NetModem™

Modem Pooling for Windows Networks

Version 4.33

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NetModem User's Guide
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1. Overview of NetModem & Modem Pooling

NetModem is a **client-server** based software solution for Windows which allows users to access shared modems (and other serial devices) located on another PC over a TCP/IP network. By creating one or more virtual COM ports on each client PC which redirect to the shared COM ports on the Modem Server PC, your client applications can access these devices simply by pointing them to a virtual COM port.

Modem Pooling is a feature which allows each client to automatically connect to the next available modem or device in a pool of defined COM ports, rather then each client connecting to a specific device. When all the modems or devices in the pool are in use, the client PC is optionally informed. Multiple modem pools can be defined on the NetModem Server, each pool can contain one or several COM ports.

Here is how it works:

1. Configure the NetModem Server Software to share one or more modems or other serial devices.
2. Configure the NetModem Client Software to create virtual COM ports, each point to a modem server.
3. When a client application opens a COM port, it gets redirected to the next available modem or serial device on the NetModem Server PC (or to a specific device).

Features:

- Simple to Install and use.
- Supports Windows 10/8/7/Vista/XP and Windows Server 2000 through 2016.
- Shares up to 256 COM ports, modems, and other serial devices.
- Supports multiple pools (groups) of modems and other serial devices.
- Co-exists with MS RAS (Remote Access Service) using the same modems.
- Compatible with Remote Desktop/Terminal Services, Hyper-V, VMware, and Citrix XenApp.
- Automated Server Failover, if primary server is full or unavailable.
- Definable access hours, limit usage to specific hours per day/week.
- Security by pool passwords or Windows user authentication.
- User authentication supports Active Directory or non-domain networks.
- ODBC database or textfile logging of all calls and activity.
- Virtual Phone Books simplify administration of current phone numbers.
- Powerful client diagnostics allows application debugging.
- Includes SSL/TLS Encryption, using the current generation OpenSSL 1.1.0.
- Compatible with DialUp Networking, Fax applications (Class 2 & 2.0), and most communication applications for Windows and DOS.
- Supports COM Port Control (RFC-2217) enhanced Telnet protocol.
- Supports Baud rates up to 921000.
- NetModem virtual COM ports run as a kernel-mode driver.
- Unlimited user client redirection software is included at no extra charge.
- Includes upgrade protection and technical support.

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2. Software Installation Quick Guide

This Quick Guide is intended for users familiar with installing Windows based software. The information below will enable you to get your NetModem Server and Clients up and running, as quickly as possible.
We still recommend you read the entire guide to become familiar with the software.

Requirements:

Operating System Software (for both Server and Client PC's):

- **Windows 10/8/7/Vista/XP, and Windows Server 2000 through 2016** 32-bit and 64-bit editions. All editions are supported: **Professional, Home, Premium, Ultimate, Workstation and Server (Including Small Business Server, DataCenter, and Enterprise).**
- NetModem supports Windows **Hyper-V, Remote Desktop / Terminal Services**, as well as **Citrix XenApp, VMware**, and **Virtual PC** environments.
  If you plan to use the user authentication feature with Active Directory Domain Server(s), the NetModem Server PC should **not** be running under a Home Edition of Windows.

Hardware: (for both Server and Client PC's):

- **PC equipped with an Intel Pentium compatible processor or later, single or multi core.**
- **Network Card** (configured to use the TCP/IP Protocol).
- **At least the minimum RAM recommended by Microsoft to run the installed version of Windows.**
- **At least 20 megabytes of free hard drive space.**

The NetModem Server PC also requires at least one **serial communications port,** which could be a physical

connector that attaches to an external serial device such as an analog modem, or it could be an internal modem, T1/E1 Serial ISDN RAS card, or other device which create Windows COM port(s).

Server Software Installation and Configuration Overview:

Here is a list of the steps needed to install the Server Software, which are explained in chapters 3 and 4:

1. Log into Windows with Administrator privileges. This is not required if the PC's security policy is configured to allow "Privilege Elevation".
2. Choose either the NetModem Server 32-bit (x86) installer or the 64-bit (x64) installer.
3. Install the NetModem Server Software, using the default choices.
4. Leave the license key blank for a 30 day trial or it can be entered now.
5. Optionally define additional pools and pool credential/security settings.
6. Select one or more local COM port that you wish to be shared.
7. Save the changes.
8. Ensure that any firewall software permits incoming connections on TCP port 6000. The installer will automaticly add an exception to the Windows Firewall.

Client Software Installation and Configuration Overview:

Here is a list of the steps needed to install the Client Software, which are explained in chapters 5, 6 and 7:

1. Log into Windows with Administrator privileges. This is not required if the PC's security policy is configured to allow "Privilege Elevation".
2. Choose either the NetModem Client 32-bit (x86) installer, or the 64-bit (x64) installer, matching the edition of Windows that the Client is being installed under.
3. Install the NetModem Client Software, using the default choices. No license key is needed.
4. In the “**Select Ports**” window, choose which virtual COM ports you wish to create and click OK. Usually only one Virtual COM port is needed.
5. In the “**Client Configuration**” Window, enter the IP address of the NetModem Server PC. (The HOSTNAME can be entered instead).
6. Leave the TCP/IP port set to 6000, unless you changed it on the Server.
7. Leave the “**Remote COM port to Redirect to**” setting on “**Automatic Pooling**” to allow the client to access the next available shared COM port on the server. A pool name is only required if you have defined multiple pools on the server.
8. If NetModem Server is set to require credentials, set the client to a compatible authentication setting.
9. Click the “**Test Server Connection**” to confirm that the COM port you created can access the server.
10. Repeat steps 4,5,6 and 7 for each additional COM port you created.
11. Click the "**Save**" button, and the "**Install Modem Driver**" window will automatically appear.
12. If you are not sharing Modems then skip this step. Otherwise click “**Add Modem Drive**r” to run the “**Add Hardware Wizard**” to install the proper modem driver on the virtual COM port(s).
13. Configure your application software to use one of the NetModem Client virtual COM ports, or the name of a modem driver device attached to one of the NetModem Client virtual COM ports.

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3. Installing the NetModem Server Software

The NetModem Server software should be installed on a PC where the modems (or other serial devices) are physically located. NetModem Server can run under any version of Windows 10, 8.x, 7, Vista, XP, and Windows Server 2000 through 2016. The PC can be running any Intel Pentium compatible processor, and should have at least the minimum amount of RAM suggested by Microsoft to run.

Before installing NetModem Server:

- Configure the server hardware, such as installing internal or external modems and connecting the modems to telephone lines.
- Log on as a user with Administrator rights. This is not required if the PC's security policy is configured to allow "Privilege Elevation", which allows portions of the setup procedure to run at elevated privileges by a user that does not have Administrator privileges.
- Determine if Windows is running the **32-bit (x86)** edition of Windows, or the 64-bit (x64) edition, and use the matching edition of the NetModem Server installer. To determine which edition of Windows is installed, open the Windows control panel and navigate to the "System" applet icon.
- Run a **NetModem Server installer** to begin the Installation Wizard. It will take you through the following steps:
- Review the **License Agreement** and indicate whether you accept the terms or not. If you do not accept the terms, the software will not be installed.
- Select the **Destination Folder** to install to. The default is default is \program files\netmodem\server\
- Review or change any settings, and **Begin Installation**.

Once the installation is finished, enter the **End-User Information** (your name and organization), and optionally enter a **License Key**. Leave the license key blank to evaluate the software for 30 days.

The NetModem Server installer automatically adds an exception in Windows Firewall to allow incoming access on TCP port 6000. If using a different firewall or different TCP port, configure the firewall accordingly.

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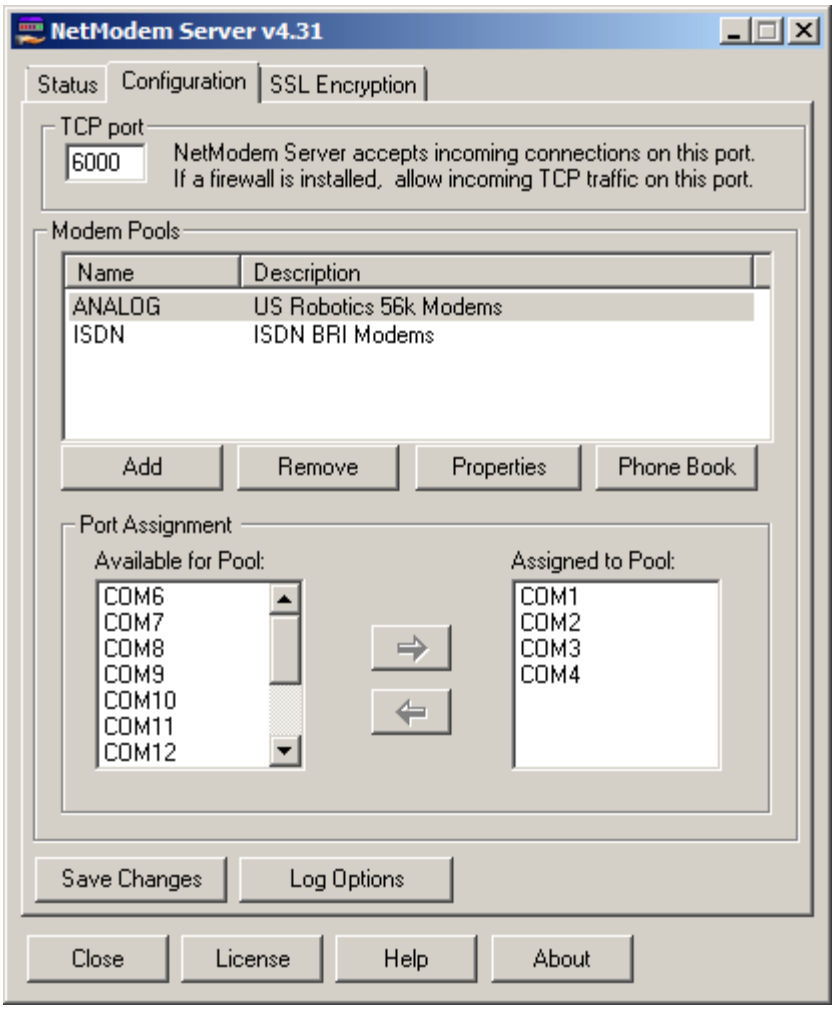
4. Configuring the NetModem Server Software

NetModem Server is configured from the **Configuration** tab of the NetModem Server manager. This can be opened from the **Start > All Programs > NetModem Server** menu, or by by right-clicking on the NetModem Server system tray icon and selecting **Configure**. The Tray icon is usually located in the lower right corner of the screen near the clock. In Windows 7 and later the tray icon is hidden by default, and can be found by clicking the ^ symbol in the taskbar, to show hidden icons.

If the NetModem Server manager is already open, click the **Configuration** tab at the top.
The Configuration screen allows selecting the TCP/IP port to use, the names and property settings of the modem pool(s), and allows defininge which local COM ports are assigned to each pool.

Server Configuration:



The default TCP port is **6000**. NetModem Clients should be configured to use the same TCP port.

One modem pool is defined by default. Each modem pool can contain one or more local COM ports. Each COM port assigned to a pool is given the security settings defined in the Properties window for that pool.

Center buttons: **Add** or **Remove** pools, and view/edit each pools **Properties**.

To assign COM ports to a pool, select the modem pool, select COM ports in the "**Available for Pool**" list, and click the **Right Arrow** button to move them to the "**Assigned to Pool**" list on the right.

To remove COM ports from a pool, select the modem pool, select COM ports in the "**Assigned to Pool**" list, and click the **Left Arrow** button to move them to the "**Available for Pool**" list on the left.

Afer making changes to the configuration options, click the **Save Changes** button.

Bottom command buttons:
Save Changes - Saves any changes made to the Pool Properties, COM Port lists or the TCP/IP port.
Log Options - Allows disabling dial logging and blocking for non-modem applications, and allows enabling both ascii logs and/or an ODBC log database.

Close - Closes the Window (Also asks if any unsaved changes should be saved).
License - To Enter a license key, allowing the NetModem Server to operate beyond the evaluation period. also displays license key, or number of days remaining until an evaluation period ends.
Help - Displays the user's guide you are reading now.
About - Display copyright information, and support links.

When changing the TCP/IP Port number:

- Select a TCP/IP port number which is not already in use by another application or service on the NetModem Server PC.
- TCP/IP port numbers below 2049 are reserved, and should not be used.
- The NetModem Client(s) must be configured to use the same TCP/IP port number as the server.
- If a firewall is installed on the server, allow inbound access on the selected TCP/IP port. During installation only TCP port 6000 is given inbound access in the Windows Firewall.

When configuring NetModem Server for the first time, add at least one COM port from the "**Available for Pools**" list on the left to the "**Assigned to Pool**" list on the right.

The **Pool Properties** window allows you to define the name of the Pool, an optional pool description, user credentials (to require an authenticated username/password or a pool password), and several other configuration options and rules as shown below.

The **Support RAS Sharing** option allows the NetModem Server to share the COM ports with the Windows "Routing and Remote Access Service". Turning off this option will allow prevent NetModem Server from assigning a COM port to a client which is already held open by the Routing and Remote Access Service. For more information, See **Using NetModem with RAS**.

Credentials can require clients to provide login credentials or a pool password, as described in the **User Authentication** chapter.

A **Default Flow Control Method** is useful if non-NetModem clients connect via a standard telnet client.

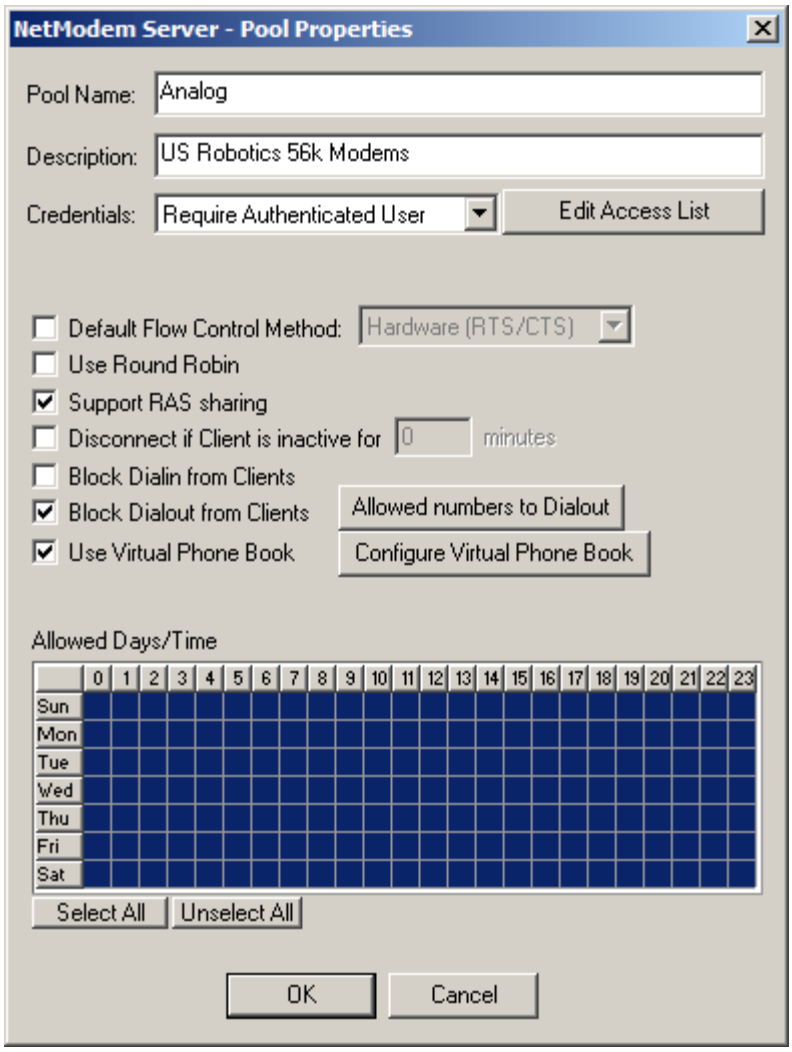
Use Round Robin distributes ports evenly rather then always using the lowest numbered available port.

The **Disconnect if Client Inactive** option will disconnect clients which hold a COM port open without any activity for the specified time.

The **Block Dialin** and **Block Dialout** options prevent clients from receiving or making unauthorized calls. See **Block Dialout and Dialin**

The **Virtual Phone Book** options allows pseudo-phone numbers, which when clients try to dial these phone numbers NetModem Server instead dials the actual numbers assigned.

The **Allowed Time** can restrict use



of devices in this pool to specific hours per day of the week.

Once the pool properties have been updated as needed, click **OK** to close the properties window, and click **Save Changes**.

The next step is to install the NetModem Client software on each PC which needs to access the shared modems, and verify the connection using the NetModem Client Configuration "**Test Server connection**" button.

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5. Installing the NetModem Client Software

The NetModem Client software should be installed on each PC that requires access to the modems (or other serial devices) whose COM ports are defined in the NetModem Server "Assigned to Pool" list. The NetModem client software is compatible with Windows 10/8/7/Vista/XP and Windows Server 2000 though 2016. The client can also be installed under Windows Remote Desktop, Hyper-V, Citrix XenApp, VMware, or Virtual PC. The PC can be running any Intel Pentium compatible processor, and should have at least the minimum amount of RAM suggested by Microsoft to run.

Before installing the NetModem Client Software:

- Log into Windows as a user with Administrator rights.

- If performing an upgrade from a previous version of NetModem Client, exit any programs that are using virtual COM ports.

- Determine if Windows is running the **32-bit (x86)** edition of Windows, or the 64-bit (x64) edition, and use the matching edition of the NetModem Client installer. To find out which edition of Windows is installed, open the Windows control panel and navigate to the "System" applet icon.

Run the **NetModem Client installer** to begin the Installation Wizard. It will take you though the following steps:

- Review the **License Agreement** and indicate whether you accept the terms or not. If you do not accept the terms, the software will not be installed.

- Select the **Destination Folder** to install to. The default is c:\program files\netmodem\client\

- Review or change any settings, and **Begin Installation**.

The NetModem Client never requires a license key, and it is fully functional but limited to operating with the NetModem Server software.

The installation should only take a moment to finish. Once the installation completes, the "**Select Ports**" window shown below will automaticly open if this is a first time installation.

For information on performing unattended installations with pre-configured virtual COM port(s), refer to the NetModem Support guide here: **http://pcmicro.com/netmodem/support_install.html**

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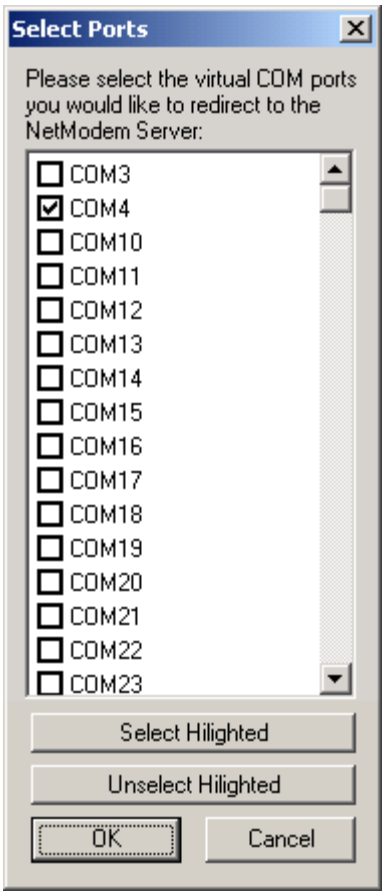
6. Configuring the NetModem Client Software

The NetModem Client can create one or more virtual COM ports, which are each redirected to a pool of shared COM ports on a NetModem Server PC over the network. The first step is to select the virtual COM ports.

Only COM ports that don't already exist on the client PC may be selected. In the image to the right COM1 and COM2 are not shown in the list because they already exist on this PC.

Most modem applications require only one modemt, in which case only one virtual COM port is needed regardless of the number of modems on the server. The virtual COM port number on the client **does not need to match** the COM port values on the server.

Some older applications only allow selecting a COM port between COM1 and COM4, inclusive. Therefore it's usually best to select a virtual COM port numbered below COM5.



COM ports can be added/removed from the NetModem Client Configration later on, by clicking the NetModem Client tray icon and selecting **"Configure**" to get to the NetModem Client Configuration window, and choose "**Select Ports**". It can also be accessed from the Start menu: **Start > All Programs > NetModem Client > Configure.**

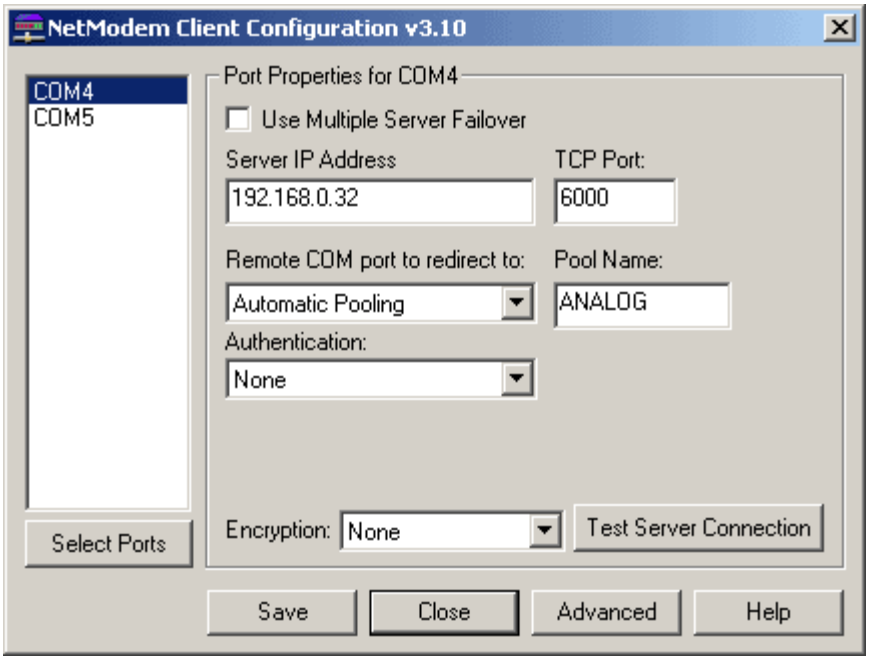
Under special applications such as Remote Desktop or a Fax server it may be desirable to create several virtual COM ports. A range of ports can be selected or unselected by clicking the first COM port, then hold down the **Shift** key as you click on the last COM port in the range, then click on either the **Select Highlighted** or **Unselect Highlighted** button.

Once virtual COM port(s) are selected clicked **OK**, and the NetModem Client Configuration Window will appear. The NetModem Client Configuration window allows defining the Server IP address and TCP Port for each virtual COM port, and optionally which remote COM port it and Modem Pool should redirected to.

The **Server IP Address** should be set to the IP Address or the hostname of the NetModem Server PC.

The **TCP Port** should be the same value used on the NetModem Server (The default setting is 6000).

The **Remote COM port to redirect to** is normally left at "**Automatic Pooling**" which redirects the virtual COM port to the next available COM port in the selected pool on the NetModem Server PC. If you always want to redirect to a specific COM port on the server, select it here.



If the **Pool Name** is left blank, the first pool defined on the server will be used.

The "**Use Multiple Server Failover**" checkbox allows a list of Failover servers to be configured. NetModem Client can automatically go to other servers if the primary server is either full or unreachable.
See the **Using Multiple Servers for Failover** chapter for details.

The **Authentication** options are:

None , Use Login/Password , Use Windows Credentials , Use Pool Password , and Prompt at Logon.

The default setting is None, which does not attempt to send a credentials to the NetModem Server.
If the NetModem Server's Pool Properties requires the client to provide authentication, then NetModem Client should be configured appropriately. See the **User Authentication** chapter for details.

The **Encryption** options are:
"None" ," TLSv1.x or SSLv3" , "TLSv1.2", "TLSv1.1 or 1.2", "TLSv1.x", and "SSLv3 only".

The default setting is None, which disables encryption. See the **SSL/TLS Encryption** chapter for details.

The command buttons on the NetModem Client Configuration window are as follows:
Select Ports - Choose which Virtual COM ports should be created for NetModem Client.
Test Server Connection - Tests the connection to the NetModem Server.
Save - Saves changes without closing the Configuration window.
Close - Closes the NetModem Client Configuration window, and saves changes.
Advanced - Allows configuring advanced options. See the **Client advanced options** chapter for details.
Help - Displays the user's guide.

Once the Server IP Address, TCP Port, and optional settings have been defined for each of the virtual COM ports, verify that each virtual COM port can communicate with the NetModem Server by selecting the COM port, and then clicking the **Test Server Connection** Button.

The Server Connection Test:

This test allows you to verify that the client can communicate with the server, and it can automaticly fix any detected setting conflicts.

The top settings are filled with the current COM port settings.

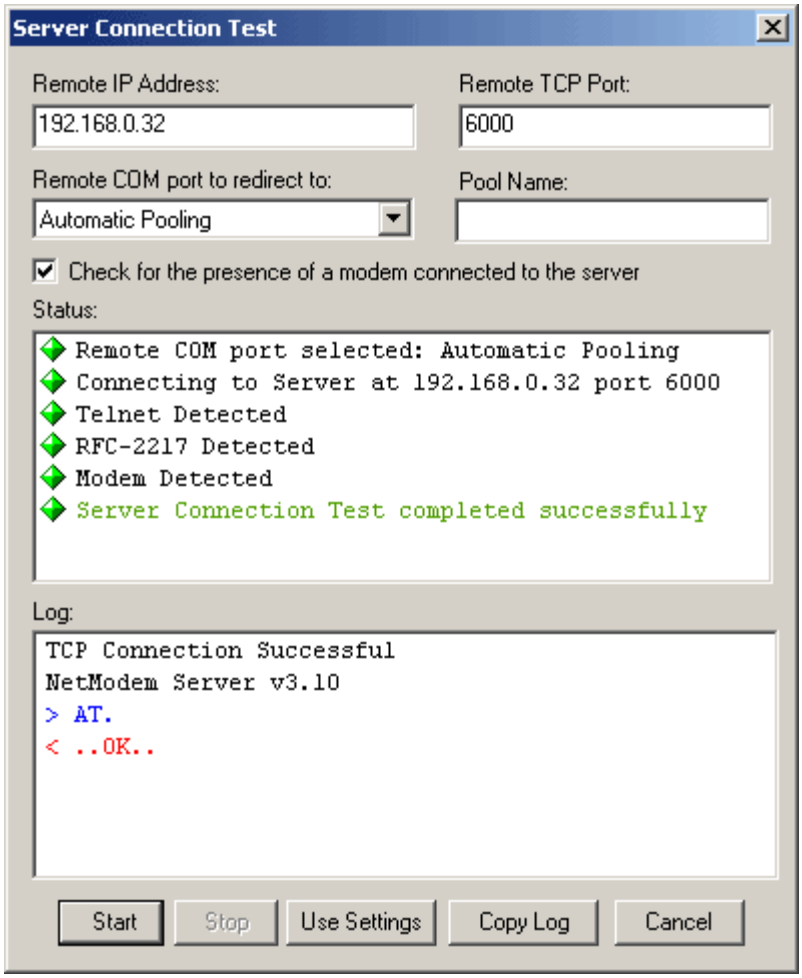
If connecting to **non-modem** devices on the NetModem Server, then **disable** the checkbox to check for the presence of a modem.

Click the "**Start**" button to begin the test. If everything is successful the results will look much

like the image on the right.

After the connection is made to the server, it checks if the server is using both the Telnet protocol and the RFC-2217 Telnet protocol extension (COM Port Control).

If you enable the checkbox to check for the presence of a Modem then the test will finish by sending an "AT" command to the modem, and confirms that the modem responds with an "OK".



When the test stops, you may click on "**Start**" to test the port again, or click "**Use Settings**" to accept any changes that were made to your settings. The "**Copy Log**" button allows you to copy the test results to the clipboard, allowing it to be pasted into a document or email. The "**Cancel**" button exits the test without saving.

If your virtual COM ports tested with similar results as shown above, then you have successfully

configured the NetModem Client. Click "Use Settings" to close the test window.

If the result says "**Connection Failed**" then either the IP Address is is unreachable, or the NetModem Server is not accepting connections on the defined TCP port for some reason. See the **Troubleshooting** Chapter.

Once you have successfully configured the virtual COM port(s), click **Save** or **Close** and you will be provided with a reminder to install modem drivers which will guide you through the process outlined below.

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7. Installing the Client Modem Driver

If the devices you are connecting to the shared ports are not Modems, you can skip this section.

Most Windows DialOut Applications require a modem driver to be present in order to dial out, but some applications do not require a modem driver as they communicate directly with the Windows COM port. We suggest installing a modem driver for compatibility with the widest range of applications.

PLEASE NOTE:
When installing a modem driver on the client's virtual COM port(s), it is important that it matches the physical modem on the NetModem Server. For example, If the Server uses a specific modem driver, then do **not** use the Windows "**Standard 56k modem**" driver on the client, as this could result in a modem driver mismatch.

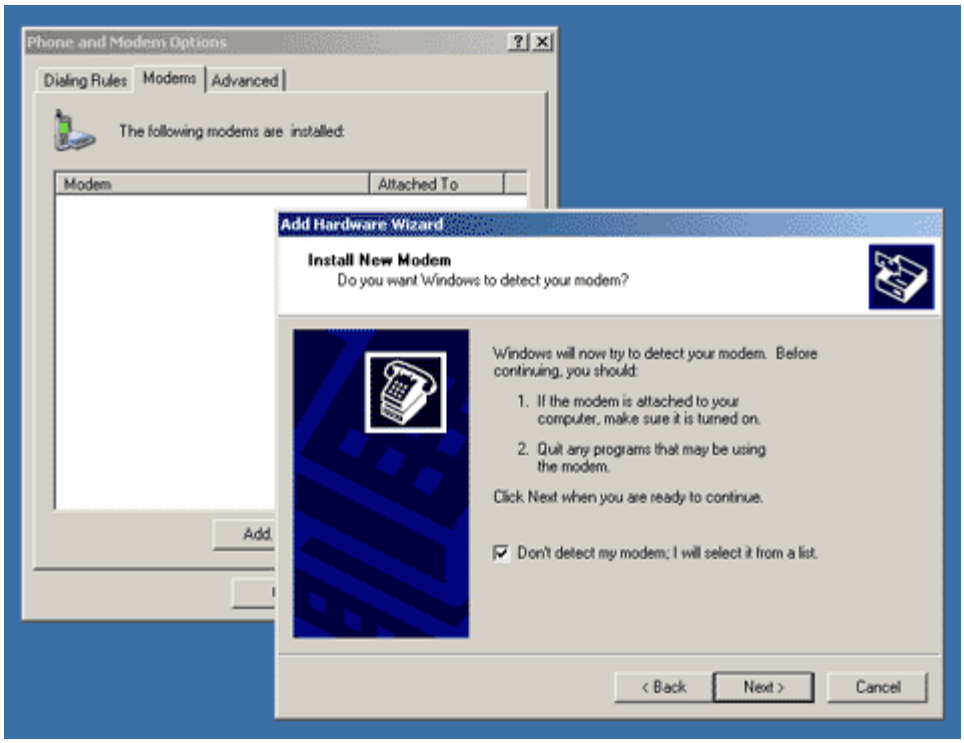
When using NetModem for pooling multiple modems, it is important that every modem within the pool uses the identical modem driver so they will always match the client end.

Most of today's inexpensive PCI or USB "**Software Modems"** (also known as "**Soft Modems**") have modem drivers that can not detect a modem on a virtual COM port. This can also occur on hardware based modems using plug-and-play modem drivers. Most of these modems are **not** fully compatible with the Windows "Standard 56k modem" driver, but this driver might work with some applications. Using the correct modem driver is always the best choice for guaranteed driver compatibility.
Request Technical Support if you need assistance in getting the correct modem driver to install on a Client.

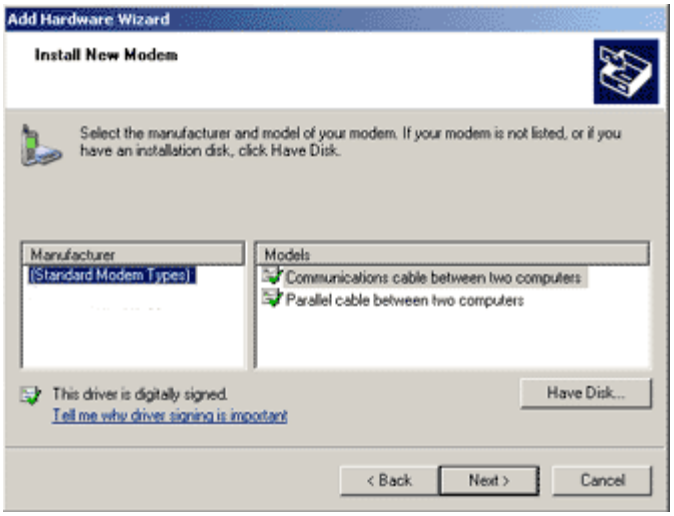
To select a "Standard 56K modem" driver instead of a manufactures driver, **(which is generally not recommended)** do Not click the "**Have Disk** " checkbox as instructed below, instead select the driver by scrolling down the list of "Standard Modems". **Standard Modem Drivers may not be compatible with many applications**, including Fax and Dial Up Networking.

Some modem drivers can be installed using their own setup program, but if the setup program is looking for the modem to be physically present on the computer it may not complete, so we suggest manually installing the modem driver using the Modem Driver .INF file as shown below.

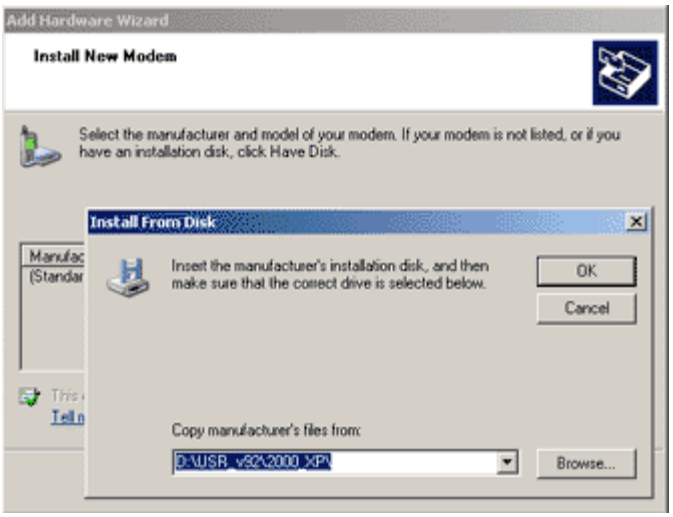
To open the "**Phone and Modem**" applet manually, Go to the **Windows Control Panel** and locate the "**Phone and Modem**" icon. In older versions of Windows Control Panel you may need to switch from "Catagory View" to "**Classic View**" or "**Large Icons**" to find it. Double click on the "**Phone and Modem**" icon to enter the "**Phone and Modem Options**" Window. Then click on the "**Modems**" tab at the top, and it will show you which modems are currently installed. Click the "**Add**" button at the bottom to add a modem driver.



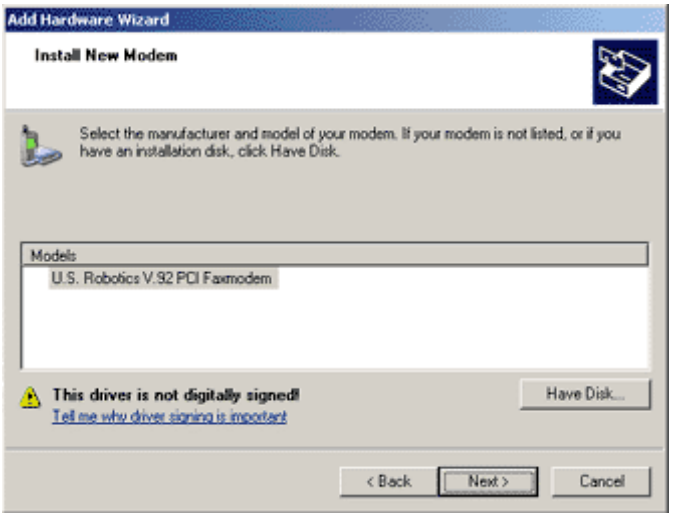
From the **Add Hardware Wizard**, enable the checkbox: "**Don't detect my modems**" and click "**Nex**t".



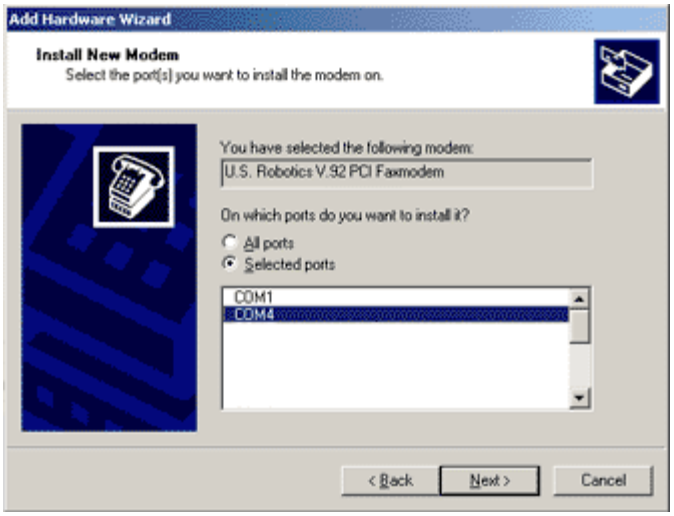
From the "**Select Manufacturer and Mode**l" screen, click the "**Have Disk**" button.



Enter the path to the modem driver .INF file (or click Browse to locate it).

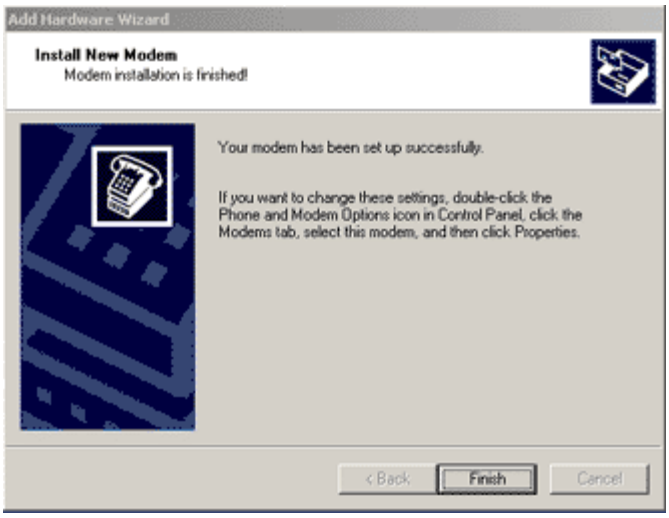


A list of one or more modem models should be displayed. If there is more then one choice, select the one that matches the name shown in the Control Panel's "**Phone and Modems**" applet on the NetModem Server computer. Click "**Next**".

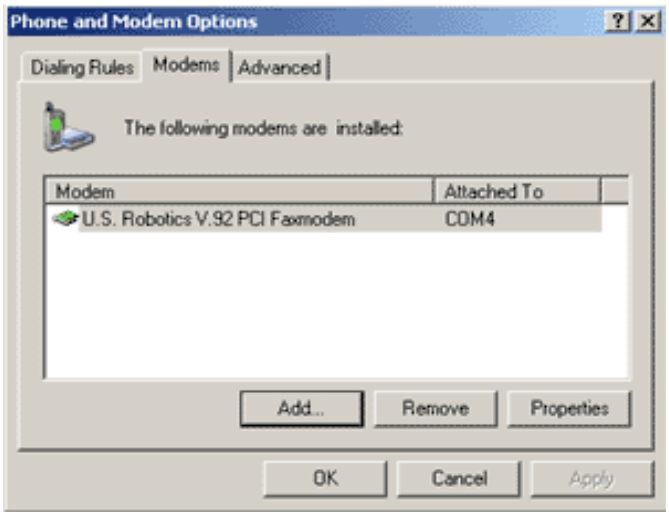


A list of available COM ports should appear. Click the "**Selected ports**" option, and click the virtual COM port which you selected in the NetModem Client Configuration window (In this case it is COM4). Click "**Next**".

If no Virtual COM ports appear in the white box, then either the NetModem Client was unable to establish a connection with a modem on the server, or the modem driver is not designed to detect a virtual COM port. To narrow down the cause, run the NetModem Client Configuration's "**Test Server Connection**" to see if it successfully detects a modem on the server. If this succeeds then the cause is a modem driver issue.



The modem driver should now be installed. Click "**Finish**" to close the **Add Hardware Wizard**.



From the Phone and Modem's "Modem" tab, verify that the installed modems list shows that the new modem is "**Attached To**" the Client Virtual COM port.

If the modem driver installed successfully, your installation is now complete. All that is left is to configure your application software to use the virtual COM port (or to use the Modem Driver name attached to that COM port).

If your modem driver can not be installed on the virtual COM port for any reason, contact a **technical support** engineer for assistance.

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8. Monitoring Activity on the Server and Clients

8.1 Monitoring Activity on the Server:

From the NetModem Server PC the Administrator can view the active connections and real-time log files from the **Status** screen in the NetModem Server manager. You can get there by **Right clicking** the NetModem Server tray icon, and selecting Status, or by going to the **Start > All Programs > NetModem Server > Manage** menu.

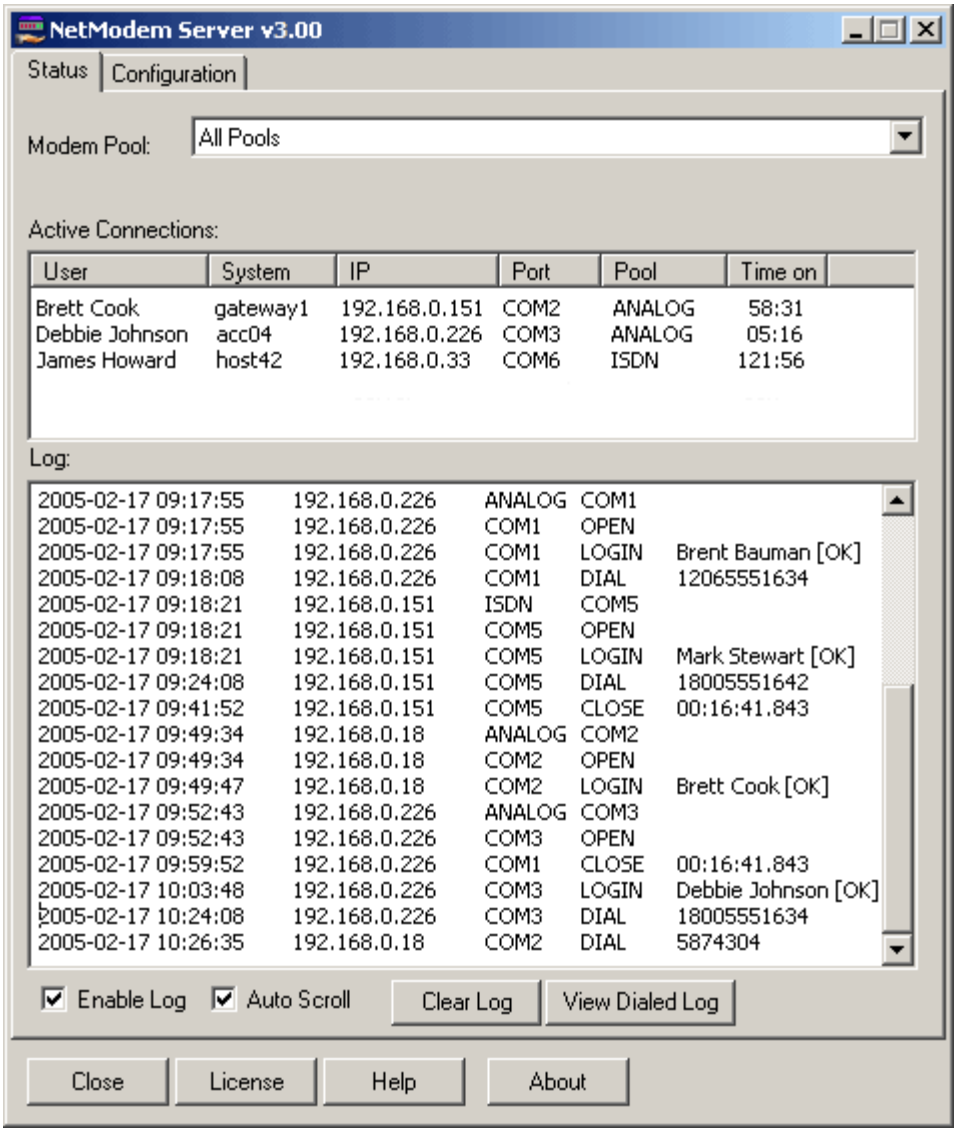
The NetModem Server manager can also be accessed remotely using **Remote Desktop**.

By default all pools will be displayed in the Status screen, but you can view just a particular pool by selecting it from the pulldown list.

Active Connections shows the clients that are currently connected. By right-clicking one of the active connections, the Administrator can disconnect any user.

The activity log shows client logins, COM ports being opened and closed, phone numbers that are dialed, etc. separate logs for each pool plus a master log are all written to log files in the folder where NetModem Server is installed.

The last 500 lines of a log are viewable from the status screen.



Tip: The Status tab window can be widened as needed to view additional notes in the Log entries, and the new width will be used each time it's opened in the future.

If more then one pool is defined, a separate log is maintained for each modem pool, as well as a master log for all pools. The logs are located in the folder that the NetModem Server was installed in, usually in **c:\program files\NetModem\Server**

The filename of the master log is **allpools.log,** and the filename of each pool is **{*poolname*}.log**,

The "**Clear Log**" button allows clearing just the current log being viewed, or all the logs. It also asks if the log files should be also be deleted.

The "**View Dialed Log**" Displays a list of all phone numbers that have been dialed, in addition to any phone numbers which were blocked by NetModem Server due to dialin block filter defined in the pool properties. Each entry contains the following data:

- **Time/Date of Call**
- **Duration of call**
- **Phone Number**
- **User Name**
- **System Name**
- **IP Address**
- **COM Port**
- **Pool Name**

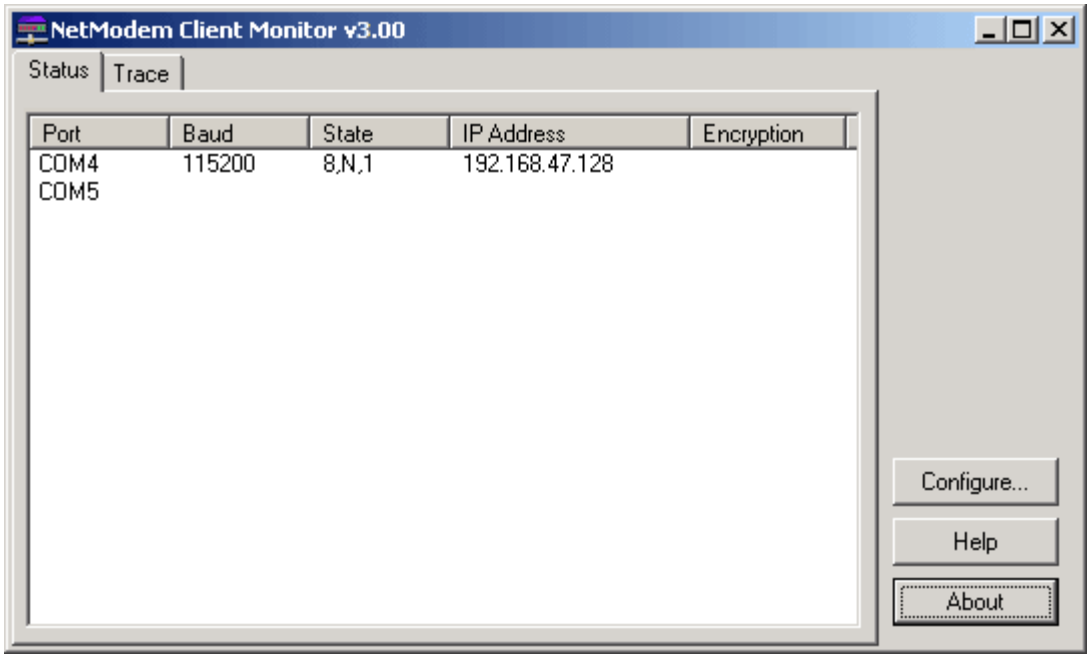
- **Bytes Sent**
- **Bytes Received**

Logging can also be directed to any ODBC compatible database. See the **Logging Options** chapter for details.

The "**Close**" "**License**" "**Help**" and "**About**" buttons are described in the **Configuring NetModem Server** chapter.

8.2 Monitoring Activity on the Clients:

Client users can display the NetModem Client Monitor Status screen by **right clicking** the NetModem Client system tray icon and selecting Status. This can also be accessed from the **Start > All Programs > NetModem Client > Monitor NetModem Client** menu.



Each Virtual COM port created by NetModem Client is Listed under "**Ports**" in the Status screen.
When a COM port is open, its **Baud**, **State**, and **IP Address** fields will appear.
After a COM port is closed, these fields are removed a few seconds later.

Baud: The number of times per second that an RS-232 serial signal can change on this port.
Common values are 300, 1200, 2400, 9600, 19200,38400 ,56700 and 115200.

State: The number of Data Bits, the Parity Type, and the number of Stop Bits the port is configured for.
(I.E.: the above "**8,N,1**" means **8** Data Bits, **N**o Parity, and **1** Stop Bit.)

IP Address: The IP Address (or Hostname) of the NetModem Server PC which this COM port is redirecting to.

Encryption: The Encryption Cipher being used, if any.

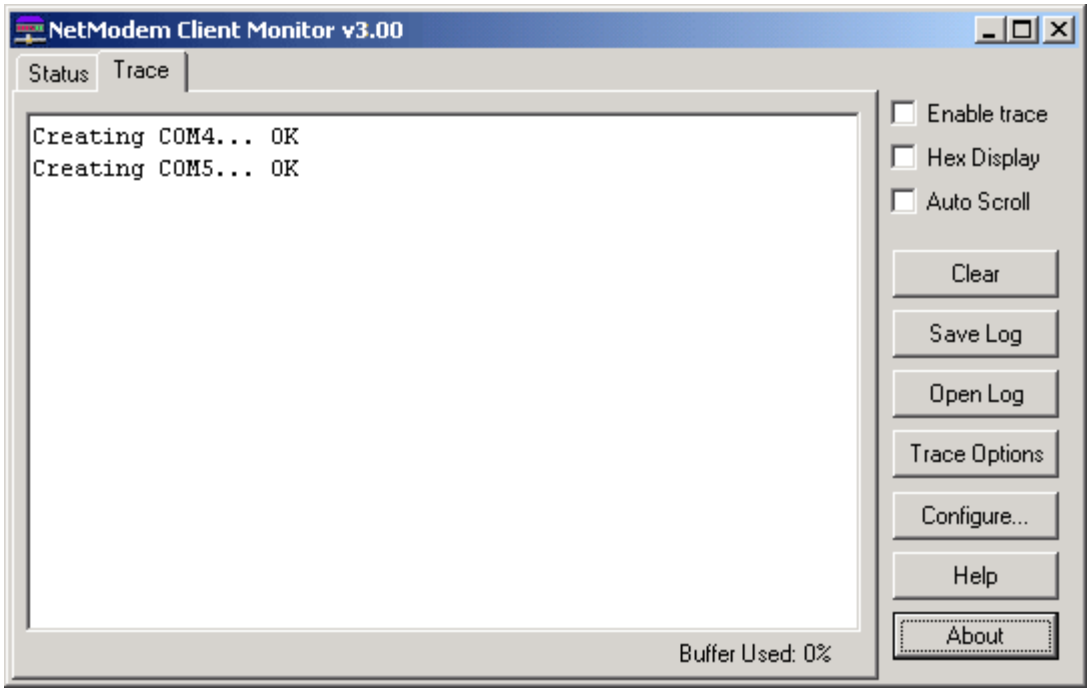
The following buttons are usually available are on the right:

Configure: Opens the NetModem Client Configuration Window. (This button may be removed by the Administrator to prevent users from making changes to the configuration).

Help: Opens the Users Guide.

About: Displays the version, copyright and contact information.

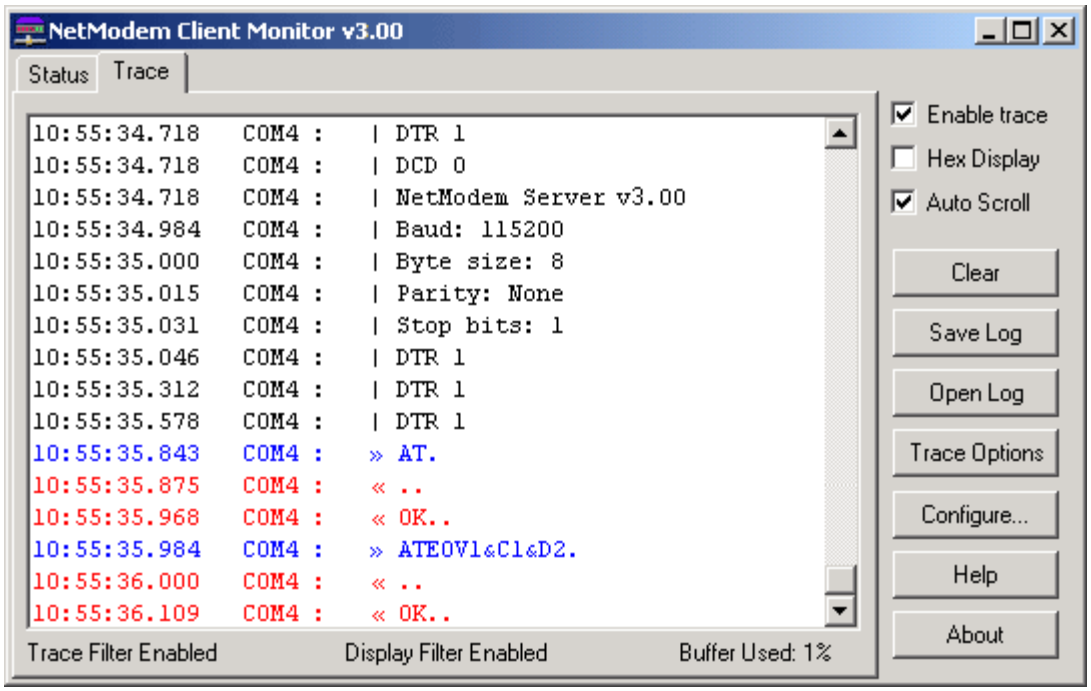
Client users can monitor the Data Flow occurring on all of the Virtual COM ports by selecting the **Trace** tab in the NetModem Client Monitor.



The trace Window normally only displays messages when virtual COM ports are created or removed, or the virtual serial port driver is restarted.

When the **Enable Trace** checkbox is selected, this tab will display the serial data moving to and from the client and server along with the timestamp and name of the COM port. You can optionally select the **Hex Display** checkbox to show the data in hexadecimal numeric format instead of the default ASCII code format, and you can select the **Auto Scroll** checkbox to have the window scroll as more data is logged.

Enabling the Trace can be a valuable tool for troubleshooting misconfigured application software.
Trace should normally be left disabled, as enabling it will cause a slight decrease in the performance and will increase the amount of RAM used.



There are three color codes used in the trace data:

- **Control Information**
  Black text preceded with a "|" is Control Information, such as a changing Status Line, Baud Rate, or State setting, or when a COM port is opened or closed.

- **Transmit Data**
  Blue text preceded with a "»"is data transmitted over the COM port by the application software. This can be viewed in either ASCII code format, or Hexadecimal numeric format.

- **Receive Data**
  Red text preceded with a "«" is data received over the COM port by the application software. This can be viewed in either ASCII code format, or Hexadecimal numeric format.

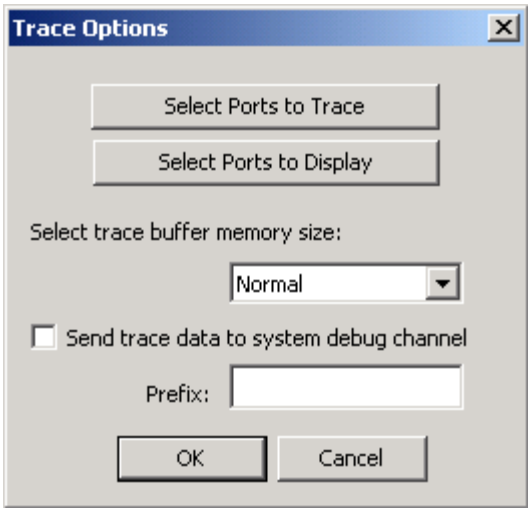
There are four buttons used to control the trace log:

Clear: Erases the entire log from the window.
Save Log: Saves the log file in either ASCII format (.log) or binary format (.trc)
Open Log: Opens a binary format (.trc) trace file that was previously saved.
Trace Options: The following Trace Options are available:

Select Ports to Trace: Allows limiting the number of COM ports that will be traced. For applications using a large number of COM ports, this can lower the system overhead.

Select Ports to Display: Allows limiting the number of COM ports who's data is displayed in the trace window, to specific ports that are being traced. For applications using a large number of COM ports, this allows focusing on specific ports.

Select trace buffer memory size: Allows choosing the amount of RAM used for tracing. Options are Normal and Large. Normal uses 512KB of RAM, and Large uses 10MB of RAM.



Send trace data to system debug channel: By enabling this option, all trace data is also sent to the system debug channel. This data can be collected using third party applications such as **DebugView**. An optional prefix can be defined, which is added to the beginning of each event line.

DebugView is an application which allows monitoring debug output on a local PC, or any computer on the network that can be reached via TCP/IP. DebugView is a free product from Microsoft Sysinterrnals, which can be downloaded here: **http://technet.microsoft.com/en-us/sysinternals/bb896647.aspx**

DebugView can be used to send the Trace Log data directly to a file by using the **File** > **Log to File** command. Otherwise, DebugView defaults to filling its buffer with the Trace data which can be saved to a file manually by using the **File** >**Save as** command.

DebugView can include the Timestamp of each event that is logged by enabling the **Options** > **Show Time** option.

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9. Server Logging Options

9.1 Server Logging Overview

NetModem Server allows logging of phone calls and other activity to be stored in ASCII text files, or an ODBC database. Both logging methods can also be enabled simultaneously, or logging can be disabled entirely.

ASCII text files are convenient for use with simple scripts, and can be viewed using Notepad or WordPad.

The following ASCII text file logs can be created:

ALLPOOLS.LOG	A master activity log of all the pools. (Only used if more then 1 pool is defined).
{*POOLNAME*}.LOG	A separate activity log for each pool defined, where {*POOLNAME*} = name of pool.
DIALED.LOG	A log of all phone numbers dialed.

ASCII text files are stored in the **Log Files Path** defined under **Log Options** in the **Configuration tab.**
The default is c:\program files\netmodem\server\logs

ODBC Databases offer many advantages over ASCII text file logs. Any ODBC Database can be used, including:

- Microsoft Access
- Microsoft Excel
- Microsoft SQL
- MySQL

Third party applications such as **Crystal Reports** and custom **scripts** written for **MS-SQL** or **MySQL** can create complex reports by accessing the database data in real-time.

The same database table names can be created as the ASCII text files above, but without the .log extension. The database filename and location is defined by the ODBC database driver.

When either **ASCII text files** or **ODBC database** logging is enabled, NetModem Server can display up to the last 500 lines of the activity logs in real-time from the Status tab. The maximum size of the logs is limited only by the size of the hard disk.

The Status tab allows the Activity logs to be cleared either from the real-time viewer, or also deleted from the hard disk.

The following Activity data can be logged:

- Date/Time
- System Hostname
- IP Address
- COM port
- Pool name
- Event Description
- User name
- Phone Number dialed
- Comments

Event Descriptions list user logins, when COM ports open or close, When dialing is detected, when calls are blocked, and idle timeouts. Comments describe event conditions, such as security settings, encryption, and connection duration.

The following Dialed data can be logged:

- Date/Time
- System Hostname
- IP Address
- COM port
- Pool name

- Duration of the connection (or if the phone number was blocked)
- Phone number dialed
- Number of bytes sent and received

The log options Window can be accessed by opening the NetModem Server Configuration tab, and clicking the **Log Options** button.

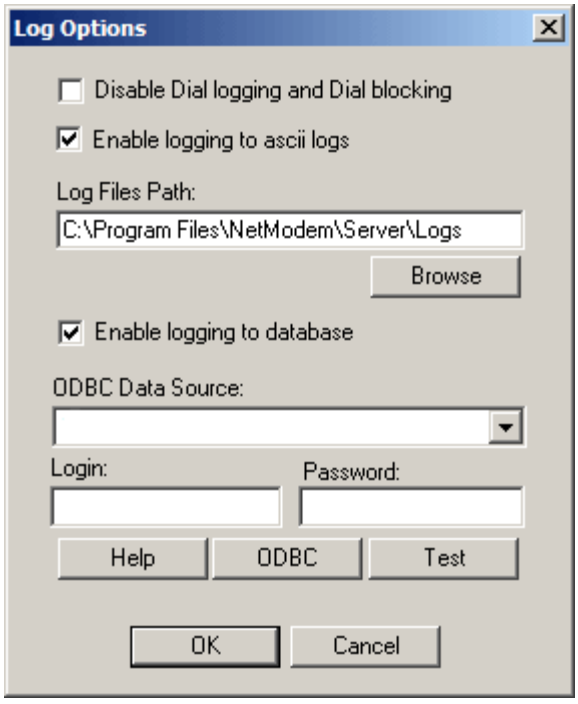
The default settings are shown below, which have ASCII logging enabled, and database logging disabled.

If you have something other then modems attached to the COM ports, then it is recommended to check the first option, "Disable Dial Logging and Dial blocking". This will cause AT commands sent to the COM ports to be ignored.

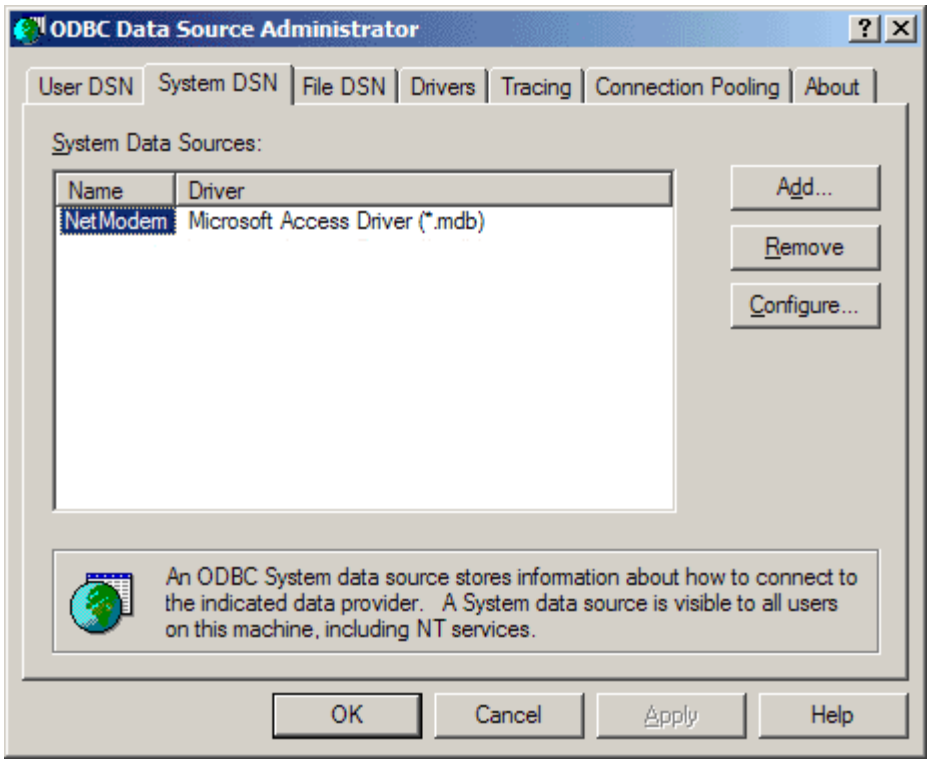
9.2 Enabling Server Database Logging

By default database logging is disabled. It can be enabled by taking the following steps:

1. Open the NetModem Server manager's **Configuration** tab, and click the **Log Options** button.

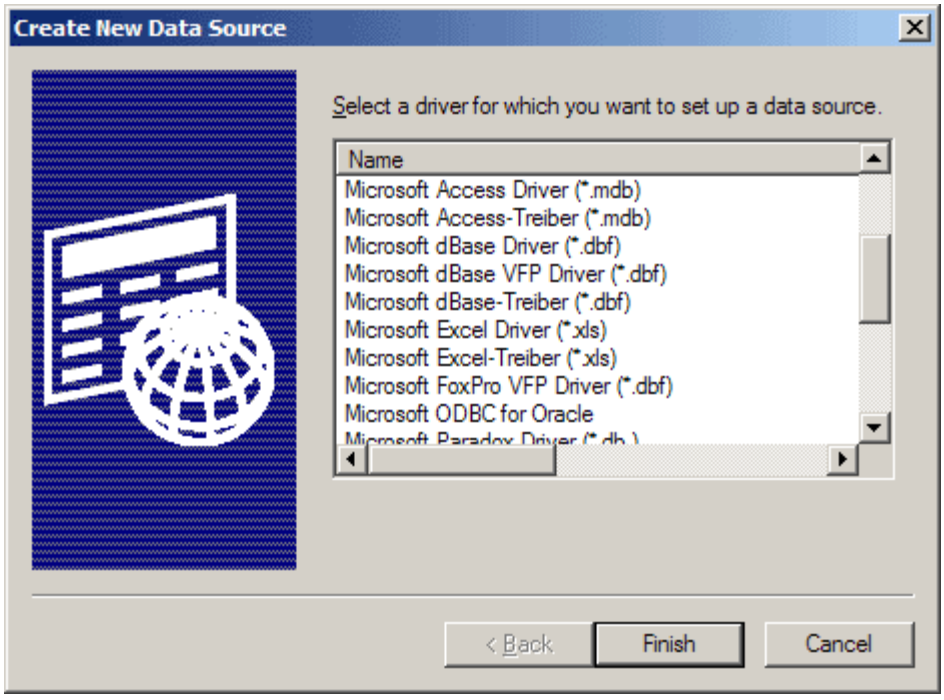


2. From the **Log Options** window, enable the **logging to database** checkbox.
3. Click the **ODBC** button, to open the **ODBC Data Source Administrator tool**.

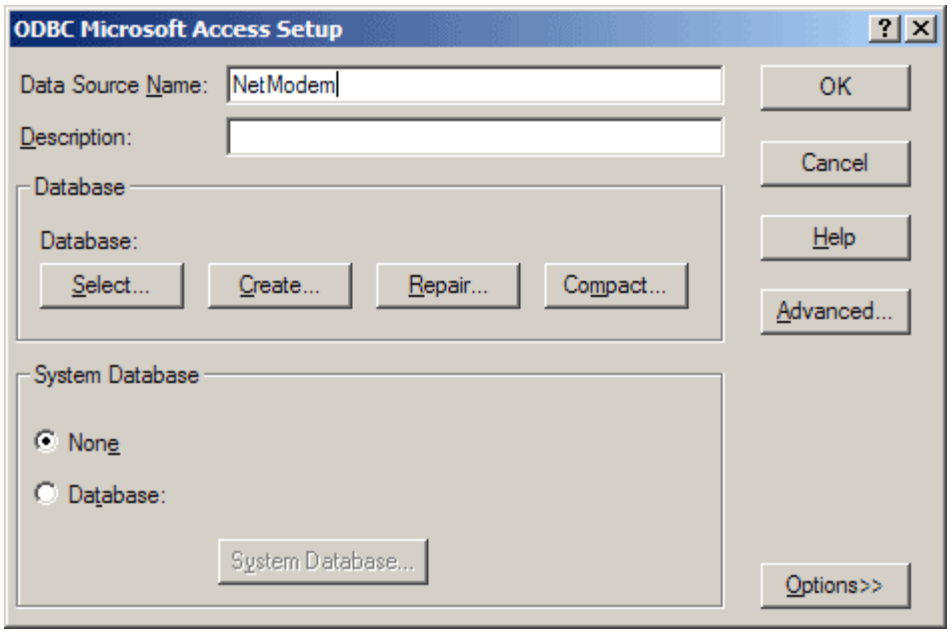


4. Click the **System DSN** tab. ***** THIS IS A VERY IMPORTANT STEP! *****
   (NetModem Server runs as a service, and therefore it requires System DSN.)

5. Click the **Add** button, which opens the **Create New Data Source** window.



6. Select the proper ODBC driver for the desired database, and click **Finish**. *In our example we will selected the Microsoft Access Driver.* This will bring up an **ODBC Driver Setup** window for the driver you selected.



7. Type in any **Data Source Name** such as "NetModem". The description field is optional so it can be left blank.

8. Some ODBC Driver setups (such as MS Access) include a **Create** button. If your driver setup has a **Create** button, click this to bring up the New Database tool, allowing you to select the location and filename of your database. Windows must allow access to the location you select and any filename can be used, for example ***c:\Windows\System32*** with a name of ***NetModem***. If your ODBC Driver Setup does not have a **Create** button just skip this step.

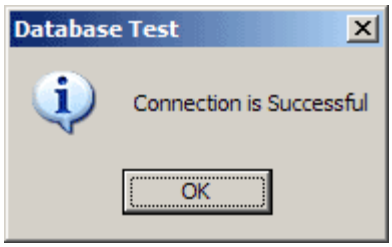
9. Some database types support **Login name** and **Password** enforcement. If these are to be used, these fields should be filled out in the ODBC Driver Setup. Some ODBC Driver Setups (such as MS Access) have the Login name and Password fields located under the **Advanced** button, while other drivers (such as Excel) do not support these.

10. When you are finished configuring, click **OK** to close the **ODBC Driver Setup** window and click **OK** to close the **ODBC Data Source Administrator** window.

11. From the NetModem Server **Log Options** window, select the **ODBC Data Source** name you created from the pulldown menu.

12. If you provided the ODBC Driver Setup with a **Login name and Password**, then you must also enter the same values in the **Log Options** window. Otherwise leave those fields blank.

13. Finally, click the **Test** button to open the Database Test, which checks if NetModem Server can connect to the database. If the test is successful, click on **OK** to close Log Options and click the **Save** button. If the test fails, please review this overview for any mistakes.



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10. User Authentication

In order to use authentication, the proper credential methods should be configured on both the NetModem Server and the NetModem Client PC's.

10.1 Server Authentication:

Each pool of COM ports on the NetModem Server can be configured to limit access to specific authenticated Windows users, or to clients that can provide a pool password.

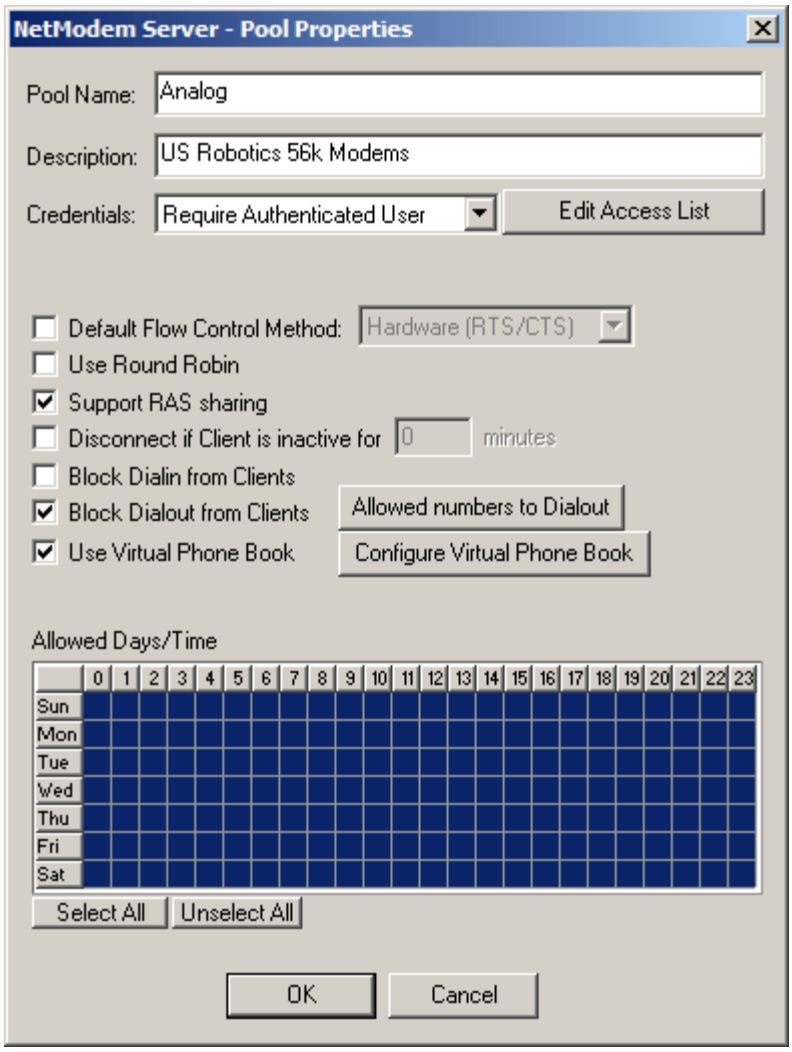
User Authentication and other security options are configured separately per pool, from the NetModem Server Configure Tab.

Select one of the pools, and click the **Properties** button to bring up the Pool Properties window:

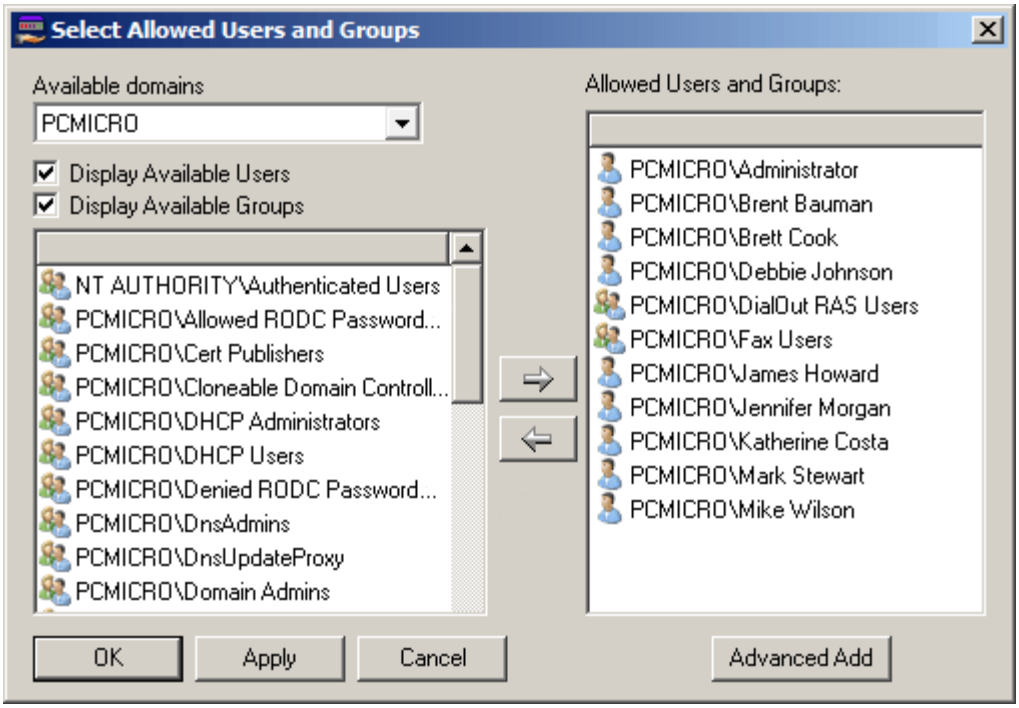
The credential options for each pool are:

None
Require Authenticated User
Require Pool Password

By default **None** is selected, allowing any client to connect to the COM ports in this pool without providing a login or password.



Require Authenticated User - This credential option limits access to COM ports in this pool to a list of allowed users and/or groups. When this option is selected, the "**Edit Access List**" button appears. Clicking this button brings up the "**Select Allowed Users and Groups**" dialog shown below:

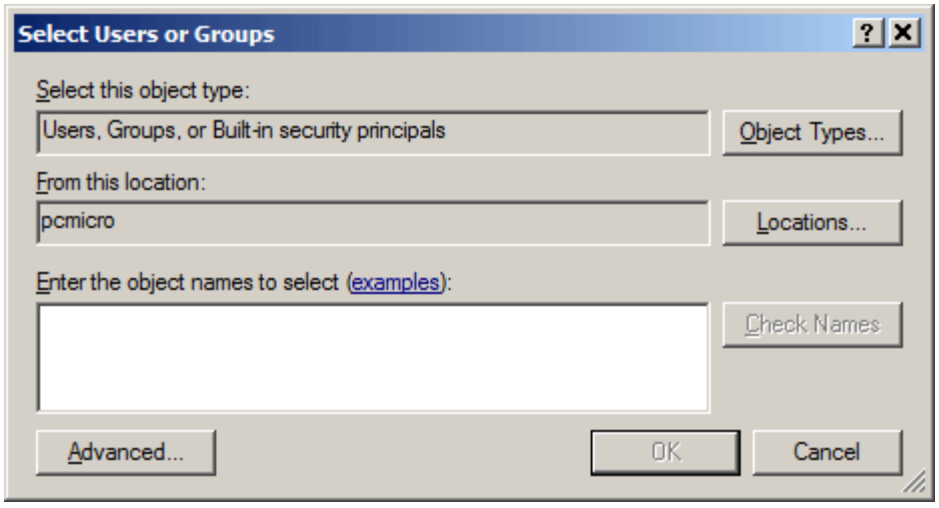


The **Edit Access List** allows defining users and/or groups that are allowed to access ports in this pool.

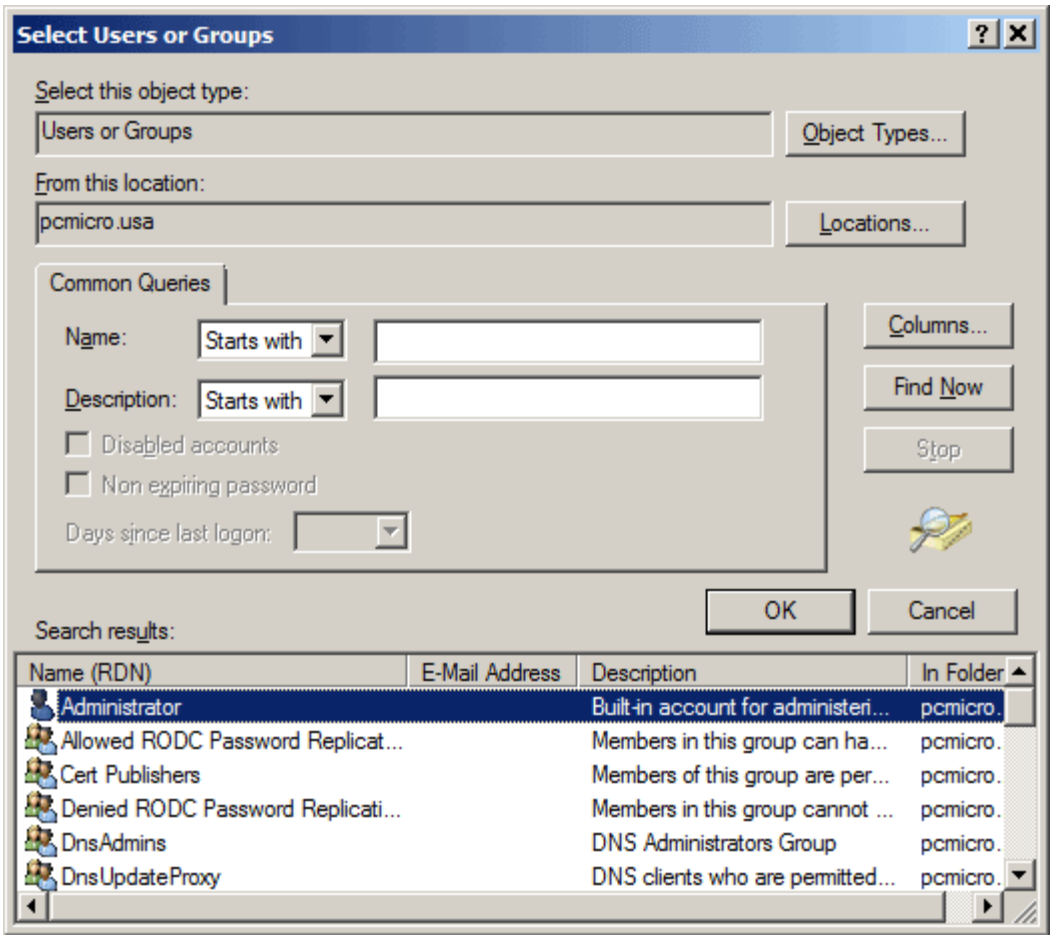
To add a an item, select it from the list on the left, and click the **Right Arrow** to move it to the list on the right. To remove an item, select it group from the list on the right, and click the **Left Arrow** to return it to the left list.

When a new pool is created requiring user authentication, a special group named "**Authenticated Users**" is added to the pool's allowed list by default. This is the recomended setting to give everyone with valid credentials access to the modems in this pool.

The **Advanced Add** button opens the Windows internal "**Select Users and Groups**" dialog, which allows typing in the desired user name(s) or group(s) to add.



Clicking the "**Advanced**" button in the above dialog brings up the dialog below, which allows query searches for either object names or descriptions.



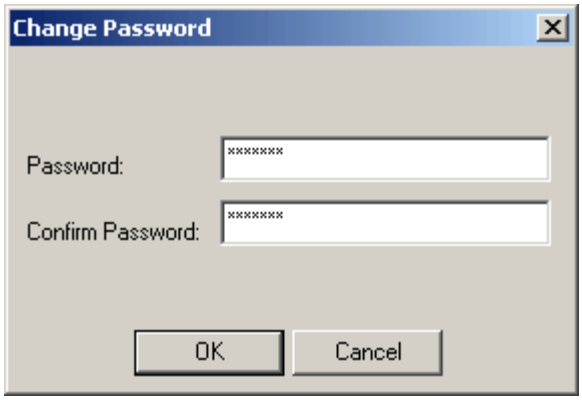
Clicking the "**Find**" button without typing in a search query will list all the objects.

Require Pool Password - This credential option limits access to COM ports in this pool to only clients that can provide the pool password. When you select this option the "**Change Pool Password"** button appears.

When a pool password is defined in NetModem Server, the same password must be defined in each NetModem client that needs to access this pool of COM ports or modems.

The Password prompt requires you enter a password twice, to confirm that you typed it correctly.

After clicking OK to accept the new password, please be sure to also click "**Save**" to begin using this password for the pool.



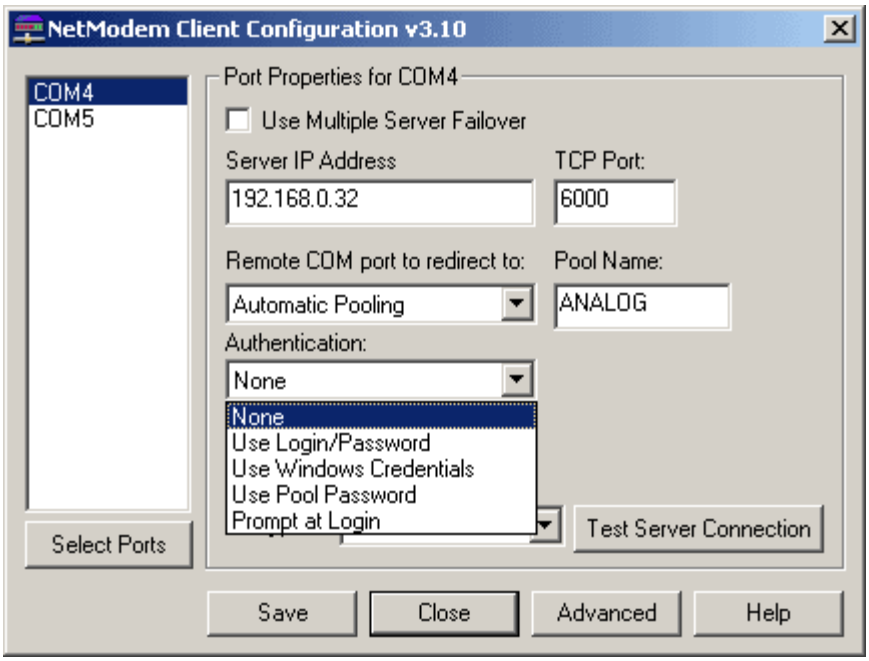
10.2 Client Authentication:

Once Authentication has been enabled on the server, it will also have to be enabled on the clients. Right click the NetModem Client Tray icon and select **Configure**. (or go to **Start > All Programs > NetModem Client > Configure**.

The NetModem Client Configuration Window allows you setting different authentication settings for each Virtual COM port you have defined.

The following authenticationl options are available
None
Use Login/Password
Use Windows Credentials
Use Pool Password
Prompt at Login

The default is **None**, which does not try to send any authentication when it connects to the server.



Use Login/Password - This will provide the server with a login and password each time a virtual COM port is opened. When you select this authentication option, a button will appear that says "**Change Login/Password**". which allows defining the Login name of the user, and their password.

The Login Name and password the client

provides must match the Windows Credentials information found on either the domain controller used by the NetModem Server, or if a domain controller is not used then it must match a user that is defined on the NetModem Server computer.

The Password prompt requires entering the password twice, to confirm that you typed it correctly.

Use Windows Credentials will provide the server with the current user's Windows login information each time a virtual COM port is opened. NetModem client obtains this information from Windows during the login process. After the NetModem Client is installed, the user will need to logoff and then login again before this option will be functional.

Use Pool Password will provide the server with a password for the selected pool each time a virtual COM port is opened. The server allows a unique pool password to be defined for each pool of COM ports or modems. When you select this security option, a button will appear that says "**Change Pool Password**".

Prompt at Login will prompt the user for their password each time they login to Windows.

Once you have enabled one of the security options in the NetModem Client Configuration, run the "**Test Server Connection**" to make sure that the security handshaking between the client and server are successful.

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11. SSL/TLS Encryption

11.1 Encryption overview

Transport Layer Security (TLS) and its predecessor, Secure Socket Layer (SSL) are protocols designed to secure the transfer of data passed between the client and server by providing encryption, certificate authentication and data integrity. Enabling SSL/TLS in NetModem can effectively prevent intruders from eavesdropping or modifying the data streams passed over an insecure network or over the internet.

NetModem's encryption uses the current-generation OpenSSL toolkit version 1.1.0g. OpenSSL is the most popular library for creating SSL/TLS applications, and is used on most SSL/TLS enabled servers.

OpenSSL supports **SSL version 3**, and **TLS version 1.0, 1.1, and 1.2**. TLS is preferred over the less-secure SSL, and **TLS version 1.2** is the current and reccomended version to use. TLS/SSL makes use of one or more cipher suites. A cipher suite is a combination of encryption and authentication algorithms. Most ciphers supports multiple key lengths (known as **Encryption Strengths**)

NetModem supports the following ciphers suites: **RC4**, **3DES**, **CAMELLIA**, **CHACHA20**, and **AES**.
RC4 and 3DES are now depreciated and should not longer be used. Support for older depreciated ciphers such as RC2 and DES was removed from OpenSSL in the 1.1.0 release.

AES (**A**dvanced **E**ncryption **S**tandard) is the recommended cipher suite, and it is the **only** cipher suite available when selecting TLS version 1.2.
When **AES** is selected, NetModem will automaticlly use the hardware based **AES-NI** instruction set when a compatible Intel/AMD CPU is detected, which gives AES a performance boost of 4 to 10 times the speed while reducing CPU overhead. AES-NI was first put into production by Intel in 2010, and is supported on most later generation Intel and AMD CPUs.

CHACHA20 is recomended for mobile devices and older PC's which do not have CPU's that support the hardware based AES-NI instructions, as CHACHA20 provides faster performance then AES without hardware accelleration.

CAMELLIA is another well designed cipher suite. While there are no real advantages over either AES or CHACHA20, it can be benifitial to have an alternative cipher suite in the event AES and/or CHACHA20 ever become compromised.

When Encryption is enabled, Each NetModem Client can request an SSL/TLS Certificate from the Server, which is used to validate the servers identity by confirming that the certificate was issued and signed by a Certificate Authority (known as a CA). A built-in list of CA's is included with NetModem Client, and a custom list of CA's can be used instead. NetModem Client also allows unsigned/self-signed certificates to be used.

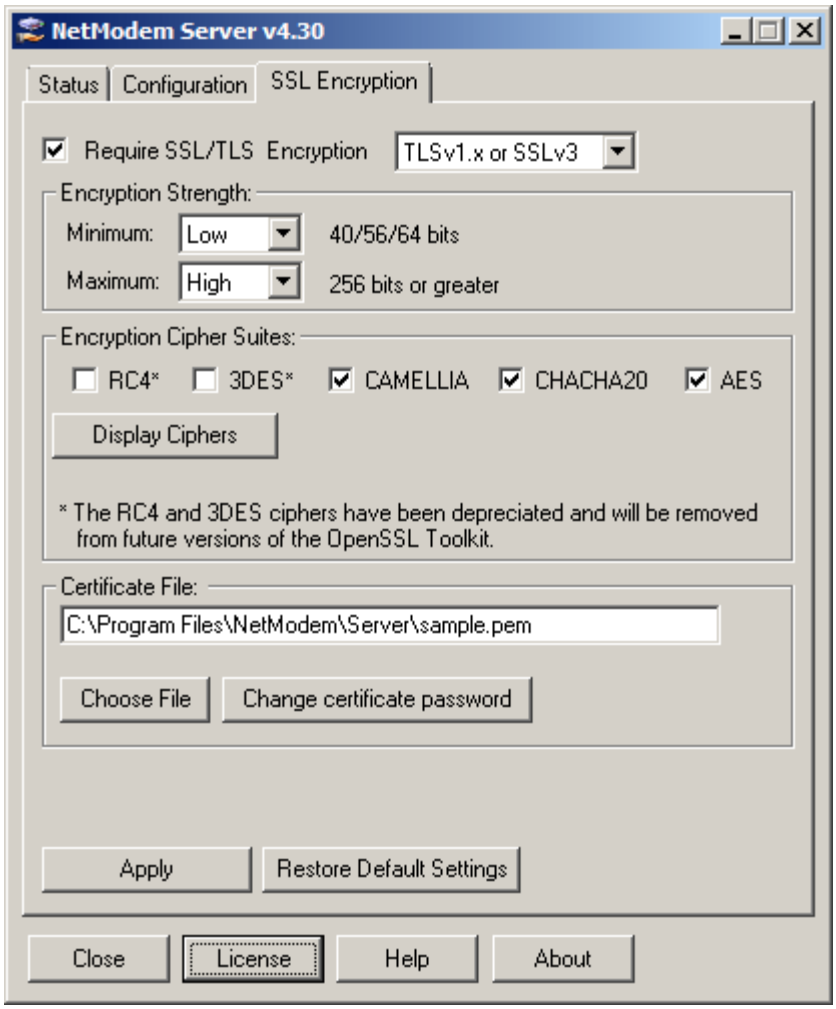
A Sample unsigned certificate is included with NetModem Server, named Sample.pem. This is useful in the testing phase, but it should never be used in a production environment since it uses a known password.

11.2 Enabling Encryption

For encryption to be used, both NetModem Server and NetModem Client must both be configured to enable encryption and to be able to negotiate a common protocol, cipher suite, and cipher strength.

On NetModem Server:

1. Click the "SSL Encryption" tab on the NetModem Server Graphic User Interface.



2. Enable the **Require SSL/TLS Encryption** checkbox.

3. Optionally select to use the desired SSL\TLS protocols from the **Encryption** pull-down menu.
   The options are:
   TLS version 1.x or SSL version 3
   TLS version 1.2 or 1.1
   TLS version 1.2 only
   TLS version 1.x (any)
   SSL version 3 only

4. Optionally select the Minimum/Maximum Encryption Strengths and Encryption Ciphers suites that NetModem Server will allow.
   Note: if "**TLS version 1.2 only**" is selected, then the only cipher suite available will be **AES**.

5. Select at least one cipher suite: **RC4**, **3DES**, **Camellia**, **ChaCha20** or **AES**. Several or all suites can be selected, and the server and client will negotiate the best mutual cipher to use each time a client connects.
   Note: **RC4** and **3DES** have been depreciated and are no longer recommended.
   If **TLS 1.2 only** is selected, then **AES** will be the only available cipher suite.

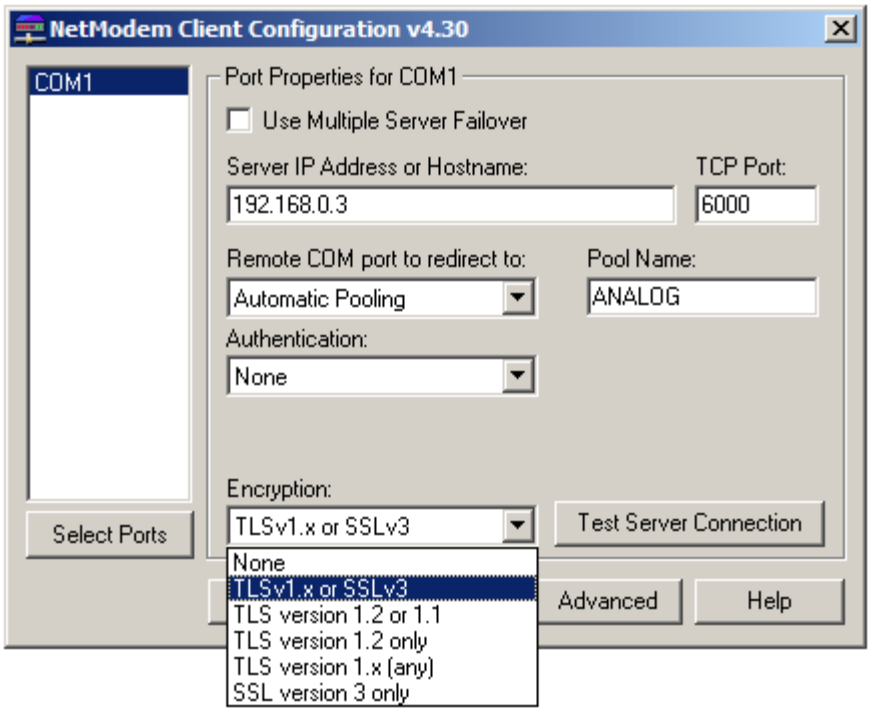
6. If you are supplying your own certificate file, click the **Choose File** button to select your Certificate .PEM file and then click the **Change Certificate Password** to enter the password that was used to create the certificate. The password for the sample.pem certificate is "**password**". Note: The sample.pem certificate provided with NetModem Server should only be used for testing. Any publicly distributed certificate can not be considered secure.

7. Click the **Apply** button to save the changes.

Note: The Certificate password is stored in the Windows Registry in encrypted form.

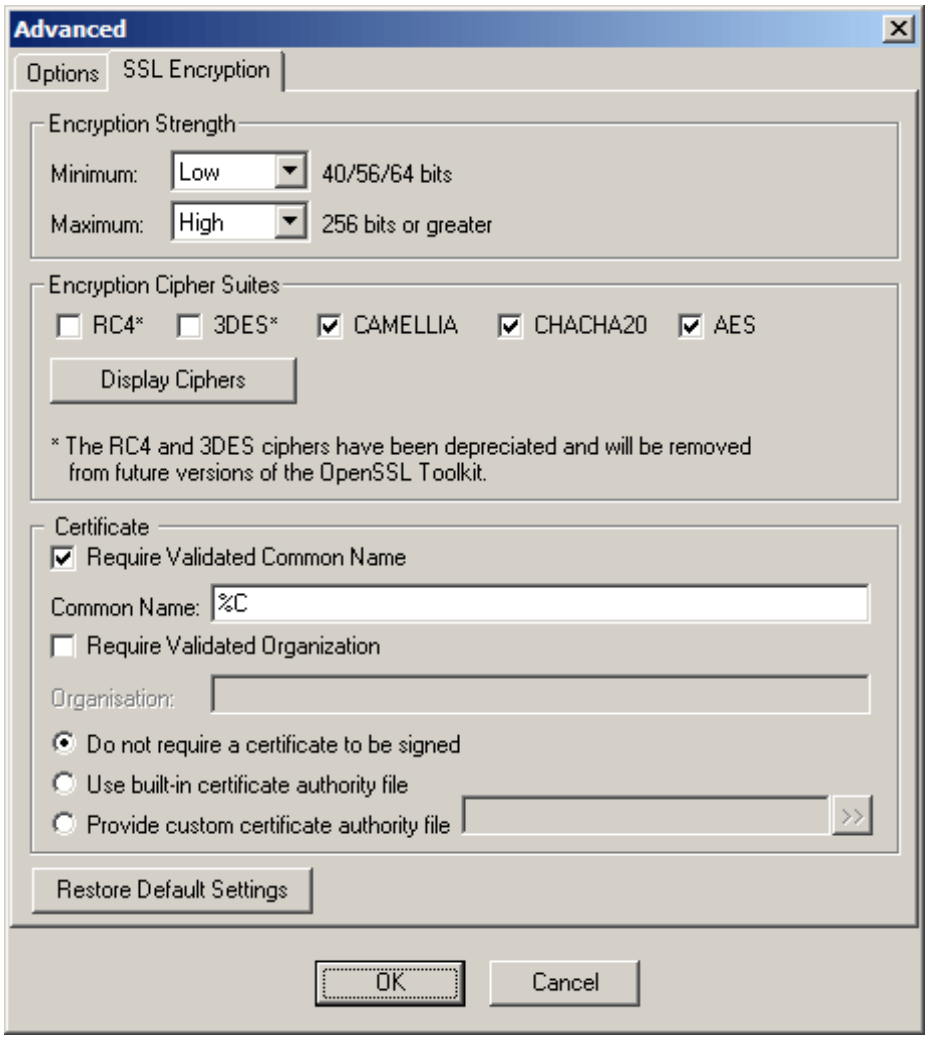
On NetModem Client:

1. Open the **NetModem Client Configuration** window, and on the **Encryption** pull-down menu select one of the following encryption protocols::
   TLS version 1.x or SSL version 3
   TLS version 1.2 or 1.1
   TLS version 1.2 only
   TLS version 1.x (any)
   SSL version 3 only



It is recommended to select the "**TSLv1 or SSLv3**" option, as this allows the Server to choose which will be used.

2. Click the **Advanced** button, and from the Advanced window click on the **SSL Encryption** tab.



3. Select the **Minimum** / **Maximum** Encryption Strengths and the **Encryption Cipher Suites** which NetModem Client will offer to negotiate with the Server. You will need to have at least one Cipher suite selected which NetModem Server has also been configured to allow.

4. To assure that the Certificate supplied by NetModem Server has the correct credentials, select the **Require Validated Common Name** checkbox. By default there will be a **%C** in the Common Name Field, which is a meta-tag used in place of the Servers Hostname or IP Address, as defined in each COM port configuration screen. This should always be used when there is more then one Server the client will connect to.

   Optionally, by selecting the **Require Validated Organization** checkbox, you can specify the name of the organization the Certificate was issued to, to verify that the client is connecting to the authorized server.

   When either of these checkboxes are selected, the client will demand that the field(s) defined for them are an exact match for the same fields defined in the Servers certificate. You may leave these fields blank to be filled in automatically when you test the server connection in step 7 below.

5. If NetModem Server is using the **Sample.Pem** certificate, or if NetModem Server is using some other unsigned certificate then you should select the **Do not require a certificate to be signed** option.
   If you are using a certificate signed by a known CA (Certificate Authority) then select the **Use built-in Certificate authority file** option.
   If NetModem Server is using a certificate signed by a CA not listed in the included CA.PEM textfile, then either select **Do not require a certificate to be signed** or Provide a custom certificate authority file. Review the CA.pem file to for information on creating a custom CA file.

6. Click the **OK** button to close the Advanced window.

7. In the NetModem Client Configuration window, click the **Test Server Connection** button to verify that the Encryption options you specified are compatible with the settings defined on the NetModem Server.

8. If any encryption issues are found by the test, it will ask you if you wish to fix the problems. Answering yes will change the encryption options on the client to match what the server requires.

9. Once the test is successful, be sure to click the "**Use Settings**" button at the bottom of the test window.

You can see which Encryption Cipher is being used by each active COM port in the **NetModem Client Monitor** Status Window.

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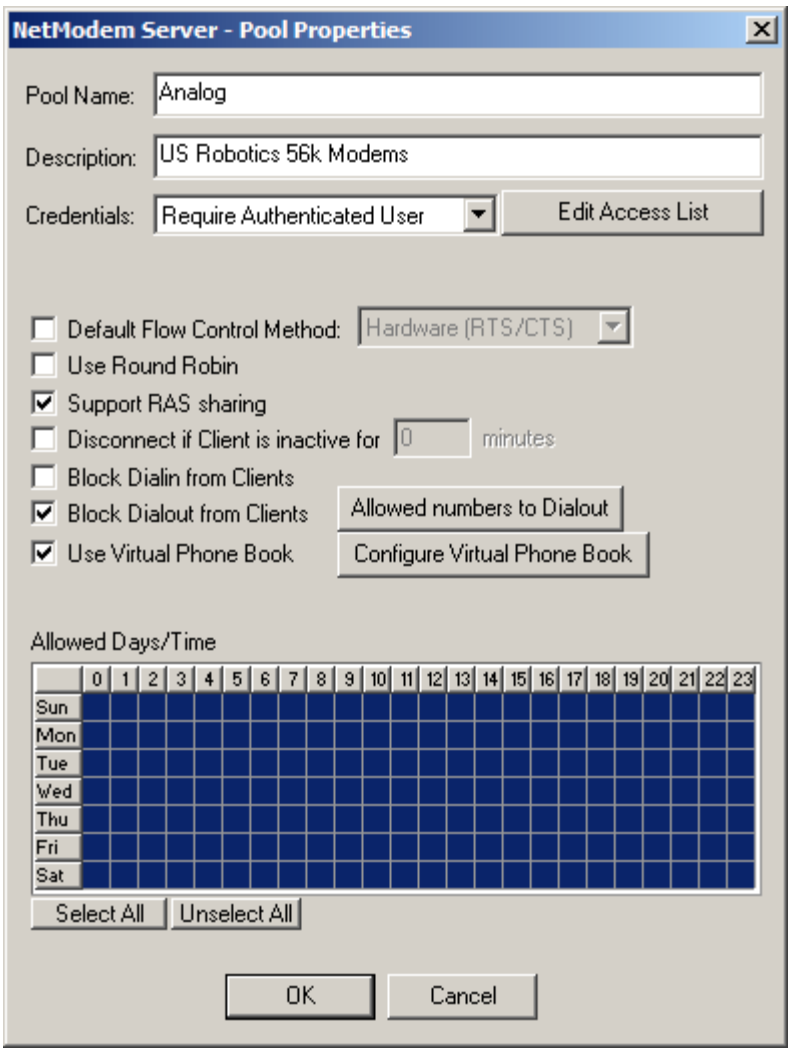
12. Blocking Dialin and Dialout

Each modem pool defined on the NetModem Server can be set to block incoming calls and/or limit outgoing calls to a defined list of phone numbers.

The Pool Properties for any defined modem pool can be selected from the NetModem Server configuration screen, by selecting the pool and clicking the **Properties** button.

The **Block Dialin** and **Block DialOut** options are disabled by default.

When the "**Block Dialout**" option is enabled, it causes a button labeled "**Allowed Numbers to Dialout"** button to appear.



How the "**Block Dialin from Clients**" feature works:
When enabled, this function prevents the clients from sending certain AT command to the modems in the selected pool, as these commands are used to allow a modem to accept an incoming call. In particular, the following two AT command are blocked:

ATA - Answer an incoming call

Client applications send an ATA command to a modem to tell it to manually answer an incoming RING.

ATS0=x - Set Auto Answer mode on (where x = a numeric value from 1 to 9)

Client applications can send an ATS0=1 command to a modem to tell it to automatically answer an incoming call on the first ring. Any non-zero value after the equal sign enables it to automatically answer an incoming call on that ring number. Setting S0=0 disables the auto answer mode, and this command is not blocked.

Note that AT commands can contain other modem commands between the **AT** and the actual command. For example: **ATM0E0A**
This is actually several modem commands: **M0** turns the modem speaker off, **E0** turns echo mode off, and **A** answers an incoming call.

How the "**Block Dialout from Clients**" feature works:
When enabled, this function limits the phone numbers that the clients can tell the modem to dial, to a predefined list of phone numbers including wildcards. Clicking the "**Allowed numbers to Dialout**" button brings up notepad with the current pools allowed-list loaded. Each entry on the list should be on its own line.

The format of the allowed numbers list file is as follows:

- Each phone number must be on a separate line.
- A phone number may only contain numeric values, and/or a Wildcard character *.
- Any hyphens or spaces must be removed.
- A phone number must include any prefix numbers dialed, such as 1 or an area code.
- A Wildcard * character can be used to represent any series of numbers.

The default list contains only one entry, a line with only a Wildcard character. This allows any phone number to be dialed. Lets imagine this is replaced with the following list:

```
8005551212
9508888
713*
```

The above list would allow the modems in this pool to dial either of the first two numbers, or any number beginning with "713".

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13. Virtual Phone Books

Virtual Phone books allows the administrator to assign pseudo phone numbers to clients, which are translated to the actual phone number when dialing out. This allows phone numbers for specific services to be changed without needing to globally reconfigure every dialout user's terminal with the new phone number(s).

Once a Virtual Phone book has been assigned to a Pool, the administrator can view and edit it directly, or allow a third party database tool or script to maintain it.

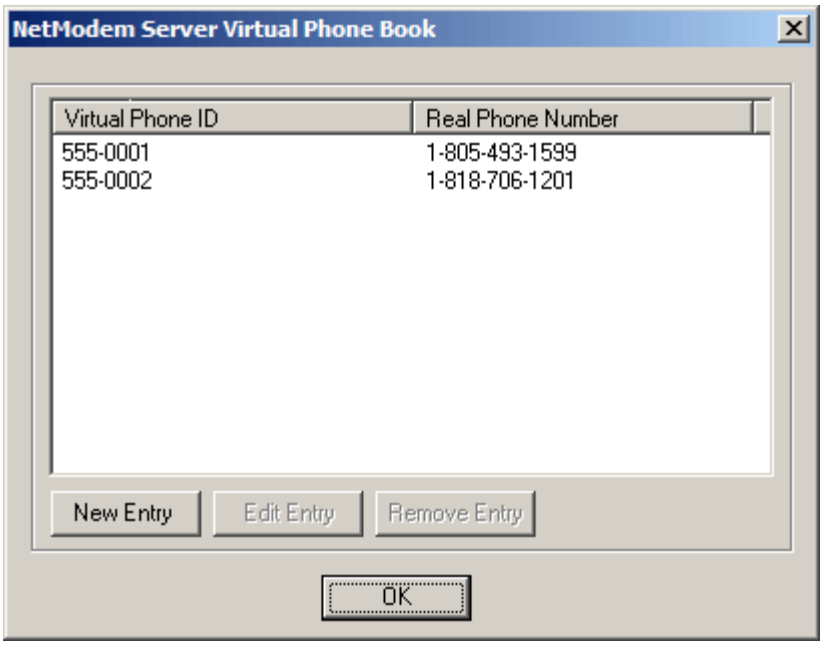
Viewing or Editing a Virtual Phone Book:

From the NetModem Server Configuration tab, select a Modem Pool and click the **Phone Book** button.

Virtual Phone Books are lists containing pairs of Virtual Phone ID's and the real phone number they will be translated to.

A separate Virtual Phone Book can be assigned to each Pool, or Multiple Pools can share a common Virtual Phone Book.

Each Virtual Phone book is stored in either a flat text file, or an ODBC database.



Configuring Virtual Phone Books:

From the NetModem Server Configuration tab, select a Modem Pool and click the **Properties** Button.

From the Pool Properties window, enable the "**Use Virtual Phone** Checkbox", and click the **Configure Virtual Phone Book** button.

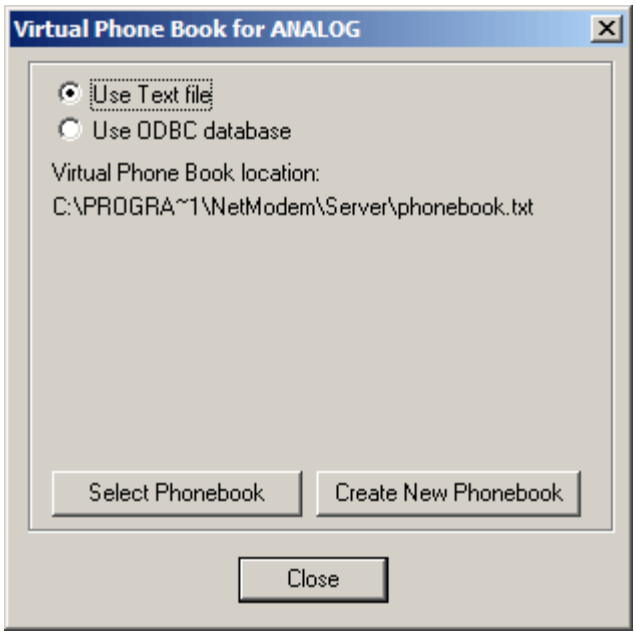
Choose to store the Virtual Phone Book in either a Text file, or an ODBC Database.

By default a Text file named **phonebook.txt** is selected, located in the NetModem Server data directory, which is usually locaed in: **\users\all users\nmserver** You can choose to use a different Text file as the phone book for this Pool by clicking on either the **Select Phonebook** or **Create New Phonebook** button.

A **Text file** stores the data in the following format:

ID1,Real_Phone_Number1
ID2,Real_Phone_Number2

Each ID and Real Phone Number pair are on the same line, separated by a comma.



When choosing to use an **ODBC database**, the following fields appear:

ODBC Data Source: This pulldown allows you to select a pre-existing database source

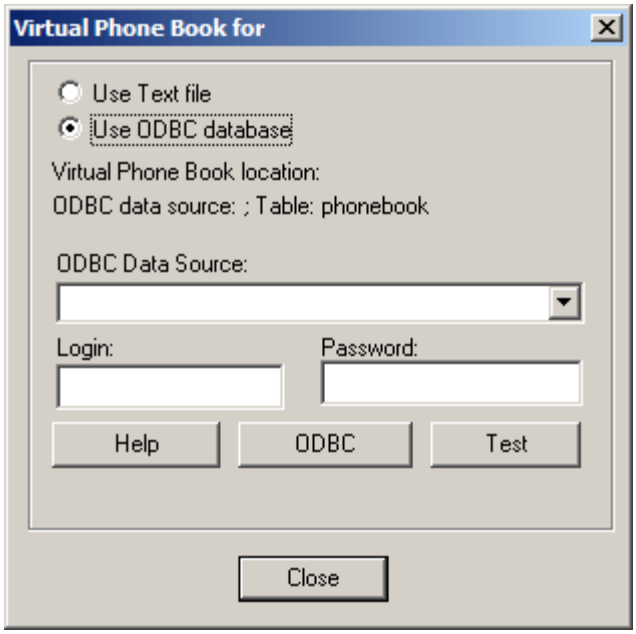
Login and Password: These are optional

Help: Opens a tutorial on creating an ODBC database using the ODBC Database Administrator tool.

ODBC: Opens the Microsoft ODBC Database Administrator tool

Test: Verifies that NetModem Server can access the selected ODBC data source successfully.

The table name "**phonebook**" is always used.



If NetModem Server is configured to log to an ODBC Database, the same Data Source can be used for both logging and a virtual phone book, or separate Data Sources can be used for each.

To create a new ODBC Data source, click the **ODBC** button to open the **ODBC Database Administrator tool**.

Step by step instructions on using the **ODBCD database Administrator tool** can be found in the **Enable Server Database Logging** chapter.

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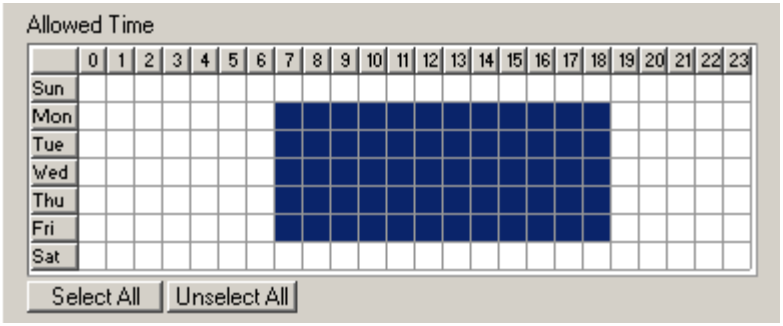
14. Limiting Usage Hours

Each pool can have separate Usage Hours defined. Usage hours are the hours of the day that COM ports in this pool are allowed to be accessed.

View or change the usage hours from the NetModem Server Configuration tab, by selecting a Modem Pool and clicking on the **Properties** button, to bring up the **Pool Properties** window. The bottom of the window has a graph representing each hour of the week with a block that can be selected (colored) or unselected (white).

This graph shows that clients are allowed to access the COM ports in this pool Monday through Friday from 7:00AM until 6:00 PM.



To change the allowed access hours, click the mouse on an hour block, or select a block by holding down the mouse and dragging. Days and hours can also be toggled on/off by clicking on the desired Day or Hour button.

Click the **OK** button when you are done to close the Pool Properties window, and click the **Save** button in the main window to save and activate your changes.

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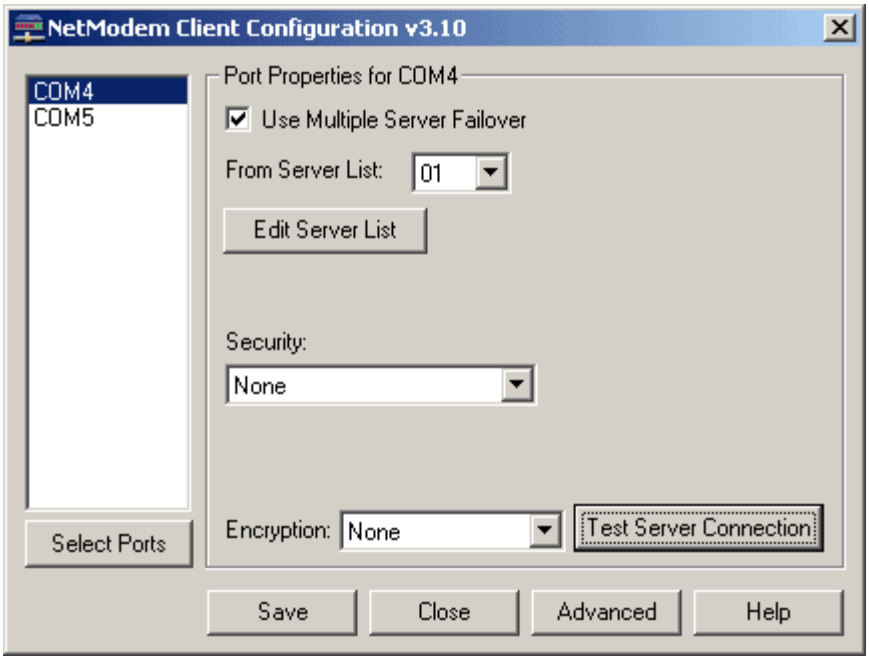
15. Using Multiple Servers for Failover

If multiple NetModem Servers are installed, clients can be configured to maintain a list of servers to attempt to connect to each time a Virtual COM port is opened. If the first server on the list is either full or unreachable for any reason, the client tries the next Server on the list. Note: Each NetModem Server requires a separate license.

The Client Configuration Screen looks different when **Use Multiple Server failover** enabled. The usual input fields for IP Address, Port, and Pool are replaced with the Server List options. These allow you to choose from several different lists of servers, and will allow you to edit any one of those lists.

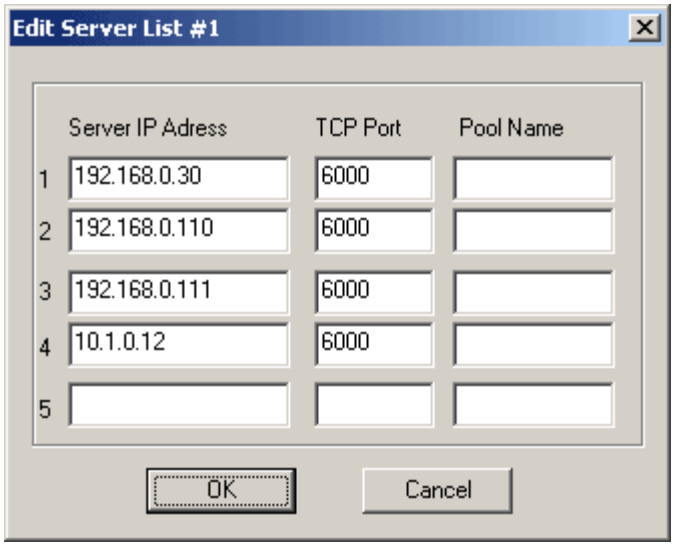
Up to 20 Server Lists can be defined, and each server list allows up to 5 Servers to be specified.



The **Edit Server List** allows up to 5 servers can be defined per list. in the order that the client will attempt to connect to them.

A Server list needs at least two servers defined. Each Server entry must have the IP Address (or hostname) of the Server, and the TCP Port. An IPv6 Address or hostname can be used only if the "Enable IPv6" option is enabed under the Advanced Configuration options. A Pool Name is optional, if no Pool Name is defined, the Servers default pool will be accessed.

When an application opens a COM port configured to use multiple servers, NetModem Client attempts to connect to the first server on the list. If that server is either full or unreachable, it attempts to connect to the next server on the list. This continues until a server with an available modem is reached, or until all the servers have failed.



When using multiple servers, you can fine tune how long NetModem Client waits for each server to respond when the Client requests a COM port from a server. By default it waits up to 2 seconds for the server to respond, and if there is no response then it switches to the next server in the list. The settings can be found under the "**Advanced**" button in the NetModem Client Configuration window. The value is in milliseconds (1/1000th of a second), so the default value of 3000 = 3 seconds maximum. On a slow Network you might need to increase this value, and on a Network in which Several Failover Servers are defined, you might need to decrease the value in order to speed up the search.

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16. Troubleshooting and Technical Notes

16.1. If the NetModem Client "Test Server Connection" Fails

First check that the client COM port has the correct IP address of the NetModem Server defined, and that the TCP port being used on that COM port matches the TCP port being used on the NetModem Server.

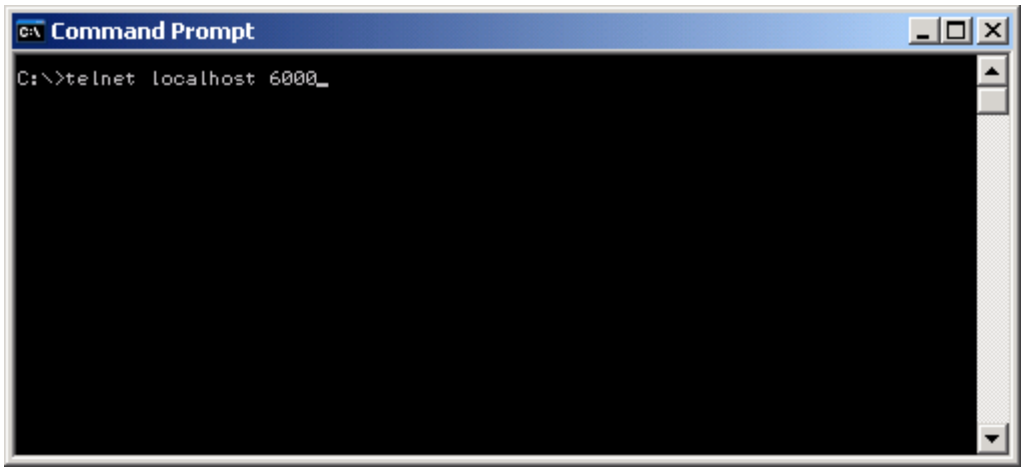
If that does not solve it:

Find out if NetModem Server is accepting TCP connections locally, as it may be a network issue or firewall issue which is preventing remote computers from connecting.

One way of verifying that NetModem Server is accepting TCP connections is to use the Windows telnet client (telnet.exe) locally on the **NetModem Server PC**. telnet.exe is enabled by default in Windows XP and earlier, but in later versions of Windows it will need to be enabled by going to the Control Panel's **Programs and Features** applet, and in the left column click **Turn Windows features on or off**, and enable the check-box next to "**Telnet Client**". Before proceeding, disable SSL/TLS encryption in NetModem Server to allow telnet access.

To run the Windows Telnet Client, open a **Command Prompt** (Click the start button and search for **CMD**). From the Command Prompt window type in the following command line and press [Enter] :
telnet localhost 6000

(If a TCP port other then 6000 was configured on the NetModem Server, use that value instead)



A black empty screen with a cursor in the upper left corner indicates a successful connection. If Credentals are enabled, there should also be a login prompt by the cursor.
A "**Could not open connection to the host**" response indicates that NetModem Server is not accepting incoming connections on that TCP port.

If the telnet connection is successful locally on the **NetModem Server PC**, next try the telnet command from a **NetModem Client PC** but change the word "localhost" to the IP address of the NetModem Server. For example "Telnet 192.168.0.1 6000". If this works from the server, but not from the client, then there is most likley a **firewall** blocking inbound traffic to the TCP port on the server.

If the telnet connection works from the Client PC, then it should also work successfully from the NetModem Client Configuration's "**Test Server Connection**".

16.2. If the Client says "NetModem Server reports COM port not available"

This indicates that the COM port the client requested is not available on the NetModem Server. Check if the NetModem Client's virtual COM port is configured for **Automatic Pooling** as this tells the server to provide the next available COM port in a pool of Shared Ports defined on the NetModem Server.

If the client is set for **Automatic Pooling** then the next step is to find out why none of the "Assigned to pool" COM ports in the NetModem Server's first (default) pool are available. It could be due to other clients holding all the shared COM ports open. Look at the Active Connections listed in NetModem Server's Status screen on the Server PC. If some of the Shared Ports are in use by a client, then they will each be listed as an Active Connection, showing the IP address of the client PC that is using each port. If all the assigned ports in a pool are listed under the Active Connections list, then none will be available until they are closed by their client's application.

If all the COM ports in a pool are not listed as Active Connections, then there is some other reason that these COM ports are not available to the client. Either an application or service on the NetModem Server PC is currently using those COM ports, or there is a problem with the COM ports or their attached modems. If no other application on the NetModem Server PC appear to be using these COM ports, then try accessing the COM ports directly from the NetModem Server PC using a terminal program such as HyperTerminal or PuTTY. If a terminal program is unable to access the modems or COM ports directly, then the NetModem Server will not be able to access them either.

The pop-up Window that displays "**NetModem Server reports COM port not available**" to the client user can be disabled by going to the **Advanced** section of the NetModem Client configuration program and disabling the checkbox.

16.3. Solving Network Faxing Issues

Class 2 or **Class 2.x** fax modems are recomended for faxing over a network, due to **Class 1** being very timing sensitive. Many low-end internal or USB "**Software Modems**" (also known as **Soft Modems**) only support **Class 1** fax. However, most external serial modems, multi-modem cards, and several name-brand internal modems support either Class 2 or Class 2.x faxing. It's a good idea to check which fax class is supported with the modem manufacturer before purchasing a modem to be used for faxing over a network.

The Faxing software you use also needs to be configured for Class 2 or Class 2.0. Keep in mind that Class 2 and Class 2.0 are not the same, so it's important that the software is configured for a class that the fax modem supports. Newer Fax modems may support Fax Class 2.1 which is backwards compatible with Class 2.0 software, but neither of these classes are compatible with Class 2 software.

Consult your faxing software documentation for information on setting Class 2 or 2.0 in your faxing software. There is additional information on this subject found on PC Micro's **NetModem Support Site**.

16.4. Running the NetModem Server as a non-Service program

The **NetModemServer.exe** can run as a normal program (Rather then running as a Windows Service). Doing this will add an additional menu option to the system tray icon called **Exit** which allows the program to exit only if none of the COM ports are currently in use. If any COM ports are in use, this **Exit** option will be gray and unselectable.

16.5. Preventing accidental client configuration changes

If the Administrator is concerned about the possibility of a client user misconfiguring the virtual com port settings, the **configure.exe** file can be removed from the NetModem Client folder. This is usually located in **c:\program files\netmodem\client**

16.6. NetModem under Remote Desktop / Terminal Services or Citrix XenApp

Windows Remote Desktop Services (formerly known as Terminal Services) and Citrix XenApp are both multi-user environments which can be used with NetModem.

Remote Desktop Services is included with Windows Server, allowing a user to connect to a Remote Desktop Session Host (RD Session Host) server (formerly known as a terminal server) by using Remote Desktop Connection (RDC) client software.
Remote Desktop is a light single-user version of a Remote Desktop Services. included in Windows Professional, Business, and Ultimate editions.
Citrix XenApp is an advanced remote access infrastructure server for enterprise applications.

When using either of these environments to allow "Thin-Clients" to access the shared COM ports, the following procedure should be used:

1. Install the NetModem Client on the RD Session host, or XenApp PC. This can be the same PC where NetModem Server is installed, or not.

2. Select one virtual COM port in the NetModem Client configuration, and assign the IP address of the NetModem Server.

3. Next Select as many additional Virtual COM ports as needed. (Usually you will want to select one virtual COM port for each thin-client user). Up to 256 Virtual COM port can be selected. All the additional virtual COM ports will default to using the same Server IP address as you assigned in step 2.

4. When you close the client configuration window, you will be guided to install a modem driver. When you are instructed to select the ports to assign the modem driver to, select all the Virtual COM ports.

5. Assign one of the Virtual COM ports to each thin-client user. This will allow each user to access the next Shared COM port on the server though their virtual COM port. This allows up to 256 thin-clients to access the modem pool.

6. Under the **Advanced** options in the NetModem client configuration, disable the "**show message if COM port not available"** checkbox. If no COM port is available on the NetModem Server, the thin client will be informed by an error message in their application software attempting to use a COM port.

7. If NetModem Servers Pool Settings is configured to require User Authentication, the NetModem Client Security setting may not be set for "**Use Windows Credentials**". Instead the "**Use Login/Password**" security setting must be used. This is because Terminal Server and Citrix XenApp will not allow NetModem Client to access the current user's Windows Credentials.

These environments can also be used to allow you to monitor and configure the NetModem Server from a remote computer.

To configure Windows 10, 8, 7, Vista, or XP (non-home editions) to become a **Remote Desktop**, use the following procedure:

1. Right-click **My Computer**, click **Properties**, and then click **Remote tab** or **Remote Settings**.

2. Turn on Remote Desktop by selecting the check box **Allow users to remotely connect to this computer**. Later versions of Windows will allow either "less secure" or "more secure" options.

3. Designate remote users by clicking the **Select Users** button.

To connect to a Remote Desktop (formerly Terminal Services) Server from another computer, use the Microsoft **Remote Desktop Connection** (RDC) tool. Additional information can be found here:
http://msdn.microsoft.com/en-us/library/windows/desktop/bb892075(v=vs.85).aspx

In Windows 7 and earlier, RDC is accessed by clicking on:
Start > **All Programs** > **Accessories** > **Communications** > **Remote Desktop Connection**
Enter the IP address or hostname of the Remote Desktop Session host and click on **Connect**.

RDC has an option to allow the local serial ports of the computer that RDC is running on to be accessed by applications running on the Remote Desktop session. This can be enabled by clicking on the **Local Resources** tab, and under the **Local Devices** section enable the checkbox for **Serial ports.**
We do not recommend doing this under normal conditions, as these remapped RDC COM ports can cause great confusion for other clients connected to the terminal server, since the COM ports will be visible (in serial communication applications such as HyperTerminal) to any client that is logged into that remote desktop server, but they can only be accessed by the RDC connection which owns these local serial ports.

If NetModem Server is installed on a Remote Desktop / Terminal Services Server or a Citrix XenApp Server, any remapped RDC COM ports will be listed with an asterisk * to the left of the name, for example: **COM1***. The remapped RDC COM ports can only be shared by NetModem Server if NetModemServer.exe is running as a non-service from that terminal session. This is due to a limitation of RDC, in which the remapped ports are only allowed to be accessed by an application running in the local terminal session, and can not be accessed by a service. To make matters even more confusing, it is possible for a remapped RDC COM port to have the identical name as a COM port which physically exists on the terminal server. If this occurs, NetModem will display both COM ports, and both will be treated as the identical port since only one of them is actually functional.

Remapping COM ports

Windows versions released after Windows XP (except for Server "Web" Editions), include a command line utility called **change.exe** which can map any COM port to a different port number. This can be useful under a terminal Services session to map each clients unique COM port to a common COM port number.
For example, a Remote Desktop Connection client could enter this command:

change port COM1=COM12

This allows a RDC client to access COM1 in their application software, which is redirected to COM12 by the RD Session Host. COM12 could be either a physical COM port, or a virtual COM port created by NetModem Client.

A second RDC client could enter this command:

change port COM1=COM13

Now both clients can access COM1 at the same time in their application software, and they will really be using COM12 and COM13 respectively.

This allows all clients to use application software configured for a particular COM port, and allows legacy applications that only supported COM1-COM4 (or in some cases COM1-COM9) to be used by more then 4 or 9 Terminal Services clients at the same time. However, this will not work with TAPI, so applications that need to communicate with a Modem Driver name rather then a COM port value can not take advantage of this feature.

The **change port** command can be used as part of each users login script to map COM1 to a specific NetModem Client virtual COM port which is reserved for that user. For example if COM99 is reserved for a

particular user, the following would be added to that users login script: **change port COM1=COM99**

Mapped COM ports should only be named **COM1**, **COM2**, **COM3**, or **COM4**. While **change port** will appear to accept higher values then COM4, such ports will fail to open. This is because the change port function was designed to be an aid for DOS application compatibility, which only support COM1 to COM4 under Windows.

By running **change port** without any parameters, it will display the available COM ports and the current COM port mappings.

To delete a mapping for a COM port, use **change port /d COMx** where COMx is a remapped port that you wish to remove.

A limitation of the **change port** command is that the new COM port exists only in memory, and is not written to the registry **HKEY_LOCAL_MACHINE\HARDWARE\DEVICEMAP\SERIALCOMM** which is where many application programs look to see which COM ports exist. One solution would be to create a dummy registry entry in this registry folder like this:

Name	Type	Data
FAKE	REG_SZ	COM1

In which *FAKE* could be any unique name, and COM1 could be any unique COMx value. Making changes to the registry should only be done by an IT professional familiar with the precautions involved in registry editing such as backing up the registry first.

Limitations under Remote Desktop / Terminal Services and Citrix XenApp

1. Only one outbound PPP (Point to Point Protocol) connection can be made at a time from any Windows PC, even under a multi-user operating system such as Terminal Services Server, Remote Desktop, and Citrix XenApp. This is not a limitation of NetModem, but rather a limitation within Windows.
   For example, A Dial-Up Networking connection to an ISP uses the PPP protocol. This causes the Windows routing table to be changed so that all TCP packets that are sent outside of the local subnet are directed to this PPP connection. If another PPP connection is created, Windows again changes the routing table which causes the first PPP connection to fail. If you need to allow multiple users to be able to make simultaneous PPP connections, you will need to install the NetModem Client on each users PC instead.

2. Citrix XenApp prevents more then one outbound VPN (Virtual Private Networking) Connection to be made using a modem.

3. If a VPN connection is used to connect to the network containing NetModem Client, then it is not possible to make a secondary PPP connection through the NetModem Client. This is due to a limitation in the VPN protocol.

Additional Information on Terminal Services and Remote Desktop can be found at Microsoft's web site using the following link:

Microsoft TechNet - Remote Desktop:
https://technet.microsoft.com/en-us/windowsserver/ee236407

16.7. Using NetModem with RAS (Remote Access Service)

RAS is a feature most commonly used in the Windows Server family but it is also available in Windows 10, 8, 7, Vista, and XP (non-home editions). RAS allows remote users to connect to your network using one of the following methods:

- A modem connection, using Dial-Up Networking.
- A Virtual Private Network (VPN) connection, over the Internet or an intranet.
- A direct connection, using an LPT parallel printer port.

- An Infrared Port.

When modem connections are used for RAS, the selected modems are normally not able to be used by any other programs, even when they are idle and waiting for an incoming call. NetModem Server has a pool-properties option to share modems with RAS, allowing the same pool of modems to be used for both inbound (dialin) connections controlled by RAS (RRAS), and outbound (dialout) connections controlled by NetModem Server. When a client requests a modem which is currently controlled by RAS and this pool option is enabled,, NetModem Server asks RAS if the modem is currently in use, and if RAS says its available then NetModem Server borrows the modem from RAS. Once the client closes the modem, NetModem Server returns it to RAS.

Windows RAS is part of the "Routing and Remote Access Service" (RRAS). In addition to supporting other features such as VPN and NAT, The Windows Server RRAS service allows modems to be used by either RAS, Demand Dial Routing, or both. NetModem can share modems with RAS, but it can not share modems with Demand Dial Routing.

To disable Demand Dial Routing in RRAS on a Windows Server, use the following procedure:

1. Open the **Routing and Remote Access** MMC Window, and navigate to:
   Server Status > ***Name of your Server*** > **Ports**.

2. Right click on **Ports**, and select **Properties**.

3. From the **Port Properties** Window, select the modem device name, and click the Configure button.

4. From the **Configure Device** Window, make sure that only the "**Remote Access connections**" checkbox is enabled, and that the "**Demand Dial routing connections**" is checkbox is disabled.

5. Click OK, and the Port Properties window should show the modem device name is used by **RAS**

To remove a modem entirely from RAS control, use the following procedure:

1. Open the **Routing and Remote Access** MMC Window, and navigate to:
   Server Status > ***Name of your Server*** > **Ports**.

2. Right click on **Ports** and select **Properties**.

3. Highlight the modem name and select **Configure**.

4. Un-check any enabled boxes and select **Apply**.

5. Restart the RRAS service from the services management console.

Installing RAS on Windows 10, 8.x, 7, Vista, or XP:

Windows 10/8/7/Vista/XP (non-home editions) are limited to one inbound RAS connection at a time per connection type (Dial-Up, VPN, Direct Parallel or Infrared) and it has less security features then RAS under a Windows Server. To install RAS on a non-server (and non-home) edition of Windows use the following procedure:

1. Log on to Windows with Administrator access, and open the control panel (from the start button) and select **Administrative Tools**.

2. Double-click the **Services** icon to open the Services control panel, and Double-click on the **Routing and Remote Access** entry to access the **Routing and Remote Access** properties.

3. Select **Automatic** from the Startup type drop list**,** and then click the **Start** button**.**

4. Select **Ok** to close the **Routing and Remote Access Properties** window, and also close the **Services**

and **Administrative tools** panels.

5. From the control panel, double click the **Network Connections** icon.

6. Select **Create A New Connection** from the left pane under Network Tasks. This invokes the New Connection Wizard, which can be used to create both outgoing and incoming connections.

7. Click Next on the **Welcome** page. This takes you to the **Network Connection Type** page, which offers the following options:

   [ ] Connect to the Internet
   [ ] Connect to the Network at my workplace
   [X] Setup an advanced connection

8. Select the last option, **Setup an advanced connection** and click **Next.** This takes you to the **Advanced Connection Options** page, which offers the following options:

   [X] Accept incoming connections
   [ ] Connect directly to another computer

9. Select **Accept Incoming Connections** and click the **Next** button , so others can connect to this remote access server.

10. The **Devices For Incoming Connections** page will show any modems attached to this computer in the list of connection devices. If you want to set up the computer to accept incoming dial-up connections, check the checkbox(s) for the modem(s) you want to use. If you have more than one modem and phone line connected, you will have the option to enable multilink. If you have an infrared port or an LPT printer port, you will also see additional choices called **Direct Parallel** or **Infrared,** allowing another computer to connect over a parallel cable or an infrared connection. The network interfaces don't appear here, so if you will be accepting VPN connections only, just skip this page and click the **Next** button.

11. The **Incoming Virtual Private Network (VPN) Connection** page asks if you want to allow virtual private connections to this computer. Your computer will need a name or IP address that's known on the Internet to accept VPN connections outside the LAN, unless you use VPN pass-through. Even if your computer is directly connected to the Internet, if you are using a firewall, it will have to be configured to let VPN packets through. If you're using Windows built-in Internet connection firewall (ICF), Windows will automatically change its configuration to allow VPN packets.

12. Click Next to get to the **User Permissions** page. Select the checkboxes of the local user accounts to which you want to grant remote access. If the desired users are not shown, new users can be added by clicking the **Add** button and typing in a user name and password. Click **Next**.

13. On the **Networking Software** page, select the networking components that you want to have available for incoming connections, such as Internet Protocol (TCP/IP) and File and Printer Sharing for Microsoft Networks.

14. Then click Next, and this will complete the Wizard and configure your incoming connection(s). The new connection will appear in the Network Connections folder as an icon called **Incoming Connections**. The configuration can be modified later by double-clicking the Incoming Connections icon or right-clicking and selecting Properties.

Deploying RAS on a Windows Server is considerably more involved due to advanced security features, which are beyond the scope of this users guide. Detailed information on Microsoft RAS policies and security features under Windows Server can be found on the Microsoft TechNet Windows Server Deployment guide, under the following sections:

Routing and Remote Access Service (RRAS)
https://technet.microsoft.com/en-us/library/dn614140(v=ws.11).aspx

Setting up Dial-up Remote Access (Retired content)9
http://technet.microsoft.com/en-us/library/cc779310.aspx

16.8. Database Error Recovery

If NetModem Server encounters an error when while reading or querying a database, it will automatically issue a request to the ODBC driver to repair the error. If this repair attempt fails, NetModem Server will switch further logging to the text based log files (until NetModem Server is restarted), and a database failure warning is recorded in the Windows event log.

If an automatic repair fails, we suggest you perform a **manual repair** by following the steps below. A manual repair is managed by the ODBC database driver tool, which can display detailed information on errors found and suggested solutions.

- Stop the "**NetModem Server**" service, any applications which might also be accessing the ODBC database.
- Open the **ODBC Data Source Administrator** by clicking the **Log Options** button in the NetModem Server Configure tab, and then click the **ODBC** button.
- Click the **System DSN** tab.
- Select the NetModem data source, and click the **Configure** button.
- From the ODBC setup window, click the **Repair** button.

If the manual repair does not succeed, then the database source should be replaced by using the **Remove** button from the **ODBC Data Source Administrator** in the **System DSN** tab, and then recreating the database as shown in the Server Logging Options chapter.

16.9. NetModem Client advanced configuration options

To access the NetModem Client advanced configuration options, click on the **Advanced** button from the NetModem Client Configuration screen.

The following options are found under the **Options** tab:

- **Delay closing COM port for [7500] ms.**

  When this option is enabled, it causes NetModem Client to remain connected to the server (and the physical modem) for the specified amount of time in milliseconds that begins when the virtual COM port is closed by the application. This ensures that the modem is not assigned to another client while a client application closes and reopens the virtual COM port, and ensures that an active connection is not lost if one application or process hands off a COM port to another one.

  By default this option is Enabled, with a value of 7500 ms. (7.5 seconds).

- **Show message if port not available**

  When this option is enabled, NetModem Client will display a pop-up message when an application attempts to open a NetModem Client Virtual COM port and NetModem Server is unable to provide access to the physical COM port on the server. The pop-up message displayed to the client user says "NetModem Server reports COM port not available". Further details can be found **Here**.

By default this option is Enabled.

- **Update Routing Table if needed**

  When this option is enabled, NetModem Client will add a direct route to the server when a virtual COM port is opened, if the server is not on the same subnet as the NetModem Client PC and there is not already a direct route defined. Once the virtual COM port is closed, the added route will then be removed. The reason for adding a direct route, is that some PPP applications such as Windows Dial-Up Networking will change the computer's default route in the IP routing table when they have established a connection to the remote network. Once this change is made, the NetModem Client PC will no longer have a route to the server PC if the two PC's are not on the same subnet. Without a valid route, the client will lose its connection to NetModem Server.

  Some third-party VPN software will not permit changes to the routing table. If the NetModem Client PC is connected to the NetModem Server PC through a VPN, this option may need to be disabled. In such a case, the VPN users would be unable to use NetModem to establish a dial-up networking connection.

  By default this option is Enabled.

- **Maximum time to wait for a Failover Server**

  When this option is enabled, and the NetModem Client virtual COM port is configured to use **Multiple Server Failover** this option will limit the time that NetModem Client waits for each server to respond before it gives up and attempts to connect to the next server in the failover list.

  By default this option is Enabled, with a value of 2000 milliseconds (2 seconds).

- **Synchronize with server during COM port open**

  When this option is enabled, each time an application requests to open a virtual COM port, the COM port open request is not completed until the following events occur between the client and server:

  1. The TCP connection to the server is established.
  2. The SSL/TLS encryption negotiation is established (if encryption is used).
  3. The COM Port Control protocol is negotiated.
  4. The user authentication is successful (if security is used).

     Some applications may require that the COM port open function will synchronize with the server by waiting until the server provides the modem before returning a success status, or returning a fail status otherwise.

     By default this option is Enabled, causing the virtual COM port to delay opening slightly.

- **IPv6**

  While NetModem Server versions 4.10 and later always listen for both IPv4 and IPv6 connections, NetModem Client defaults to having IPv6 support disabled to allow compatibility under certain VPN's that only support IPv4 connections. When this checkbox is enabled, NetModem Client uses a connection method that supports both IPv4 and IPv6 networks.

16.10. NetModem Client virtual COM port driver

NetModem Client uses a highly optimized kernel-mode driver to create its virtual COM ports.
The virtual COM port driver can be found in the device manager under "**Non-Plug and Play**" drivers (you will need to enable "**View > Hidden devices**" to see it).

The driver is controlled by a service in Windows. NetModem client virtual COM ports can be reconfigured by third party applications, by writing to the **VCOMM** registry folder located here:
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\VCOMM

16.11. Support for DOS applications

NetModem is compatible with both Windows applications and DOS applications running under 32-bit Windows. Generally a DOS application which uses a COM port will do so by accessing the serial port hardware directly. This hardware is called a **UART**, which stands for ***U**niversal **A**synchronous **R**eceiver-**T**ransmitter*.

32-bit versions of Windows 10, 8, 7, Vista, XP, and Server 2000 through 2008 R2 include a subsystem to run DOS applications known as the NTVDM, an acronym for **NT V**irtual **D**OS **M**achine. The NTVDM monitors the standard UART I/O ports for activity by DOS applications on COM1, COM2, COM3, and COM4. The NTVDM redirects any activity on these ports to the Windows COM port of the same name. For this reason, DOS applications can only be used with NetModem client on COM1-COM4. However, these virtual COM ports can still be redirected to any value COM port on the NetModem Server.

Some DOS applications allow you to configure the UART settings for the COM ports. The NTVDM only works with the standard UART settings shown below:

Serial Port	Base Address	Interrupt
COM1	3F8	IRQ4
COM2	2F8	IRQ3
COM3	3E8	IRQ4
COM4	2E8	IRQ3

While most DOS applications communicate with a COM port directly through the UART, there are a few DOS applications that can communicate by using the PC's BIOS Interrupt 14h or an enhanced version of the Interrupt 14h interface called a **FOSSIL** driver. If your DOS application says that it is compatible with Interrupt 14h or a FOSSIL, then you can install a third-party FOSSIL driver such as ADF or NetFoss, which can enhance performance of your DOS communication software. ADF is a free program which can be downloaded from **http://www.digsys.se/Obsolete/ADF.aspx**

An example command line to load ADF on COM4 would be:
ADF.exe COM4 2E8 3 57600 4096 1024

This TSR should be loaded in the same DOS window in which your DOS application will be started from afterwards, which can be easily done in a batch file. For more information on ADF, please refer to the ADF documentation.
ADF is a DOS driver, so it will only work on COM1-COM4.

NetFoss is a free FOSSIL driver designed to use Windows COM ports, so it will allow FOSSIL compatible DOS applications to work on any COM port value. NetFoss can be downloaded from **http://pcmicro.com/netfoss**
NetFoss should be configured for "COM Port Mode" to work with NetModem Client COM Ports.

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17. Request Technical Support

Our technical staff has many years of experience in solving communication related issues, and provides real guidance even on tough problems that take trace log analysis or network packet analysis to figure out.

You can open a support ticket online at **http://pcmicro.com/netmodem/support.html** or contact your PC Micro account manager for assistance. You can also email questions to support@pcmicro.com. Initial response time is usually **under an hour or two** between 7:00AM - 7:00PM PST (Pacific Standard Time GMT-7) Weekdays,

and limited hours during weekends and US Holidays.

PC Micro maintains a list of **Frequently Asked Questions** at http://pcmicro.com/netmodem/support.html

If you purchased or are evaluating NetModem through a local reseller or a consultant, they may provide an additional level of technical support.

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18. Update the License Key

NetModem allows a fully functional 30 day evaluation if no license key is entered into the NetModem Server. If you purchase a permanent license, you are provided with an electronic license certificate (PDF file) which contains a license key that can be entered into the NetModem Server to unlock the 30 day limitation. The license key determines the number of COM ports that can be shared on the server. Additional shared ports can be added to an existing license as your needs increase.

To update your NetModem License Key, do the following:

1. On the NetModem Server computer, open the NetModem Server window by double clicking on the system tray icon. 
2. Select the **License** button. The current license information is displayed, including how many days are left if the software is running in evaluation mode.
3. Select the **Change** button.
4. Type in your License Key in the field titled **License Key**.
5. Optionally type in the **User Name** and **Company Name**.
6. Select **OK** to accept the new information.

The NetModem Clients never require a license key. The client software is included at no additional charge and can be installed on an unlimited number of PC's.

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19. Uninstalling the NetModem Software

To Uninstall either the NetModem Client or Server software do the following:

- Close any active sessions that are using a NetModem COM port.
- In the Windows Control Panel, open the "**Add or Remove Programs**" applet.
- Select either the **NetModem Server** or the **NetModem Client** in the list of installed programs.
- Click the **Remove** button to begin the Uninstall process.
- If uninstalling the Client software, remember to also remove any modem drivers that were attached to its virtual COM ports.

A restart of Windows is not required after installing or uninstalling the NetModem Server or Client software.

NetModem configuration settings and Server activity logs are preserved in case of a later NetModem reinstall.