DYNAMIX DC - E112

HomePNA Switch

USER'S MANUAL

FOREWORD

This guide has been constructed in a simple to follow and navigate style, meant for VAR, SI, and reseller installation situations. This guide is also available in Traditional Chinese, Simplified Chinese and Japanese.

Keep this guide in a safe place; it contains useful commands required for the setup of the switches core functions in the event of a power loss or other interruption.

Information printed within this guide is subject to change at any time without notice. All specifications and parameters, including commands are subject to change without notice.

Some information in this guide is acquired from the World Wide Web.

1. INTRODUCTION

Thank you for choosing the HomePNA Switch for your MDU Solution. We have been on the forefront of HomePNA technology since its inception, and will always strive to create quality, cost-effective solutions for HomePNA installers and users.

By choosing the HomePNA Switch, you have enabled your network to have the ultimate in flexibility. The HomePNA Switch has plenty of Ethernet ports, to offer you many paths for upgrading your network, as well as 12 VLAN HomePNA ports ready to plug in to your existing wiring system using current Cat.3/RJ-11 installations.

Some highlights of the HomePNA Switch included:

- Supports security with port based VLAN function.
- Supports Virtual LAN (VLAN) Grouping.
- Auto Noise Leveling (Automatic & Manual).
- Twelve 1Mbps HomePNA Ports
- Four 10/100 Mbps Base-Tx Ethernet Ports
- One Console Port for HomePNA Switch.
- Easy installation – no new wire required inside the building.
- Easy To Use Menu System and Command Interface.
- HomePNA and Ethernet ports status Monitoring.
- Frequency division multiplexing for uninterrupted simultaneous voice/data transmission.
- Layer 2 Switching.
- Supports Full and half duplex modes.
- Store-and-Forward mechanism.
- HomePNA port *transmission speed* up to *1Mbps*
- Back pressure and IEEE 802.3X compliant flow control.
- Supports 8K MAC addresses entries.
- Standard 19” Rack-mountable.
- Less distance restriction (500 ft or 160 m) than regular Ethernet (100 m).

2. HOMEPNA SWITCH TECHNICAL SPECIFICATIONS

- **Twelve (12) HomePNA Ports**
  - HomePNA Specs 1.1
  - 1Mbps Speed
  - Transmit Distance: 500 ft Full Throughput, 1000 ft Factory Tested
  - LED: Link, Activity, Collision
  - RJ-11 Port Type for use with Twisted Pair Cable

- **Four (4) Ethernet Ports**
  - 10/100 Base-Tx, Auto-Negotiation
  - IEEE 802.3, 802.3u
  - LED: Link/Activity, 10/100, Full Duplex/Collision

- **One (1) Console Port**
  - Baud Rate: 19200Bps, 8 Data Bits, 1 Stop Bit, No Parity, No Flow Control
  - Console Management Command (Local Mode)
  - Manageable by HomePNA Management Switch (Remote Mode)

- **Physical Specifications:**
  - AC Input: 100 - 250 VAC, 47 - 63 Hz, Internal Universal Power Supply
  - Power Consumption: 12W Max
  - Operating Temp: 0 - 50°C
  - Storage Temp: -25 - 70°C
  - Humidity: 10% - 90% Non-Condensing
  - Certification: FCC Part 15/68, CE, VCCI, JATE Safety Compliance & Emissions
  - Weight (Net): 3.04 kg
  - Dimensions: 443.6 mm × 222 mm × 44 mm

- **Other Features**
  - 1 MB Buffer Memory
  - Broadcast Storm Control
  - Support Back Pressure and 802.3x Flow Control
  - Support 8K MAC Addresses Entries
  - Frequency Division Multiplexing for Simultaneous Voice/Data
  - Standard 19” Rack-mountable

3. HARDWARE DESCRIPTION & PACKAGE CONTENTS

Upon opening your package you should have the following items:

- (1) Power Cord w/Ground
- (1) HomePNA Switch
- (1) Installation and Setup Manual
- (4) Mounting Feet (Shelf Install)
- (2) Mounting Brackets (Rack Install)
- (4) Mounting Diamonds (Stack Install)
- (8) Screws For Shelf or Rack Install
- (1) Cat.5 Patch For Switch To Switch Connection (1.80m)

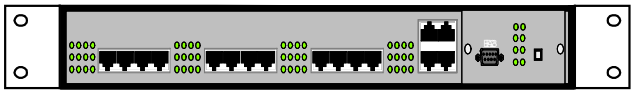
If any of these items are missing, please contact your vendor immediately before continuing. For additional manuals or mounting feet please contact your vendor.

Before removing the switch from the package please make sure to remove all static devices and static electricity from your body by touching an available metal plate or grounding point.

Your new HomePNA Switch has 12 HomePNA RJ-11 Ports, 4 Ethernet Ports, 1 Console Module.

EQUIPMENT MOUNTING SETUP

4.1 RACK MOUNT



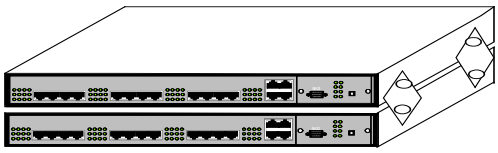
The HomePNA Switch is supplied with mounting ears for easy installation into a Standard 19” rack configuration cabinet. Simply use the supplied ears and screws to mount it to your current rack.

1. Use the included screws to secure ears into the sides of the HomePNA Switch in the provided pre-drilled holes.
2. Align the unit into a single 19” rack space and secure using standard rack mount screws, the use of a nut is optional.

4.2 SIMPLE STACK UP

When mounting the HomePNA Switch on a shelf, be sure to install the included rubber feet onto the bottom of the unit to prevent scratching of the mounting surface, as well as to allow clearance between the switch and surface for better airflow. Once feet are installed onto the switch unit, allow for a clearance of at least 5 inches from rear to wall, and 1 to 2 inches on each side, for adequate airflow.

4.3 STACK MOUNTING

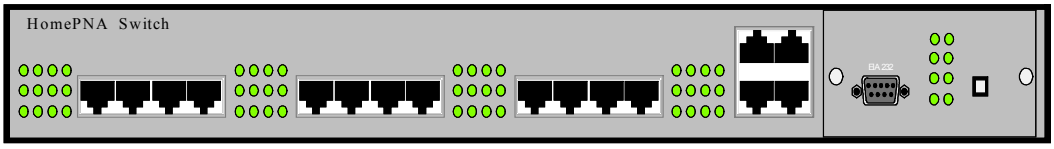


Use the diamond shaped stackable mounts to attach to units together from the sides. Simply apply the diamonds to each side using the included screws to the upper holes on the bottom device, and the lower holes on the top device.

4.4 CABLE SELECTION

Selecting the correct cable type(s) and length(s) will assist you to make a clean and error free installation. For Ethernet uplinks and connections use Cat.5 or higher certified cables, to minimize cross talk and noise in the cable. For easier connection and safer operation use booted RJ-45 connections as well. For HomePNA ports, use of shielded Cat.5 is highly recommended, but is not a must. Refrain from using excess cable when installing to further reduce line noise and cross talk.

5. LED INDICATORS



LEDs	Function	Color	Status	Description
Power	Power Indication	Green	On	Power on
			Off	Power off
Ethernet Port				
LNK/ACT	Ethernet Port Active	Green	On	The Ethernet port is linked
			Blinking	The Ethernet port is sending or receiving data
			Off	Port is not connected
10/100	Ethernet port Transmit And Receive Speed	Green	On	The speed is at 100Mbps
			Off	The speed is at 10Mbps
FDX/COL	Full Duplex Transmission And Collision Indicator	Yellow	On	Port is operating at full duplex
			Blinking	Transmission collisions have occurred on the Ethernet port
			Off	Port is operating at half-duplex
HomePNA Port				
LINK	Link Indication	Green	On	The HomePNA port is linked
			Off	The HomePNA port is not linked
ACT	Activity Indication	Green	On	The HomePNA port is sending and receiving data
			Blinking	The HomePNA port is linked but not active
			Off	The HomePNA port is not linked
COL	Collision Indication	Yellow	Blinking	Transmission Collision has occurred on the HomePNA port

Module

LEDs	Function	Color	Status	Description
SNMP	SNMP Mode	Green	--	Reserved
XTLK	Auto noise level status	Green	On	Auto Noise Level function is on
			Off	Auto Noise Level function is off
VLAN	Virtual LAN status	Green	On	VLAN and VLAN Grouping is on
			Off	VLAN and VLAN Grouping is off
Alarm	--	--	--	Reserved
ID 0,1,2,3	--	--	--	Reserved

6. HOMEPNA SWITCH CONNECTION

The following illustrates the HomePNA Switch and of its ports.

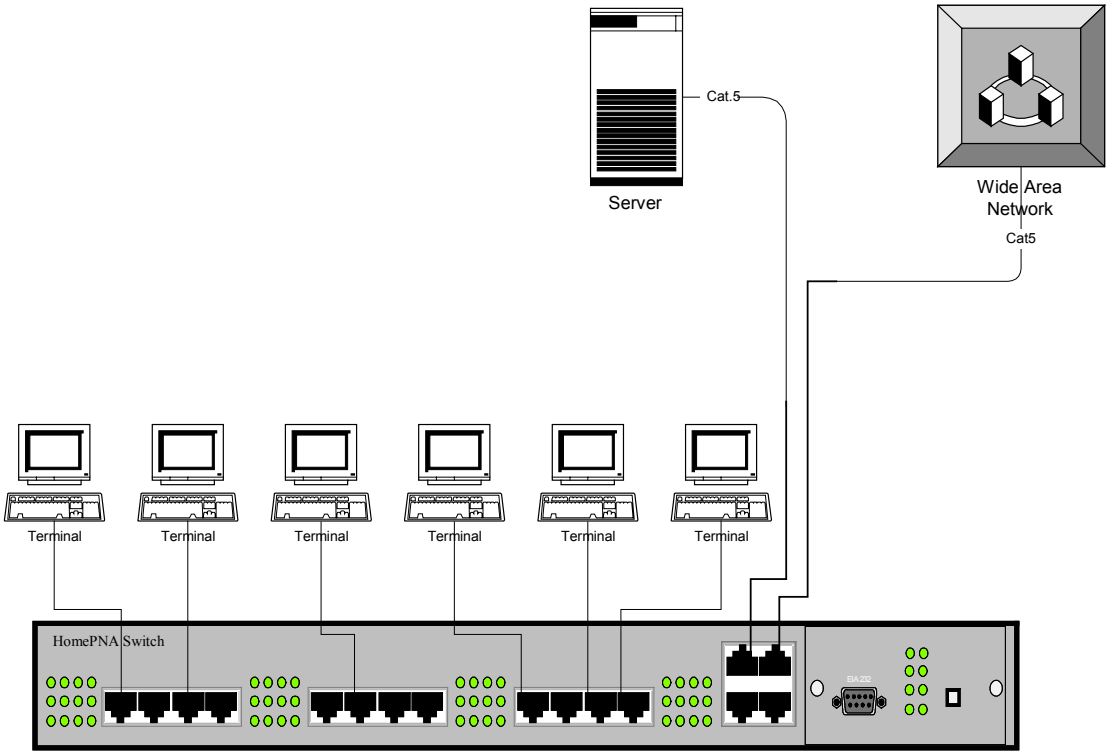


Figure 1

7. CONNECTING HOMEPNA SWITCH TO HOMEPNA MANAGEMENT SWITCH

One of the main features of the HomePNA Switch is manageable by other switches within the family such as SNMP Agent HomePNA Switch. The SNMP Agent HomePNA Switch is a master management switch that serves as master HomePNA Switches over slave HomePNA Switches such as HomePNA Switch.

To setup the Management Switch, the slave HomePNA Switch must contain a DB-9 type console port on the front of the unit to connect to the Management Switch. The Management Switch Console port then uplinks to the connecting Switch DB-9 console port. Once connected, set the first DIP switch on the front of the Management Switch management module to the down position, this will allow the port to communicate with the slave switch.

Once two units are connected, you can issue ICD commands to both units through Telnet or Web interfaces for basic monitoring and maintenance. Use the HomePNA Switch port “D” to uplink to the HomePNA Management Switch port “C”.

This illustration shows how HomePNA Switch is connected to HomePNA Management Switch.

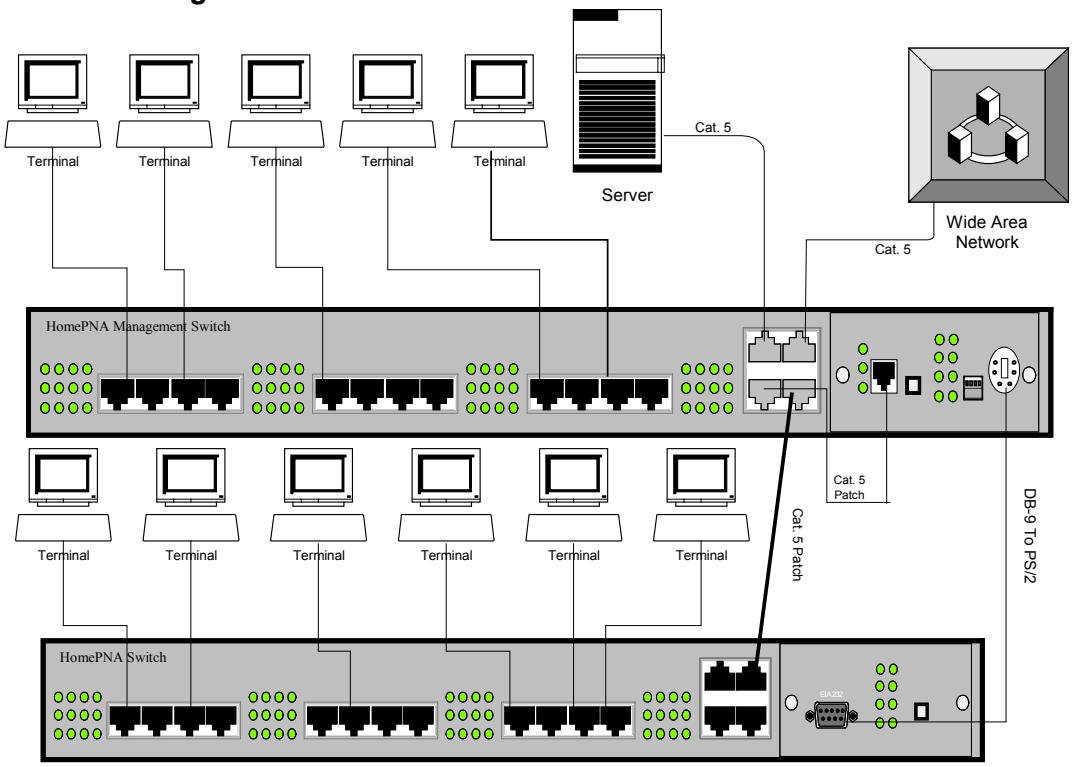


Figure 2

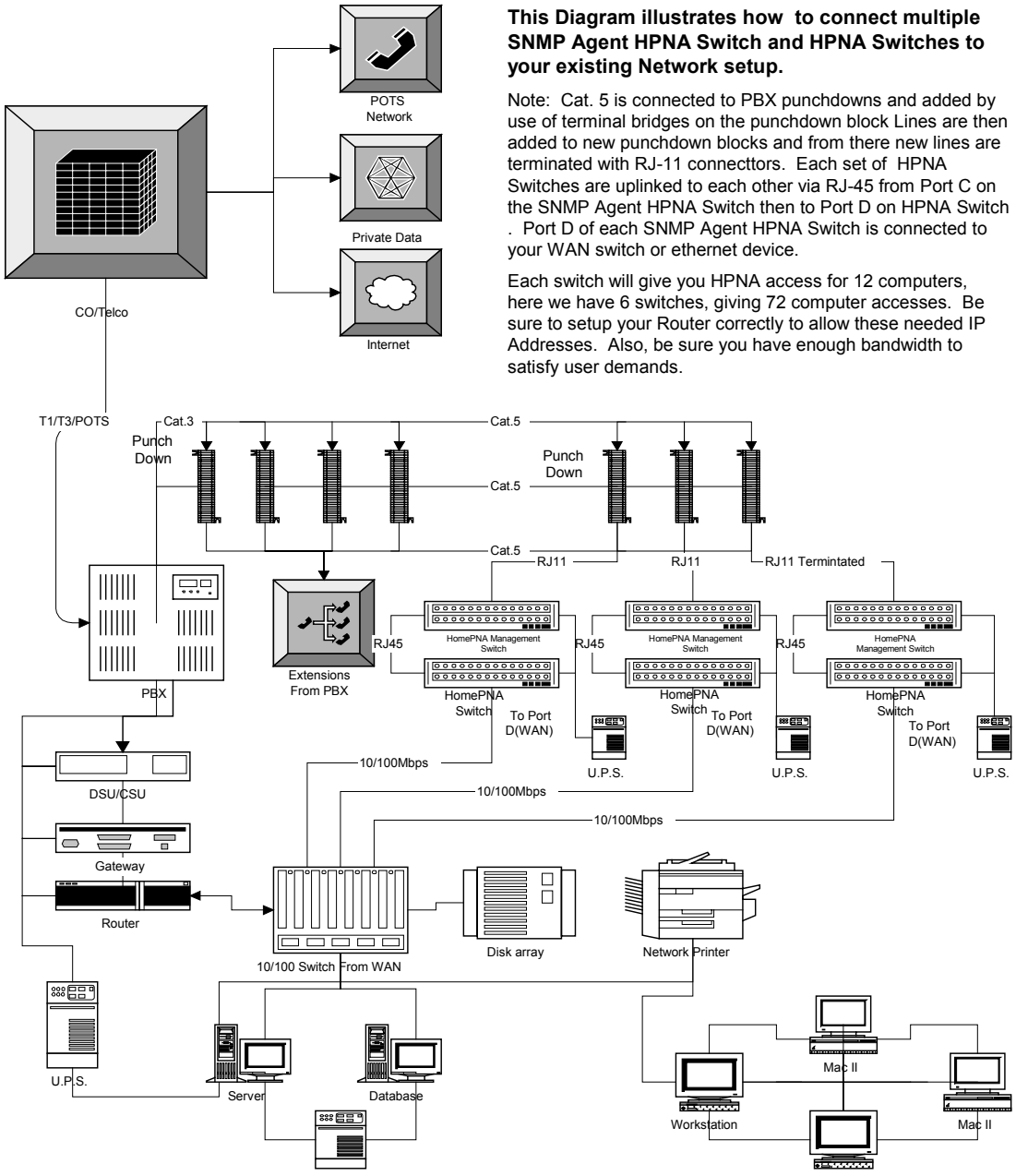
Take note of how the WAN, Server, SNMP module, and managed switch uplink are connected to the unit. For optimal functionality and less troubleshooting, you should connect your equipment as shown in this diagram. The Ethernet ports on The HomePNA Management Switch are labeled A, B, C, D; they should be connected as follow:

Port A: Connect to SNMP Module
Port B: Connect to Server or Additional WAN
Port C: Connect to Down Link Switch
Port D: Connect to Up Link Switch

Next to Ethernet ports, you will find an “Uplink” button. When connecting port “D” to your WAN or Internet connection using cross-over cable, place the “Uplink” button to normal or raised position. When using straight-through cable, press down the “Uplink” button to connect the devices to the ports.

Since there is only one available Console port, the HomePNA Management Switch cannot connect to the Console port for Console interface and for additional switch management simultaneously. Therefore, users should first assign an IP to the master unit through the Console interface. Then connect the Console port to the slave switch and use Telnet to perform modifications to the master/slave switches.

8. DEPLOYMENT DIAGRAM



This Diagram illustrates how to connect multiple SNMP Agent HPNA Switch and HPNA Switches to your existing Network setup.

Note: Cat. 5 is connected to PBX punchdowns and added by use of terminal bridges on the punchdown block Lines are then added to new punchdown blocks and from there new lines are terminated with RJ-11 connecttors. Each set of HPNA Switches are uplinked to each other via RJ-45 from Port C on the SNMP Agent HPNA Switch then to Port D on HPNA Switch . Port D of each SNMP Agent HPNA Switch is connected to your WAN switch or ethernet device.

Each switch will give you HPNA access for 12 computers, here we have 6 switches, giving 72 computer accesses. Be sure to setup your Router correctly to allow these needed IP Addresses. Also, be sure you have enough bandwidth to satisfy user demands.

Figure 3

9. USER INTERFACES

9.1 *THE CONSOLE PORT SETUP*

This portion of the manual will discuss connection to the switches core functions via the Console Port. For connection to the HomePNA Switch via the console port, you must use *DB-9 to Serial DB-9 cable (not included)*. Connect the Console port on the unit to PC COM port using the *DB-9 to Serial DB-9 cable*. These cables have custom pin out assignments, and the use of other cables or converters may cause damage or malfunction to the equipment.

Once you have connected the module to your console port, start any terminal program, such as HyperTerminal by Hilgraeve® Software in Windows® 98. Once you have started your terminal application, you will need to set the terminal with the following settings:

Baud Rate	Data Bits	Parity	Stop Bits	Flow Control
19200Bps	8	None	1	None

Also note that this switch can be used with a dumb terminal that has a DB-9 serial type port installed. If using a dumb terminal, set the DIP switches on the terminal to the appropriate settings as listed above.

Now that you are logged into the switch, proceed to the next chapter for an explanation of ICD commands.

10. ICD COMMAND INDEX

ICD Console Command & Description	
ICD COMMAND	**COMMAND DESCRIPTION**
AO##	Enable Auto Noise Level on given port or all ports when port number is not entered (Please refer to *Auto Noise Level Functionality* section)
AF##	Disable Auto Noise Level on given port or all ports when port number is not entered (Please refer to *Auto Noise Level Functionality* section)
A	Display Auto Noise Level Status
VF	VLAN Off
VO	VLAN On
V	Display VLAN Status
VG	Set VLAN Groups (Please refer to *Setting VLAN Functionality* section for complete explanation)
P	Display Status of All Ports
PD##	Disable given port (only for HPNA Port)
PE##	Enable given port (only for HPNA Port)
C	Clear Packet Counters of All Port Counter or Given Port
PC##	Display Transmit/Receive/Collision Counters in Hex of given port or all ports when port number is not enter
U	Display Unit Information
S	Save Data
RSP<S or U>,<YY>	Set switch to auto reset every (1-24) hour (Please refer to *Auto Reset* section for complete explanation)
RSP <F>	Turn Auto Reset off
RS	Reset Unit
RSW	Restore MIB Agent Factory Defaults and Reset Switch
?	Display console command help
HPHS##	Set Port to High Power, High Speed
LPHS##	Set Port to Low Power, High Speed
HPLS##	Set Port to High Power, Low Speed
LPLS##	Set Port to Low Power, Low Speed
X	To Exit ICD Command Mode

Symbol Key:

HomePNA Port Number
<S> reset Switch and port
<U> reset unit
<YY> the interval between each reset; from 01 to 24 hours

11. SETTING VLAN FUNCTIONALITY

The VLAN function offers security and flexibility of controlling each port access from one to another. This feature is useful in MDU and hotel situations where you would not want each computer to be able to "see" all other computers connected to the switch. However, in some situation you may need to have a few ports with the capability of communicating with one another. Such situations may arise for sharing of files, collaboration software, faster multi-player gaming, etc.

Activating the VLAN function allows each port to be individualized, and non-communicative to other ports on the switch in regards to local traffic. Deactivating VLAN allows the switch to act as a normal Ethernet/HomePNA Switch by passing along multicast and broadcast traffic to each port. Disabling this feature would be useful when installing the switch in an office setting and file sharing/print sharing.

Through ICD command interface you can turn the VLAN function on or off. In ICD interface simply type "VO" to activate VLAN function, and "VF" to deactivate the VLAN function.

HomePNA Switch also allows VLAN Grouping, which enable switch administrators to defined ports to communicate with each other, while remaining isolated from the other ports (outside the defined range) traffic. The HomePNA Switch supports up to 16 different groupings, and can **only be set within the ICD Command Interface.**

The command line format is as follow:

[VG][group][-][port1,…,portN]

Syntax	Description
[VG]	Command string.
[group]	Group number (in decimal) to set, from 1 to the number of ports + trunks.
[-]	Separator between the group number and the ports.
[port1,…, portN]	List of ports to be included in the group separated by commas, the ports are numbered from 1 to12, the trunks are considered as ports and are numbered using letters from A to D.

Important: *Each invocation of the VG for the same group will overwrite the previously saved list for that group.*

Note: *There are no spaces between command strings.*

Below are examples of VLAN Grouping through telnet:

Example 1: Place ports 1, 2, 5 and 8 to group 5 and link them to trunk port A and B.

Command >VG5-1,2,5,8,A,B

Sample Output 1:

Setting Group 5–1,2,5,8,A,B

Example 2: Add port 10 and 11 to group 5 from example 1.

Command>VG5-1,2,5,8,10,11,A,B

Sample Output 2:

Setting Group 5-1,2,5,8,10,11,A,B

Example 3: Delete port 5 and 8 from group 5 from example 2.

Command>VG5-1,2,10,11,A,B

Sample Output 3:

Setting Group 5-1,2,10,11,A,B

Example 4: Empty group 10

Command>VG10-

Sample Output 4:

Setting Group 10 –

12. AUTO NOISE LEVEL FUNCTIONALITY

Auto Noise Level Adjustment is a very useful feature in HomePNA Switch when installing under noisy line conditions, or with old wiring. The unit can automatically compensate for noise within the line by analyzing the signal of each port and adjust its noise floor accordingly.

You can turn on/off the Auto Noise Level feature through the ICD command interface via Console or Telnet. The commands to activate and deactivate this feature within the ICD command interface are “AO” and “AF” respectively.

You can also turn on/off Auto Noise Level to individual port using ICD commands. Please contact your vendor for more information on turning on/off to individual port.

Occasionally you will find that the Auto Noise Level feature unable to compensate for the noise in certain lines. This is uncommon, usually caused by noisy lines and surroundings or bad wiring (high impedance). Signs of trouble with the noise floor would be indicated by excessive collisions on the affected port, or loss of link status with a sudden gain in status.

If you believe your switch needs adjustment, please contact your vendor.

13. AUTO RESET

The auto reset function enables the HomePNA Switch to automatically reset the switch & ports or the whole unit periodically. By default, Auto Reset function is off, to enable Auto Reset simple issue the “RSP” command on the ICD command interface.

Example 1:
Set unit to auto reset switch and ports every 8 hours
RSP S,8

Example 2:
Set unit to reboot unit every 8 hours
RSP U,8

Example 3:
Turn off Auto Reset
RSP F

You may view the Auto Reset status in the Unit Information through the “U” command at ICD Command Interface. When the unit is restored to its factory defaults using the RSW command, Auto Reset is off.

14. HIGH/LOW POWER MODE

The HomePNA Switch contains two power modes for transmission: low power, and high power. This setting was integrated within the switch for installations that contain some long distance HomePNA port installations of 500 ft and 1000 ft. Power modes are adjustable on a per port basis, but with the following side effects:

I. High Power Mode will cause much more Cross Talk within the line of the port modified.

II. Data Rate may be slightly affected by raising the power mode, resulting in slower transmission.

The command to change the power mode must be obtained from your vendor.

15. FREQUENTLY ASKED QUESTIONS (FAQ)

15.1 *HOMEPNA*

Q: What does HomePNA stand for?

A: HomePNA Stands for Home Phoneline Networking Alliance

Q: With HomePNA, Can I use my phone or fax and my Internet at the same time?

A: Yes, you can use them at the same time.

15.2 *SWITCH*

Q: How many users can log into the switch through telnet at once?

A: Telnet accepts only 1 connection at a time, however with the Http interface you can have unlimited administrators logged in. The console port supports only one user per session.

Q: Can I turn off ports individually?

A: Yes, Use the Console or Http Interface to do so.

Q: Can I adjust bandwidth per port?

A: No, you cannot change the throughput thresholds.

Q: Do I have to set the speeds on the Ethernet ports?

A: No, the ports are fully auto-negotiating for duplex and 10/100Mbps speed.

Q: Will the switch ever get “too busy” to handle large volumes of data?

A: No, with the flow control mechanisms and Back Pressure features in place, the unit will always be able to operate at maximum throughput.

Q: If I turn off my HomePNA Switch, will the settings be saved?

A: YES, as long as you used the “S” save command in the ICD command interface, all manual changes will be saved in the event that you turn off, or lose power to your switch.

Q: Can I use one port to support multiple users?

A: Yes, the HomePNA standard supports up to 25 subscribers per port, for shared 1Mbps access on that port, however VLAN functionality is based per port on the switch itself. If multiple users are connected to the same port, then they will be able to communicate with each other regardless of the VLAN setting on the switch.

Q: I am using my HomePNA Switch for my office network; I cannot see the file-sharing computer. Is there something wrong with my switch?

A: Not at all, just set the VLAN function to OFF and all ports will be able to communicate with one another.

Q: Is the 1Mb of speed per port, or for the whole backplane?

A: The ports are capable of 1Mb full duplex max throughput per port; the backplane can handle vast amounts of traffic.

Q: Is there a way to go back to the default passwords?

A: If you have lost or forgotten your passwords, there is a way to set them back to the defaults, you must contact your vendor directly for this procedure.

Q: Is the switch firmware upgradeable?

A: Yes, contact your vendor for updates.

Q: Are there serviceable parts inside?

A: No, you should not open the case at anytime, due to risk of shock and void of warranty.

Q: Should the FDX/COL light stay on all the time on my Ethernet ports?

A: Yes, if you have full duplex Ethernet running, the light will be always on. Collisions are only present when the light flashes.

15.3 *LAN*

Q: Can I connect computers using HomePNA at distances longer than 1000ft?

A: Under certain conditions it may be possible, our tests have proved 1000ft. as acceptable.

Q: How many pairs (cable pairs) does HomePNA transmission require?

A: One pair.

Q: Which pair runs the data in a 2 pair RJ-11?

A: It will run on either pair, just be sure that both ends of the cable have the same wiring configuration.

Q: Can I use Cat.5 Cable to make 4 RJ-11 connections?

A: Yes.

Q: Will other types of HomePNA CPE (Customer Premises Equipment) work with the HomePNA Switch?

A: Yes, however all Manufacturers do not guarantee the performance of their products when used with other manufacturer products.

15.4 *WAN*

Q: What types of WAN connections are compatible with the HomePNA Switch?

A: Virtually any connection that has an Ethernet interface can be used.

Q: What router should I use for best results?

A: Any router should perform well with the HomePNA switch.

Q: My router has a firewall, how do I get through remotely to my switch to monitor and change settings?

A: In your firewall you should have a private connection-tunneling feature, to allow direct connections between addresses on your network and out of band workstations. Refer to your Router User Manual.

15.5 *PBX*

Q: Will the switch work with all PBXs?

A: Your Switch will work with all analog PBXs and most Digital systems, however not all PBX is compatible with this product, you may require a low pass filter, contact your vendor for availability.

Q: What PBX should I use for the best results?

A: Any analog PBX should work well with our system. Because HomePNA is based on FDM (Frequency Division Multiplexing) it sometimes conflicts with digital PBX carrier signals

16. TROUBLESHOOTING

This section covers some common problem areas, also known fixes and solutions. Although the solutions offered in this section should solve your problem, occasionally a problem might arise that takes on a symptom of an issue, hence cannot be solved in the same fashion. If you are unable to fix the problem after going through this section, contact your vendor technical support for assistance.

Cross Talk Noise: Can Include Collisions and Link On/Off

Cross Talk Noise can be generated by HomePNA signals of bundled pairs of telephone wire. When two pairs are adjacent to each other, or twisted around each other they can create cross talk noise. A significant amount of cross talk noise can be generated on the HomePNA switch due to the high power output of the switch. Therefore, when telephone pairs are close together and twisted at the switch, the adjacent port may suffer from above problem.

Available solutions for this issue are:

1. Use Cat.5 certified cables between the MDF and switches, including Cat.5 punchdown blocks and shielded/booted RJ-11 connectors going into the switch.
2. Turn on the Auto Noise Leveling Feature
3. Make manual adjustments if previous solutions failed. Manual adjustments are covered in the “Auto Noise Level Feature” chapter.

Reflection Noise: Caused by Un-Terminated Phone Jacks

HomePNA uses Frequency Division Multiplexing to allow simultaneous flow of data and voice services on same pair of wires. For this reason, your phone lines also act as data transmission lines for the frequency range of 5.5 MHz to 9.5 MHz. Therefore, if there is any open jack at the end of the circuit in HomePNA port, the frequency information (data) will have nowhere to go, and reflect back into the system, causing noise and non-function.

Solution:

Terminate those jacks using a Terminator or one of its specifications. Otherwise, remove the excess jacks from the circuit.

HomePNA Switch Causes Inoperable or Malfunctioning PBX

There are many models of PBX worldwide today. Some PBX does not correspond to certain standards when it comes to data transmission and FDM (Frequency Division Multiplexing). Occasionally, when a HomePNA switch is installed on a system with a PBX, the PBX will cease to operate or the HomePNA switch stops functioning. The problem occurs due to the two devices use FDM to allow the sharing of the telephone wire. When one device is attached to the other, the impedance values begin to change the expected frequency responses, rendering both devices making one of them unusable.

Solution:

Install an impedance matching filter to correct the frequency domain shift. Depending on the frequency domain, type of PBX, and amount of impedance shift a filter may be needed between the PBX and the MDF or the CPE and Telephone set equipment. Contact your vendor for more information on troubleshooting impedance matching and the installations of Filter and Tester kits.

Standard Ethernet Frame Dropping

The HomePNA Switch will discard all illegal frames per Ethernet Standards:

1. Packets Less Than 64Bytes
2. Oversized Packets Larger Than 1522Bytes
3. Bad CRC Frames

All Ports Show Collision and Flashing Link Lights

Reset the switch through the command interface or power cycle the unit.

Cannot Connect To Internet or WAN From HomePNA Ports

Verify port and link status connecting to the router in the trunk unit. If LED is on, ping Gateway to see if routing is configured correctly. If LED is off, check RJ-45 cable to see if cross-over cable is being used.

17. APPENDIX

17.1 *HOMEPNA SWITCH FACTORY DEFAULTS*

HomePNA Switch Factory Defaults

IP Address –192.168.1.1

Gateway Address–0.0.0.0

Subnet Mask–255.255.255.0

Auto Refresh Time–15 sec

Auto Reset–OFF

MIB Agent Factory Defaults

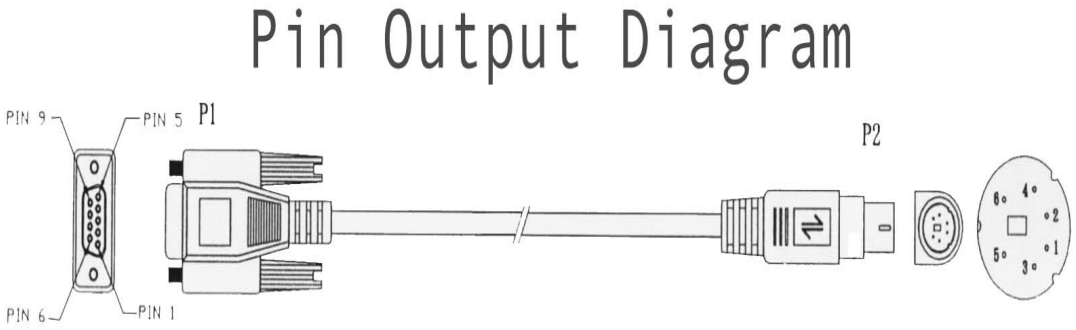
Auto Noise Level Adjustment–ON

Power and Speed Mode–Low Power High Speed

17.2 *COMPLETE ICD COMMAND INDEX*

Complete ICD Command index is available upon request.

17.3 *DB-9 To PS/2 Cable Diagram*



DB9 ASS'Y CODE PS/2		
P1		P2
PIN 2		PIN 2
3		3
5		5
SHELL	DRAIN	SHELL