

HOW TO: Ad Hoc Wireless AppleTalk Bridge

A tutorial for creating a Wireless AppleTalk Bridge; connecting a Newton MessagePad 2x00 (or eMate 300) to most (if not all) Newton Applications running under Mac OS X and Classic Mode.

My name is R A Parker. I own a Newton and a Mac.

You too, may be one of (only) a few hundred people who also fit this scenario. You are a 'Classic' kind of guy. You can stretch your Mac Dollars, two or five years beyond what Apple Inc. wish you would. You also bought yourself a Newton, because it too is a Classic.

So...

Your Mac can run Classic Mode and you have even managed to get the Newton Connection Utilities to work great now, with only a few caveats. You are not happy about serial speeds, serial dongles, USB adapters or wires (for all that matters). All you want is a fast and reliable way to make a backup, install some software, and do a restore to your Newton if necessary.

You ask yourself, "Why not use Newton Connection Utilities with a wireless adapter?" The reply you usually hear is, "Most wireless routers don't support AppleTalk."

Forget the router

Here is how you can use a Macintosh running OS X as a wireless AppleTalk Bridge, between Mac OS Classic and your Newton. What's the secret ingredient? Add any compatible 802.11b wireless adapter to your Mac and you can create your own wireless AppleTalk router (slash) bridge. As long as the wireless adapter is compatible with your Mac, then it will also be compatible with AppleTalk and, more importantly, NCU running under Classic.

You may have to wait until later to hear, just how loud this 'epiphany bell' will ring. Until then, on with the show.

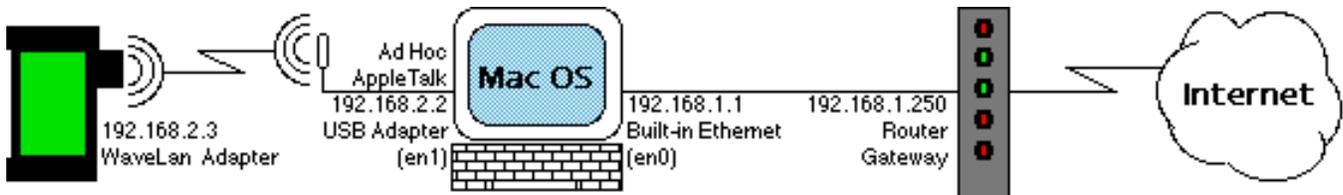
What follows can easily be adapted for the built-in AirPort card. I may in fact add these instructions later. However, the typical Macintosh of the age I have, did not come with AirPort built-in. Therefore, I did a little research into price and compatibility of after-market Wireless Adapters for Macintosh.

RECOMMENDATION: I purchased a couple D-Link brand Wireless USB (dongle type) adapters. Specifically: The DWL-G122 (rev. B1 Ralink Chipset) and the D-Link DWL-122 (802.11b only) model with software provided by D-Link. Either model worked just fine for my needs. Of these two models, the DWL-G122 used in combination with the Ralink drivers and utilities, is the definite, hands-down, winner.

Creating an Ad Hoc Wireless AppleTalk Router/Bridge

The Ad hoc (or Peer-to-Peer) mode is a specific computer-to-computer wireless configuration (similar to a crossover cable for wired networks, but not). When properly configured, your Mac will act like an AppleTalk router or bridge. Any Mac capable of running Classic mode, should work with your Newton wirelessly. With such a setup, you will be provided with high-speed access to applications like Newton Connection Utilities (NCU), Newton (Development) Tool Kit (NTK), the Internet and more.

Wireless AppleTalk Bridge Network Diagram



I will be working from the Network Diagram shown above. You can adjust the network configuration to fit your needs. Follow me for a brief moment while I highlight some important requirements.

Only the Mac, which will be acting like a router/bridge for the Newton, needs to be set in Ad Hoc mode. The Newton itself, will remain set to infrastructure mode. Otherwise, you will have two wireless adapters - each acting like routers or devices, each waiting for connections, and nothing getting connected.

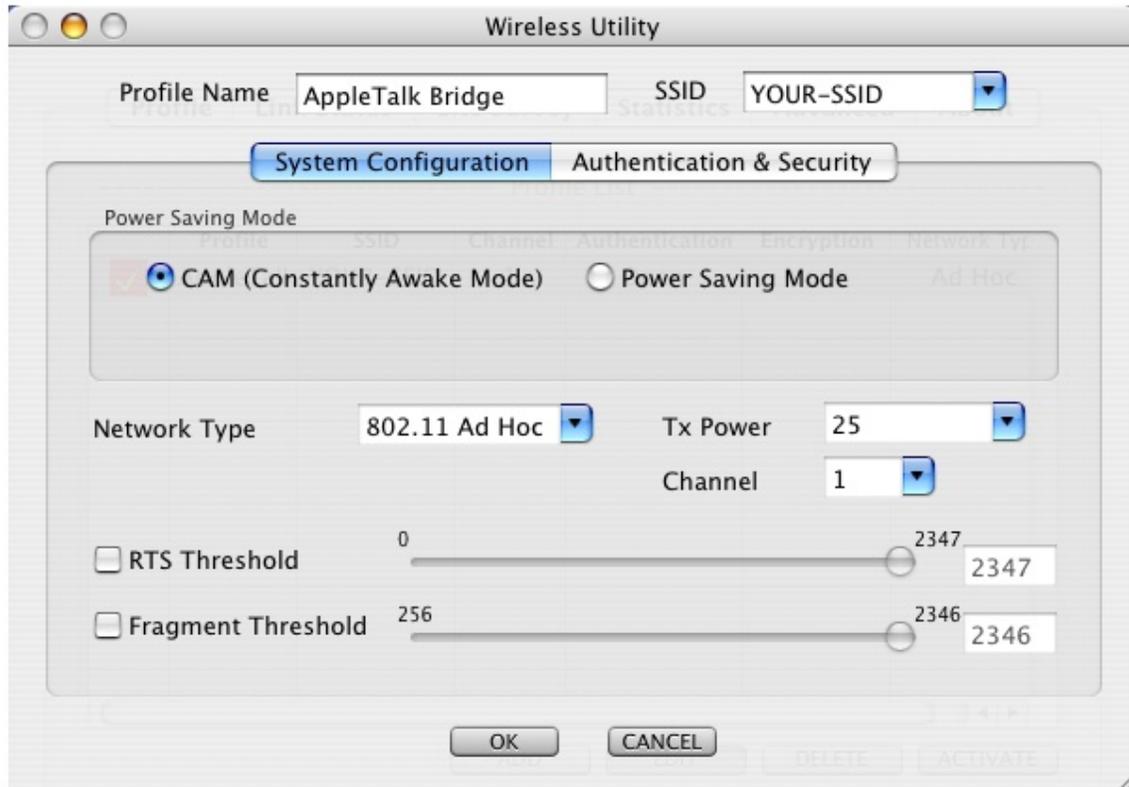
You must also be aware that you are configuring two different computers, using two different wireless adapters. Experience will be the best teacher here. It is best to have tested each adapter first and separately, to ensure that each adapter is working with their respective computers.

I will repeat it another way: Your Mac should (already) be able to connect to other wireless networks and routers. And, you should be very comfortable getting your Newton to connect to wireless networks, as well. This tutorial cannot cover enough of the pre-requisite learning which may be required. Beyond the specific details I will be covering, I will assume that you know what you are doing.

Understand that Classic Mode shares most of its network settings with Mac OS X. The underlying protocol layers for the physical adapters, as well as for the AppleTalk File Sharing Protocol, are all controlled under OS X. So... you will first make your settings on the Mac OS X side, and then start Classic mode and confirm the necessary settings there.

Finally, your ultimate goal is to get your Newton, to be able to see "Your-Macs-Name" as a service over your new wireless AppleTalk Network. This will not happen unless NCU is running AND everything has been configured. There is a chicken in the room and there is an egg in the corner. Which one you should use first can be a little hard to see at this point.

Wireless Utility Configuration Settings



The key information required (within this profile) is to enter an SSID. Most importantly, you must set the wireless device's option for a Network Type "802.11 Ad Hoc" also known as, Peer-to-Peer mode.

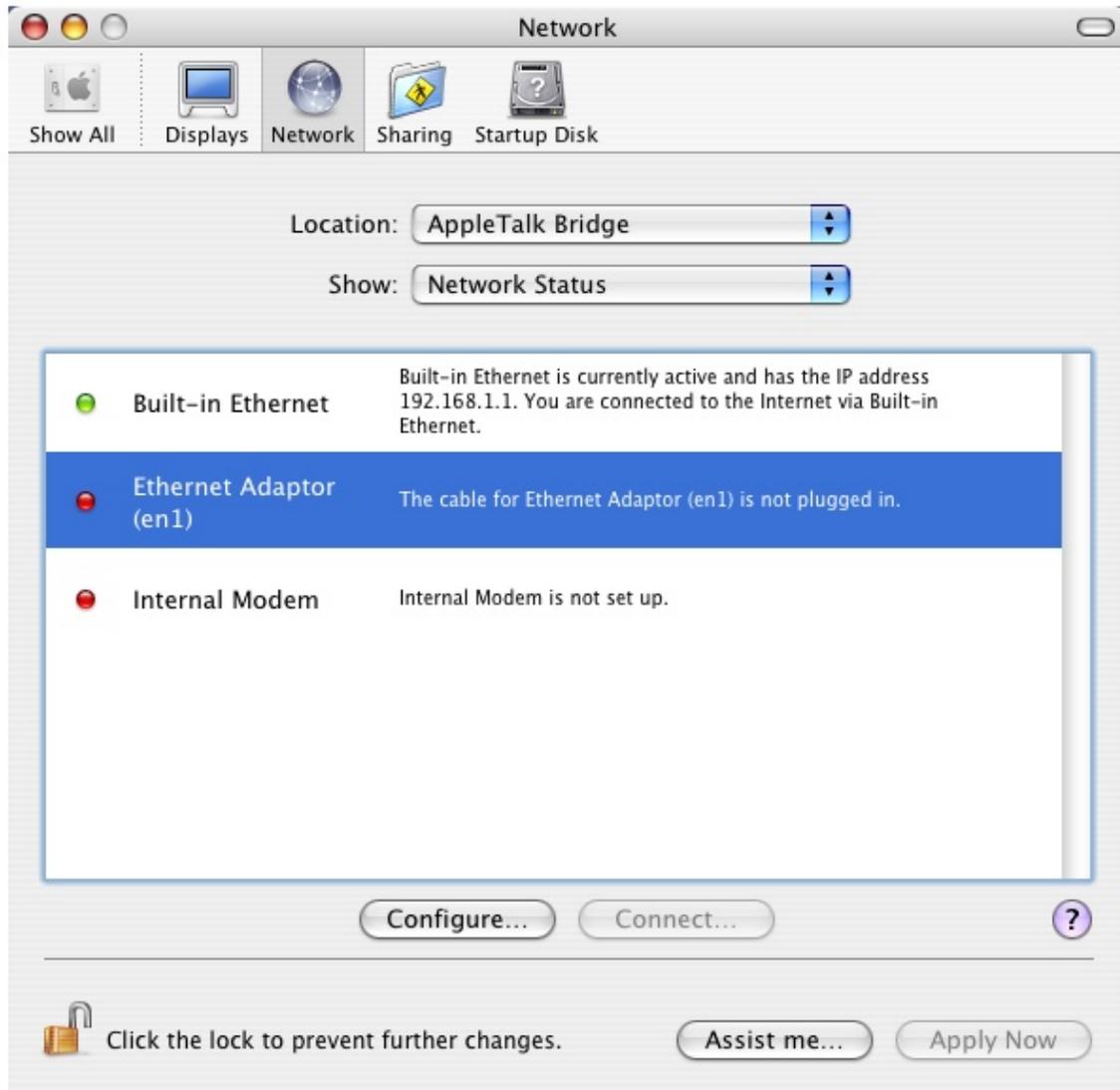
Wireless Utility Authentication & Security Settings



Switch over to the Authentication & Security options. For now you should choose “Open” for the Authentication Type, and choose “NONE” for the WEP Encryption Type. I highly recommend that you do not activate WEP until later. Remember, start simple and get everything working first. You can always complicate things later. If WEP is desired, then you will set the Authentication Type to “Shared” and enter your WEP Keys.

Once you have plugged in and configured your Mac's wireless adapter, you should be able to see the adapter as a Network Device. It will appear as an additional Ethernet Adapter (en1) in the Network Status of your Network System Preference pane within OS X. If your Mac is connected to the Internet via the Built-in Ethernet Adapter (en0), this interface should already be good to go (green light).

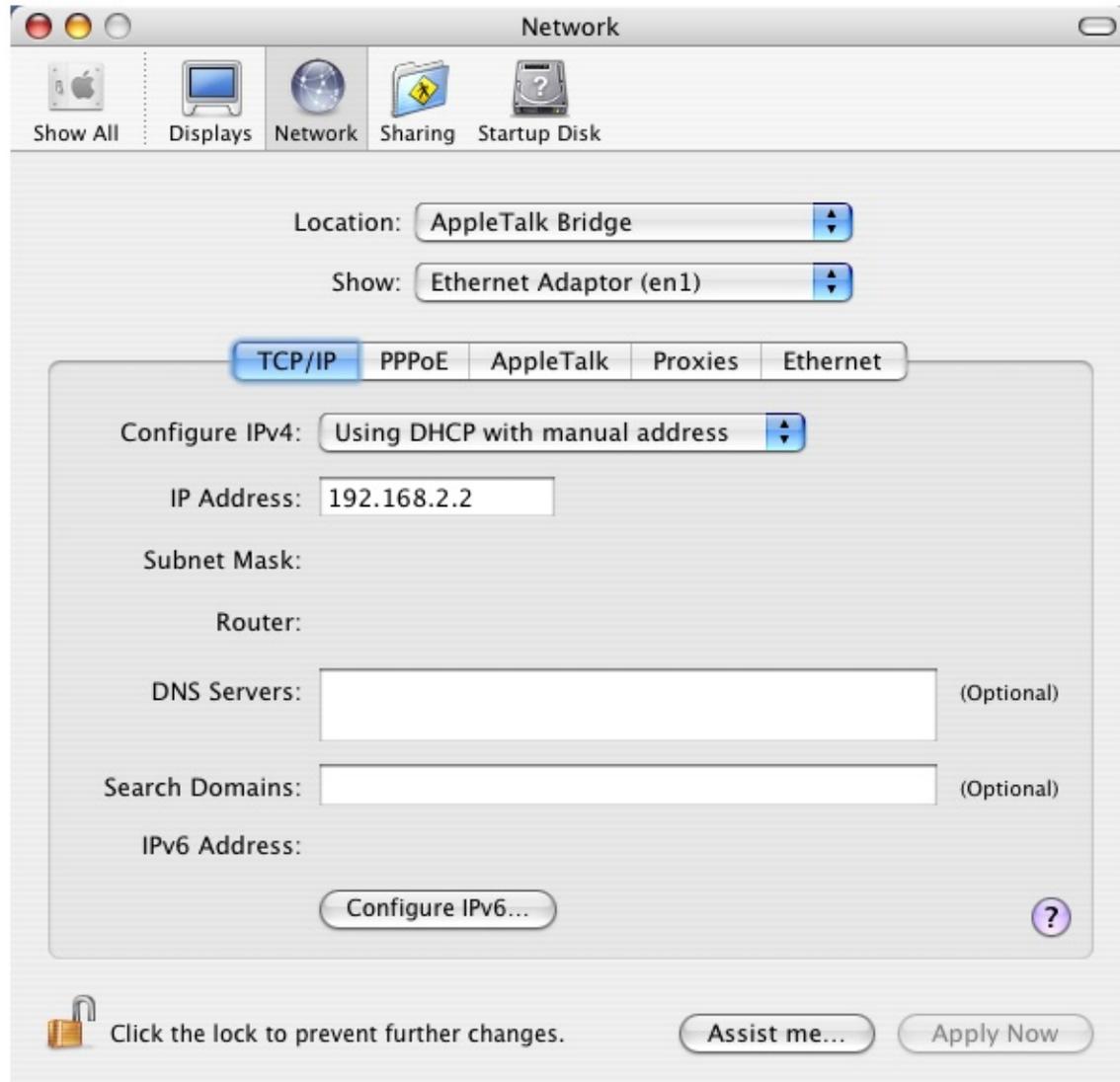
Network Status (RED)



Your wireless adapter will likely say it “is not plugged in” even though it is obvious that it is. That’s O.K. at this point, nothing has been configured nor connected yet.

Select the Ethernet Adapter (which represents your wireless adapter) in the Network Preferences and choose “Configure...” to edit the TCP/IP configuration. Administrator Login may be required to unlock the panel and make these changes.

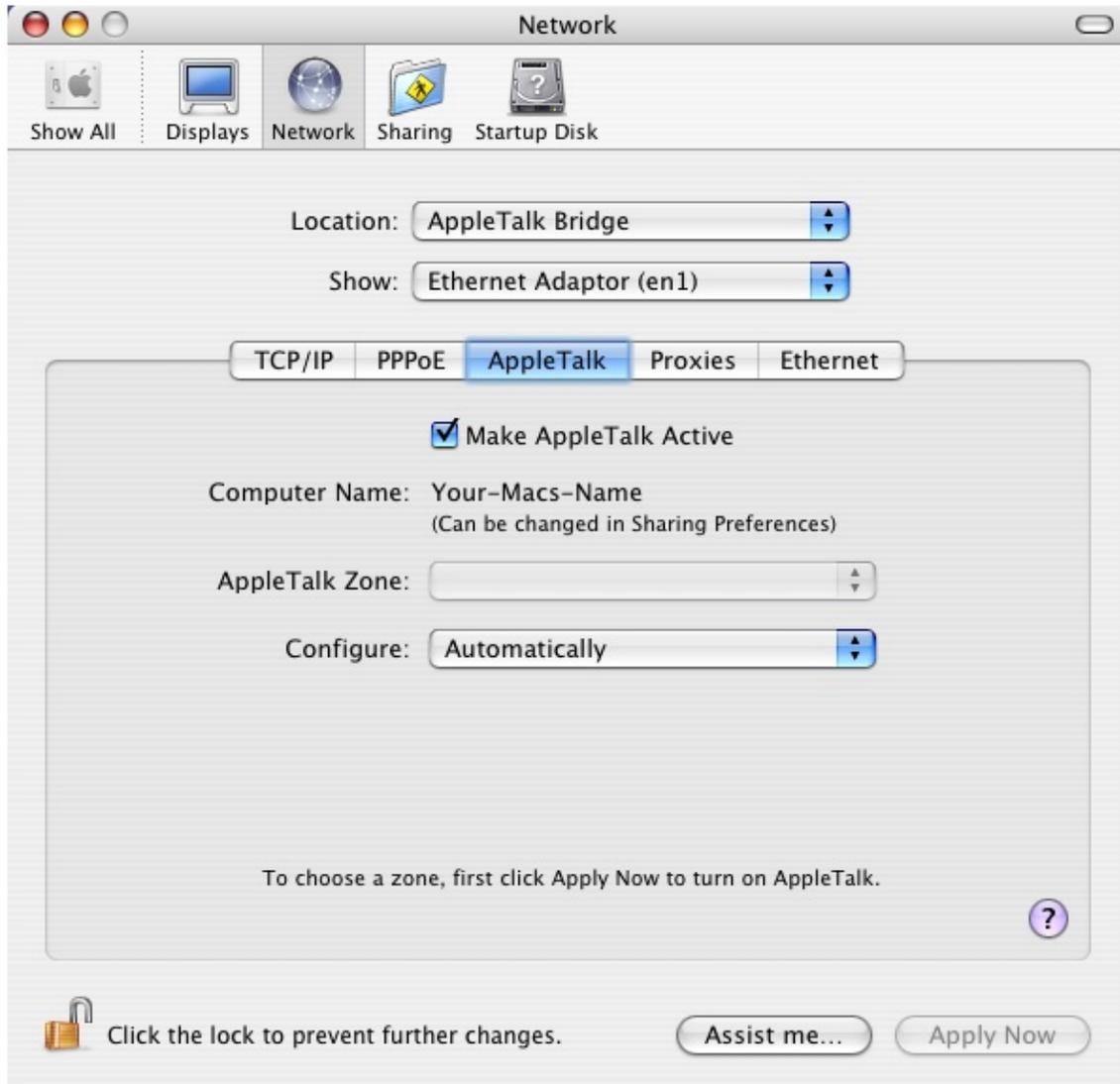
Network Preference Pane for TCP/IP



Set “Configure IPv4:” option to “Using DHCP with manual address.” Enter a valid IP Address. Keep in mind: You are bridging two separate networks across two different network interfaces. The IP Address for this new interface must be different from the Built-in Ethernet address. For instance, in this setup, I use 192.168.1.x for the Built-in Ethernet interface and 192.168.2.x for the wireless USB interface. Set the IP address as indicated and then select the AppleTalk tab in the Network Preferences.

AppleTalk, for the purposes of the establishing a connection to the Newton Connection Utilities, will not be using IP Addresses nor does it use DNS Servers. However, some of these network settings will be required to ensure the each of the adapters are configured properly, especially for Internet sharing. (Later in the tutorial)

Mac OS X Network Preference Pane for AppleTalk



Make AppleTalk Active on the wireless interface (en1). AppleTalk can only be active on one interface at a time. If you are using AppleTalk on your Built-in Ethernet interface, it will be deactivated while this bridge is configured and active.

Personal File Sharing Services Settings



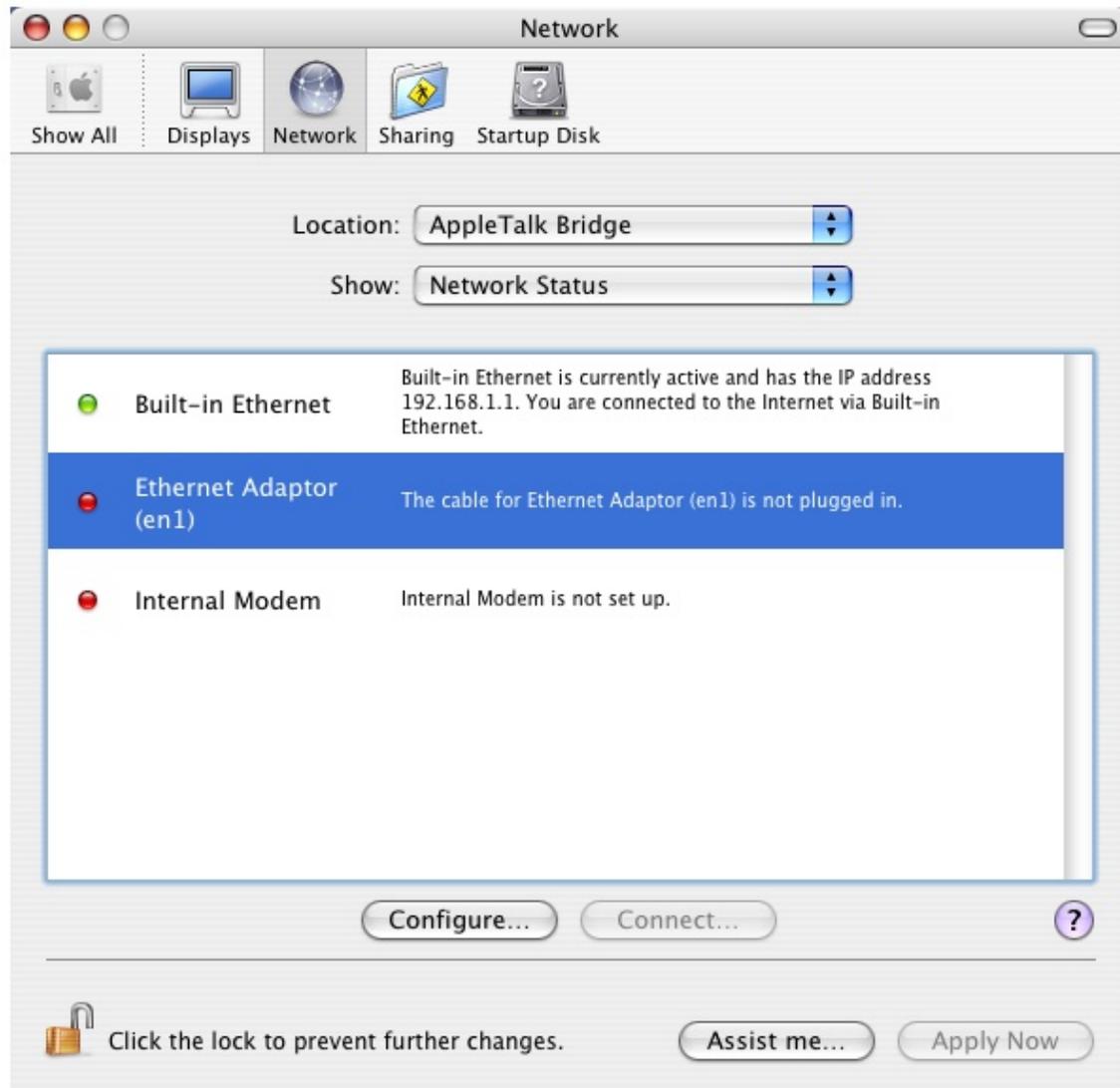
Open the Sharing Preference Pane in OS X. If you haven't already done so, you will give your Mac a name. The various other service settings in Sharing Preferences, are for activating the TCP/IP based sharing services over Ethernet. These settings do not affect how Classic Applications like NCU or NTK, uses the AppleTalk protocol.

WARNING: Unless you have a specific need to open up access (read: reduce your security), you should not activate these services on your wireless interface.

Use the Mac OS X location settings, similar to the Newton's Worksite slips, to help you save the preferences for editing and adjusting later. This also helps if you will need to have AppleTalk active on another interface. You can easily switch between the Wireless AppleTalk Bridge settings and your normal network settings, when needed.

Once your network interfaces, on the OS X side, have been properly configured, things should work smooth and as expected when running under Classic. Activating AppleTalk services within OS X will activate it within Classic Mode. However, the last step (which we won't get to until later) is what makes everything active, green and go. The NCU application (running under Classic) needs to "advertise" the availability of its AppleTalk Services, over the wireless Ad Hoc network.

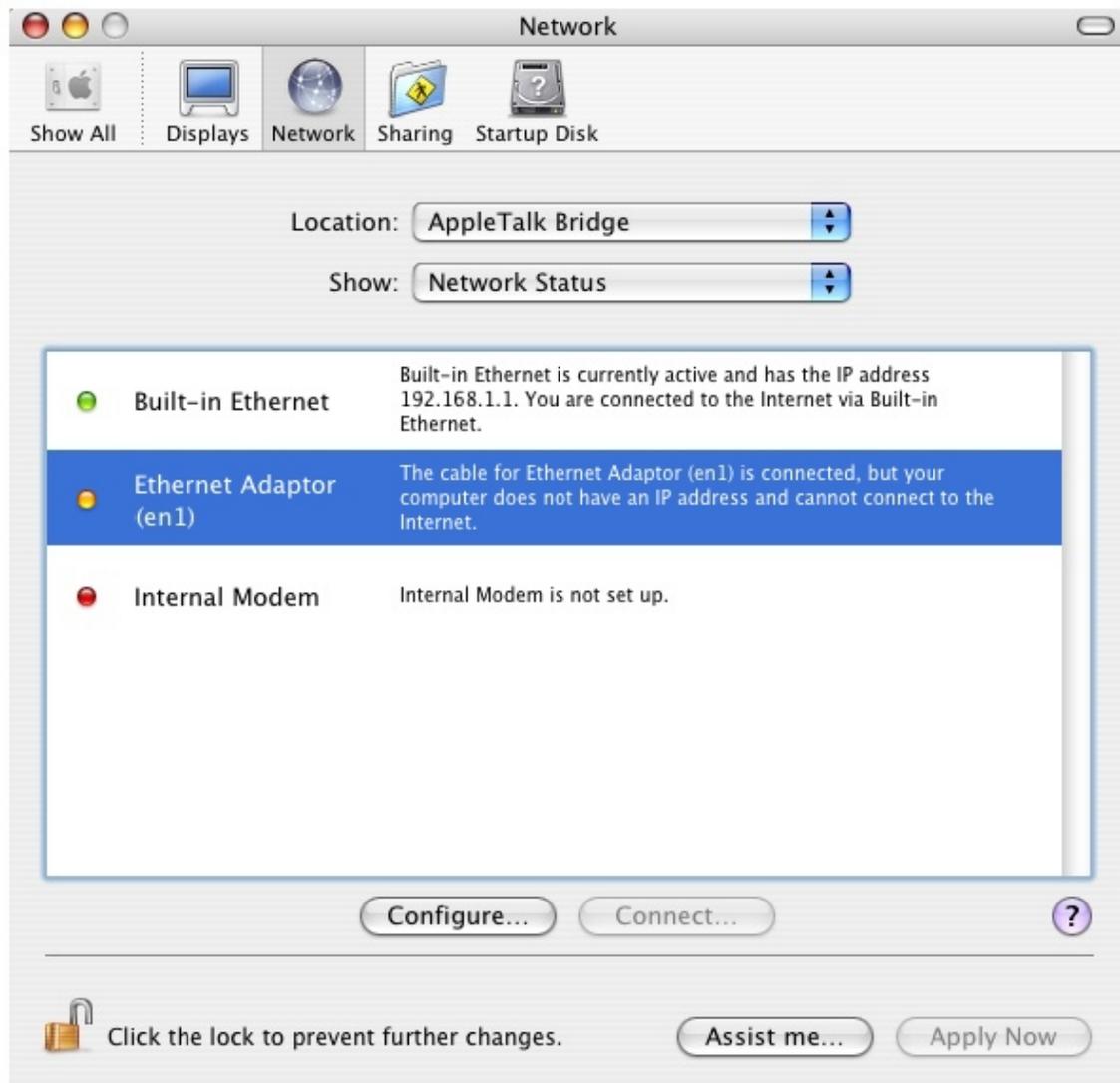
Network Status (RED)



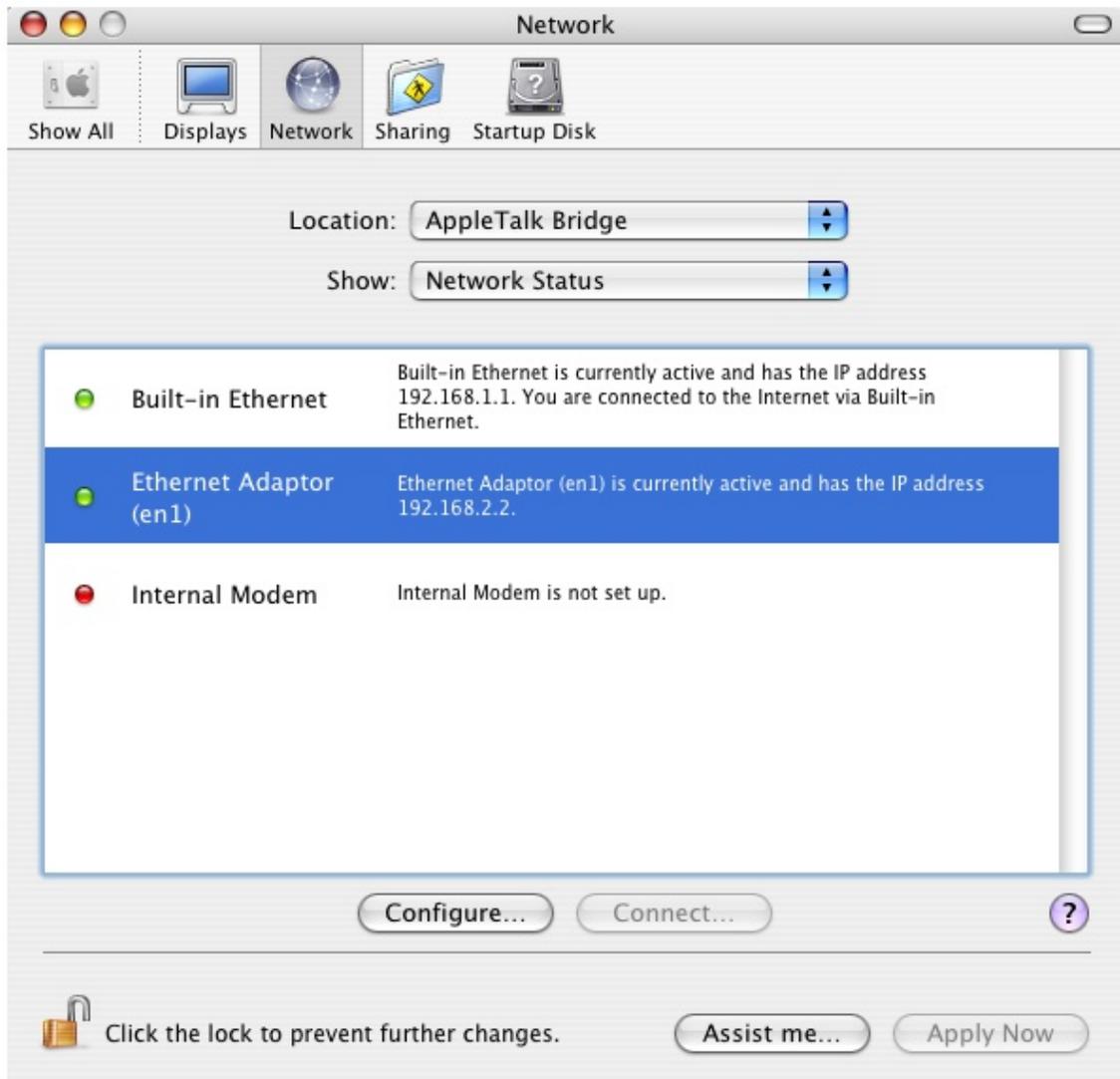
Watch the Network Status screen again. You will notice that the interface for the wireless adapter, identified as (en1) on my computer, will always start as deactivated (Color: Red), even though you have plugged in the wireless adapter to your Mac. This is normal, especially the first time. The wireless adapter, being set to Ad Hoc mode, has not yet been seen in a "Cable Connected" state, until a connection from another network device (which will be the Newton) is established.

IMPORTANT HINT: You may find it necessary to jump-start the wireless Network adapter and kick it into a “cable connected” state. You do this by opening the Dock application on your Newton and searching for an “Other Computer.” The Newton may not find anything (especially at this point) so, you can hit stop when the Newton starts looking. Once your Newton initiates this connection, the network interface and protocols on the Mac OS X side will also begin to activate. It may take a minute or two (Color: Yellow) before the adapter is fully active.

Network Status (YELLOW)



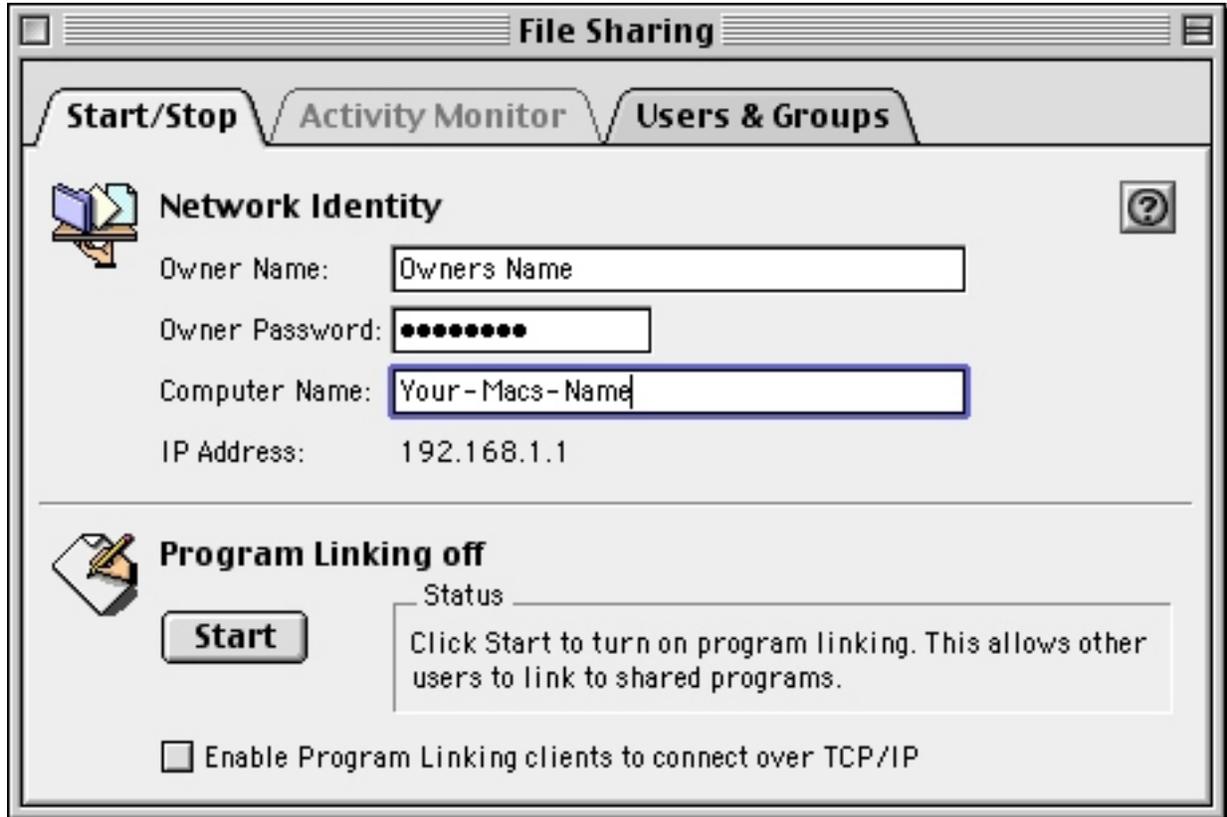
Network Status (GREEN)



When your Mac's wireless adapter is ready to go (Color: Green), everything should begin to fall into place. Once active, you must specifically turn it off or unplug the adapter itself. Otherwise, Mac OS X will keep the Ad Hoc network active, and your Mac will continue to wait for a connection. You should seriously consider the security implications of this fact. I will cover this in a little more detail, later.

It's time to launch Classic and get this network started. When Classic is up and running, you will need to configure the File Sharing Control Panel from the OS9 side of the Apple menu. Enter (or simply verify) the Owner's Name and Password. You must also give the Computer a name.

File Sharing Control Panel – Name Your Mac

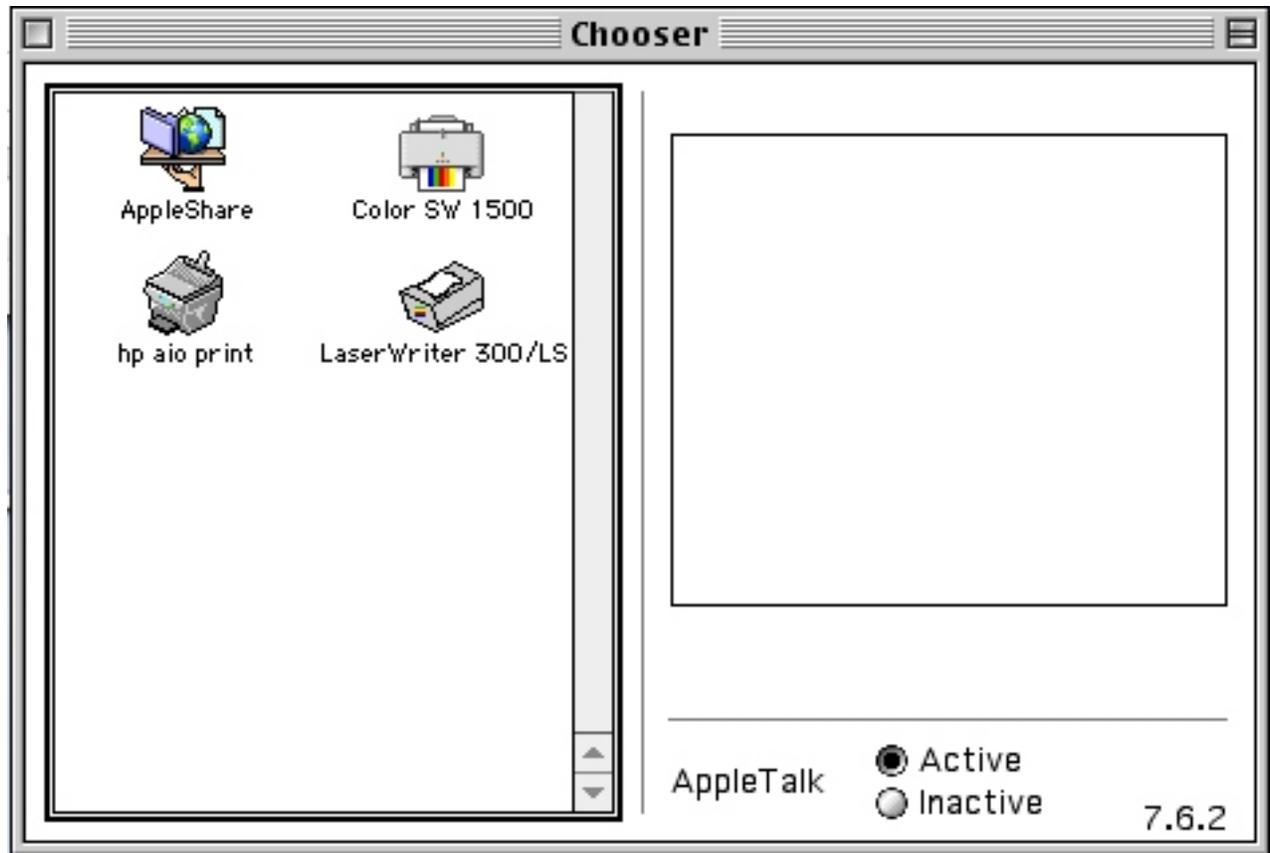


IMPORTANT NOTE: It is the Computer Name located here, which will be the name your Newton sees over the Ad Hoc wireless AppleTalk connection. Classic programs (like NCU and NTK) broadcast their availability using this setting. Although it is not required, I do recommend using the same name as you defined in OS X. This will prevent any confusion or conflicts with the sharing protocols.

The IP Address which is displayed here, may confuse you. Notice that Classic has picked up the IP # from the Built-in Ethernet interface. You can ignore this fact. Why? I don't know. My best guess is that (in a previous life) Classic was expecting to activate File Sharing Services (via TCP/IP over Ethernet) using the Built-in Ethernet interface. However, the AppleTalk protocol that we will be activating is on the wireless adapter. The concept of TCP/IP File Sharing over Ethernet will not be used where we are going.

For monitoring purposes, you should now open The Chooser from Classic's Apple Menu. It is important that this window indicates that AppleTalk is Active BEFORE you launch the NCU application. Otherwise, NCU will complain or AppleTalk will not be available as an option.

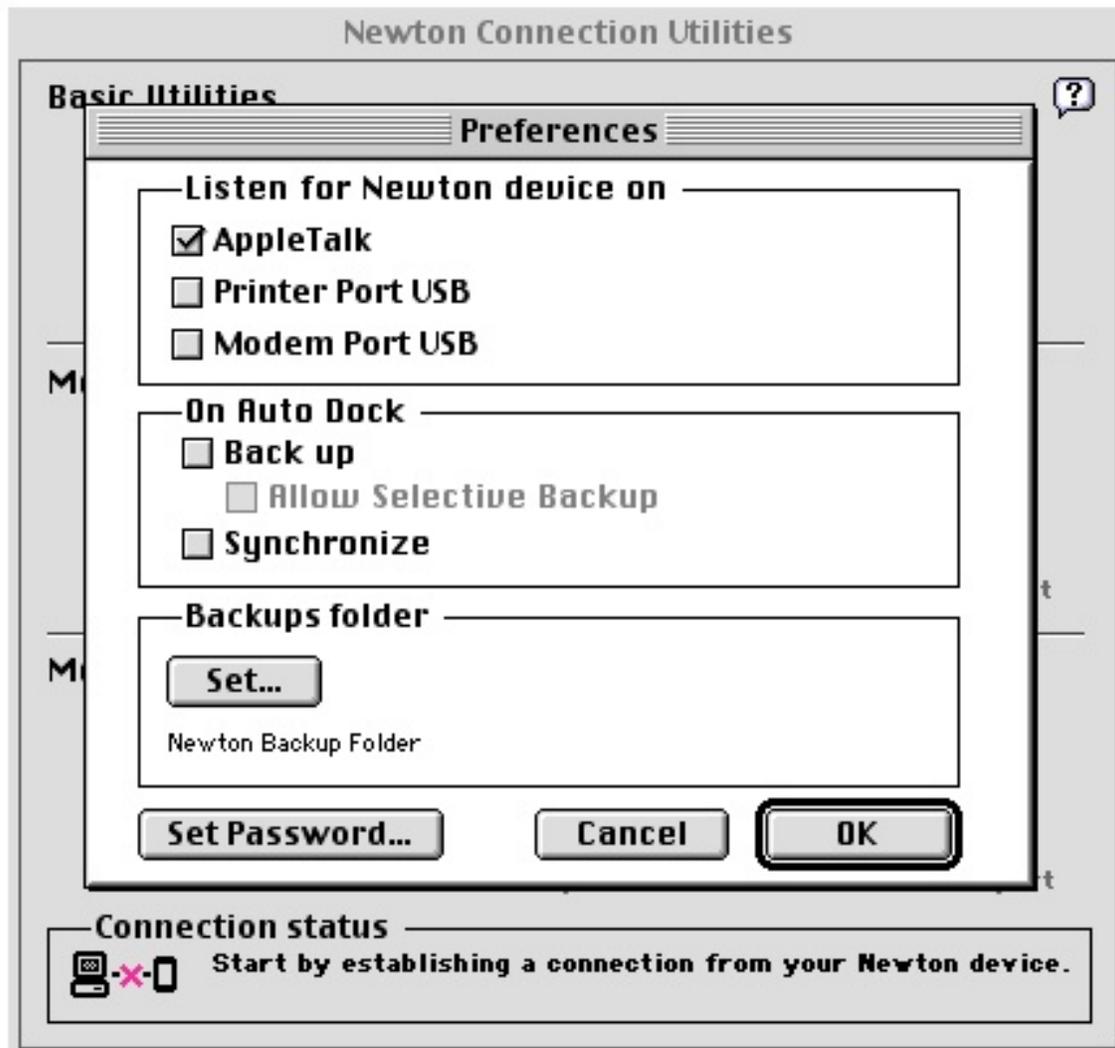
Chooser – AppleTalk Active



Be aware that this button is showing the status only. You cannot activate AppleTalk (here) unless you are running Mac OS Classic “natively.” When running Classic Mode under OS X, you must activate AppleTalk using the Mac OS X Preferences Panes. If the Chooser indicates that AppleTalk is Inactive, your Newton will not be able to make connections to your Classic applications.

Only when the status light in the OS X Network Preference pane is green AND the AppleTalk status within Classic's Chooser is Active, should you launch the Newton Connection Utilities. Once you have launched NCU, you need to verify the Preferences, making sure AppleTalk is available and is the selected connection method for the "Listen for Newton device on" option.

Newton Connection Utilities – AppleTalk Available



Move on over to the Newton. It's a good time to remind you about the Newton's ability to create and save Owner Worksite settings (similar to Location settings in Mac OS X). Profiles from the various Preference Slips can be associated with specific Worksites, within your Owner Settings. You will find this feature is an easy way to switch between different wired or wireless networks that you have setup and plan to use.

Go to your Owner slip. Add a worksite and give this Worksite a name like AppleTalk Bridge or something similar. After creating the Worksite, you will want to add the 802.11b WaveLAN setup, Internet Access settings, and eventually the Dock Info setting to this new Worksite.

Adding an AppleTalk Bridge Worksite



You should now insert the WaveLAN compatible wireless adapter into your Newton's card slot.

When you insert a PCMCIA card (the WaveLAN wireless adapter) into your Newton, the Card Slip dialog opens. Tap the Setup button to edit the wireless adapter settings. You can also use the Card application (found in the Extras Drawer) to access this setup screen. You will want to leave the Mode as Infrastructure and set your SSID as established earlier. Close this screen.

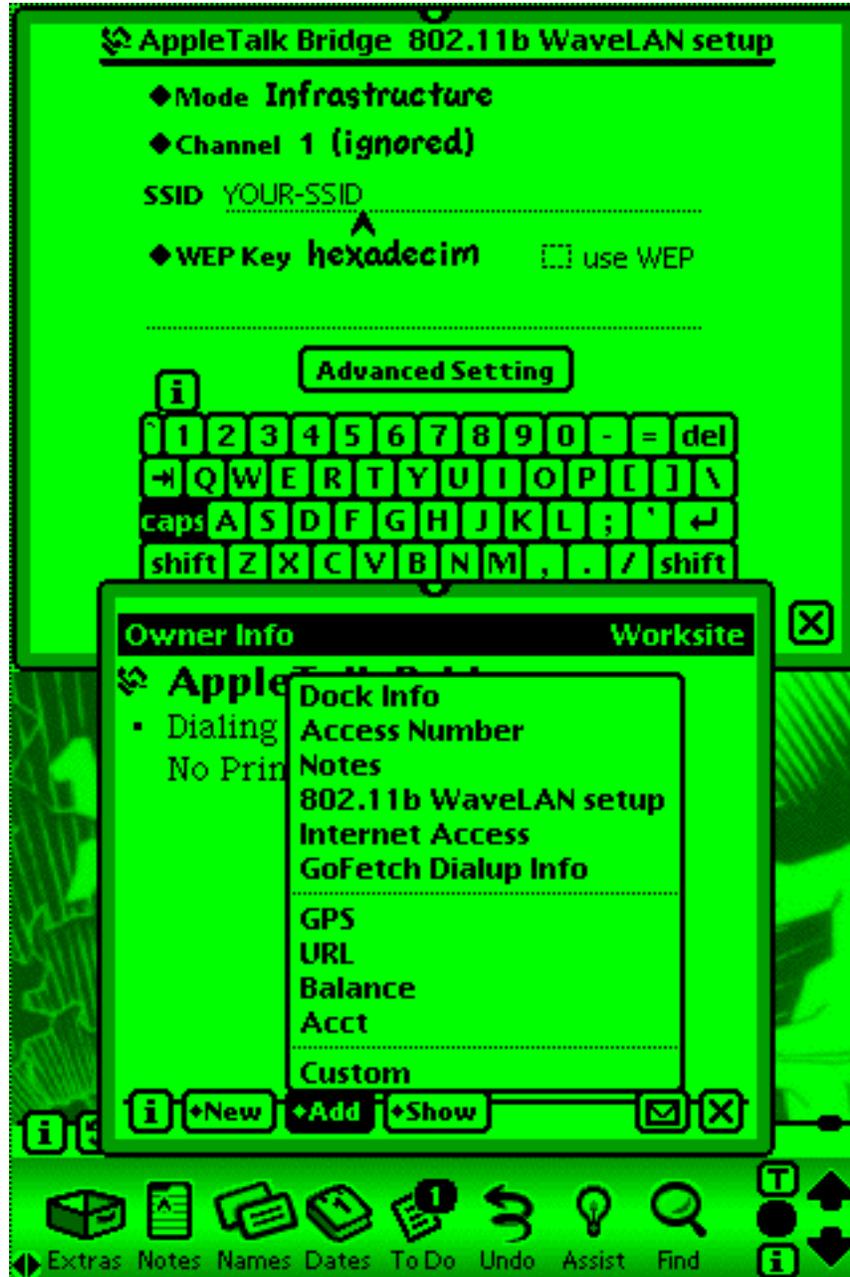
IMPORTANT: Make sure the checkmark 'Use card for AppleTalk' is checked. Then close the Card Slip.

Card Settings – Wireless Adapter for AppleTalk Bridge



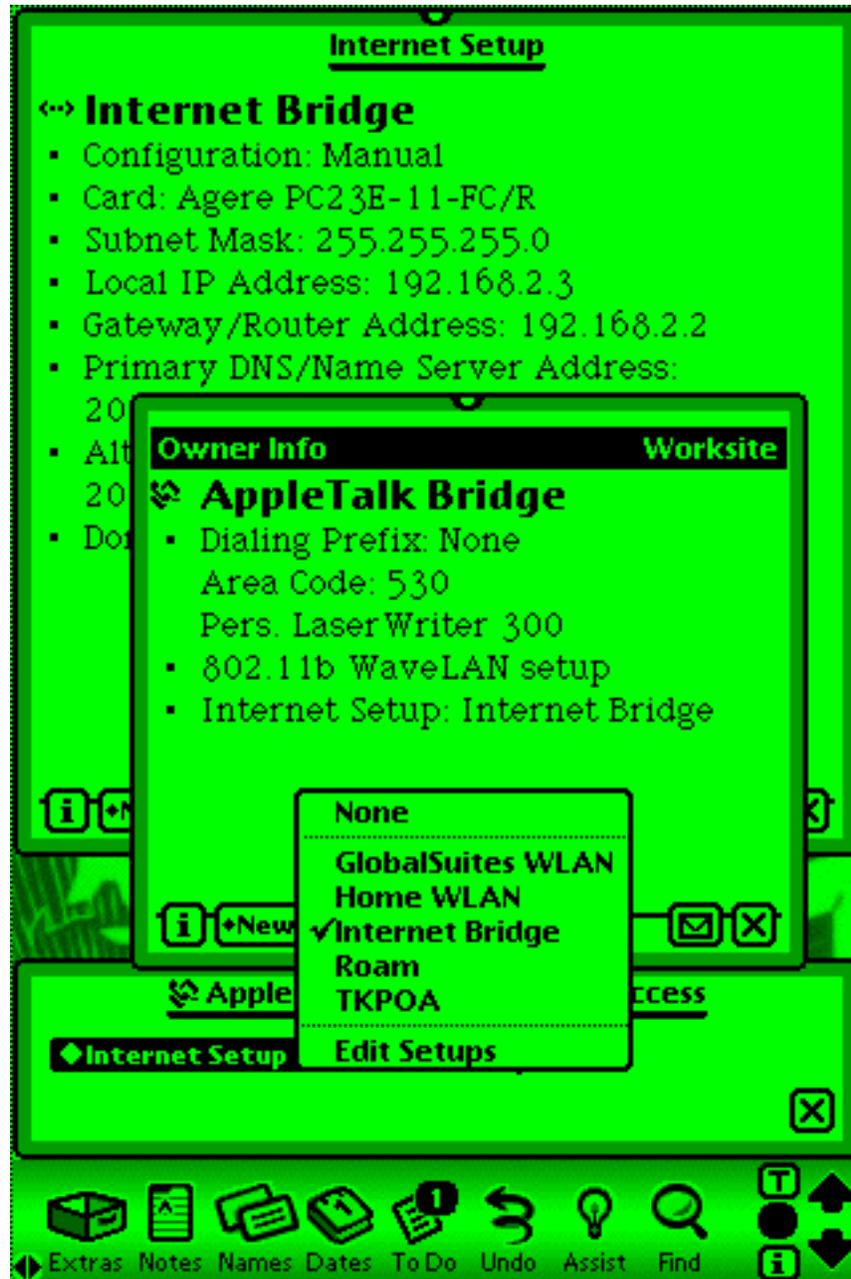
Going back to your Owner Info and the new Worksite you have created, add the 802.11b WaveLAN setup and the Internet Access settings. Once added to the Worksite, you will be able to easily edit the setup screens for your wireless adapter and add/change the WEP Keys later, if desired.

Adding the 802.11b WaveLAN setup



Adding the Internet Access settings to your Worksite is not required for connecting via AppleTalk. But, you would be well advised to configure these settings at this time. This will help guarantee that your network settings are correct for other features you may wish to take advantage of, later.

Adding Internet Access



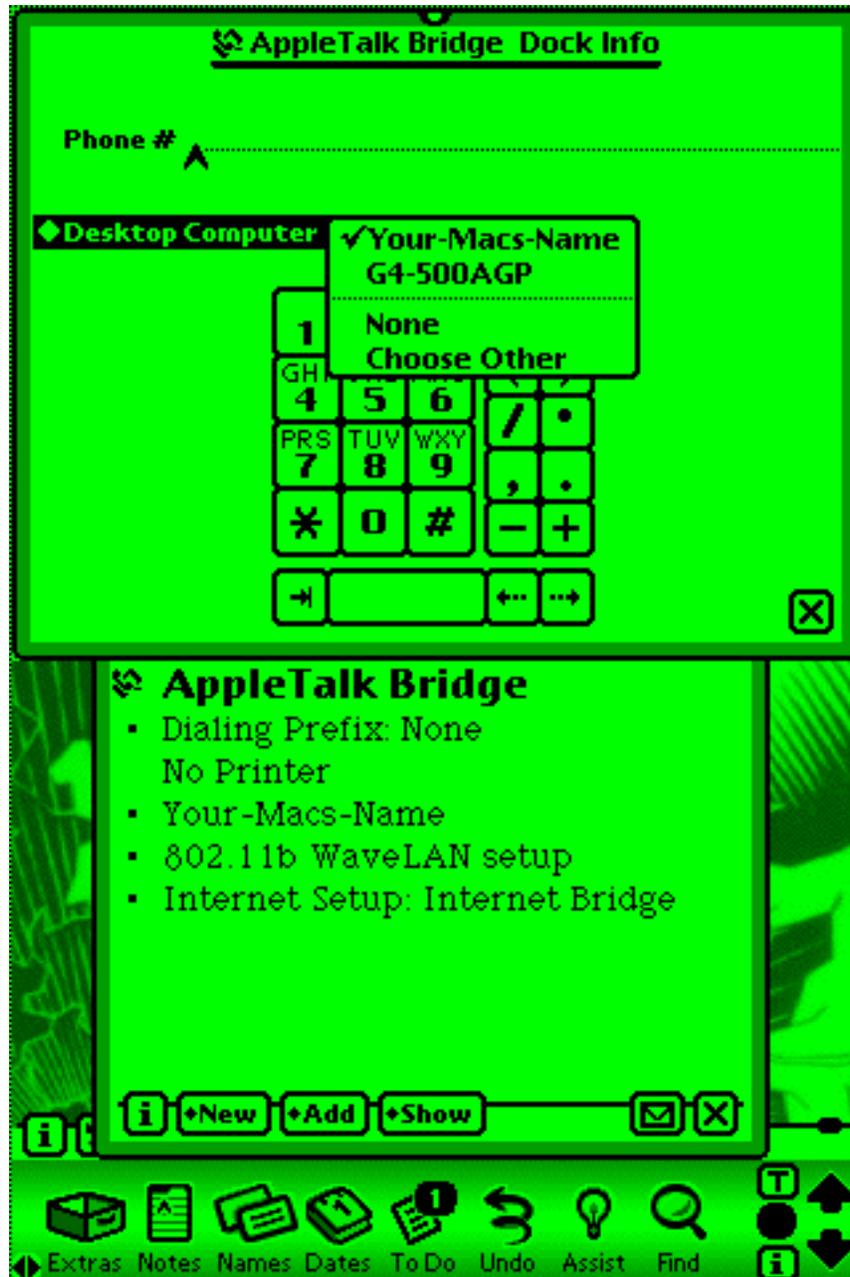
The Ad Hoc network will not be passing DHCP information to your Newton. Therefore, you will need to set the Configuration to Manual. Enter an appropriate IP number that defines your Newton's network address. The Gateway/Router for your Newton will be the IP Address given to the (wireless) Ethernet adapter earlier, within the Mac OS X Network Preferences pane.

Primary and Secondary DNS/Name Server Addresses are usually the same IP numbers provided to you by your ISP. If you don't know what these numbers are, or you're not able to

find them with a network utility on your Mac, try the ISP's website and support pages. You could also call the ISP's Technical Support Department and they should be able give them to you without too much problem.

Finally, add the Dock Info to your Worksite. This preference slip is asking for a Phone #. Ignore this and tap "Desktop Computer" and then select "Choose Other" to start the search for Your-Macs-Name on the network.

Adding the Dock Info



Watch and wait.

If everything is perfect and God is on your side, Your-Macs-Name will appear. Select Your-Macs-Name and close the window. After selecting Your-Macs-Name, the wireless adapter for your Newton will disconnect, but that's OK. As mentioned before, your Mac will keep the network up and running. You should be able to reconnect at any time and everything will move much faster. Much, much faster.

HELP!

If something is wrong, well... you will not get beyond this point. And to think, you were so close. Although the setup is now complete, adding the Dock Info is the all-important "moment of truth" letting you know, whether or not you can continue. First, I'll narrow this chaos down to the simple and logical order that is required to get beyond this point.

#1 – Your Mac's wireless adapter is configured, activated, and the Network Status pane shows a green light for that specific Ethernet Adapter.

#2 – AppleTalk is active in the Classic Chooser.

#3 – Newton Connection Utilities is running with AppleTalk selected in the preferences.

#4 – Your Newton is able to connect to the Ad Hoc network.

#5 – You can see Your-Macs-Name on your Newton.

OK...now what? Having problems connecting to Your-Macs-Name? Review these five points I have outlined above and see what's not right. Check the Ralink status screens, as well as the Network Status to verify that a wireless connection is actually being established. Make sure the profiles, locations and worksites you have created are all selected as active.

Watch and Wait: A Better Approach

On some occasions, even after having successfully used my AppleTalk Bridge, the Newton Dock would refuse to make a connection to the NCU application. When searching for "Other Computers" there was a considerable delay before My-Macs-Name would show itself, if at all. Everything seemed fine, AppleTalk was active in Classic and the NCU application was running. The connection lights on the WaveLAN cards indicated a very good, solid connection.

Try a different approach to the jump-start idea. Completely shut down Classic. Before bringing Classic and NCU back up, start the search for an "Other Computer" from your Newton. This time, do not hit Stop. Allow the Newton to continue searching for this "Other Computer," while at the same time, you start the Classic mode and then launch the NCU application. Your-Macs-Name should appear, the moment that NCU finishes loading.

More Notes about Connection Issues

Up until now, I have been working solely with my MessagePad 2100 and a generic OEM WaveLAN card. I am now at a point where I have decided to try and duplicate my success. Only this time, using my wife's eMate 300 and a genuine Orinoco Gold card. I wanted to prove to myself that the instructions that I have just laid down, are truly the secret of success. It took a bit of work and determination. However, I do believe I now have twice the knowledge and experience.

The first problem I solved was with the WaveLAN driver on the eMate. The eMate did not want to connect to my Ad Hoc network at all. I had previously tested both cards in my Newtons using a wireless router and I already know they work. The lights on the WaveLAN card would simply blink a couple times every second. The Ralink software on the Mac would never show a connection. And, of course, the Network Preference Pane would never get to Yellow or Green, AppleTalk would not activate.

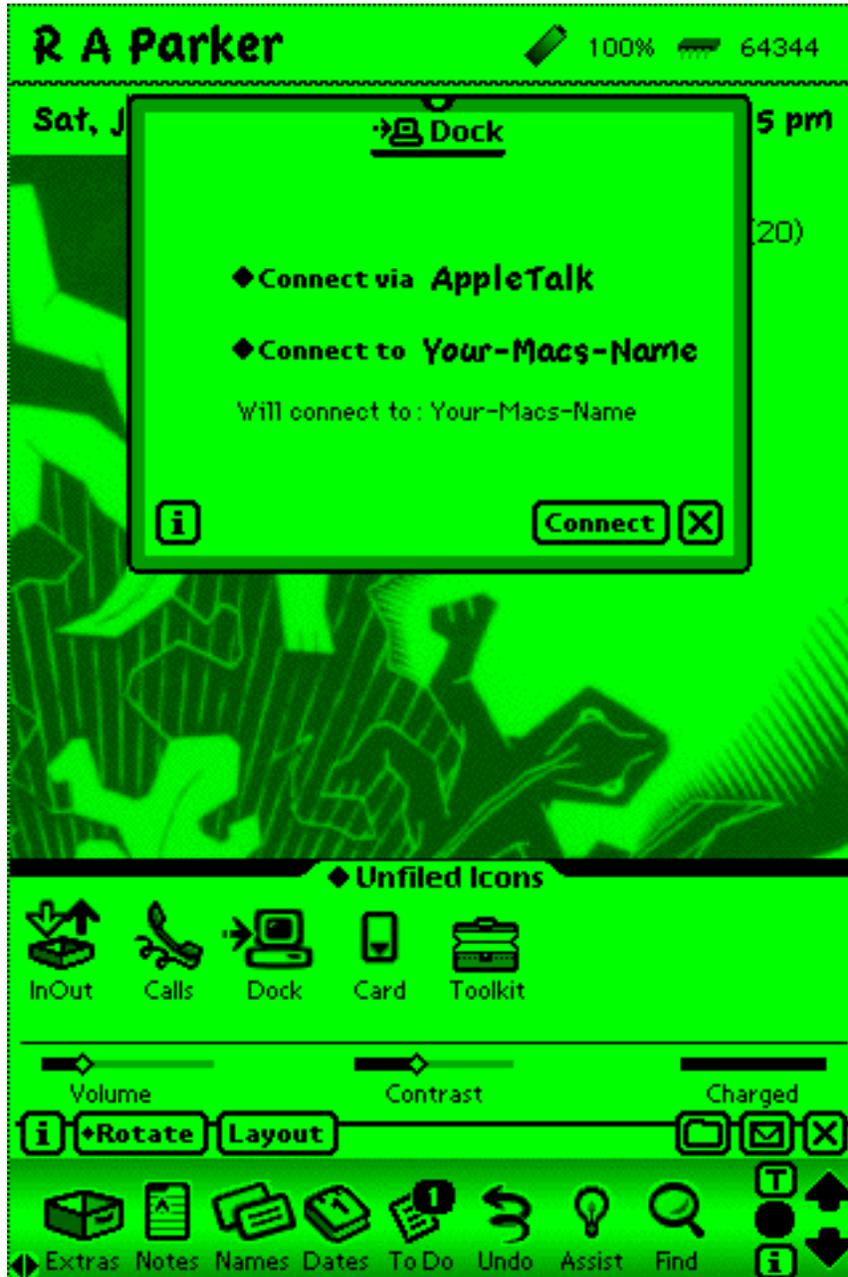
This certainly looked as though it were showing symptoms you would expect to see with an SSID or WEP mismatch. So, I turned off the WEP, checked the wireless card and network settings on both computers, and tried again. Nope... still no go.

I then looked more closely at the eMate and started disabling all non-essential extensions, one or two extensions at a time. It was then that I noticed I was inadvertently loading the "More Wifi" extension, which is not needed for a true Orinoco Gold card. Freezing this package allowed the WaveLAN wireless driver to figure itself out and make a good connection. The WaveLAN light went solid. AppleTalk activated and I was able to run NCU without complaint.

Moving On...

If you have successfully saved Your-Macs-Name to your Worksite, you can consider the setup complete and you are ready to move on. Launch the Dock app on your Newton.

Launching the Dock Application



In the Dock slip, be sure that “Connect via AppleTalk” is selected. Next, tap “Connect to” Your-Macs-Name, which should already be saved. You can also use the “Connect to” menu to select a different Worksite or look for an “Other Computer.” Finally, tap Connect.

You should now be connected to the Newton Connection Utilities, plain and simple.

Good News... Bad News...

Fast, very fast! In another word, "Blazing!" Well, when compared to standard serial port speeds... Personal observations suggest a wireless connection to NCU is about 4x-8x faster than a serial connection to NCU, when using a Keyspan USB Serial Adapter.

Speed is a relative thing. Maximum Ethernet speed is 10Mbps or you can set your wireless adapter to a slower speed of 1Mbps. It will not make a difference. Data transfer rates will actually be more dependent on the ability of the Newton's hardware (and filing system) to keep up with, and process the data. Maximum throughput from a Wireless connection can never (really) be expected. Below are some timed examples that will give you a better idea how much of a speed gain you can expect.

Newton MessagePad 2100 via Wireless AppleTalk

Install Large Binary Package – 1984.pkg – Total File Size: 2,409KB (2.3MB)

Apple Super Bowl commercial introducing the Macintosh.

3 minutes 3 seconds. – Approximate Speed: 13.16KB/sec

Full Backup Internal Store Only – Total File Size: 3,040KB (2.9MB)

3 minutes 38 seconds – Approximate Speed: 13.95KB/sec

Full Backup Internal and 24MB Flash Card – Total File Size: 14,816KB (14.4MB)

12 minutes 12 seconds – Approximate Speed: 20.24KB/sec

Full Restore 24MB Flash Card – Total File Size: 11,776KB (11.5MB)

28 minutes 43 seconds – Approximate Speed: 4.32KB/sec

eMate 300 via Wireless AppleTalk

Full Backup Internal Store Only – Total File Size: 2,944K (2.8MB)

3 minutes 22 seconds – Approximate Speed: (14.57KB/sec)

eMate 300 via USB Serial Adapter

Full Backup Internal Store Only – Total File Size: 2,944K (2.8MB)

13 minutes 23 seconds – Approximate Speed: (3.67KB/sec)

Yep... about 397% faster. Check out that full backup... less than 15 minutes! Now that might, almost be considered, "click and go" speeds, my friends. Sorry, I don't have a serial cable for my MessagePad 2100. Therefore, I am unable to provide any comparisons of speeds from this type of setup. I would suspect similar results as the eMate which also limits serial port speeds to 38400bps.

Security Considerations

First, you must realize, you are activating a wireless access point which is connected directly to your computer. By activating the Ad Hoc mode on a wireless adapter from your Mac, anybody within range could (in theory) access your network and computer as if they were connected by a wired network cable. So... do not leave your wireless adapters connected. Do not leave them unattended. Do not leave Ad Hoc mode active unless you need it. And, only activate Ad Hoc mode when you need to use it. After you are finished using your AppleTalk Bridge, you should quit all related applications, shutdown the Classic mode and/or unplug the wireless adapter from your Mac.

Unlike a full-blown router, Ad Hoc mode will not hide your SSID. Everyone within radio range can see your network and are able to glean some limited information from your signal. Using an SSID that doesn't mean anything, like MY-GATEWAY or NETWORK-B will help obscure what you're doing. Avoid using an SSID like APPLTALK-GATEWAY or NEWTON-BRIDGE, as those names would give someone just a little too much information.

Use WEP encryption. Yes, WEP is widely known as being insecure and broken. But, it's better than nothing. The radio signal being broadcast from your Mac will be advertising that a "WEP Encrypted Ad Hoc Network" connection is available. It is sort of like hanging a sign on your door that says, "Inside is my computer and here is the lock. Go away." Of course, nothing will stop someone from kicking in the door, if that person really wants to break in.

File Sharing options should be double-checked and strong passwords utilized wherever possible. Generally, you want to disable all services on the wireless interface when using this bridge.

But wait... there's more!

Sharing the Internet over your AppleTalk Bridge

This feature is probably moot but still be worth mentioning. If you've gotten this far, you (likely) know how to connect your Newton to the Internet. With two network adapters on your Macintosh, you can choose to activate Internet sharing. You will find this option within the Mac OS X Sharing Preferences pane under the Internet tab. Set the option to share from your Built-in Ethernet connection to your wireless Ad Hoc network. Switching this option on, routes port 80 (HTTP) requests and traffic, over your wireless Ad Hoc network, to and from your Newton.

Consider this only a small side benefit of the Ad Hoc network described above. This option will allow you to surf the Internet or connect to the Dock using the AppleTalk Bridge configuration. The short side of this: It will offer HTTP access only. Email applications like Simple Mail, Mail V, and GoFetch will not connect. These apps use port 25 (POP3) and port 10 (SMTP) to communicate with mail servers. The Internet sharing option only routes port 80 (HTTP).

TCPSerial

Got other Macintosh apps for your Newton that do not support an AppleTalk connection? Try TCPSerial. This extension, running in Classic, allows you to create virtual serial ports, which are Communications Toolbox aware.

I have played with this once or twice and found the idea had a sort of "wow" factor about it. As I try to recall how it works, the Newton connects using the wireless AppleTalk connection options, not a serial port. The data is transmitted wirelessly to the Mac side, through the TCPSerial extension, which then routes the data to one of two virtual serial port.

Maybe useless... definitely cool.

Newton Backup Utility (NBU)

Companion to the Newton Connection Utilities and similar in function and compatibility. NBU provides Backup, Restore and Installation of Packages only. Looks and feels like NCU with out the import/export functions.

Newton Took Kit (NTK)

I am not a Newton developer... yet. However, The Newton Developer Tool Kit has played a minor roll in my Newton user experience. Best of all, you can connect wirelessly to NTK via AppleTalk and use some of the extra features it does offer. Can you say, "Screenshot please!"

Thanks! You've got it now.

Additional Resources

Macintosh compatible D-Link DWL-G122 (version B1) Wireless USB Adapter:

<http://computers.shop.ebay.com/items/Computers-Networking_W0QQ_nkwZDWLQ2dG122Q20MACQQ_armrsZ1QQ_fromZR7QQ_mdoZComp utersQ2dNetworkingQQ_sacatz58058QQ_sofindtypeZ0>

Ralink Technology Mac OS X Support & Downloads:

<<http://www.ralinktech.com/ralink/Home/Support/Macintosh.html>>

Newton compatible WaveLAN Gold Cards:

<http://computers.shop.ebay.com/items/_W0QQ_dmpZCOMPQ5fHNQ5fNetworkQ5fAdapters?_nkw=Gold&_sacat=45000&_fromfsb=&_trksid=m270>

Hiroshi's WaveLAN Driver for the Newton:

<<http://www.ff.ij4u.or.jp/~ngc/eng/newtwave.htm>>