

TB14110401F

Establishing a Remote Data Connection with Orion

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A cellular data connection is quite reliable for communicating with Orion since the transport protocol has an inherent error checking system to ensure accurate end to end transmission. To utilize this type of connection, you need a data modem like the Microhard IPn4G which has an RS232 port which is accessible via a TCP connection, a static IP address for the data modem, and a good signal in the location of your receiver. The following are the steps required to set up this connection.

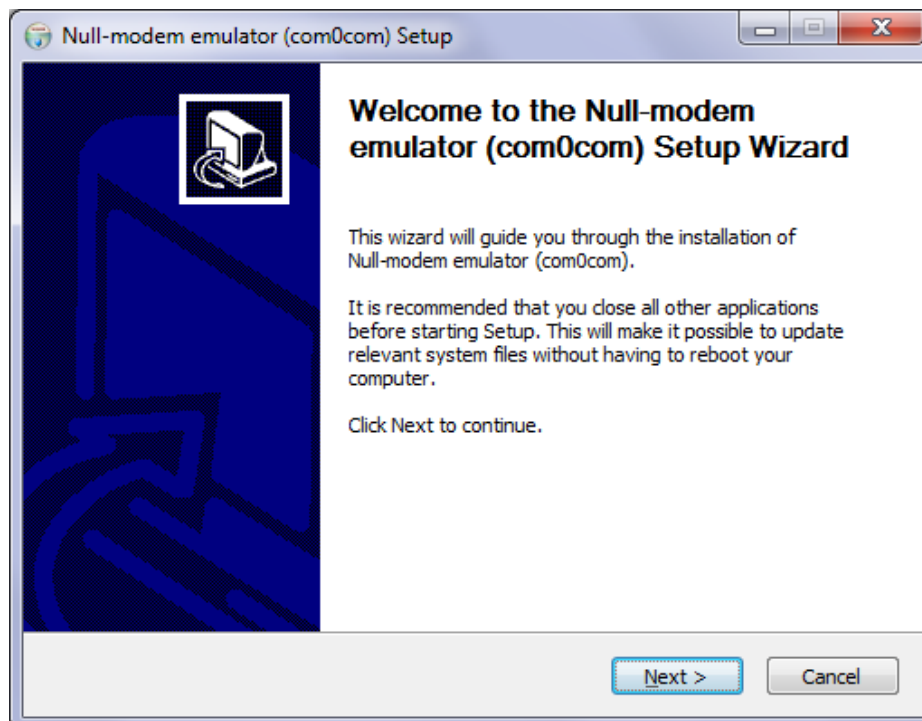
Extract the Orion Remote Connection toolkit

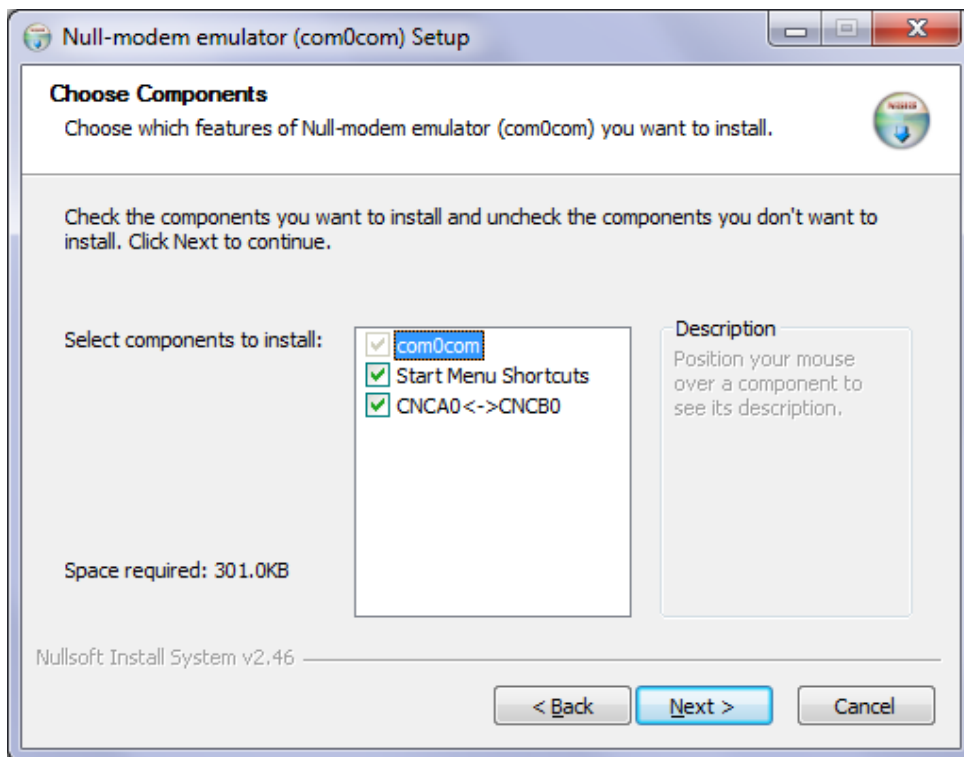
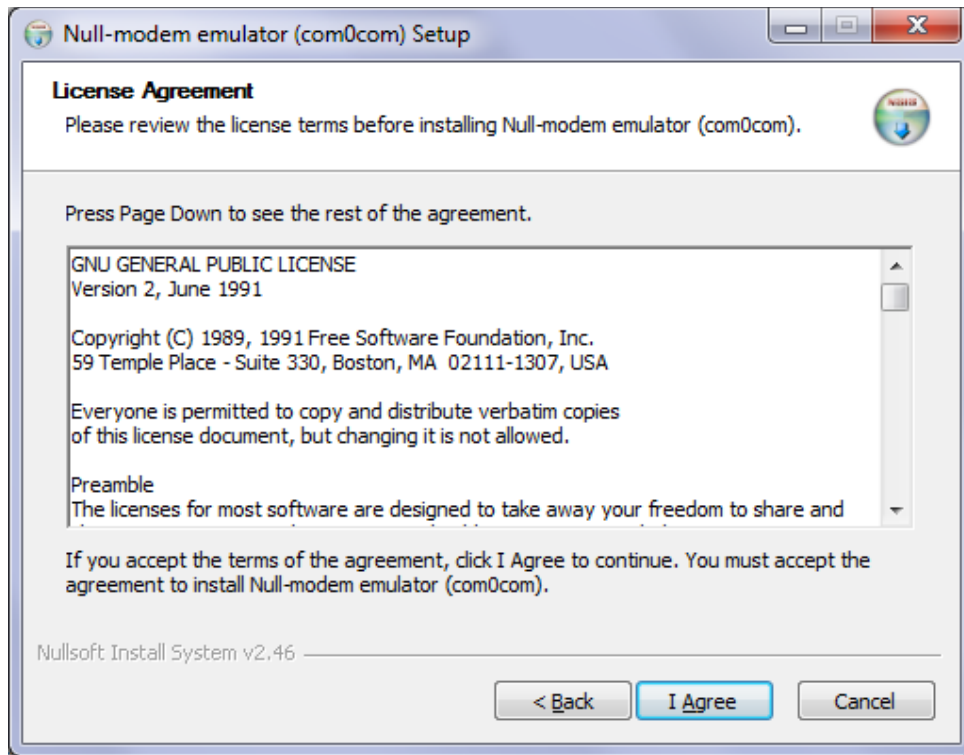
Unzip the “Orion Remote Connection Toolkit-2.0.zip” in a convenient directory (we recommend C:\SEI). In this directory you will have the following sub directories.

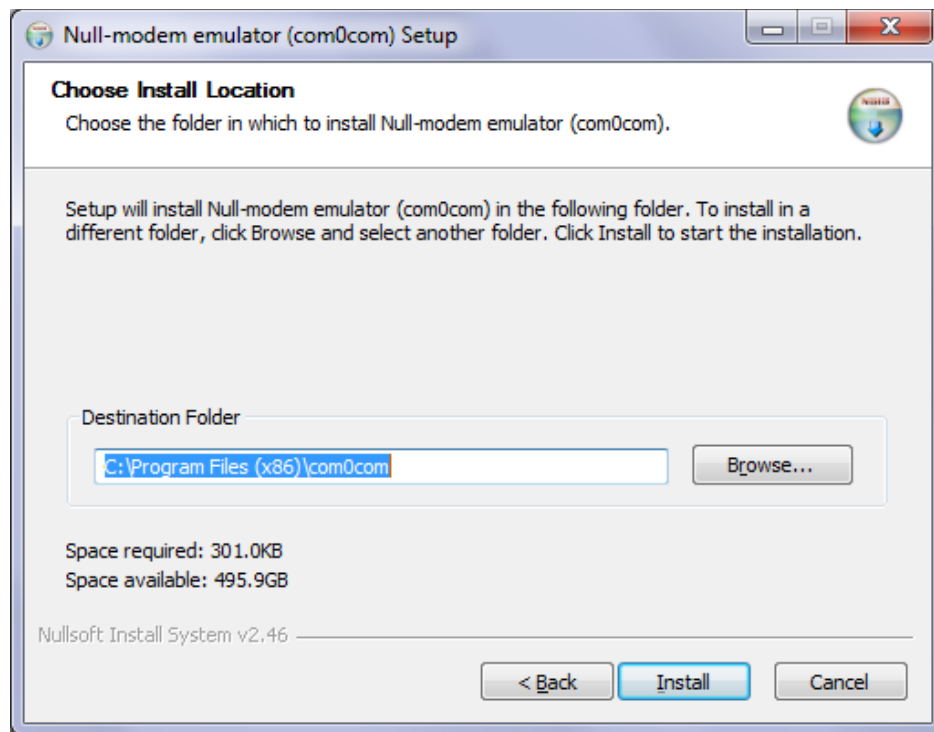
com0com-2.2.2.0-x64-fre-signed
com0com-2.2.2.0-i386-fre
com0com-SEI

Install the com0com driver

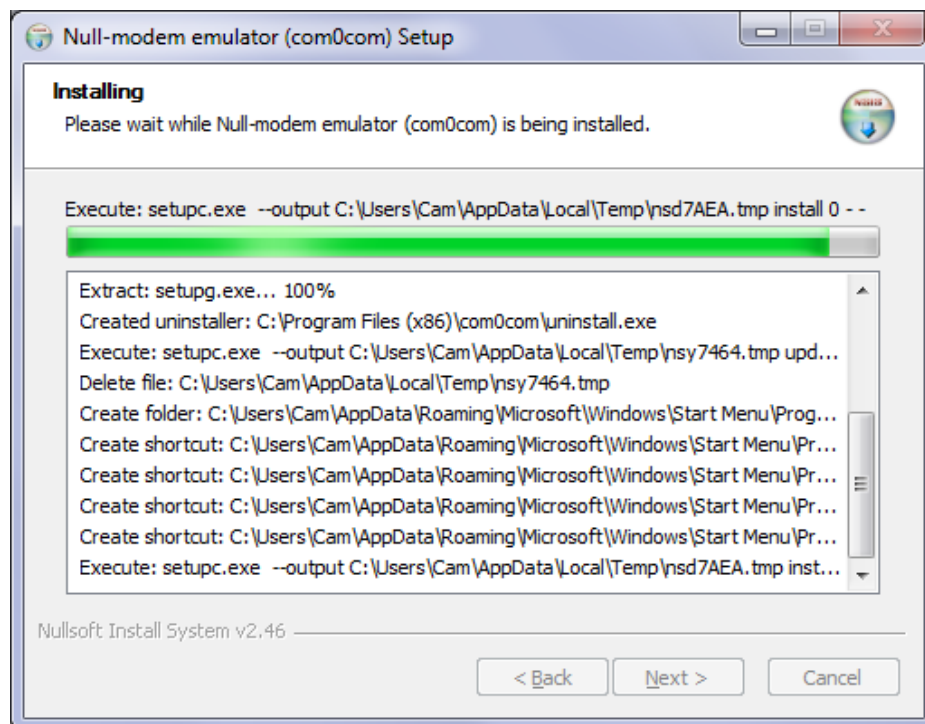
Go into the subdirectory of “com0com-2.2.2.0-x64-fre-signed” if you have a 64 bit machine or “com0com-2.2.2.0-i386-fre” if you have a 32 bit machine and run the setup.exe file. Select the defaults in the following screens.

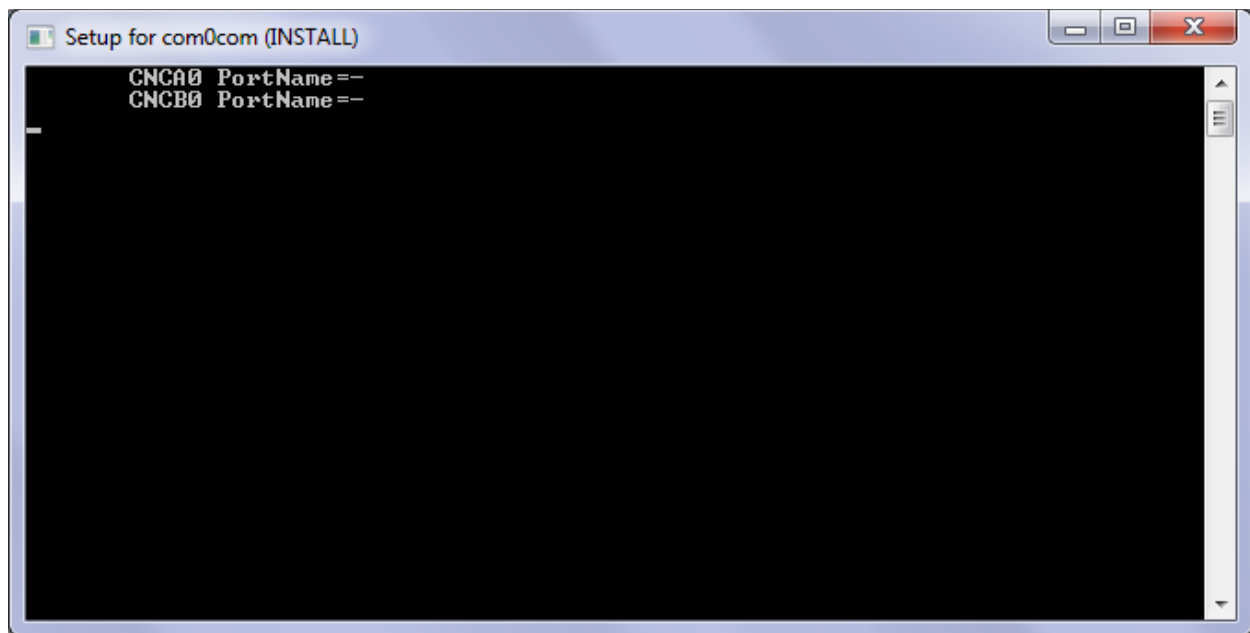




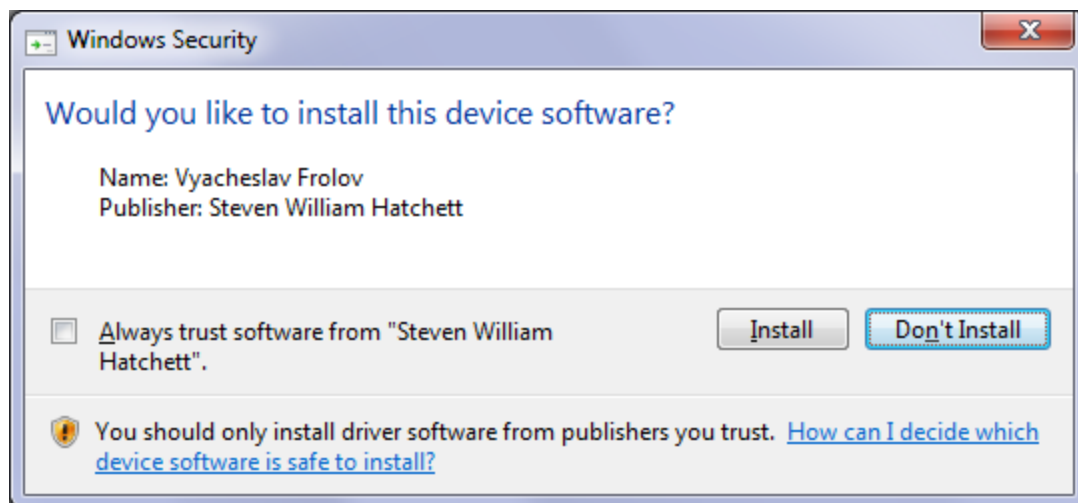


When you press install, the system will start extracting and installing files opening two windows as follows:

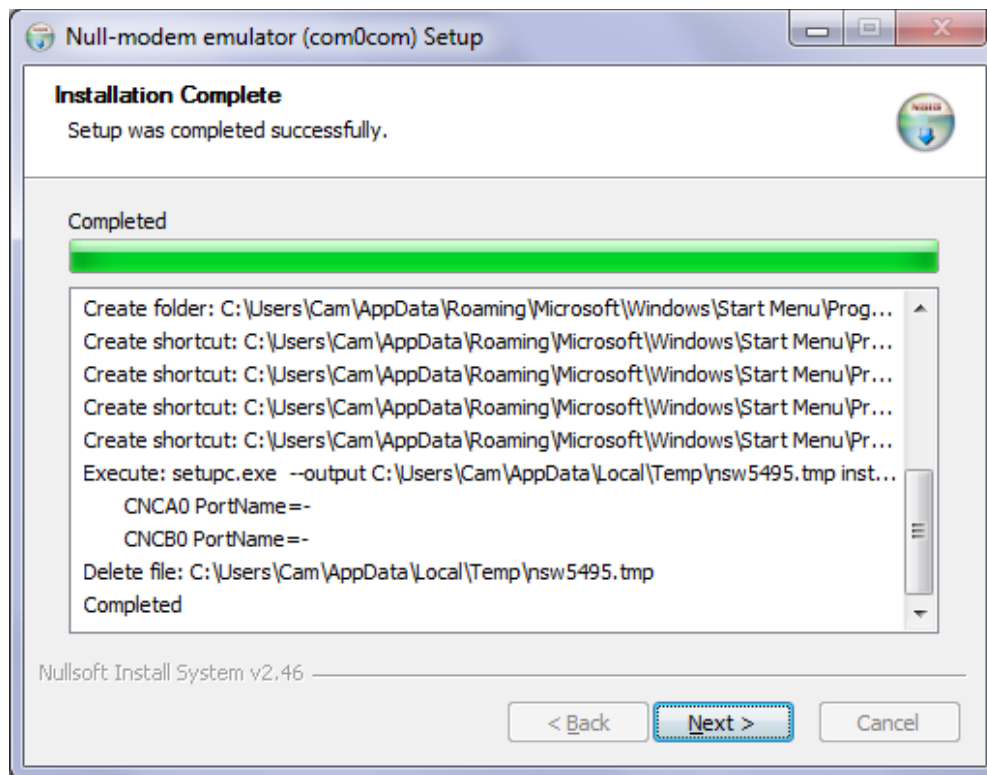




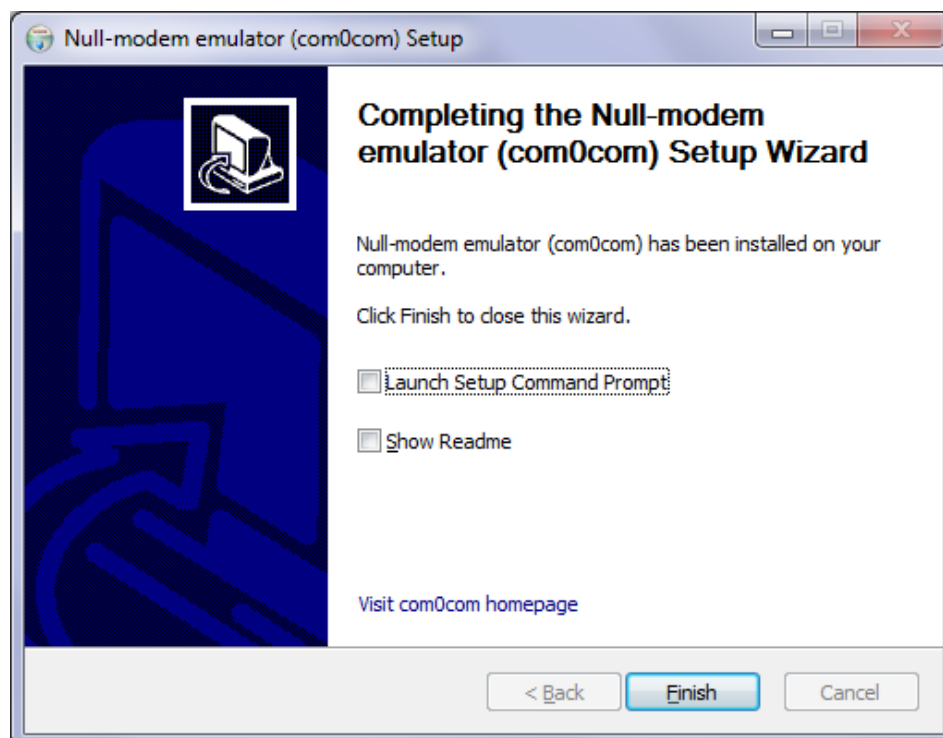
Eventually it will prompt you as follows.



Select install, and the installation will proceed. It will take a minute or two to complete, then you will get a completed message as follows.



Select Next to get the following.

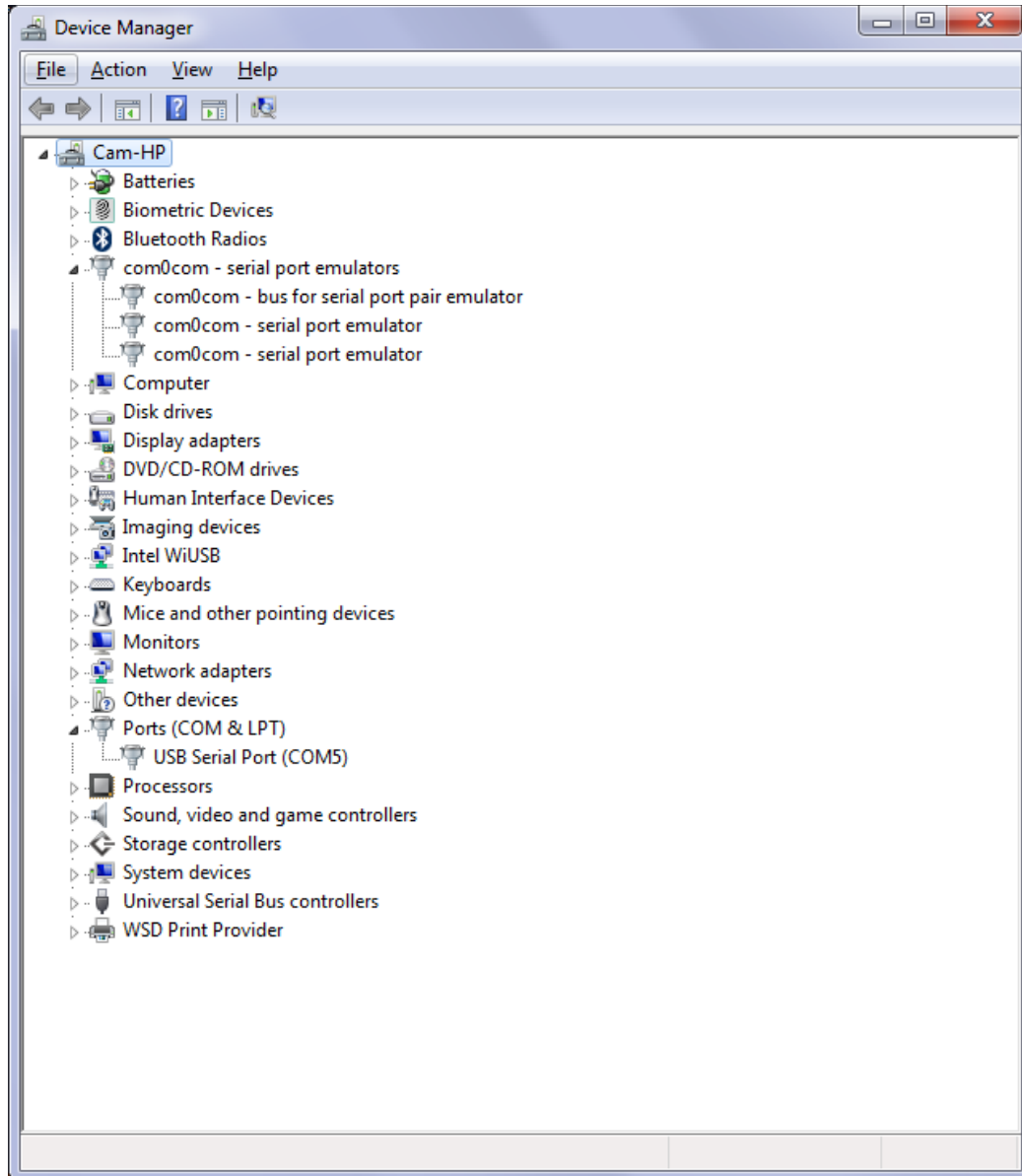


Finally, press finish and the program will exit.

After a while a com0com emulator should appear in the device manager with three components. IT CAN TAKE A FEW MINUTES for these to install and you should see an active driver installation icon if you press the up arrow on the task bar or a message might show up automatically at the bottom of your screen.



When it is finished you should see a device list as follows.



Set up the virtual COM ports

Now, start the com0com command prompt by pressing the start button and following:

Start/All Programs/com0com/Setup Command Prompt

You will may get a prompt from the User Access Control before you run the program, but go ahead and proceed. You will get a black window with the “command>” prompt.

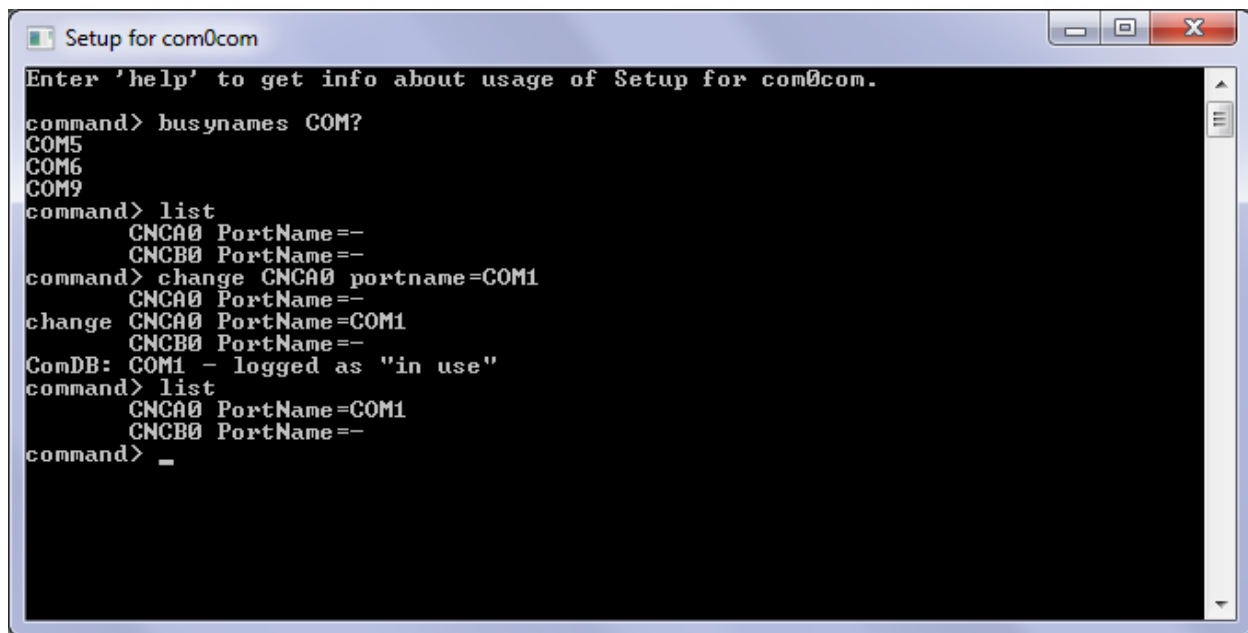
Type “busynames COM?” at the prompt and you will get a list of COM ports that are in use on your computer. Note a port that is not in use.

Then type list and you should see the virtual com ports that were setup on installation.

Finally, change the name of the CNCA0 port to the com port you have available. The following is an example for COM1,

```
command> change CNCA0 portname=COM1
```

The whole process should look like this.



```
Setup for com0com
Enter 'help' to get info about usage of Setup for com0com.
command> busynames COM?
COM5
COM6
COM9
command> list
      CNCA0 PortName=-
      CNCB0 PortName=-
command> change CNCA0 portname=COM1
      CNCA0 PortName=-
change CNCA0 PortName=COM1
      CNCB0 PortName=-
ComDB: COM1 - logged as "in use"
command> list
      CNCA0 PortName=COM1
      CNCB0 PortName=-
command> _
```

Now, type quit at the command prompt.

You now have a virtual null modem connection in your computer with two COM ports. One port is a standard COMx type port that you will connect Orion to. The other is a port called CNCB0 that you will use to connect a program to that will establish a TCP connection through the Internet to your remote site. Graphically it will look like this.

OrionTool <----> COMx<----->CNCB0<----->com2tcp program<----->data modem<--->Orion

Now, go into the “com0com-SEI” directory. Right click on the OrionTCP.bat file and select Edit. A notepad editor will open up. You will see the following line in the batch file.

```
start com2tcp \\.\CNCB0 xx.xx.xx.xx pppp
```

This will start the com2tcp program, attach it to the virtual CNCB0 port and connect it to the IP address

(xx.xx.xx.xx) and port number (pppp) given. Change the IP address to match your static IP for your data modem. Port 20001 is the default port for the RS232 port on the modem. If you have a different port number, you may need to change this as well.

This running program will need to stay active while you connect to your remote Orion. You can close it when you are finished and re-run the batch file before a future session. You can also create several copies of this batch file with different IP addresses to setup quick access to several different sites.

When the com2tcp program is running, you can now start OrionTool as you normally would. Check that the OrionTool COM port under options/set options matches the COM port you selected for the com0com driver.

Preparing the Data Modem

IPn4G

If you are using an Microhard IPn4G cellular data modem, you will need to make a few changes from the default for things to work properly.

Carrier Settings

For most carriers, after you obtain a static IP assignment, you need to change the APN to match the server that will assign the static IP address to you based on your SIM card account. Once done, your modem will be visible from the outside world at your given IP address. The firewall will now determine what you have access to.

For the Microhard IPn4G, insert the SIM card and power up the modem. Attach an Ethernet cable between your PC and the modem. The modem will automatically assign an IP address to your PC and you should be able to connect to the modem with the browser at the address 192.168.168.1. Login as user "admin" password "admin".

Navigate to the menu Carrier/Settings and change the APN from auto to the the assigned name (for Rogers, ltestaticip.apn). At the bottom of the page, select "submit".

Settings - IPn4G Administ: x

74.198.224.88/cgi-bin/webif/carrier.sh

microhard SYSTEMS INC.

System Network **Carrier** Comport I/O GPS Firewall VPN Tools

Status **Settings** Keepalive Traffic Watchdog Dynamic DNS SMS Config SMS DataUsage

Carrier Configuration

Configuration

Carrier status Enable

Data Roaming Disable

Carriers Auto

IP-Passthrough Disable

DNS-Passthrough Disable

APN ltestatic.apn

SIM Pin

Technologies Type ALL

Technologies Mode AUTO [Advanced](#)

Primary DNS Address

Secondary DNS Address

Static IP Address

Authentication No Auth

User Name

Password

[Submit](#) [Cancel](#)

Setting the password

Navigate to System/Access Control and change the password.

Access Control - IPn4G Administ: x

74.198.224.88/cgi-bin/webif/system-acl.sh

System Network Carrier **Access Control** Services Maintenance Logout Reboot

Access Control

Password Change

User Name : admin

New Password : (min 5 characters)

Confirm Password: [Change Passwd](#)

Add User: (Note: Changes will not take effect until the system is rebooted)

Username : (5-32 characters)

Password (min 5 characters)

Confirm Password

Carrier

Comport

Firewall

GPS

I/O

Network

System

Tools

VPN

Add User [Add User](#)

Users Summary

No users defined.

[Submit](#) [Cancel](#)

Adjusting the Firewall

Once the modem has a static IP, the firewall setting will control what connections are permitted. For Orion, you want to enable two protocols, ICMP for testing the access to the data modem via a PING command, and TCP on the 20001 port to allow access to Orion.

For the Microhard IPn4G the rules would look like this.

Rules - IPn4G Administration

74.198.224.88/cgi-bin/webif/firewall-rules.sh

Apps Frequent Admin Engineering Ham Radio Misc Radio Stations Clients News LAN Health Current Weather - C... Other bookmarks

microhard SYSTEMS INC.

System Network Carrier Comport I/O GPS Firewall VPN Tools

Status General Rules Port Forwarding MAC-IP List Reset

Firewall Rules

Firewall Rules Configuration

Rule Name: rule1

ACTION: Accept

Source: None

Source IPs: 192.168.0.0 To 192.168.0.0

Destination: None

Destination IPs: 192.168.0.0 To 192.168.0.0

Destination Port: 0

Protocol: TCP

[Add Rule](#)

Firewall Rules Summary

Name	Action	Src	Src IP From	Src IP To	Dest	Dest IP From	Dest IP To	Destination Port	Protocol	
Orion	Accept	None	0.0.0.0	255.255.255.255	None	74.198.224.88	74.198.224.88	20001	TCP	Remove Rule
Ping	Accept	None	0.0.0.0	255.255.255.255	None	74.198.224.88	74.198.224.88	0	ICMP	Remove Rule

[Submit](#) [Cancel](#)

Adjusting the COM Port settings

The COM port settings need to be adjusted to match the speed of the Orion port and be connected to a TCP server so that a remote connection can be established.

For the Microhard IPn4G modem navigate to Comport/COM0 and adjust the Data Baud Rate to 115200. The other default parameters should be ok (8 bits, no parity, 1 stop bit). Change the IP Protocol Config to "TCP Server". Finally, change the Incoming Connection Timeout to 600 seconds. The local Listening port can be left at 20001. Submit these changes.

The screenshot shows a web browser window with the address bar displaying `74.198.224.88/cgi-bin/webif/comport.sh`. The page title is "Com0 - IPn4G Administration". The main navigation bar includes "System", "Network", "Carrier", "Comport", "I/O", "GPS", "Firewall", "VPN", and "Tools". The "Comport" tab is selected, and the "Com0" sub-tab is active. The "Comport Configuration" section is titled "COM0 Configuration" and contains the following settings:

Setting	Value
Com0 Port status	Enable
Channel Mode	RS232
Data Baud Rate	115200
Data Format	8N1
Flow Control	none
Assert DCD	Always
Pre-Data Delay (ms)	100
Post-Data Delay (ms)	100
Data Mode	Seamless <input type="radio"/> Transparent <input checked="" type="radio"/>
Character Timeout	0
Maximum Packet Size	1024
Priority	Normal <input checked="" type="radio"/> Medium <input type="radio"/> High <input type="radio"/>
No-Connection Data	Disable <input checked="" type="radio"/> Enable <input type="radio"/>
MODBUS TCP Status	Disable <input checked="" type="radio"/> Enable <input type="radio"/>
IP Protocol Config	TCP Server

Below the COM0 Configuration section is the "TCP Configuration" section with the following settings:

Setting	Value
Local Listening port	20001
Incoming Connection Timeout	600

At the bottom right of the form, there are two buttons: "Submit <<" and "Cancel <<".

Bullet Plus

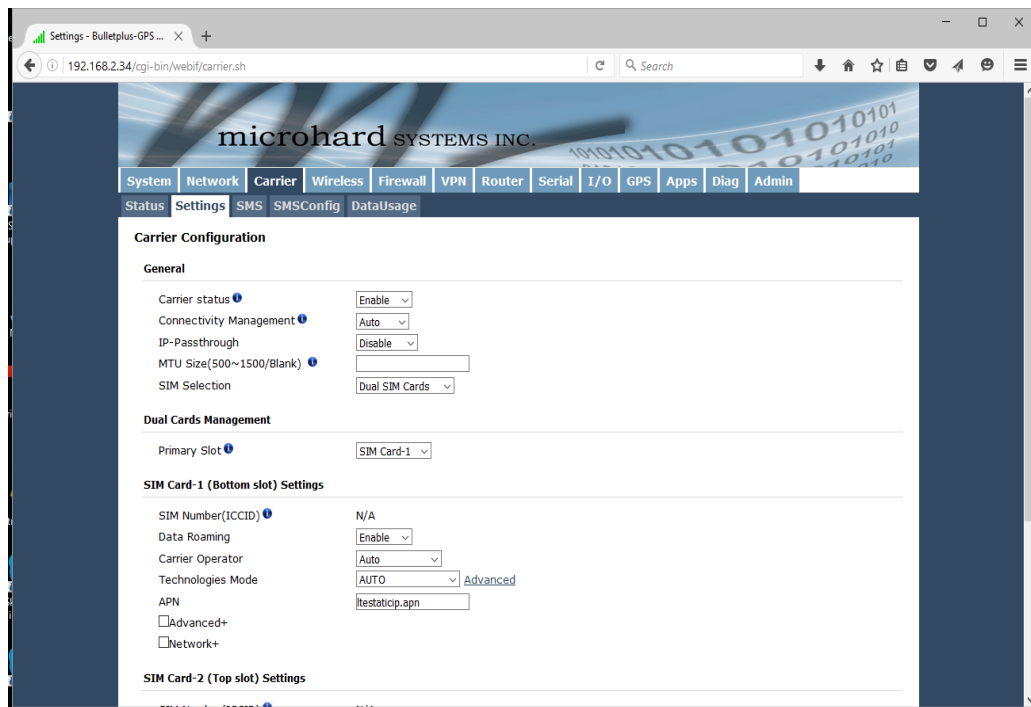
If you are using an Microhard Bullet Plus cellular data modem, you will need to make a few changes from the default for things to work properly.

Carrier Settings

For most carriers, after you obtain a static IP assignment, you need to change the APN to match the server that will assign the static IP address to you based on your SIM card account. Once done, your modem will be visible from the outside world at your given IP address. The firewall will now determine what you have access to.

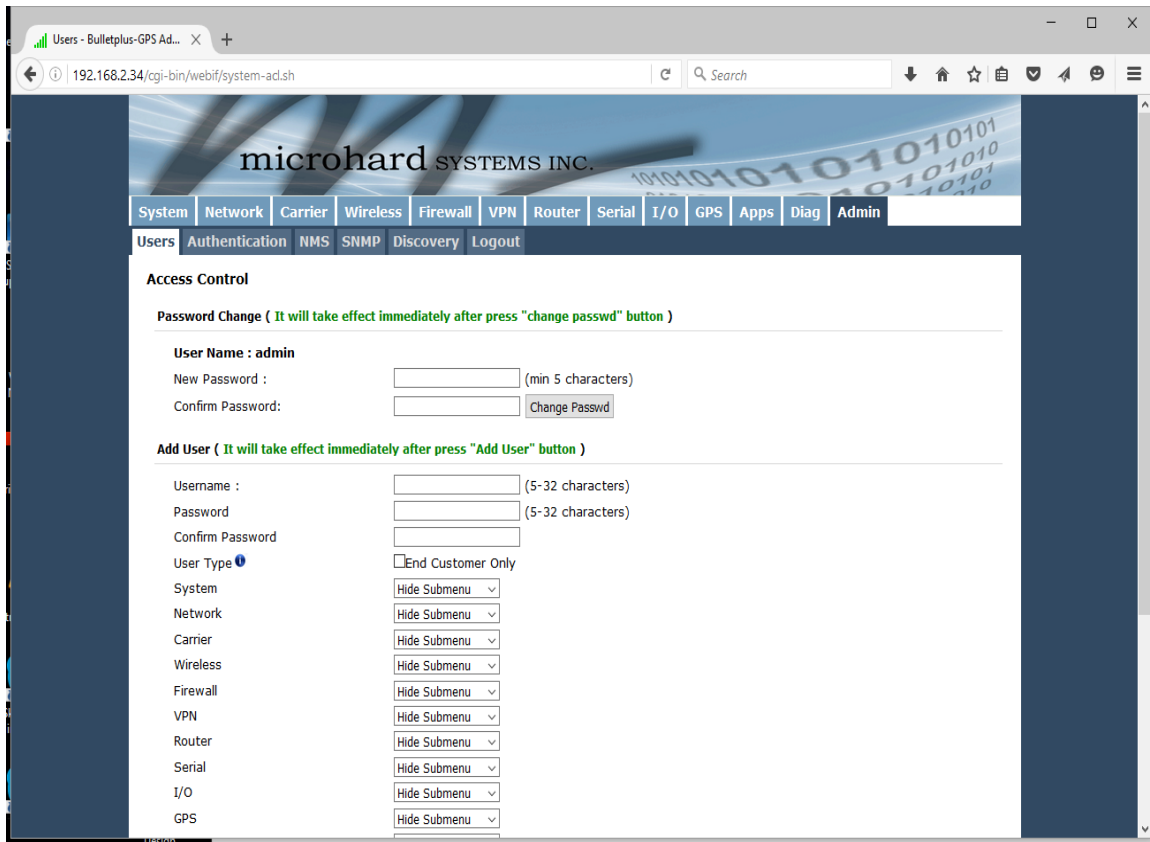
For the Microhard Bullet Plus, insert the SIM card and power up the modem. Attach an Ethernet cable between your PC and the modem. The modem will automatically assign an IP address to your PC and you should be able to connect to the modem with the browser at the address 192.168.168.1. Login as user “admin” password “admin”.

Navigate to the menu Carrier/Settings and change the APN from auto to the the assigned name (for Rogers, ltestaticip.apn). If you may be taking your modem to a different country/carrier, you might want to allow roaming as well. At the bottom of the page, select “submit”.



Setting the admin password

Navigate to Admin/Users page and change the admin password.



The screenshot shows a web browser window with the address bar displaying `192.168.2.34/cgi-bin/webif/system-ad.sh`. The page header features the logo "microhard SYSTEMS INC." and a navigation menu with tabs: System, Network, Carrier, Wireless, Firewall, VPN, Router, Serial, I/O, GPS, Apps, Diag, and Admin. Below this is a sub-menu with tabs: Users, Authentication, NMS, SNMP, Discovery, and Logout. The main content area is titled "Access Control" and contains two sections:

Password Change (It will take effect immediately after press "change passwd" button)

User Name : admin

New Password : (min 5 characters)


Confirm Password:

Add User (It will take effect immediately after press "Add User" button)

Username : (5-32 characters)

Password : (5-32 characters)

Confirm Password :

User Type  ☐ End Customer Only

System :

Network :

Carrier :

Wireless :

Firewall :

VPN :

Router :

Serial :

I/O :

GPS :

Adjusting the Firewall

Once the modem has a static IP, the firewall setting will control what connections are permitted. For Orion, you want to enable two protocols, ICMP for testing the access to the data modem via a PING command, and TCP on the 20001 port to allow access to Orion.

For the Microhard Bullet Plus the rules would look like this. For the destination address range, use the static IP provided by your carrier rather than the one shown.

The screenshot shows the 'Firewall Rules' configuration page for a Microhard Systems Inc. device. The page has a navigation bar with tabs for System, Network, Carrier, Wireless, Firewall, VPN, Router, Serial, I/O, GPS, Apps, Diag, and Admin. The 'Firewall' tab is selected, and the 'Rules' sub-tab is active. The 'Firewall Rules Configuration' section contains a form for a rule named 'rule1'. The 'ACTION' is set to 'Accept', 'Source' is 'None', and 'Destination' is 'None'. The 'Protocol' is set to 'TCP'. The 'Destination Port' is set to '0'. The 'Add Rule' button is visible. Below the configuration form is a 'Firewall Rules Summary' table.

Name	Action	Src	Src IP From	Src IP To	/PrefixDest	Dest IP From	Dest IP To	/Prefix	Dest Port	Protocol
Ping	Accept	Carrier	0.0.0.0	255.255.255.25	None	192.168.2.34	192.168.2.34		0	ICMP
Orion	Accept	Carrier	0.0.0.0	255.255.255.25	None	192.168.2.34	192.168.2.34		20001	TCP

Adjusting the Serial Port settings

The Serial port settings need to be adjusted to match the speed of the Orion port and be connected to a TCP server so that a remote connection can be established.

For the Microhard Bullet Plus modem, navigate to Serial/Settings page and set the Port status to “data.” Adjust the Data Baud Rate to 115200. The other default parameters should be ok (8 bits, no parity, 1 stop bit). Change the IP Protocol Config to “TCP Server”. Finally, change the Incoming Connection Timeout to 600 seconds. The local Listening port can be left at 20001. Also change the maximum packet size to 1024. Submit these changes.

Settings - Bulletplus-GPS... x +

192.168.2.34/cgi-bin/webif/comport-com2.sh

microhard SYSTEMS INC.

System Network Carrier Wireless Firewall VPN Router Serial I/O GPS Apps Diag Admin

Status Settings

Serial Port Configuration

Port Configuration

Port status	Data
Data Baud Rate	115200
Data Format	8N1
Data Mode	<input type="radio"/> Seamless <input checked="" type="radio"/> Transparent
Character Timeout	24
Maximum Packet Size	1024
No-Connection Data	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
MODBUS TCP Status	<input checked="" type="radio"/> Disable <input type="radio"/> Enable
IP Protocol Config	TCP Server

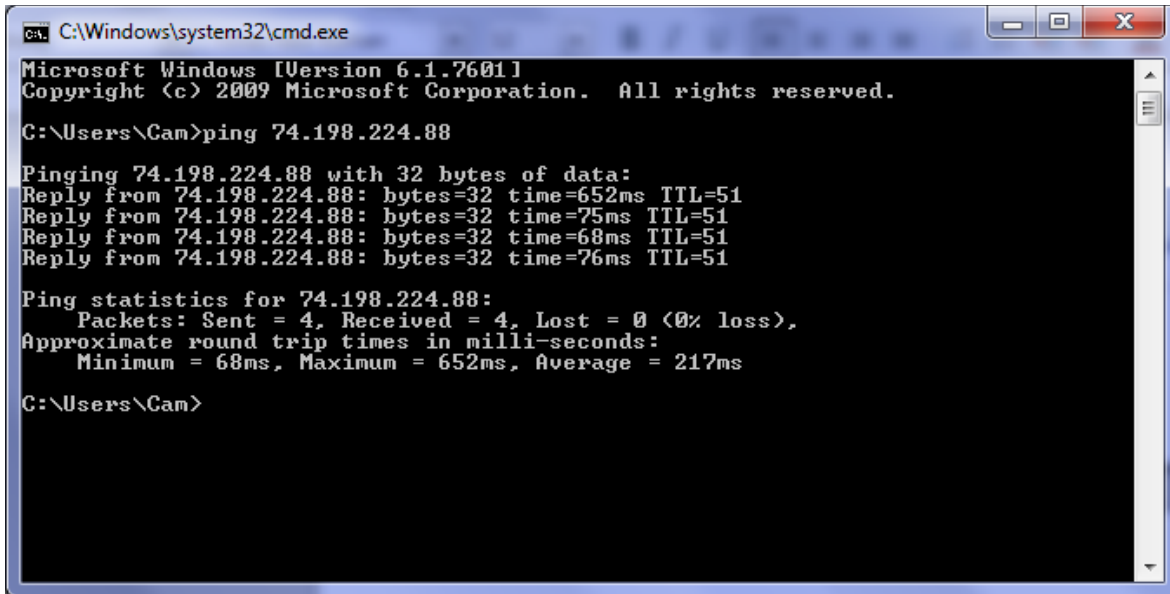
TCP Configuration

Server Mode	<input checked="" type="radio"/> Monitor <input type="radio"/> Polling
Polling Timeout (seconds)	10
Local Listening port	20001
Incoming Connection Timeout(seconds)	600

Submit « Cancel «

Testing the connection

You should now be able to ping your data modem. at the command prompt on your PC, you should be able to see replies from the modem as follows.



```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\Cam>ping 74.198.224.88

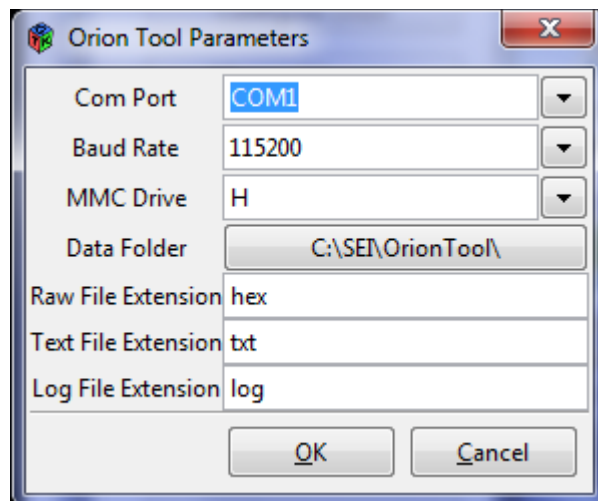
Pinging 74.198.224.88 with 32 bytes of data:
Reply from 74.198.224.88: bytes=32 time=652ms TTL=51
Reply from 74.198.224.88: bytes=32 time=75ms TTL=51
Reply from 74.198.224.88: bytes=32 time=68ms TTL=51
Reply from 74.198.224.88: bytes=32 time=76ms TTL=51

Ping statistics for 74.198.224.88:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 68ms, Maximum = 652ms, Average = 217ms

C:\Users\Cam>
```

Start the com0com driver to open the TCP connection through the Internet to from your computer to the modem. To do this, go into the “C:\SEI\com0com-SEI” directory or wherever you unzipped your files. Double click on the OrionTCP.bat file you modified earlier. At this point, the TCP connection should be open.

Now, open up OrionTool, and set the COM port to match the one you assigned with the com0com driver.



Now you should be able to access the Orion with Configure Orion, Manage Memory, Open Serial Port,

etc. as you normally would.

When you are finished with OrionTool, make sure you close the com2tcp window as well.

If you have multiple sites, you can create multiple versions of the OrionTCP.bat file using different extensions to the name such as “OrionTCP-Site1.bat” and modifying each one with the IP address of each site. Then, all you need to do is open the batch file that corresponds to the site you want to access.

For convenience, you might want to place links to your OrionTCP.bat files on your desktop.