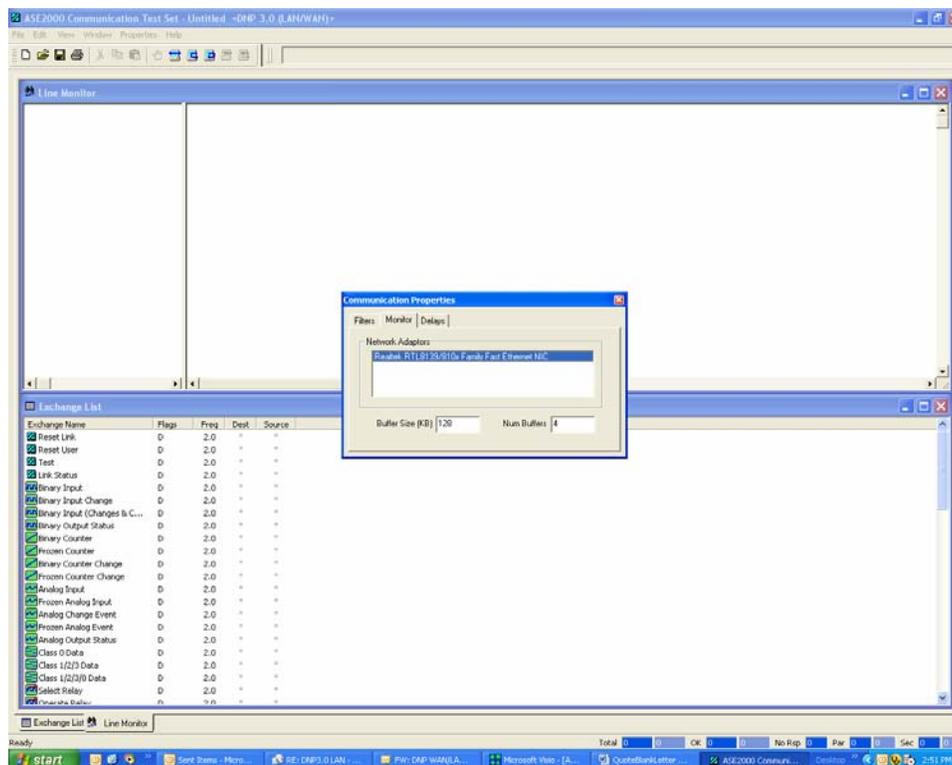


## ASE2000 Network Protocol Use Technical Note

The ASE2000 currently supports three network based protocols, DNP 3 Wan/Lan, Modbus TCP, and IEC 870-5-104. All three test set modes, Master, RTU, and Monitor mode are supported but there are different physical connection requirements depending on which mode(s) is to be used.

The ASE2000 uses the standard PC network interface device (NIC) for all network communication but still requires that either the ASE PCMCIA card or Rainbow Sentinel Security Plug (dongle) be installed on the PC where the ASE2000 software is to be run. Even though the PC network interface is used for network communication, the PCMCIA card or dongle is still used to enable the ASE2000 software.

If the test set computer has multiple network adaptor interfaces, it may be necessary to designate which adaptor the ASE2000 test set should use. For devices with multiple adaptors, select "**Properties > Communication > Monitor tab**" and select the appropriate adaptor.



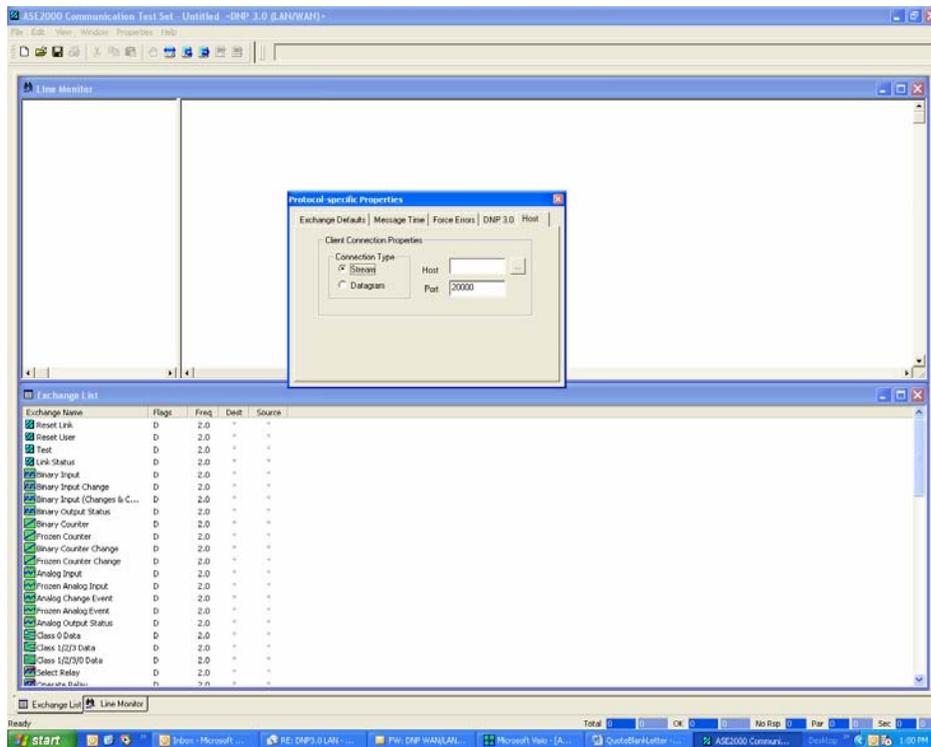
Basic test set operation is the same for both network and serial protocols but there are a few set-up differences that the user must be aware of.

### Master Mode

In Master Mode, the test set will operate as a Master and issue commands to and receive responses from a remote device. To address the proper device, it will be necessary to configure both the IP address and device (RTU/IED) address in the ASE2000. To set the network address of the remote device, select "**Properties >**

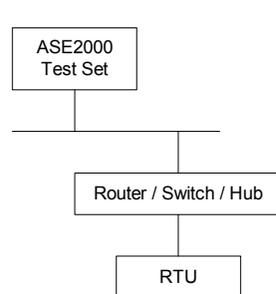
**Protocol Specific > Host tab** and enter the remote device node name or IP address. For DNP 3 Wan/Lan, specify **Stream** for TCP or **Datagram** for UDP. Also for DNP 3 Wan/Lan the Port address can be changed but it is recommended that the default value of 20000 be used. Please note that the ASE2000 will use the standard, protocol defined, Port number for each of the supported network protocols. The standard port numbers are:

- DNP 3 Wan/Lan – Port 20000 (Changeable through dialog)
- Modbus TCP – Port 502 (Not changeable)
- IEC 870-5-104 – Port 2404 (Not changeable)

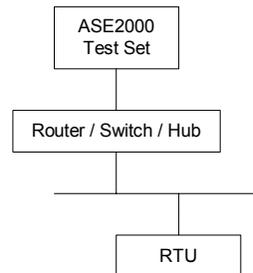


The protocol address (RTU address) of the device is specified the same as with the serial version of the protocol on the Exchange List view by double-clicking on the exchange name or setting the address on all exchanges using the **“Properties > Protocol Specific > Exchange Defaults tab”**.

In Master Mode, there are no special connection requirements or connection restrictions. The test set PC can be connected directly to the remote device, through a router, a switch, or a hub as shown below.



**Master Mode Example 1**



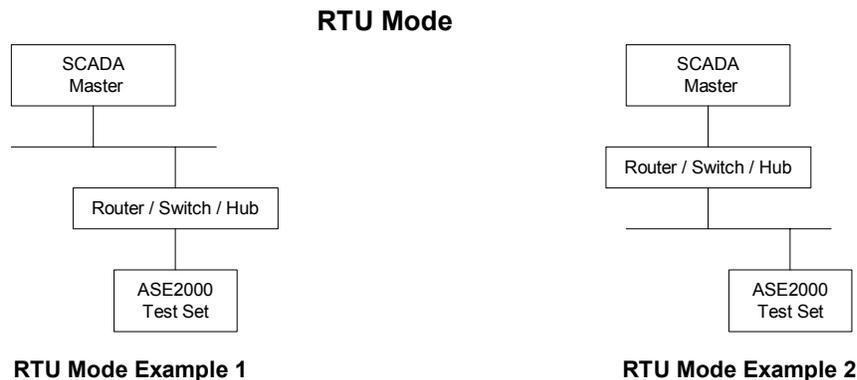
**Master Mode Example 2**

Once the address configuration and physical connection is complete, test set operation is the same as for serial operation.

## RTU Mode

In RTU Mode, the test set will operate as a remote device and respond to commands received from a SCADA Master. It is not necessary to do special configuration due to using network communication. As the “remote” device, the test set software will accept an incoming connection request and, from that point on, test set operation is the same as with a serial connection. If the device protocol address is left to the default value \*, the test set will respond to requests containing any address. Alternatively, a specific protocol address (RTU address) for the device can be specified the same as with the serial version of the protocol on the Exchange List view by double-clicking on the exchange name or setting the address on all exchanges using the **“Properties > Protocol Specific > Exchange Defaults tab”**.

In RTU Mode, there are no special connection requirements or connection restrictions. The test set PC can be connected directly to the remote device, through a router, a switch, or a hub as shown below.



Once the address configuration and physical connection is complete, test set operation is the same as for serial operation.

## Monitor Mode

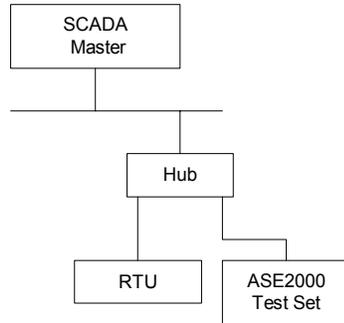
In Monitor Mode, the test set will monitor and display communication messages between two or more devices that are communicating using the designated network protocol.

Unlike Master Mode and RTU Mode, there are physical connection requirements that must be followed in order for the test set to have access to the messages between the devices to be monitored.

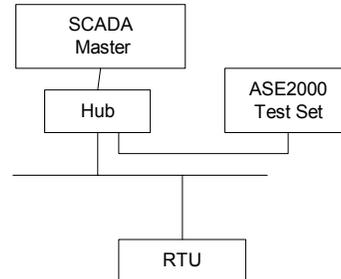
In Monitor Mode, the ASE2000 test set forces the network interface to operate in what is called “promiscuous” mode. This allows the test set to read network messages that are not addressed to the device the test set is running on. In order for this to work, it is necessary for the test set PC and either the SCADA Master or the remote device to be on a common network segment. This is most commonly accomplished by plugging the devices into a common hub; not a router or switch. It is necessary to use a hub in this case so the messages between the devices being monitored will be present on the LAN segment the test set is connected to. A router or switch will only pass messages to a port if the addressed device is known by the switch or router to be connected to that port. So, if you connect the test set directly to a port on a router or switch for monitoring purposes it won’t work since the router/switch will not pass the data to that port. As described above, a router or switch can be used for Master or RTU mode but not Monitor mode. Since a hub passes all data to all connected ports, data for the devices being monitored will

be available to the test set only if the test set and at least one of the devices being monitored is connected to the hub. It is possible, and most likely necessary, to use routers and switches in other parts of the network but a hub must be used for the monitored devices. See connection examples below.

### Monitor Mode



**Monitor Mode Example 1**



**Monitor Mode Example 2**

As with serial communication, it is possible to filter the data processed and displayed by ASE2000 test set using network protocols. With serial communications, the filtering is accomplished by setting the device address on the Exchange List view. With network protocols, filtering can be set at the IP addresses level and the device address level.

To set an address filter at the IP address level, select **“Properties > Communication > Filters tab”** and set the host name or IP address of the device to be monitored. The default value **“Any”** will display messages between all devices on the network segment using the designated protocol.

