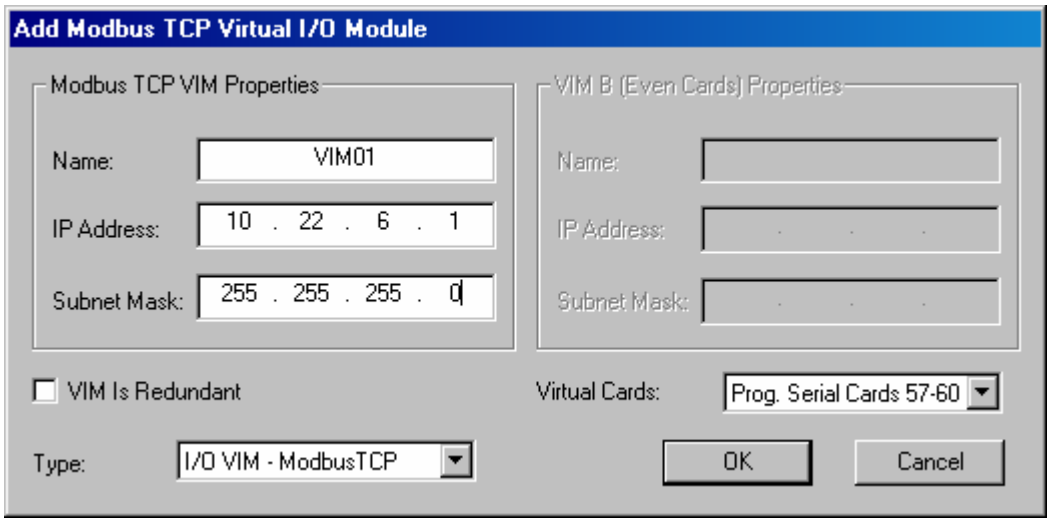

Figure 2: Add the Modbus VIM placeholder

7. Fill in the parameters as follows:
   a. **Name** – Unique 32 character VIM name
   b. **IP Address** – an IP address in your network which is not currently being used
   c. **Subnet Mask** – can remain the default one but must match the subnet mask of NIC
   d. **Virtual Cards** – select card group to be emulated by VIM, i.e., cards 57-60, or 61-64
   e. **Type** – This is the VIM firmware type. **Select Modbus TCP**.
   f. **Redundancy** – Leave the "VIM is Redundant" checkbox unchecked if this is a simplex VIM.

After filling out the parameters, select OK.

8. The VIM placeholder has been added and it is ready to commission to one of the decommissioned VIMs. Click on the **Decommissioned VIMs** to display all of the decommissioned VIMs connected to network.

9. Once you see the VIM with **Modbus TCP** firmware in the Decommission VIMs list, you can right-click on VIM placeholder and select **commission**.

Tip: You can also drag and drop the decommissioned Modbus TCP VIM to the placeholder on the left and that will commission the placeholder to that VIM.

Important Note: You can tell the state of your VIM as soon as it is powered up. If the VIM shows up only with the Power and Network LEDs lit, that indicates it is in decommissioned state. The VIM is commissioned if its Power and Active LEDs stay steady green and the network LED is amber flashing or steady.

10. To complete the VIM configuration, Network devices must be added to the Virtual Cards. Right-click on the Serial Port and select the **Add Device** menu option.

Important Note: The VIM has the capacity to communicate with **up to 32 network devices simultaneously**. The communications tasks in the VIM are all active concurrently, each handling the messaging for the configured device (with its unique IP address). Of the 32 network devices, any mix of TCP and UDP devices can be configured.

For each network device that you want to interface using VIM, you must enter its IP address as

shown below.

Important Note: The VIMNet Explorer configuration correlates each **unique Modbus address** with an IP address. At the simplest level, each Modbus device equates to an IP address. In some cases, a single IP address may also be mapped to more than one Modbus device, as is typically required when interfacing with **Motor Control Centers**. In this case, the IP address mapped belongs to a gateway device, which acts as a data concentrator communicating with multiple actual Modbus devices, each with a unique address.

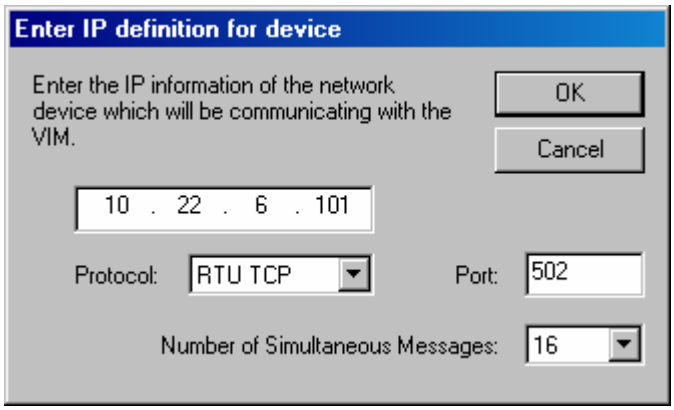

Figure 3: Enter IP definition for device with Simplex VIM

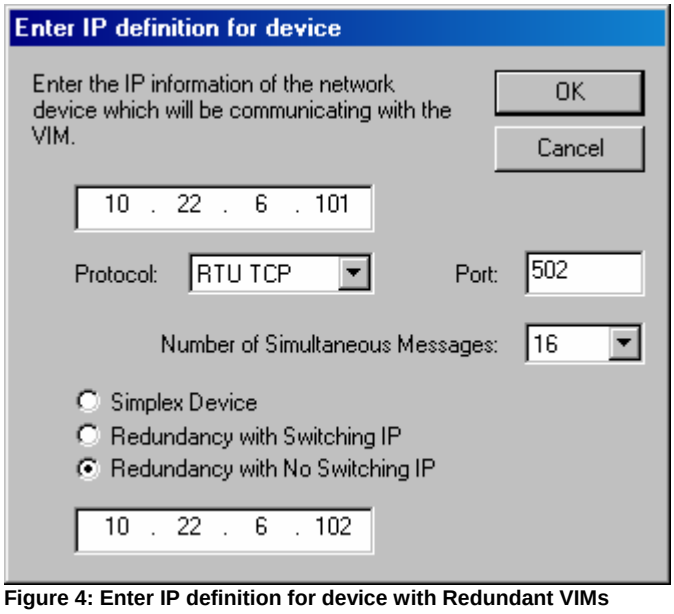

Figure 4: Enter IP definition for device with Redundant VIMs

Tip: You can also configure the number of simultaneous messages to enhance the communication for devices that support multiple messages. The default number of simultaneous messages is one, and it is set in the VIMNet Explorer as shown above. Up to 16 simultaneous messages can be sent per device. You can use this feature to increase the data transmission and performance improvement. This feature is available only with RTU TCP protocol.

11. Once you have added all of the network devices, you need to right-click on VIM and select **Upload the Configuration to the VIM.** The VIMNet configuration creates a **mapping between PLC device addresses and IP addresses.** This mapping must be uploaded into the VIM for proper communications.

Tip: A configuration that has not been uploaded to the VIM is indicated with a blue triangle ▲ next to the VIM icon. To be able to upload a configuration, the VIM must first be commissioned.

Warning:
Uploading a new configuration into the VIM will cause all field communications to terminate. After upload completion, the VIM will automatically reboot.
VIM upload must be done with the process in safe mode.

12. Click on **File->Save** as to save the VIMNet Configuration in a file with **.VIO** extension.

Warning:
It is recommended to make BACKUPS of the VIO file, because once it is deleted from the PC's drive, it cannot be retrieved back out of the VIM and you will lose time configuring it again. If the original configuration file is not available, the VIM will be in error and needs to be reset. Performing a Reset will decommission the VIM; therefore, it will terminate all field communications.

To Reset a VIM, right-click on the VIM in the Decommissioned VIMs list to get the context menu. Then. select **Reset**. The VIMNet Explorer will send a Decommission command over the network, and clear the VIM from its list. The VIM will then appear as an unconfigured, decommissioned VIM in the VIMNet Explorer list, and you can commission it to the new placeholder again.

DeltaV Configuration

In the DeltaV system, configure the **serial card** as shown below in figure 5. Select the "Card is redundant" checkbox if you are creating a redundant serial card.

Important Note: Each PSIC has 2 ports configured under it. Make sure that you **Enable the Port** by clicking on the Enabled box. All 4 cards must be added even if they will not be used. Unused ports can be disabled**.**

Next, you should configure the **Advanced tab**. In the dialog shown in figure 2.4, select **Master** and set the number of **retries, timeout, and transmit delay** as shown below. All PLC devices configured under a given port will use the same time parameters.

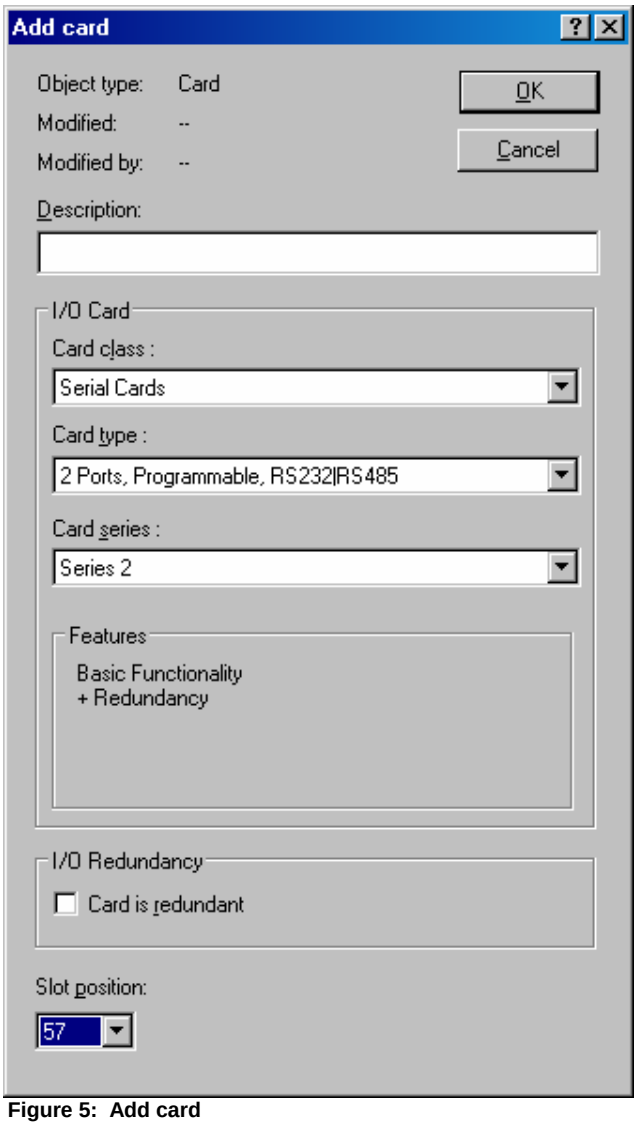

Figure 5: Add card

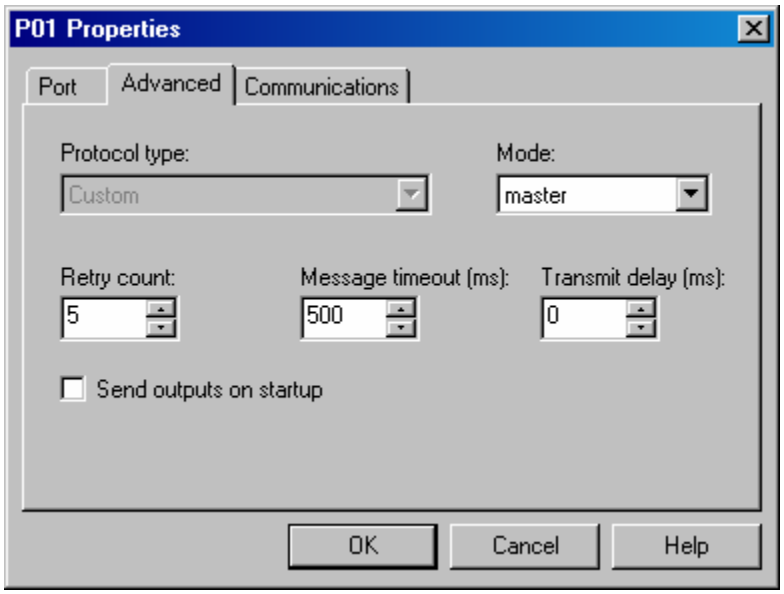

Figure 6: Port properties

The parameters that appear on the **Communications** tab are not used. Simply select the defaults and click OK.

Configuring the Datasets

When configuring the **datasets** in DeltaV Explorer, make sure to review the examples provided in the VIM manual. Remember that each Serial Device can have 16 datasets under it, or you can have 16 devices with 1 dataset each. A dataset can be input or output. The output datasets can have two modes: block and single. Output mode of 0 indicates **Block outputs**, i.e., the entire dataset is written out to the PLC if any dataset register changes. An Output mode of 1 indicates **Single value output**, i.e., only the value that has changed will be written out.

There are few things to remember when configuring the datasets. You must choose one of two **directions**, input (reads) or output (writes). You can configure the output datasets with readback. This will read back the values from the PLC and display it in the DeltaV system. The **device data type** will map DeltaV data types to PLC (or external Device) data types. PLC data type values and corresponding PLC registers are:

Device Data Type	Device Register
0	COILS
1	INPUT STATUS
2	INPUT REGISTERS
3	HOLDING REGISTERS
6	VIM STATISTICS
All other values	Reserved

Table 1: Modbus Device Data Types

Important Note: The **Start Address** on the PLC tab specifies where in the PLC to read the data. If the Device Data type is 3, and the starting address is 0, you have configured the dataset registers to read holding registers

starting at 40,000. It is important to configure the start address as an offset and not full address 40,001. This can be any PLC specific address, but you need to set the start address to the offset only.

For the most part, the **Special Data** tab is not used except for some customization.

Tip: **Special data 1** value is used when transferring data for Floating point, signed 32-bit integer and unsigned 32-bit integer registers. Special data 2 is used to indicate the number of registers used for Floating point and 32-bit integer values. For details on this subject, please review Modbus TCP Master manual section 5.4.

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