

**SHARP®**

**MODEL**

**HN-VA401SU**

**PowerLine Ethernet  
Adapter Kit**

**OPERATION MANUAL**

## **FCC regulatory information**

**WARNING** - FCC Regulations state that any unauthorized changes or modifications to this equipment not expressly approved by the manufacturer could void the user's authority to operate this equipment.

**Note:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

## **Declaration of Conformity**

### **SHARP PowerLine Ethernet Adapter, HN-VA400U and HN-VA100U**

This device complies with Part 15 of FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Responsible Party:

SHARP ELECTRONICS CORPORATION

Sharp Plaza, Mahwah, New Jersey 07430-1163

TEL: 800-237-4277

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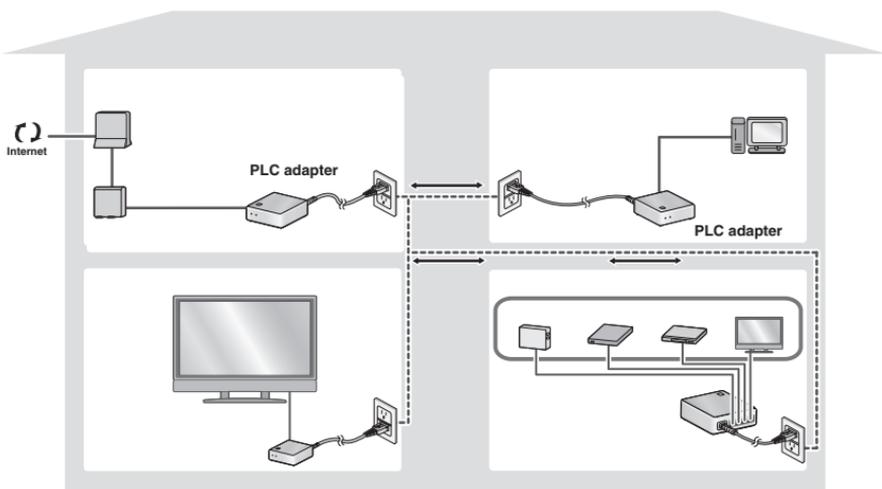
## Introduction

Thank you for purchasing a SHARP PLC (PowerLine Communication) adapter kit.

The SHARP PLC adapter kit lets you use the existing electrical wiring in your house to create a home network. Simply plug the adapters into electrical outlets at the desired locations, and then connect your computer and other devices to the adapters with LAN cables (two LAN cables are provided).

If you have Broadband Internet service, connect your router to one of the adapters to allow all your network devices to access the Internet.

Data can be exchanged at speeds of up to 85 Mbps on your powerline network.



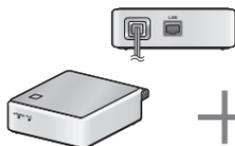
Connect a network-enabled AQUOS LCD-TV to your powerline network with ease.

Up to four devices can be connected to the HN-VA400U adapter.

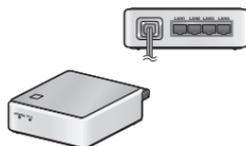
Two adapters are provided in the kit. Additional adapters (HN-VA400U/ HN-VA100U) can be purchased to expand your network. A total of 16 adapters (including the adapters in this kit) can be used.

## Unpacking Checklist

1-port PLC adapter  
(HN-VA100U)



4-port PLC adapter  
(HN-VA400U)



LAN cables (2): 59.1" (1.5 m)  
(Part order number: QCNWG337DXHZZ)



Operation manual

## Safety Information

Do not disassemble the adapter or attempt any procedures not described in this manual. Refer all servicing to qualified service personnel.

Do not install or use the adapter near water, or when you are wet. For example, do not install the adapter near a bath tub, kitchen sink or in a wet basement. Do not spill any liquids on the adapter.

Unplug the adapter from the electrical outlet and consult a qualified service representative if any of the following situations occur:

- Liquid has been spilled into the adapter or the adapter has been exposed to rain or water.
- The adapter produces odors, smoke, or unusual noises.
- The power cord is frayed or damaged.

Do not install the adapter near heat sources such as radiators or stoves. Do not place on top of other electrical devices.

Do not touch the adapter or the power cord during a lightning storm.

Do not use the adapter outdoors.

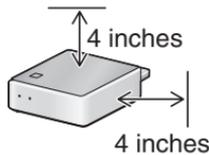
## Electrical Interference Information

Do not cover the adapter with a blanket or cloth. Excessive heating may result and cause fire.

The power outlet must be installed near the adapter and must be easily accessible.

Do not connect a cable other than a LAN cable to the LAN port on the adapter. Connecting a different type of cable may cause the adapter to overheat and result in fire.

Keep at least 4 inches free around the sides and top of the adapter to allow air circulation and cooling.

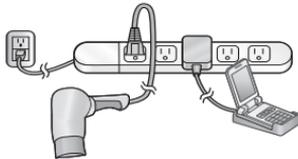
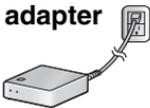


## Electrical Interference Information

### Devices that may interfere with the powerline network

Cell phone chargers, battery chargers, vacuums, power tools, hair dryers, and other appliances may cause noise on your power line that will affect the performance and communication speed of the adapters. It is recommended that you use noise filters between these devices and the electrical outlets where they are plugged in.

#### PLC adapter



Power strip with  
built-in noise filter

### Devices that may be affected by the powerline network

The powerline network may interfere with the operation of short-wave radio, wireless devices such as cordless mice, cordless keyboards and remote controls, and other devices connected to the same power line such as touch lamps and dimmers.

## Network Security

To prevent others using nearby power lines from accessing or eavesdropping on your network, only adapters that have been registered are permitted to connect to the network. In addition, the adapters communicate using 128-bit AES encryption. Encryption is automatically enabled when an adapter is registered on your network. (Note that although 128-bit AES encryption provides a high level of security, it does not guarantee 100% protection against unauthorized access to your network.)

- ◆ The adapters in your SHARP PLC adapter kit have been registered at the factory and 128-bit AES encryption has been enabled.
- ◆ In the event that you transfer one of your adapters to another person or send an adapter out for service, it is recommended that you cancel the registration of the adapter (see page 18).
- ◆ If you lose an adapter, it is recommended that you cancel the registration of your remaining adapters (see page 18) and then re-register the adapters.

### Compatibility with other PLC systems

The PLC adapters use the HomePlug® AV 1.1 standard to communicate.



The PLC adapters cannot communicate with adapters that use a previous HomePlug standard. However, the PLC adapters can coexist on the same power line with previous HomePlug adapters without mutual interference.

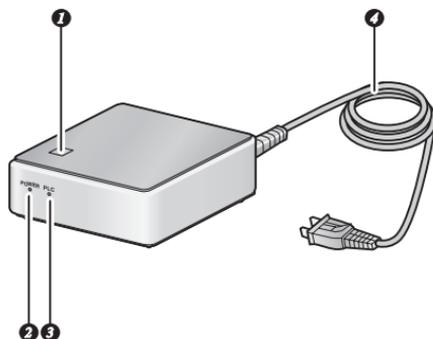
The PLC adapters cannot communicate or coexist with adapters that use a standard other than HomePlug AV.

The SHARP PLC adapter kit is only for use in the U.S.A.

## A Look at the PLC Adapter

## A Look at the PLC Adapter

### Front



#### **1** SET button

This button is used to register the adapter on the network.

**The two adapters in the HN-VA401SU kit have already been registered.** Registration using the **SET** button is only necessary when you have purchased an additional adapter, or have canceled the registration of an adapter. (The **SET** button is also used to cancel the network registration of the adapter.)

#### **2** POWER indicator

This lights green when the power is on (see page 16).

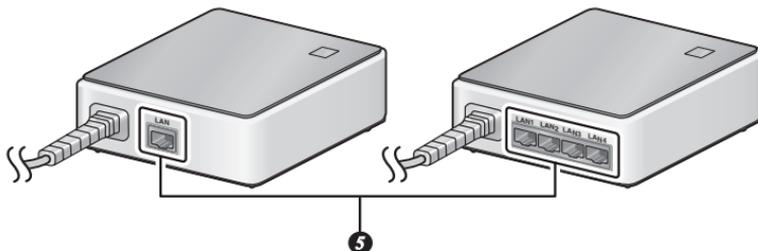
#### **3** PLC indicator

This lights steadily when communication is possible, and blinks when communication is taking place (see page 16).

#### **4** Power cord

Plug this into an electrical outlet to connect the adapter to the network.

## Rear



5

**LAN ports**

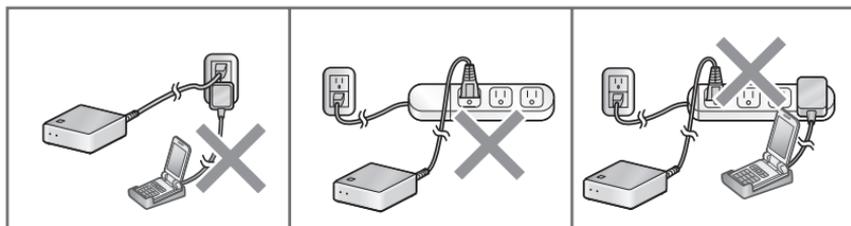
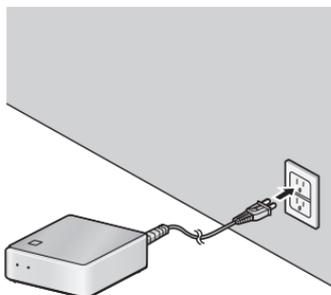
Connect network devices such as a computer, router, and TV to these ports using LAN cables. (Two LAN cables are provided; please purchase additional cables separately as needed.)

**Note:** The HN-VA100U adapter has only one LAN port.

- ◆ The indicator at the bottom right of each LAN port blinks while communication is taking place:
  - Blinks green: Communicating by 100BASE-TX
  - Blinks orange or red: Communicating by 10BASE-T
- If both indicators (at the bottom left and right of each LAN port) are off, the power is either off or the adapter is not connected to the network correctly.

## Installation

- 1 Plug the power cords of the adapters into electrical outlets at the desired locations of your house.
  - It is recommended that you plug each adapter directly into an electrical outlet. Plugging the adapters into a surge protector or other device may impair performance. (The adapters have their own surge protection.)
  - The **POWER** indicator on each adapter will blink orange and green while the adapter starts up.



Do not plug the adapter into the same outlet as another AC adapter or charger

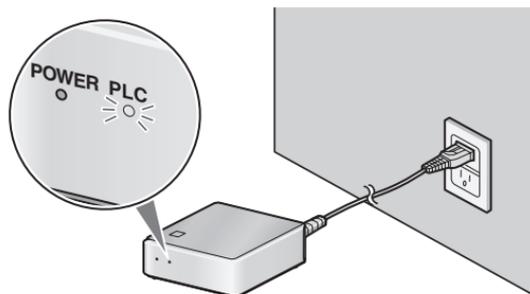
Do not plug the adapter into a power strip into a power strip with a built-in noise filter

Do not plug the adapter into the same power strip as another AC adapter or charger

### **If you already have a HomePlug AV 1.1 network**

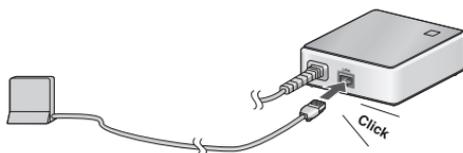
If you are adding the adapters to an existing HomePlug AV 1.1 network, you must first cancel the registration of the adapters (page 18), and then register them using an existing adapter on the network (page 11).

- 2** Make sure that the PLC indicator on each adapter lights steady green. This indicates that the adapter is able to communicate.
- To be able to communicate, the adapter must be registered. The two adapters in the HN-VA401SU kit have been registered at the factory. If you are adding a separately purchased adapter, see page 11 to register the adapter.

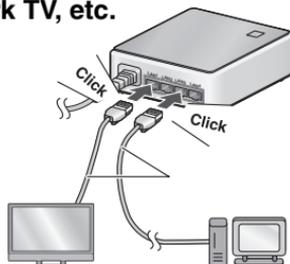


- 3** For each device (router, computer, network TV, etc.) that you wish to connect to your home network, insert one end of a LAN cable into the LAN port on the device and insert the other end into a LAN port on one of the adapters. Firmly insert the cable ends until they “click” into place.
- Two LAN cables are provided in the kit. If you need additional cables, please purchase 10BaseT-100BaseTX straight-through (regular) cables.

### Router

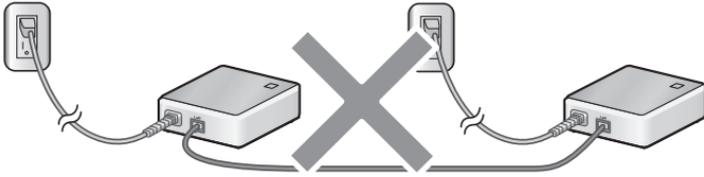


### Computer, network TV, etc.



## Installation

**Note:** Do not connect two PLC adapters together by a LAN cable



- ◆ The maximum distance (length of power line) over which PLC adapters can communicate is about 492 ft. (150 m). However, this will vary depending on line conditions such as the amount of noise on your power lines.
- ◆ A communication speed of up to 85 Mbps is possible. However, the distance between adapters, noise on the line, and other factors may cause slower speeds. If you find that communication is not satisfactory, try plugging the adapter into a different outlet.
- ◆ Communication may be slow or impossible on some power line systems. In particular, if your power lines consist of two different systems of differing phase, or if lines are separated by a breaker or other equipment, communication between the two systems or lines may be slow or impossible. In this case, try plugging the adapter into a different outlet.

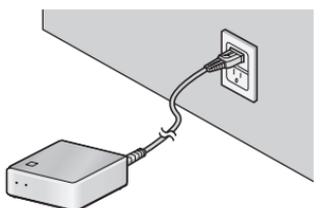
### Registering an Additional Adapter

If you purchase an additional adapter, follow the steps below to register the adapter. The new adapter cannot be used until it is registered.

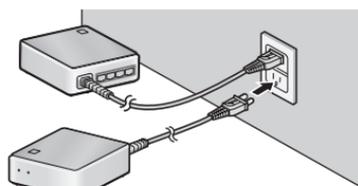
◆ Up to 16 adapters can be used on one network.

**1** Plug the new adapter into an outlet next to one of the existing adapters.

- Check the **PLC** indicator on the existing adapter and make sure it is solidly lit or blinking (registration is not possible if the existing adapter is not able to communicate normally on the network).



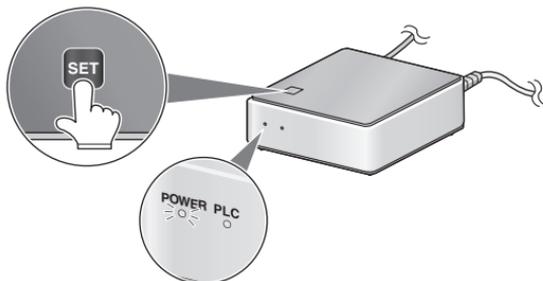
**Existing adapter**



**New adapter**

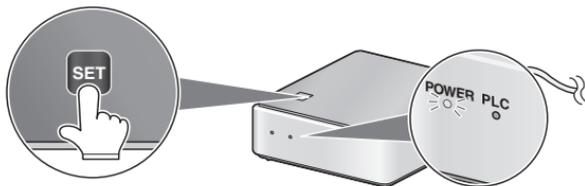
**2** Hold down the **SET** button on the existing adapter for about 2 seconds and then release it.

- When you release the **SET** button, the **POWER** indicator will blink.
- Do not hold the **SET** button down too long (if it is held down for about 10 seconds, the registration will be cleared).



## Registering an Additional Adapter

- 3** Hold down the **SET** button on the new adapter for about 2 seconds and then release it (this must be done within 2 minutes of completing Step 2).
- When you release the **SET** button, the **POWER** indicator will blink and registration will begin. During registration, communication on the network may stop temporarily. Registration may take up to 30 seconds.
  - **Important:** Do not remove either adapter from the outlet while registration is taking place.



- 4** When registration is completed, the **POWER** indicator on both adapters will stop blinking and the **PLC** indicator on both adapters will light solidly or blink. Remove the new adapter from the outlet and plug it into the outlet where you wish to use it.
- If the **PLC** indicator on the new adapter does not light up and instead the **POWER** indicator blinks in the pattern  
2 blinks OFF 2 blinks OFF ...  
registration was not successful. Cancel the registration of the adapter as explained on page 18, and then try registration again.

## Troubleshooting

If you have any problems with the adapter, first refer to the following troubleshooting guide. If you cannot solve the problem, call 1-800-BE-SHARP.

Problem	Solution
<p>The <b>POWER</b> indicator is off even though the adapter is plugged into an outlet.</p>	<ul style="list-style-type: none"> <li>• Make sure that the adapter is plugged into a standard (120 V, 60 Hz) outlet.</li> <li>• Make sure the outlet has power. Try plugging the adapter into a different outlet.</li> <li>• If the temperature of the adapter rises to the point that operation will be impaired, the adapter will automatically stop operating. Unplug the adapter and let it cool. Once the adapter has cooled, try using it again.</li> </ul>
<p>Communication is not possible on the network</p>	<ul style="list-style-type: none"> <li>• Is the <b>PLC</b> indicator on or blinking? If not, try plugging the adapters into outlets that are as close to each other as possible. If the <b>PLC</b> indicator still does not light, it is possible that the registration of an adapter has been canceled. Re-register the adapter as explained on page 11. If the <b>PLC</b> indicator lights in some outlets but not in others, it is likely that some condition of your power lines prevents communication in some outlets. Use the adapters in outlets where communication is possible.</li> <li>• If the <b>PLC</b> indicator lights normally but the LAN port indicators do not light, make sure the LAN cables are firmly inserted in their ports. Make sure that the LAN cables are category 5 or 6 cables that support 100BASE-TX.</li> </ul>

## Troubleshooting

<p>Connection to the Internet is not possible.</p>	<ul style="list-style-type: none"><li>• To connect to the Internet via the network, you must have a Broadband Internet connection (cable or DSL). Make sure your cable or DSL modem is correctly connected to your router, and that your router is correctly connected to one of the PLC adapters. No special settings are required to connect to the Internet through the PLC network, however, your computers and router must be correctly set to access the Internet (check with your Internet service provider).</li></ul>
<p>Network communication is slow or intermittent.</p>	<ul style="list-style-type: none"><li>• If any of the adapters are connected to a power strip with a surge protector or noise filter, communication may be impaired. Connect all adapters directly to their electrical outlets. If you must plug an adapter into a power strip, use a power strip without a noise filter or surge protector, and one that does not have a long cord.</li><li>• Other appliances may be causing noise on your power lines. Use noise filters for appliances such as cell phone chargers, battery chargers, vacuums, power tools, and hair dryers, and use these appliances as far as possible from the PLC adapters.</li><li>• If adapters are located too far apart, communication may be impaired. The maximum distance is 492 ft. (150 m), however, this may vary depending on line conditions.</li><li>• Are you also using PLC adapters of a different standard on your power lines? This may impair communication. If you must use other adapters, use them as far away as possible from your SHARP PLC adapters.</li></ul>

<p>A PLC adapter does not operate, or does not operate correctly.</p>	<ul style="list-style-type: none"> <li>• Unplug the adapter from the electrical outlet for at least 10 seconds and then plug it back in. This will restart the adapter. If the adapter still does not operate correctly, cancel the registration as explained on page 18, and then re-register it as explained on page 11. If the adapter still does not operate correctly, call 1-800-BE-SHARP.</li> </ul>
<p>Other devices such as touch lights or dimmers do not operate correctly.</p>	<ul style="list-style-type: none"> <li>• Try plugging the appliance into a different outlet. Use the appliance as far away as possible from the PLC adapters.</li> </ul>
<p>The PLC indicator blinks even though no data is being sent over the network.</p>	<ul style="list-style-type: none"> <li>• The adapters periodically communicate with each other to check the connection, and this causes the PLC indicator to blink. This is normal.</li> <li>• AES 128-bit encryption is used to prevent outsiders from gaining access to your network. However, this does not guarantee 100% protection. If you are concerned that somebody may be trying to use your network, remove the adapters from the outlets when you are not using the network.</li> </ul>

## Indicators on the PLC adapters

### POWER indicator

ON	The power is on
Blinking	<ul style="list-style-type: none"><li>• The adapter is starting up (the adapter blinks orange and green during startup).</li><li>• An adapter is being registered (see page 11).</li></ul>
OFF	The power is off.
2 blinks > OFF > 2 blinks > OFF...	Registration of a new adapter failed (see page 11).

### PLC indicator

The PLC indicator indicates both the status of PLC communication and the communication speed.

### Communication status

ON	Communication is possible.
Blinking	The adapter is communicating on the network (the interval of blinking may vary depending on communication conditions).
OFF	The adapter is not connected to the network or the power is off.

**Communication speed\***

Green	The adapters are able to communicate at a speed of 30 Mbps or higher.
Orange	The adapters are able to communicate at a speed of 10 to 30 Mbps.
Red	The adapters are able to communicate at a speed of no more than 10 Mbps.

\* The speed indication is only correct after communication has begun. The speed indicated is an approximate maximum for data transfer by UDP between adapters. It is not the effective speed between computers on the network. If more than two adapters are connected, it is the speed between the two adapters with the best communication speed.

## Canceling the Registration of an Adapter

To cancel the network registration of an adapter, follow the steps below. This should be done in the following situations:

- ◆ You attempted to register a separately purchased adapter, but registration failed.
- ◆ You wish to change the registration of an adapter to a different network.
- ◆ You are going to discard or give an adapter to someone else, or have an adapter serviced.
- ◆ If you suspect that someone is using an adapter to gain unauthorized access to your network, cancel the registration of all adapters on your network and then re-register the adapters.

**Note:** Perform the following steps with the adapter plugged into an electrical outlet.

- 1 On the adapter whose registration you want to cancel, hold down the **SET** button on the adapter until the **POWER** indicator turns off (about 10 seconds) and then release the button.



- 2 Wait until the **POWER** indicator turns back on. Registration cancellation is now complete.
  - **Important:** Do not remove the adapter from the outlet until the **POWER** indicator turns on, as cancellation may not be complete. (It may take as long as 30 seconds for cancellation to be completed.)
  - To use the adapter again, you will need to register it as explained on page 11.

## Specifications

<b>Communication standard</b>	HomePlug AV 1.1
<b>Communication speed</b> <sup>*1</sup>	PHY rate (theoretical value): 200 Mbps max. Effective speed: 85 Mbps max. (UDP) 55 Mbps max. (TCP) <sup>*2</sup>
<b>Maximum number of connectable adapters</b> <sup>*3</sup>	16 adapters
<b>Frequency band</b>	2 MHz to 30 MHz
<b>Access method</b>	CSMA/CA (PLC interface side)
<b>Encryption method</b>	AES 128-bit
<b>Modulation method</b>	Windowed OFDM
<b>Error correction method</b>	Advanced turbo coding
<b>Communication range</b>	492 ft. (150 m) maximum (varies depending on environment)
<b>LAN interface</b>	IEEE 802.3u (100Base-TX) IEEE 802.3 (10Base-T) MDI/MDI-X Automatic detection CSMA/CD (access method on LAN port side)

<sup>\*1</sup> The actual communication speed (effective communication speed) may be affected by power line conditions (structure of equipment, length of lines, etc.), other electrical appliances, and network conditions.

UDP is a data communication protocol used on the Internet, and although the data communication reliability of UDP is low, processing is simple and the communication speed is fast, and thus UDP is often used for video streaming. TCP is also a data communication protocol used on the Internet, and although TCP is slower than UDP, it has higher reliability and thus is commonly used for general communication.

<sup>\*2</sup> Measured using FTP from a Windows<sup>®</sup> PC to a Linux<sup>®</sup> server.

<sup>\*3</sup> The maximum number of adapters is a recommended value. As the number of PLC adapters and other devices connected to the network increases, the communication speed slows.

## Specifications

<b>Number of LAN ports</b>	HN-VA100U: 1 port HN-VA400U: 4 ports
<b>Power requirements</b>	120 V AC, 60 Hz
<b>Power consumption</b>	HN-VA100U: 4.4 W maximum HN-VA400U: 5.0 W maximum
<b>Dimensions (W x H x D)</b>	118 mm x 42 mm x 91 mm (excluding protrusions)
<b>Weight</b>	HN-VA100U: 340 g (approx.) HN-VA400U: 350 g (approx.)
<b>Operating temperature</b>	0° - 40°C
<b>Humidity</b>	25% - 85% (no condensation)

## **LIMITED WARRANTY**

SHARP ELECTRONICS CORPORATION warrants to the first end user purchaser that this Sharp brand product (the "Product"), when shipped in its original container, will be free from defective workmanship and materials, and agrees that it will, at its option, either repair the defect or replace the defective Product or part thereof with a new or remanufactured equivalent at no charge to the purchaser for parts or labor for the period(s) set forth below.

This warranty does not apply to any appearance items of the Product nor to the additional excluded item(s) set forth below nor to any product the exterior of which has been damaged or defaced, which has been subjected to misuse, abnormal service or handling, or which has been altered or modified in design or construction.

In order to enforce the rights under this limited warranty, the purchaser should follow the steps set forth below and provide proof of purchase to the servicer.

To the extent permitted by applicable state law, the warranties set forth herein are in lieu of, and exclusive of, all other warranties, express or implied. Specifically, ALL OTHER WARRANTIES OTHER THAN THOSE SET FORTH ABOVE ARE EXCLUDED. ALL EXPRESS AND IMPLIED WARRANTIES INCLUDING THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR USE, AND FITNESS FOR A PARTICULAR PURPOSE ARE SPECIFICALLY EXCLUDED. If, under applicable state law, implied warranties may not validly be disclaimed or excluded, the duration of such implied warranties is limited to the period(s) from the date of purchase set forth below.

Neither the sales personnel of the seller nor any other person is authorized to make any warranties other than those described above, or to extend the duration of any warranties beyond the time period described above on behalf of Sharp.

The warranties described herein shall be the sole and exclusive warranties granted by Sharp and shall be the sole and exclusive remedy available to the purchaser. Correction of defects, in the manner and for the period of time described herein, shall constitute complete fulfillment of all liabilities and responsibilities of Sharp to the purchaser with respect to the Product, and shall constitute full satisfaction of all claims, whether based on contract, negligence, strict liability or otherwise. In no event shall Sharp be liable, or in any way responsible, for any damages or defects in the Product which were caused by repairs or attempted repairs performed by anyone other than an authorized servicer. Nor shall Sharp be liable or in any way responsible for any incidental or consequential economic or property damage. Some states do not allow limits on warranties or on remedies for breach in certain transactions; in such state the limits herein may not apply.

<u>Your Product:</u>	PowerLine Ethernet Adapter Kit
<u>Warranty Period for this Product:</u>	One year parts and labor from date of purchase.
<u>Where to obtain service:</u>	At a Sharp Authorized Servicer located in the United States. To find out the location of the nearest Sharp Authorized Servicer, call Sharp toll free at 1-800-BE-SHARP.
<u>What to do to obtain service:</u>	Ship (prepaid) or carry in your Product to a Sharp Authorized Servicer. Be sure to have proof of purchase available. If you ship or mail the Product, be sure it is packaged carefully.

For product information, customer assistance or to purchase accessories, please visit <http://www.sharpsusa.com> or call 1-800-BE-SHARP.

**SHARP ELECTRONICS CORPORATION**

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# SHARP®

**SHARP ELECTRONICS CORPORATION**

**Sharp Plaza, Mahwah, New Jersey 07430-1163**

**1-800-BE-SHARP**

**<http://www.sharppusa.com>**

## SHARP CORPORATION

### FOR YOUR RECORDS

Please record the model number and serial number below, for easy reference, in case of loss or theft. These numbers are located on the rear side of the unit. Space is also provided for other relevant information.

Model Number      HN-VA401SU

Serial Number      \_\_\_\_\_

Date of Purchase      \_\_\_\_\_

Place of Purchase      \_\_\_\_\_

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(TINSE4561XHTZ)