Revised [1]

MODEL 'X' TESTING SUMMARY:

The branded Hub/Ethernet adapter FAILED testing due to an inoperable Ethernet port on one of three units; thus, at least 33% of samples were delivered with inoperable Ethernet capability.

Critical

- No drivers were found that would enable Ethernet capability on a Windows 2000 operating system, despite downloading drivers directly from the manufacturer of the 10/100 Ethernet controller. The drivers provided on the manufacturer's web site claim to be functional for Windows XP and 2000.

Important

- **Addendum, xx/xx/09:** A set of drivers was included for a retest which did provide complete functionality in Windows 2000, XP, Vista x32 and Vista x64, with no additional user intervention required.
- The above noted new Windows driver's menu and installation wizard title does not reflect the manufacturer of the product, branded.

[1] Report revised to update findings of retesting with proprietary Windows OS drivers.

Model X – USB Hub/Ethernet Adapter Test

Tested Components

Brand: branded
Model Number: 'X'
Packaging: bubble wrap
Individual components: USB Hub, 6-inch USB Extension Cable and AC power supply (documentation missing)
UPC: Unknown

We were provided with three units, all the same silver body color although two have white cables, grommets and extension cables, and the third has a gray cable, black grommet, and gray extension cable. The power supply for all three is identical. The two white units bore serial numbers K000000205 and K000000206, while the gray-cable unit bore SN K000000204.

The following functions are those that were extensively examined and tested.

Claimed Functionality:

Windows 2000, XP, Windows Vista, Mac OS 10.1.x or later

Addendum, 02/09/09: New drivers provided for a retest did provide complete functionality for **Windows 2000**, XP, Vista x32 and Vista x64.

Additional Functionality noted:

- 3 rotating USB ports plus USB input cable and an extra 6-inch extension cable, allowing easy attachment to cramped or blocked computer or notebook USB ports
- Built-in high-speed Ethernet adapter (although one of three did not work)
- External, lightweight, 100 to 240VAC power adapter allowing powering of high-current USB-powered devices by the Hub without drawing current from the computer or notebook's own USB port. Adapter may be used with almost any home or office AC power source throughout the world with the appropriate wall plug adapter (not provided). Use of the power adapter prevents attached USB devices from taking power from the computer or notebook, thus lengthening notebook battery life and reducing power demand on the computer's power supply.

Note: After considerable testing, it was found that one unit, SN K000000205, has a malfuntioning Ethernet port. This sample's file transfer speed from an Ultra-SD card to the computer meets expectations; however, there appears to be an issue with its integrated 10/100 Ethernet controller. This hub's network capability was routinely recognized and installed, yet connectivity was never established.

The table on the following pages presents our detailed examination and testing findings. Variances noted above are discussed in cells with red highlight; other possible issues that we found are highlighted with a yellow background. Note that no competing benchmark product was specified for direct comparison; however, we have included our previous notes of the Targus 4-port Hub which provides similar USB functionality although without the Ethernet adapter that the device features.

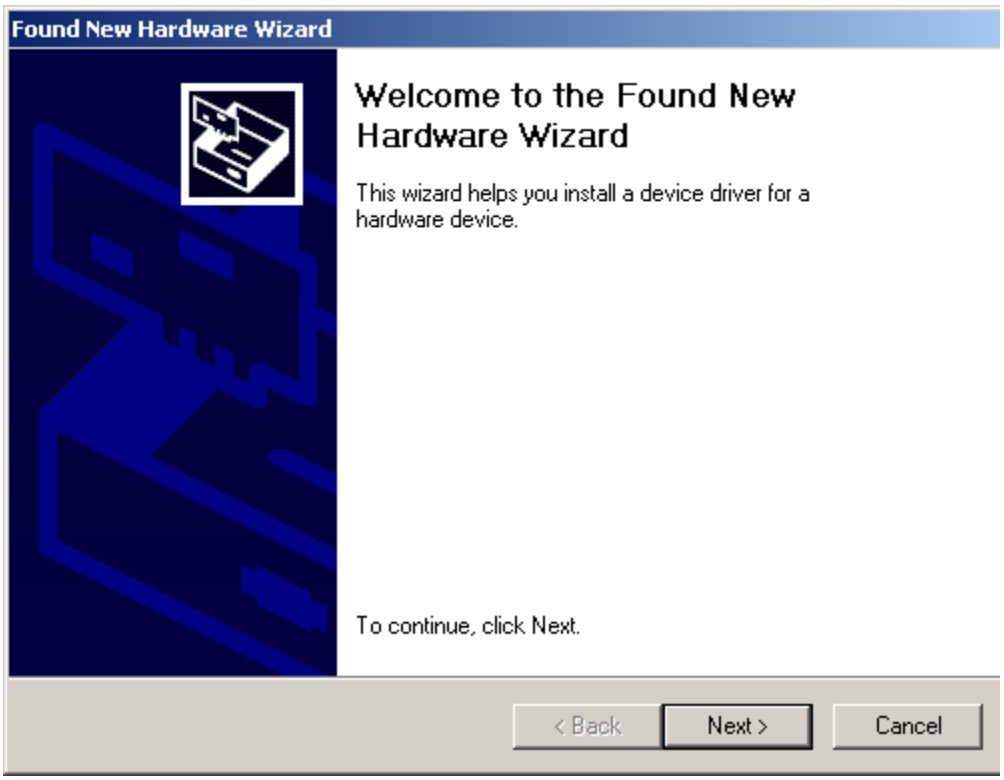
Table 1. General Comments and Observations

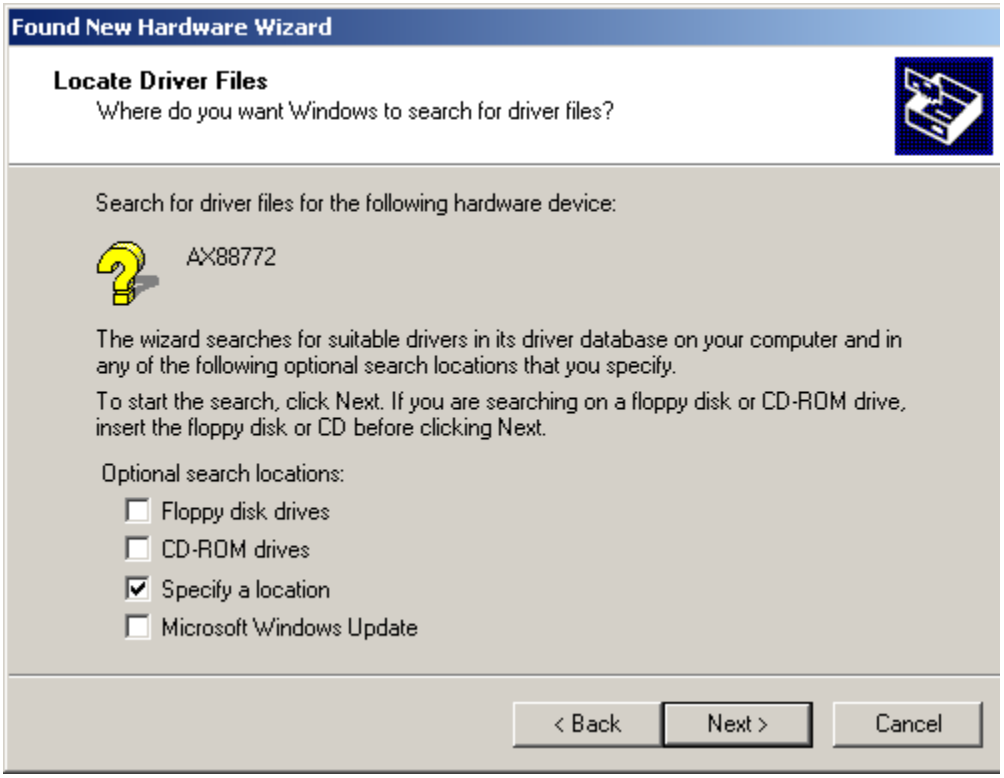
Brand	**branded**	***Competitor's Brand Name***
Model	'X'	Targus Micro Travel USB 2.0 4-Port Hub ACH63US
Packaging	Bubble wrapped **(non-retail packaging)**	Clamshell
Individual Components	USB Hub/Ethernet adapter; 6-inch USB extension cable; AC power adapter	USB Hub with Male MicroUSB to Dual Male USB (one data; one optional power) USB Hub; Documentation
UPC	Unknown	092636216337
Initial Impressions	Compact and easy to plug in, due to the securely-attached cable. The rotating ports and included 6-inch extension cable made it very easy to plug in a variety of oversized USB devices.	Compact and easy to plug in. **A retractable cable would be more portable. There is a female power plug, but no indication of voltage or polarity requirements, even in the documentation. The second male USB plug resolves this for every device I've ever used that had a low power problem from the first USB device, but computers do not universally have multiple USB plugs.**
Driver Installation, Mac 10.5	See Table 2 below.	
Driver Installation, W2K	**See Table 2 below.** Addendum, 02/09/09: New drivers were provided for a retest which did provide complete functionality for Windows 2000.	

Driver Installation, XP	For SN K0900000206, no issues observed (note: no drivers were required, nor supplied). When hub was first plugged in, “Found New Hardware” bubble appeared as the computer queried the new device then searched for appropriate drivers. The host computer quickly identified the device as a model AX88772 USB device. After a few seconds, the Found New Hardware wizard appeared, further identifying the device as “ASIX AX88772A USB 2.0 to Fast Ethernet Adapter”. A web search reveals that this is NOT the actual model of the adapter; rather, ASIX is the chip manufacturer while AX88772A is the model of the chip, identified on the web as “… Single chip Low-pin-count USB 2.0 to 10/100 Fast Ethernet controller”. The same easy installation occurred, with no issues observed, with three different XP computers: a desktop running XP Home SP3; an outdated laptop running Home SP1; and another desktop running XP Professional SP3. On the two desktop computers, the Found New Hardware wizard completed installation of the new device within half a minute. The antiquated laptop required about 5 minutes, but other than the extra time, no issues appeared. See Table 2 below for screen shots of installation.	No issues observed
Driver Installation, x32 Vista	See Table 2 below.	No issues observed
Driver Installation, x64Vista	See Table 2 below.	
Ergonomics	Very easy to use. The rotating	Very easy to use. **The two paired**

	ports and included 6-inch extension cable make it easy to plug in a variety of USB devices.	**ports are very close together (closer than on the branded product). Many USB devices will only plug in with a USB cord**.
Other Features and Comments	TBD	A functional product. Power boost proved unnecessary for anything, excepting a spinning external disk drive.

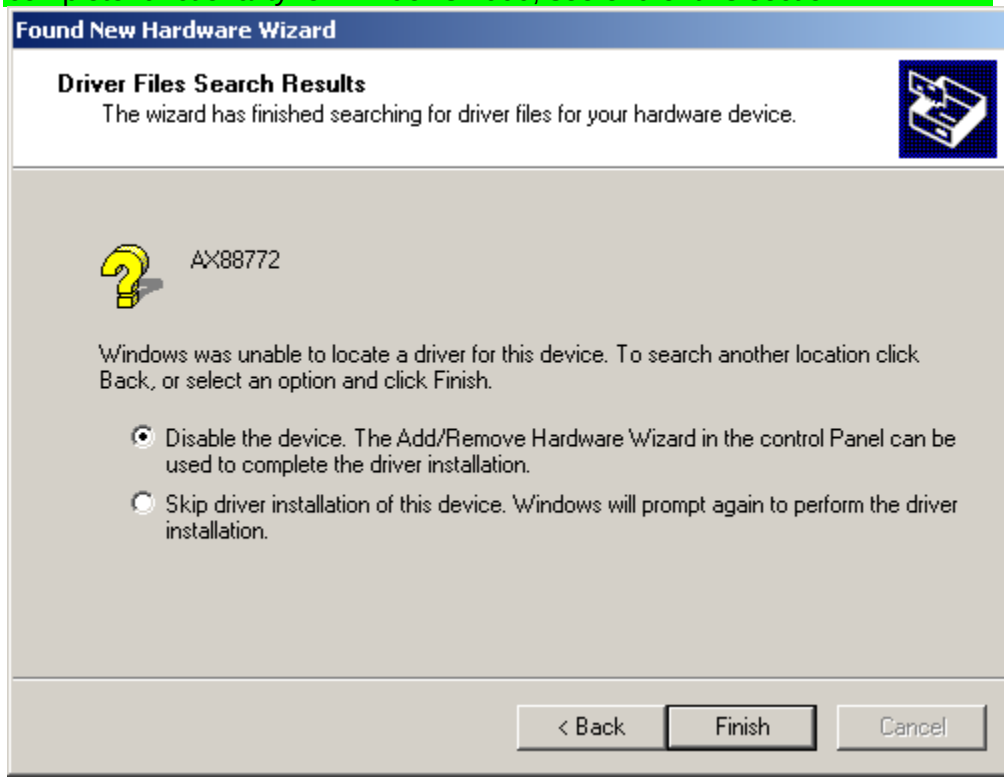
Table 2. Details and Screenshots of Driver Installation

Driver Installation, W2K	The USB hub was detected once plugged in. However, there was no native Windows 2000 driver support for the ASIX chip AX88772A. Addendum, 02/09/09: New drivers were provided for a retest which did provide complete functionality for Windows 2000; see end of this section.   Windows Update was chosen because there were no drivers included with the test unit.



Drivers could not be found by Windows Update. The tester chose to “skip driver installation”. The Ethernet USB hub could not be tested.

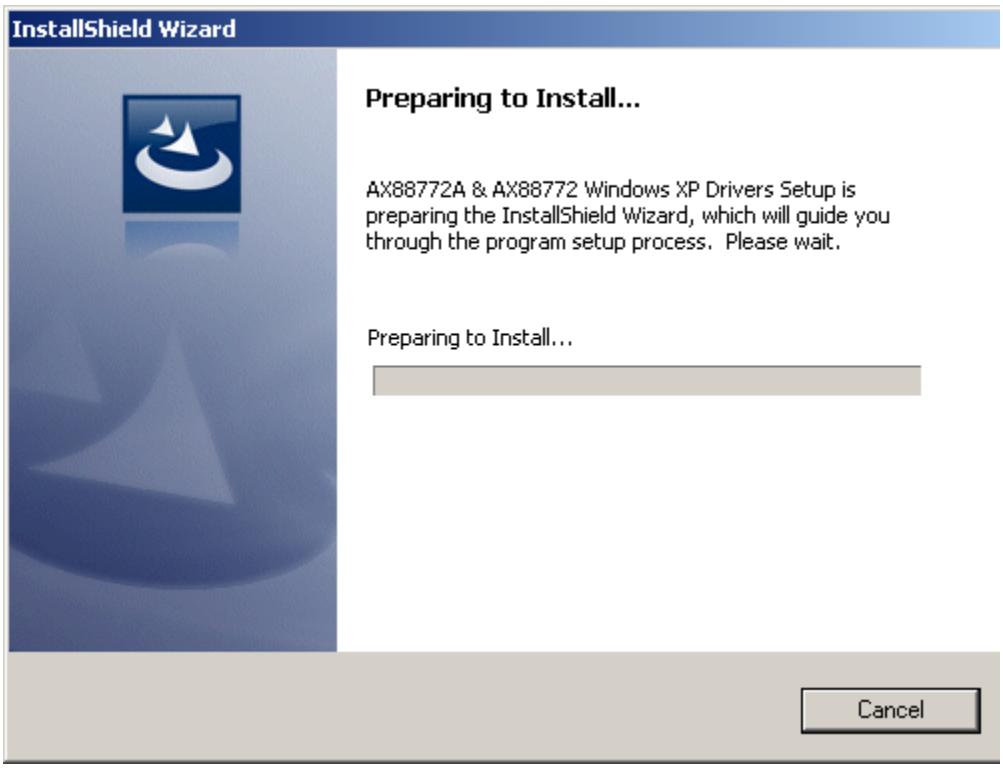
Addendum, 02/09/09: New drivers provided for a retest which did provide complete functionality for Windows 2000; see end of this section.

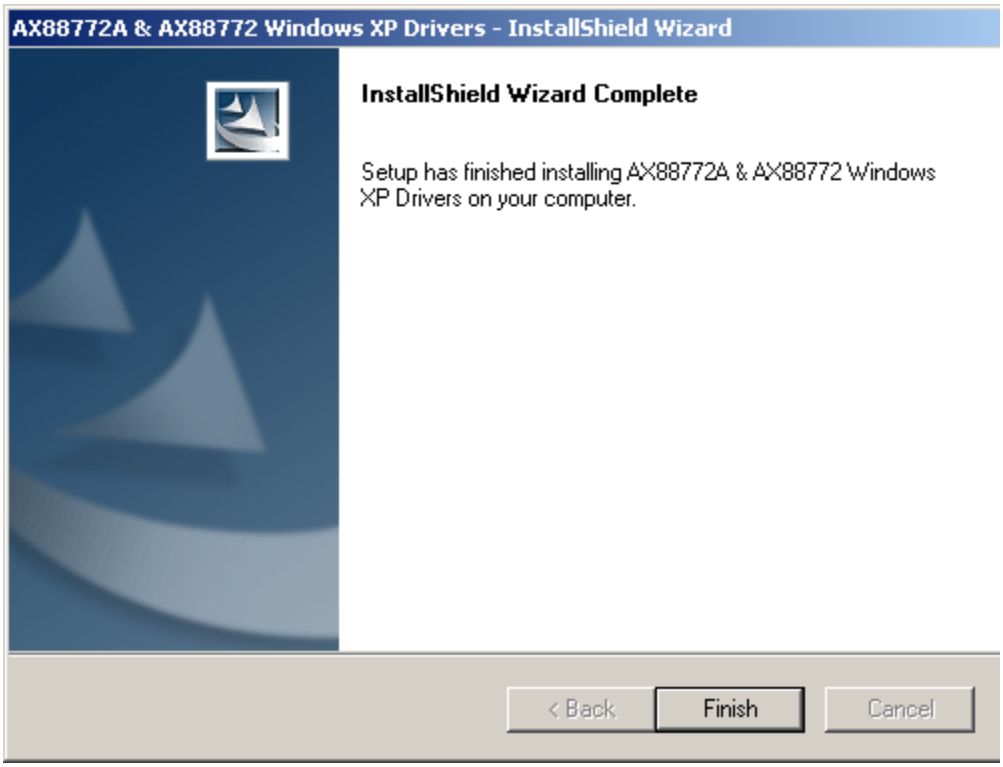


To be thorough, a seemingly appropriate driver was downloaded and tested for the Windows 2000 platform. The objective was to determine if a readily available driver could be applied so that the unit could be tested. The following driver set was downloaded from the OEM website (link omitted) WinXP/2000/2003 32-bit/64-bit Driver Setup Program

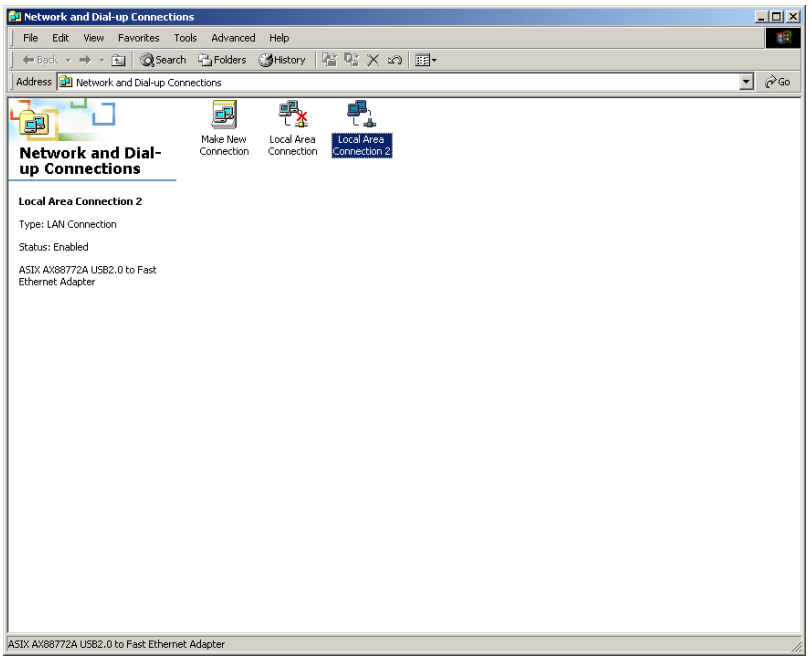
Addendum, 02/09/09: New drivers provided for a retest which did provide complete functionality for Windows 2000; see end of this section.

The following screenshots detail the unsuccessful implementation of the downloaded drivers.





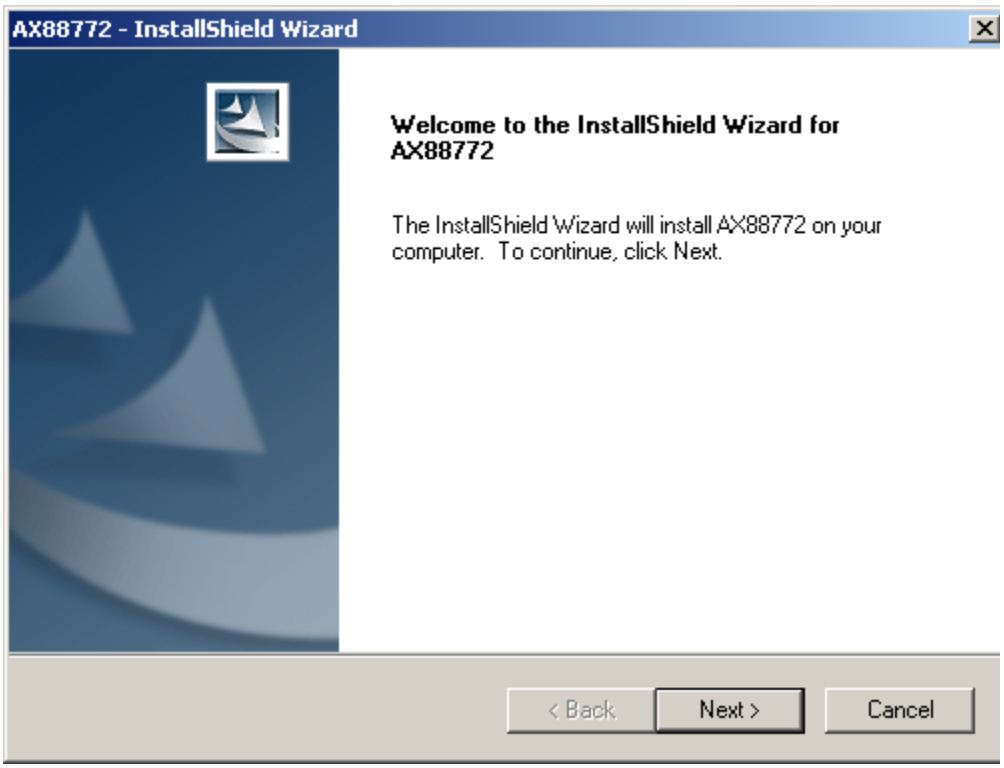
After the driver installation, the W2K OS detected the second LAN connection as per the screenshot below. However, the LAN connection via the USB hub was not functional with the installed drivers.



Conclusion: No suitable driver could be identified for the USB hub testing under Windows 2000. The Ethernet Hub functionality could not be tested.

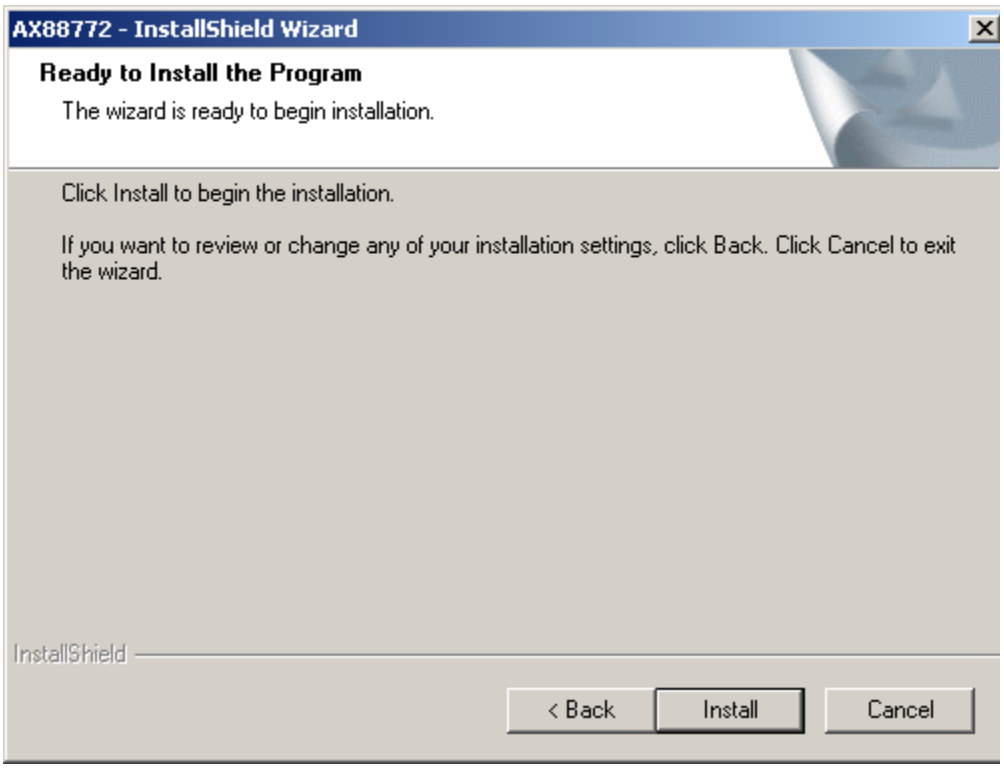
Addendum – New Windows Drivers provided for testing

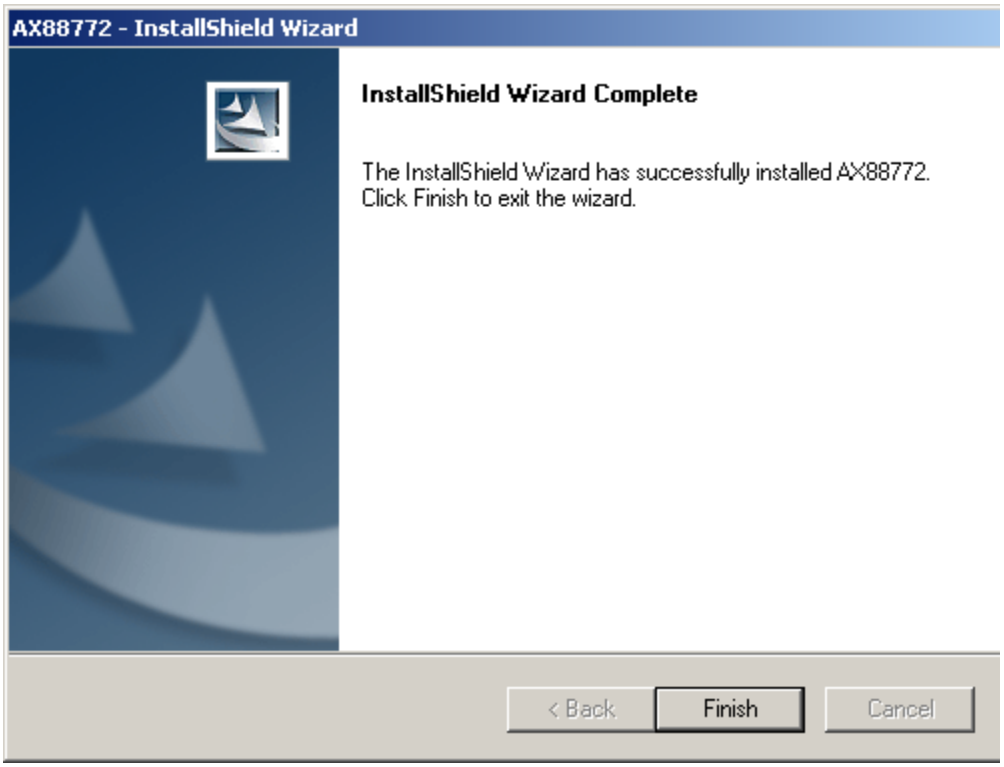
A set of drivers was provided for a retest. The following is the installation sequence for the driver test on Windows 2000. When the setup.exe is launched the following wizard loads.



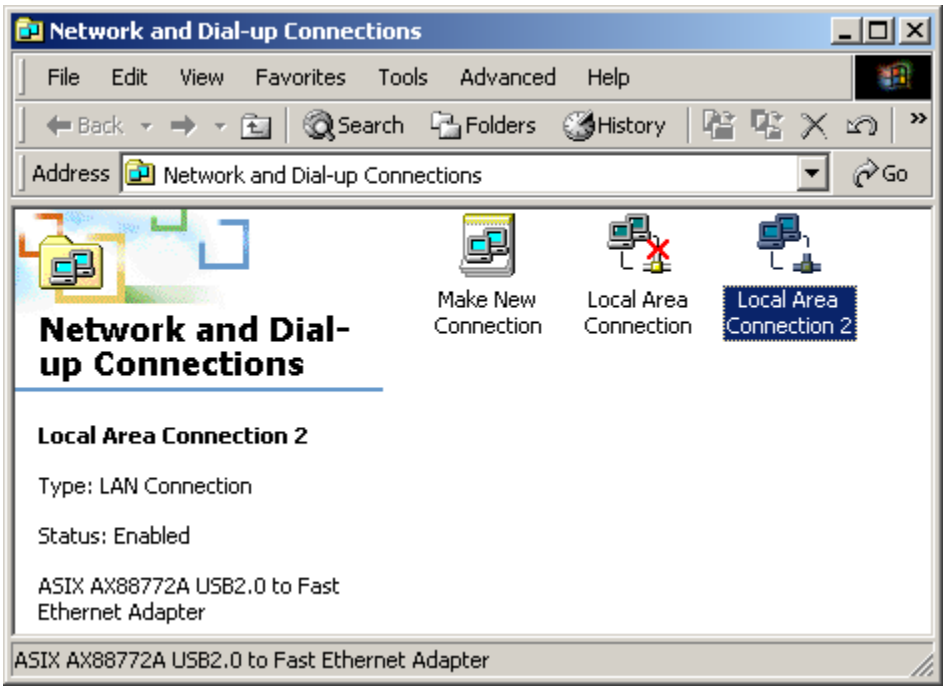
The InstallShield wizard loads, but it only stated the chip model in the title “AX88772” and did not designate who the manufacturer of the product is.

The installation sequence was very straightforward. Following the NEXT and Install options, the installation completed within a minute.



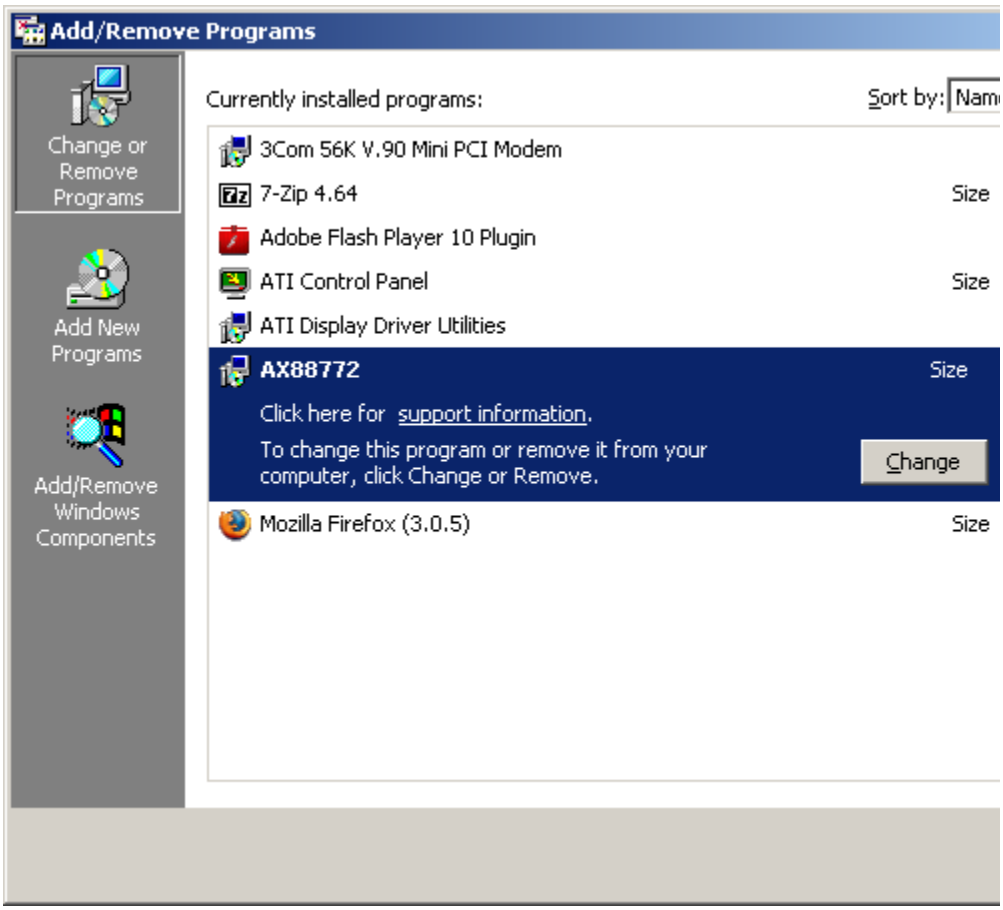


Upon completion of the installation, the network connection comes up as Local Area Connection 2.

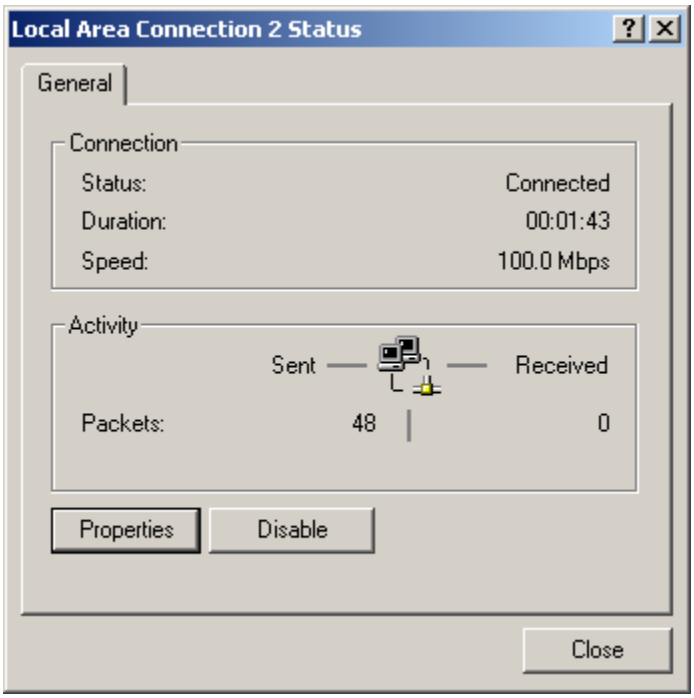


Under the program menu, the program title only states the chipset as well.

There should be some designation as to who the manufacturer of the product is.

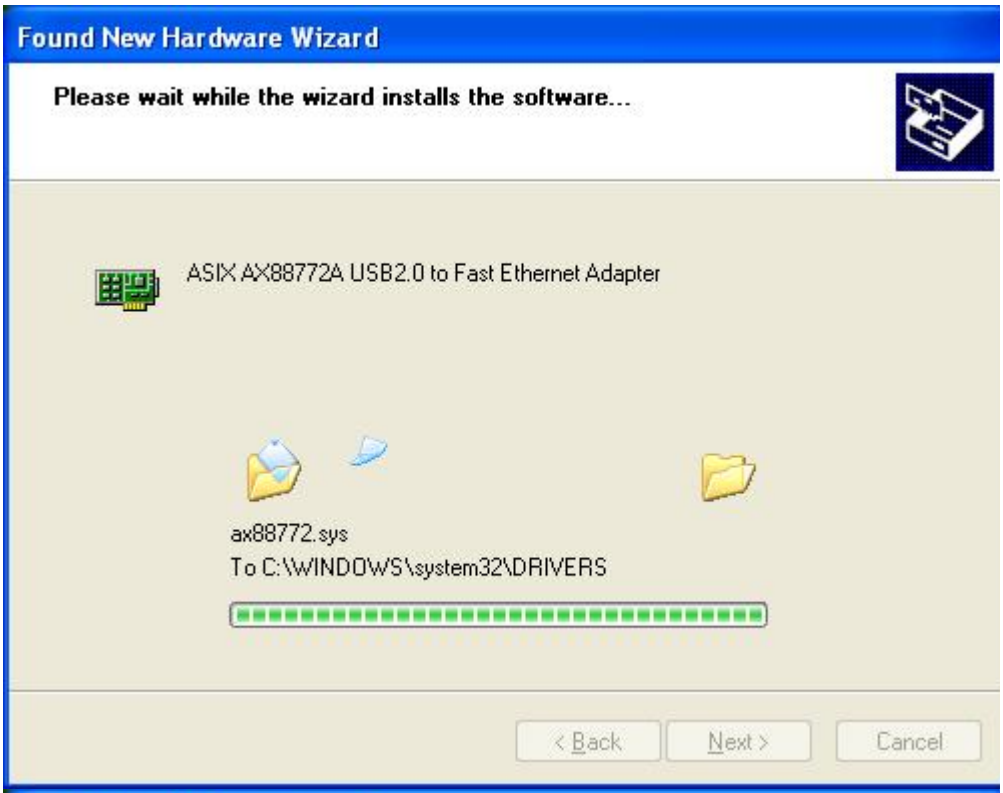


After installing the driver, there were no additional configurations that needed to be performed. Once the network connection is plugged in via the hub, it was immediately detected and functional. No DHCP configuration was required.

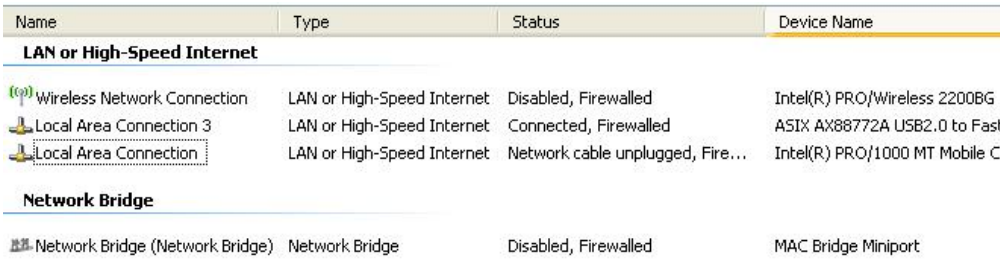
	 **Conclusion**: The new Windows driver included for testing did everything as advertised. However, the program menu and installation wizard title does not reflect the manufacturer of the product, branded, which is customary for software and driver installations.
Driver Installation, XP	The USB hub was detected immediately and the default Windows drivers installed properly with no issues on the XP platform. Screenshots of this process follow:

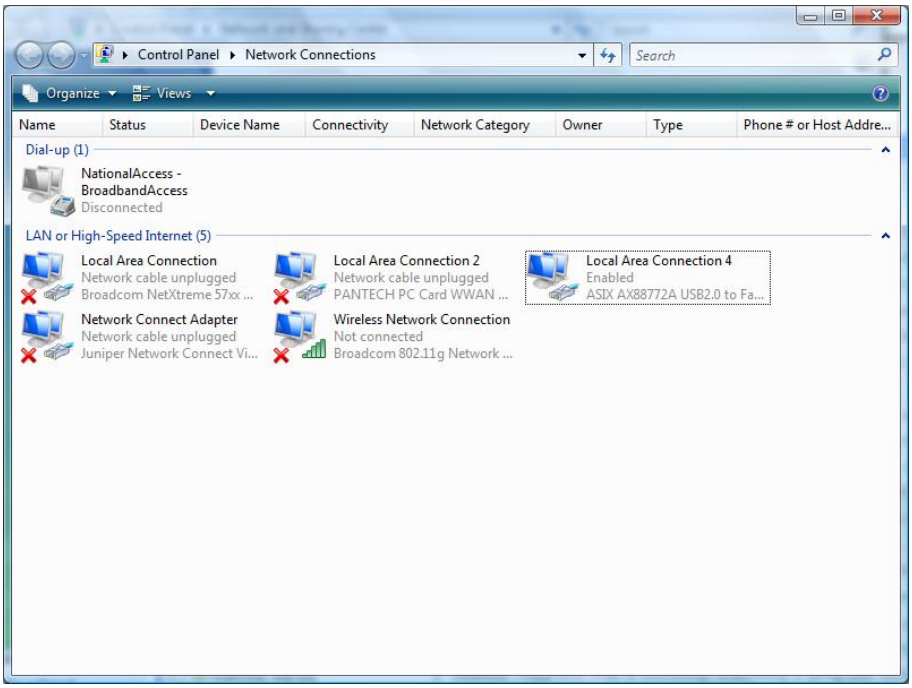

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).
Read our privacy policy
Can Windows connect to Windows Update to search for software?
Yes, this time only
Yes, now and every time I connect a device
No, not this time
Click Next to continue.
< Back
Next >
Cancel


Found New Hardware Wizard
Please wait while the wizard searches...
AX88772
< Back
Next >
Cancel

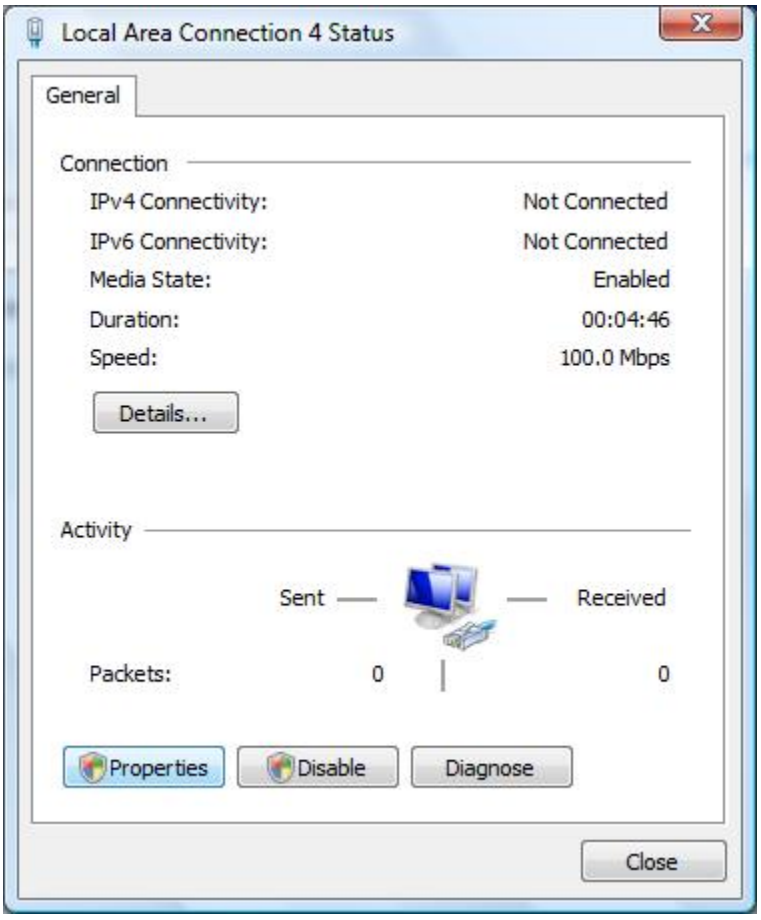


Unlike the Windows Vista platform, the network connection for the USB hub was immediately detected as LAN 3. TCP/IP is installed by default and the

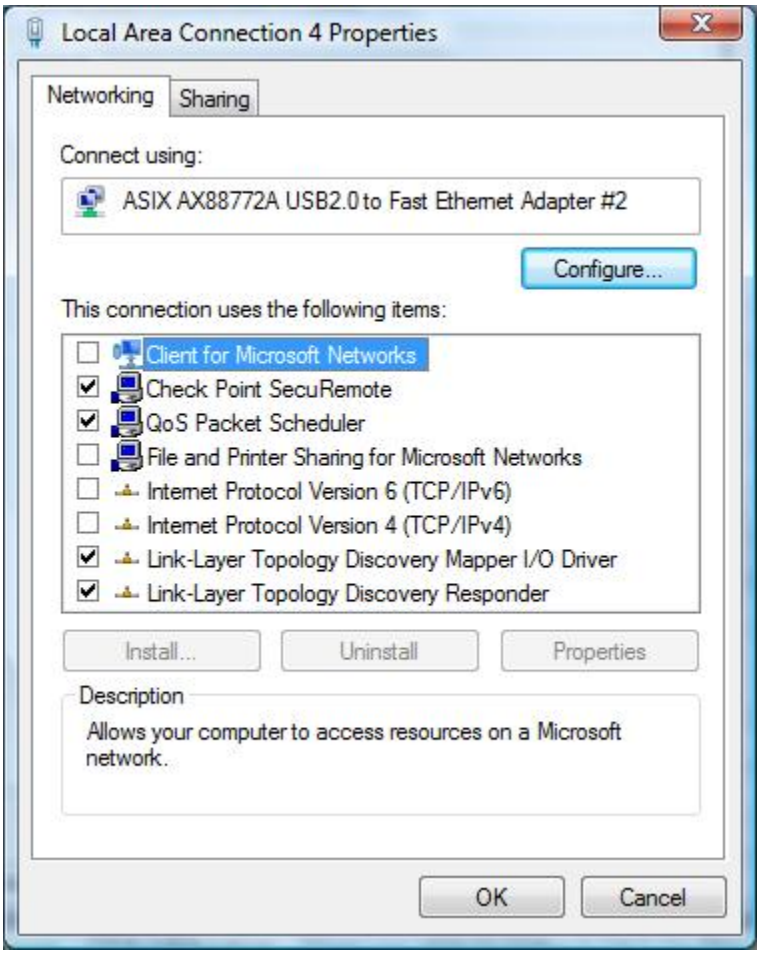
	port is configured to DHCP by default.  **Addendum** – Windows Drivers provided for testing A set of drivers was included for testing during this retest. The installation sequence was identical to the Windows 2000 installation sequence [reference screenshots in that section.] The driver installation was completed before plugging in the device and finished successfully in less than 1 minute. When the ASIX AX88772A USB2.0 Hub was already configured with DHCP and worked immediately after driver installation. **Conclusion**: The new Windows driver included for testing worked as advertised. However, the program menu and installation wizard title does not reflect the manufacturer of the product, branded.
Driver Installation, x32 Vista	The USB hub was detected and the default Windows drivers were properly installed with no issues.  When the hub is connected, a LAN connection is detected with ASIX chip AX88772A.

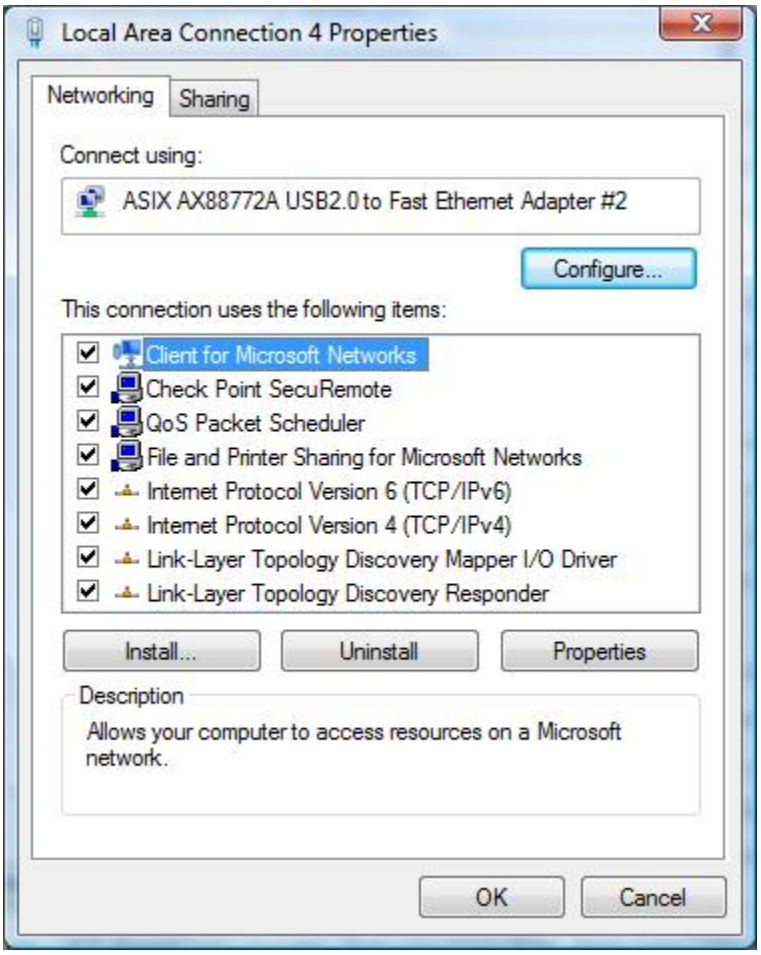


However, there was no active connection when the unit is first plugged in and installed.

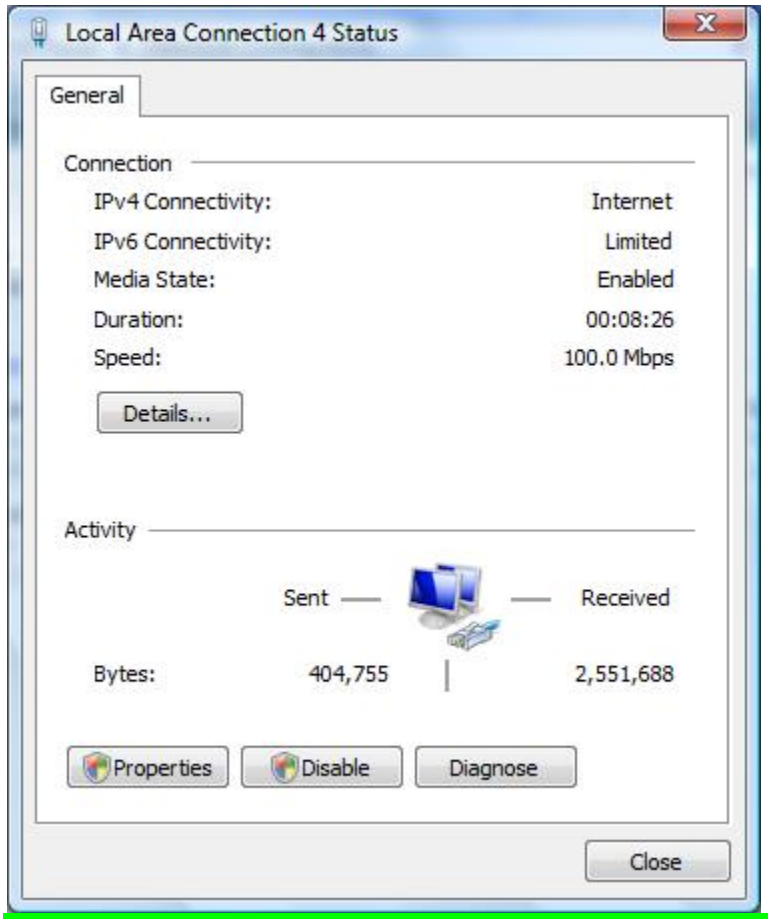


Users need to go to the Network Connection properties to enable the IP protocols. The network connections tested operates on DHCP, so DHCP functionality was tested on all scenarios.





After enabling the IPv6 and IPv4 settings, the network connection was immediately detected and functioned as advertised. Please reference speed test for Ethernet Hub Test Results.



Addendum – Windows Drivers provided for testing

A set of drivers was included for testing during this retest. The installation sequence was identical to the Windows 2000 installation sequence [reference screenshots in that section.]

The driver installation was completed before plugging in the device and finished successfully in less than 1 minute. When the Hub was plugged in, an important note is that the Local Area Connection 4 appeared for the ASIX AX88772A USB2.0 Hub.

Unlike the previous test iteration, the user did not need to install IPv4. It was already configured with DHCP, so the network connection worked without additional configuration after the driver installation.

Conclusion: The new Windows driver included for testing did everything as advertised. However, the program menu and installation wizard title does not reflect the manufacturer of the product, branded, which is customary for software and driver installations.

Driver Installation, x64 Vista	Similar results to Vista x32 steps.

Driver Installation, Mac	Upon inserting the device, the network connection was properly detected. There were no additional steps required.

The following are comments and measurements from our mechanical engineering experts.

Vendor	branded	Targus
Description	3-port USB hub with built-in Ethernet adapter	4-port micro travel 2.0 hub
Model	'X'	ACH63US
Packing	bubble wrap	RETAIL
Secure device plug ins	Yes	Yes. Stiff & Secure.
Securely attached cable	Yes	Yes.
External Power supply included	Yes	No
External Power supply port	Yes	Yes (No ratings for compatible supply.)
3ft Drop Damage	No Damage	No Damage.
Comments	Innovative rotatable ports. Possible damage when the center and end port is rotated, and a device is inserted; this causes a great deal of twisting on the hub connection that can break & cause damage to the hub.	Defaults to slower USB 1.1 standard. Power supply port available, but no voltage / amperage markings for using a compatible power supply.

The following tabulates various features of the branded device to comparable features of the Targus ACH63US 4-port USB Hub are included although the Targus does not provide an Ethernet adapter.

Product Characteristic	Subj. Grade 1 (poor) to 5 (excellent)		Comments	
	branded	Comp.	branded	Targus ACH63US
Markings on Product (not package, SW or Manual)				
Identification markings	5	5	branded name on one side, product description with SN labels on other side: “USB 2.0 3-Port Hub with Ethernet Adapter”.	Targus logo on one side, ID label on other side
Logos, model, etc.	3	5	Product description given as noted above but no model number is shown.	Model shown on ID label with SN and reg auth logos
Warnings or instructions (if necessary)	3	4	No other markings than as noted above.	No warnings
Overall grade of product markings	4	4	Model number should be shown.	Good
Documentation				
Type of documentation included	N/A	4	Prototype, none provided	User's Guide (single sheet) plus much info on cardboard inside package; describes product, how to use, speed, contents, size
Appearance of documentation	N/A	4	N/A	Good
Clarity of documentation	N/A	4	N/A	Good
Completeness of documentation	N/A	4	N/A	Good
Installation time (from CD, floppy or web download)	N/A	N/A	N/A	N/A
Languages of documentation	N/A	3	N/A	English only
Overall grade of documentation	N/A	4	N/A	Good
Cord/harness			Plugs into computer with attached cable	

Product Characteristic	Subj. Grade 1 (poor) to 5 (excellent)		Comments	
	branded	Comp.	branded	Targus ACH63US
Cord/harness quality	5	3	Excellent	Fair; cable seems clunky, has two USB conns, one for high current, other for low current and data
Cord/harness flexibility	3	3	Cable straightens out but does retain mild original bends	Cable straightens out but does retain mild original bends
Cord/harness sheath diameter	4	4	0.140" nominal	0.140" nominal
Cord/harness wire gauge	3	3	4 x #28AWG?	4 x #28AWG?
Cord/harness wire: number of strands	N/A	N/A	Unknown (unk)	unk
Cord/harness wire: material	5	N/A	Copper	unk
Cord/harness robustness	4	4	Good	Good
Cord/harness sheath appearance	3	3	Can see shape of wires inside the sheath	Can see shape of wires inside the sheath
Cord/harness markings	3	3	No marking on the attached cable; included 6-inch extension cable bears the following (not all marking is readable): STYLE 2720 80 C 30V VW-1 28AWG/1P 28AWG/2C USB 2.0 CABLE TID 80000103	UR AWM 2725 E199279 VW-1 80 C 30V 28AWGX1P+28AWGX2C USB CABLE 2.0 REVISION LEO HUI
Cord/harness inset bends/folds	2	2	somewhat retains bends and folds	somewhat retains bends and folds
Cord/harness strain relief, unit	5	4	Excellent, very secure	Good
Cord/harness length (product to tip of connector)	4	4	6”	53"
Cord/harness shield coverage	5	2	Both attached cable and extension cable are shielded	Not shielded
Overall grade of Cord/harness	5	3	Excellent	Average
Connector				
Connector type	5	5	One corded USB type A plug, three rotatable USB type A receptacles, one Ethernet 10/100 receptacle, one 2.4mm power jack	Hub: Four USB type A receptacles, one USB mini-B receptacle; Cable: two USB type A plugs, one USB mini-B plug

Product Characteristic	Subj. Grade 1 (poor) to 5 (excellent)		Comments	
	branded	Comp.	branded	Targus ACH63US
Connector quality	5	4	Excellent	Good
Connector strain relief quality	5	4	Excellent	Good
Connector strain relief molding	5	5	Excellent	Excellent
Connector strain relief molded to cord?	4	4	Yes	Yes
Overall grade of connector(s)	5	4	Excellent	Good
Product physical characteristics excluding cord/harness				
Case material	5	5	Hard plastic	Perforated steel
Case color	5	4	Silver, attractive and robust appearance	Shiny black with chromed plastic "chassis"/trim
Case finish	5	4	Excellent	Excellent but looks clunky; also has 4 screws holding each case half onto chromed "chassis"
Case material thickness	5	5	Excellent	Excellent
Case robustness	5	5	Excellent	Excellent
Case molding quality	5	5	Excellent	Excellent
Case half fit	5	5	Excellent	Excellent
Case half assembly tightness	5	5	Excellent; has 4 internal snaps and one screw	Good
Indicators/LEDs	5	5	One bright blue, indicates when plugged in; two green LEDs built into Ethernet connector showing when Ethernet cable is plugged in	One yellow LED inside the case, indicates when plugged in
Switches/electrical controls	N/A	N/A	None	None
Size/weight	5	5	Small, 4.1" x 2.0" x 1.43" (largest size with ports rotated outward), lightweight	Smaller than branded, 1.7" x 1.72" x 0.4", light (0.9 oz on placard), fits anywhere
Interior PC board	3	3	G-10 epoxy-glass, SMD components, excellent PC board and component quality.	Unknown purple board material, SMD components, good construction but found two

Product Characteristic	Subj. Grade 1 (poor) to 5 (excellent)		Comments	
	branded	Comp.	branded	Targus ACH63US
			NOTE: each rotatable port is connected to the PC board by a cable with a 5-pin straight connector with no connector lock. Upon disassembly for inspection, we found one connector body had dislodged and may have been making intermittent connection. These connectors should be replaced with a locking type to prevent this issue. When the ports are rotated, the cables twist slightly which pulls on the connector, possibly causing the connectors to eventually pull away from the PC board.	solder blobs inside case
Overall grade of Product	4	4	Excellent except inappropriate internal port cable connectors	Good
Electrical				
Operating voltage	5	5	USB 5.0 VDC from computer, and external AC power adapter	USB 5.0 VDC from computer
Other electrical features	4	4	None	Has second USB type A conn to plug into high current USB jack
Output voltage	2	2	From computer only: 5.07V no load; lowest voltage = 4.50 with 200 mA load on any port and no power adapter; with power adapter, 4.97 volts with 400 mA resistive load on any rotatable port. Idling current of adapter with no load = 148.3 mA, quite high for use with a notebook and no AC adapter; with a USB keyboard plugged into	4.81V no load; dropped to 4.54V w/130 mA load; with branded IH-K225LB, dropped as low as 3.96 volts; very marginal output voltage without the AC adapter.

Product Characteristic	Subj. Grade 1 (poor) to 5 (excellent)		Comments	
	branded	Comp.	branded	Targus ACH63US
			Hub, current jumps between 0.14 and 0.48 Amps. Current seems quite high, particularly for use with a battery-powered laptop/notebook machine. Output voltage is excellent even without the AC adapter when the most common USB devices are plugged in such as memory cards, keyboards, etc.	
Overall grade of electrical	4	3	Good without AC adapter, excellent with AC adapter	Poor without the AC adapter, good with the adapter
Product-Specific				
Product features (list individually for each)	5	4	Small size for portability and accompanying laptop; attached cable and extension cable should eliminate any clearance issues around computer's USB connector	1. *"Connect up to 4 USB devices to your notebook"*: Yes 2. *"AC adapters not required"*: True 3. *"Plug and play"*: Yes
Performance	5	4	Excellent	Some mice may act erratic especially scroll wheel
Overall grade of product-specific characteristics	5	3	Excellent; see below for evaluation of file transfer speed and Ethernet adapter speed	Fair
Operation of Product				
All hardware features in documentation are present	N/A	5	Prototype, no documentation provided	Yes
All features in doc. work as claimed	N/A	5	N/A	Yes
Additional undocumented features	N/A	N/A	N/A	N/A
Other specific features	N/A	N/A	N/A	N/A
Overall grade of Product operation	N/A	N/A	N/A	N/A
USB Ports			The following devices were tested on the USB ports with success.	

Product Characteristic	Subj. Grade 1 (poor) to 5 (excellent)		Comments	
	branded	Comp.	branded	Targus ACH63US
			• Belkin USB Network Key – Type N • Swiss Army USB 2.0 Flash Drive • Sony USB 2.0 Flash Drive • Sandisk USB 2.0 Flash Drive	
Software			None required	None required
Help (F1)	N/A	N/A	N/A	N/A
File location	N/A	N/A	N/A	N/A
Features	N/A	N/A	N/A	N/A
Overall grade of Software	N/A	N/A	N/A	N/A

Data Transfer Speed Tests

We conducted data transfer speed tests using several different computers, all running Windows XP. Very large files were stored on several types of USB-compatible memory cards and copied from these memory cards to the computers, or to another memory card, while the transfer time was noted. We tested four scenarios, not all of which were exercised on all platforms; these included:

1. Memory card plugged directly into computer
2. Memory card plugged into the branded hub which was plugged into a computer
3. Two memory cards plugged into the branded hub which was plugged into a computer, and data was transferred between the memory cards
4. Two memory cards plugged into the branded hub which was plugged into a computer, and data was transferred from each memory card into the computer, simultaneously

The time required to transfer data was measured for each scenario and computer. In one test, 1,565 jpeg graphics files (approximately 1.83 GB total) were copied from an Ultra SD memory card and the computer, both with and without the Hub. Without the hub, the average time required to transfer the files between the card reader and the computer was about 2 minutes, 22 seconds, or about 12.88 MB/sec. When the card reader was plugged into the branded hub which was then plugged into the same computer USB port, the file-transfer time appeared to be approximately the same, within two seconds: two trials were actually a second or two faster, and two trials were 3 and 5 seconds slower. This represents approximately 3% increase or 1.4% decrease in file transfer time compared to not going through the Hub.

However, in another test with the same branded hub and a laptop, the transfer rate appeared to be considerably slower, as shown in the following table:

Scenario	Highest Transfer Speed	Lowest Transfer Speed
1	8.75	5.8
2	8.75	5.8
3	1.67	1.46
4	2.9	2.3

Another fast desktop computer yielded the following:

Scenario	Average Transfer Speed
1	12.1
2	12.04
3	4.71
4	not tested

Conclusion of Data Transfer Tests:

- Results when connecting directly to the USB port and connecting via the USB hub were comparable. There was no noticeable difference in time span for the file copies (scenario #1 - #2).

- File copies between ports on the USB Hub were significantly slower than performing a similar sized copy from 2 USB ports to the computer instead (scenario #3 - #4).

Ethernet Adapter Speed Tests -
Addendum: see end of this section for Windows 2000 USB 1.1 tests.

We tested the Ethernet adapter's speed by accessing www.speedtest.net, using each of three different computers, as follows:

- Acer Athlon 64 X2 Dual Core Processor 5000+, 2.59 GHz, 1.75 GB RAM, XP Professional with SP3, USB 2.0 (fast desktop computer)
- AMD Athlon XP 1800+ (AMD K7), 1.53 GHz, 768 MB RAM, XP Home with SP3, USB 1.1 Only (somewhat slower computer known as, "slow lab computer")
- Dell Latitude CPi Laptop, Pentium II (267 MHz), 128 MB RAM, XP Home with SP1, USB 1.1 Only

The tables below tabulate our findings. We measured the connection speed for each computer in three different ways:

- by connecting our internet service's modem directly to the computer's built-in Ethernet port, if available, or an adapter card (we call this method the "direct connection");
- by connecting the computer to the internet through our in-house wireless network system; and
- by connecting our internet service's modem to the branded hub's Ethernet adapter and then plugging the adapter's USB cable into the computer's USB port. Note that only the "fast" desktop computer had USB 2.0-compatible ports; the other two computers are only USB 1.1-compatible, which limited the data transfer rate of the branded hub/Ethernet adapter.

In each case, no issues were found with switching between the branded Ethernet adapter and either of the other connectivity methods: simply plug the cable into the adapter, and the computers would automatically connect to the internet.

Using www.speedtest.net, we connected to a server operated by FastSoft in Los Angeles for every test. We ran at least ten speed tests so that we could get a good sampling of speeds even with erratic internet data transfer, and then averaged the speeds. When we noticed an extraordinarily high or low speed, we discarded that data and ran another speed test (discarded data is shown in red font in each table). Thus, the tables below sometimes show more than ten speed tests under the three different test scenarios; the red data is that which was disregarded.

The direct connection to our internet server's modem was a built-in Ethernet port on the Acer fast desktop computer's motherboard; to an add-on Ethernet board plugged into the "slow lab computer"; and to a Xircom Ethernet 10/100+Modem 56 PCIMIA card (model REM56G-100) for the Dell Latitude CPi laptop computer.

Green highlighted cells in the table Mean results point out which method provided the fastest data transfer rates. On Day 1, with the fast desktop computer, we discovered that transfer rates while using the wireless link became extremely erratic. Thus, we suspended the remainder of tests for that day and repeated all tests using all methods on Day 2. There were still several extraordinarily slow tests and the data for those, while shown, was discarded, as pointed out by the red font.

Acer Athlon 64 X2 Dual Core Processor 5000+, 2.59 GHz, 1.75 GB RAM, XP Professional with SP3, USB 2.0 (Acer "fast desktop" computer)												
	Day 1						Day 2					
	WiFire		Computer		Hub		WiFire		Computer		Hub	
	Up	Down	Up	Down	Up	Down	Up	Down	Up	Down	Up	Down
	754	2105	283	4171	1174	2427	1158	5732	1154	978	1226	5741
	1099	3179	155	4622	1139	5133	1153	5890	1129	4557	1200	6665
	1019	3274	1160	6181	1167	5811	1153	6009	1125	5256	1175	7352
	1134	3399	1177	7678	1183	7085	1192	6323	1172	6453	1203	7432
	1179	4663	1136	8026	1152	7209	1142	7335	1163	6700	1206	7451
	1177	7463	1183	9002	1199	7391	1210	7392	1159	6848	1200	7646
	1131	8876	1136	9585	1186	8227	1185	7982	1189	7212	1205	7889
	---	---	1105	9588	1164	8554	1178	8131	1154	7340	1180	7955
	---	---	1175	9914	1169	9548	1180	8783	1202	7620	1207	8175
	---	---	1172	10271	1146	9780	1185	8920	1156	7982	1204	9450
	---	---	1115	11033	1188	12288	1159	9233	1193	8638	1205	9566
	---	---	1166	11481	1203	12318	1148	9828	1198	9162	1192	9803
	---	---	1176	11589	1196	12404	1160	10018	1177	9339	1163	9840
Mean=	Note 1		1153	9276	1176	8821	1174	7600	1164	6861	1199	7958
Note 1.: Connection speeds varied wildly during measurements with the WiFire, and tests were suspended until the web settled down and became more stable on Day 2.												

Note that on Day 1 above, the fastest average Download speed occurred while using the computer's built-in Ethernet modem but the fastest average Upload speed occurred while using the branded hub. On Day 2, the Hub appeared to be considerably faster than the computer in average Download speed, and somewhat faster during the Upload tests.

AMD Athlon XP 1800+ (AMD K7), 1.53 GHz, 768 MB RAM, XP Home with SP3, USB 1.0 Only ("slow lab computer")						
	WiFire		Computer		Hub Adapter	
	Up	Down	Up	Down	Up	Down
	991	2753	1137	4794	1064	4083
	1030	2762	1106	5437	1098	4357
	1078	2844	1123	5983	1068	4497
	1034	2866	1140	6094	1106	4673
	963	2877	1170	6226	1092	5064
	1052	2895	1127	6526	1083	5069
	1003	2922	1138	7196	1104	5475
	1047	2929	1123	7300	1117	5541
	992	2952	1158	7857	1132	5593
	960	3013	1113	7978	1064	5638
	---	---	1164	8367	1106	5646
	---	---	1119	8379	1099	5746
Mean=	1015	2881	1136	6896	1097	5155

In the case of the "slow lab computer" (see table above), it appears that the slower USB 1.1-compatible port into which the branded hub was plugged, may have prevented the

branded hub from downloading or uploading faster than the computer. The very slow WiFire speeds are most likely due to the wireless server being used at the time, which was not part of our own wireless network and so no control over its traffic could be exercised. Again, the fastest and slowest speeds for each method were discarded before the mean was calculated for the remainder of that method's speed results.

Dell Latitude CPi Laptop, Pentium II (267 MHz), 128 MB RAM, XP Home with SP1, USB 1.0 Only								
	D-Link PCIMIA Wireless Adapter		Computer w/Xircom Adapter		Hub Adapter, Day 1		Hub Adapter, Day 2	
	Up	Down	Up	Down	Up	Down	Up	Down
	477	390	898	1956	808	1644	924	2232
	474	452	935	2160	878	1876	991	2433
	486	541	539	2206	910	1895	1039	2523
	463	552	577	2226	875	1908	992	2587
	474	605	946	2401	837	2082	1031	2591
	546	679	992	2487	1004	2545	388	2605
	434	750	190	2504	1081	2593	1016	2640
	351	751	1053	2606	1094	2767	965	2687
	425	785	939	2615	1056	2784	1080	2749
	421	910	504	2651	1034	2957	1064	2957
	446	1125	---	---	---	---	---	---
	350	1334	---	---	---	---	---	---
Mean=	452	715	757.3	2381.2	957.7	2305.1	949	2600.4

In the above results from the Dell Latitude CPi laptop, the hub appeared to provide marginally faster download speeds and markedly faster upload speeds. However, the wide range of upload speeds seen with both the Xircom Ethernet adapter and the hub indicate that the internet was somewhat unstable, at least insofar as uploading was concerned; note how much more consistent upload speeds were while using the hub on day 1. The very slow speeds seen with the wireless adapter are almost certainly due to the wireless server to which we were connected. Note that Upload speeds through the wireless network appeared to be very consistent whereas Download speeds varied over almost a 3.5:1 ratio. The data above mainly indicates that the branded hub Ethernet adapter appears almost transparent for either uploading or downloading, and may, under some circumstances, be slightly faster compared to a PCMCIA Ethernet card plugged into the laptop/notebook computer.

We later performed another series of speed tests using a fast laptop, per the following description.

The speed tests were performed using http://www.speakeasy.net/speedtest. Three separate speed test scenarios were performed on each platform (W2K, XP, VISTA, MAC), with the tester running at least three speed tests per scenario. The averages for each of the scenarios on all the platforms are listed below.

Scenario	Down Average	Up Average	Connection
Connect Network Cable direct to Laptop	23040 kpbs	493 kbps	Cable Modem
Connect Network Cable via USB Hub (USB ports idle)	23150 kbps	493 kbps	Cable Modem
Connect Network Cable via USB Hub (USB ports actively copying)	23350 kbps	492 kbps	Cable Modem

Although the test connections via the hub were slightly faster (on average ~1%), the different is so small that it can be considered negligible.

Addendum, 02/02/09: Windows 2000 Data Transfer Tests

On Windows 2000, the speed test results via hub and via direct connection were drastically different, most likely due to W2K's incompatibility with USB v2 versus USB v1 as used on current and newer laptop models.

Speedtest via Hub

1- 5838 kbps down / 495 kbps up
2- 5837 kbps down / 494 kbps up
3- 5842 kbps down / 494 kbps up

Speedtest via Direct

1- 17600 kbps down / 490 kbps up
2- 16658 kbps down / 495 kbps up
3- 17438 kbps down / 496 kbps up

Tests Conclusions

It is apparent, from the above tests, that the branded Hub/Ethernet Adapter performs generally in-line with expectations, and in some cases appearing to provide a speedier internet data transfer rate than a direct connection to a computer's built-in 10/100 Ethernet controller. The actual transfer rate does clearly depend upon the computer's USB capability, however; using a USB 1.1 instead of 2.0 port slows down data transfer as much as by four times. The file transfer tests show that simple data transfer through the hub's USB ports is also nearly as quick, and possibly even quicker under some circumstances, as not using the hub at all, except in the special case of transferring from one USB port on the Hub to another, where the data must first go into the computer and then back to the Hub.