

3DMP Technical Manual

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## Safety Notice

- Follow the normal safety precautions for any office equipment when using the 3DMP machine.
  - Use only the AC adapter/power supply included with the 3DMP device
  - To protect against electric shock and to ensure good quality ECG signals, plug the AC adapter into a properly grounded electrical outlet
  - Avoid using wall outlets controlled by wall switches or shared with other equipment
  - Do not remove any component from the 3DMP machine, this will void product warranty
  - Use the equipment only for its intended use, to collect and transmit human ECG data and to display the test results
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## Warning

During cable connection and installation, take care not to turn on either the computer or the monitor.

To prevent electrical shock, **do not** remove cover. No user-serviceable parts are located inside. Refer servicing to qualified personnel.

In the unlikely event the computer or the circuit on which it functions is hit by lightning, it may shut down. Before rebooting, take note of the data that may have been lost from the time the computer shut down before recommencing testing.

During setup, try to work in a static-free environment. While testing the patient, the 3DMP system must be insulated at all times from metal objects, cellular phones, and any device that creates an electro-magnetic field. If the EKG leads or other cable components are touching a metal surface, the extremely sensitive equipment may pick this up as interference, inducing an artifact in the waveform displayed.

## Specifications

### **Software**

3DMP Client v 1.0.0

### **Leads**

V5 and II

### **Environmental Requirements**

50°F/10°C – 95°F/35°C

Relative Humidity <85%

### **Input Impedance**

Transdermal electrode signal amplifier – A/D Converter

### **A/D Set**

2 channel, 12 bit.

### **Power Requirements**

100/115 VAC, 50–60Hz

### **Leakage**

Patient >2  $\mu$ A

Ground, Chassis >10 mA

### **Frequency Domain Resolution**

0.2Hz

### **Input Offset Tolerance**

Protected: 2.5kV/min  $\pm$ 25V

### **Equipment Type/Safety**

Classification

Class 1, CF

## Technical Support

If a user encounters difficulty during installation or test administration of the 3DMP device, technical support can be accessed via Online Service and Support or via the telephone.

### **Online Service and Support**

Connect with Premier Heart online by visiting our website at <http://www.premierheart.com>. The website will also provide you with the latest updates, downloads and contact information.

### **Premier Heart Telephone/Fax Support**

Premier Heart telephone support services are available to all of our customers. For information or inquiries please contact us at (516)883-3383.

Use your fax machine to receive/send general product information and fact sheets by dialing (516)883-5812

### **Support for old and discontinued versions**

In the event that a new version of the 3DMP software is released, you will receive updated information via email. Telephone support will be also provided for the set up of the latest software.

## Service and Support Offices

### **North America**

Premier Heart  
14 Vanderventer Ave  
Port Washington, NY 11050  
U.S.A  
Tel: (516)883-3383  
Fax:(516)883-5812

**Manager** : Joseph T. Shen, MD ([jtshenmd@premierheart.com](mailto:jtshenmd@premierheart.com))

**Technical Support** : [support@premierheart.com](mailto:support@premierheart.com)

### **Asia/Pacific Rim**

Premier Heart (Asia) Ltd  
Room 1202-3 121F  
Chinachem Johnston Plaza  
178-186 Chinachem Johnston Road  
Wan Chai, Hong Kong 040  
Tel: (852) 9771-5445  
Fax: (852) 3006-4275

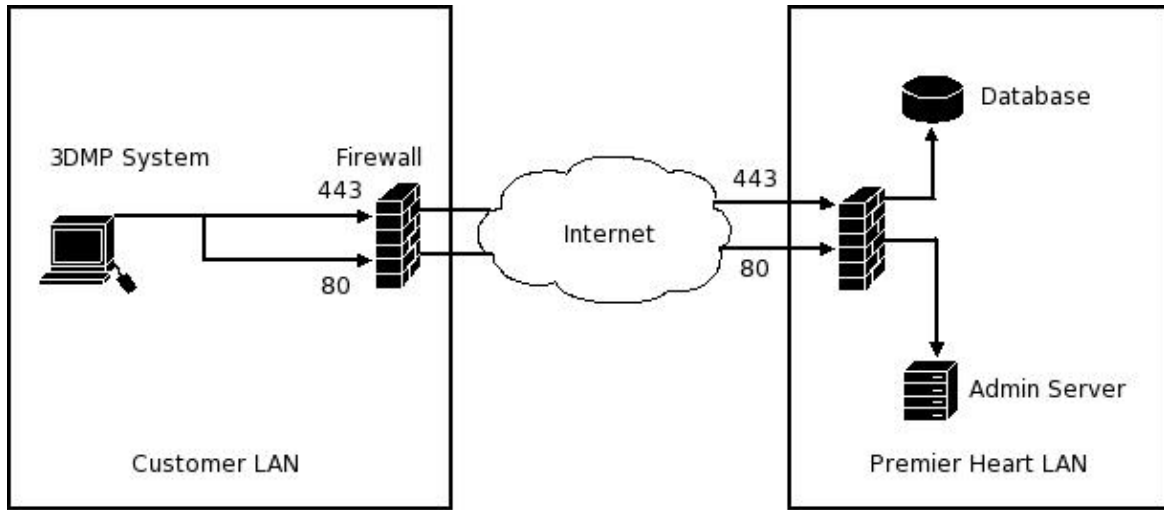
**Contact** : Eric Chien ([eric.chien@premierheart.com](mailto:eric.chien@premierheart.com))

## System Requirements

**Outbound TCP Ports**

The 3DMP system uses the HTTPS protocol for all normal traffic (e.g. sending patient test data and receiving reports). The HTTPS protocol requires unrestricted access to outbound port 443.

The 3DMP system uses the SSH protocol for all system administration traffic (e.g. updating software, or allowing remote administration). The SSH protocol requires unrestricted access to outbound port 80.

**3DMP TCP Traffic**

*Unrestricted outbound traffic on ports 443 and 80 is required for 3DMP system operation.*

Ports 80 and 443 are standard ports for web traffic and should be available from behind all firewalls.

**Internet Connection**

The 3DMP system must have a direct connection to the internet; that is, an ethernet (or wireless ethernet) connection to a router or gateway server which provides the internet access. There may be any number of hubs, routers, and switches between the 3DMP system and the gateway/router, but no servers which perform any translation of the network traffic (e.g. proxy servers or machines using Windows Internet Connection Sharing). The connection should be a broadband connection; connections under 128k/s, such as modems, will cause network timeouts and are not supported.

It is recommended that the server or router providing the connection also provide DHCP configuration of the 3DMP system IP address, default (gateway) route, and name (DNS) server. Static configuration of the 3DMP machine is possible, however Premier Heart staff cannot determine whether the static settings for a customer's network are correct, and therefore cannot support static network configuration.

While most network hardware such as routers are preconfigured, or offer simple configuration utilities for services such as DHCP, such configuration varies widely by manufacturer and cannot be supported by Premier Heart. Similarly, server configuration will vary by operating system, hardware, server software, and

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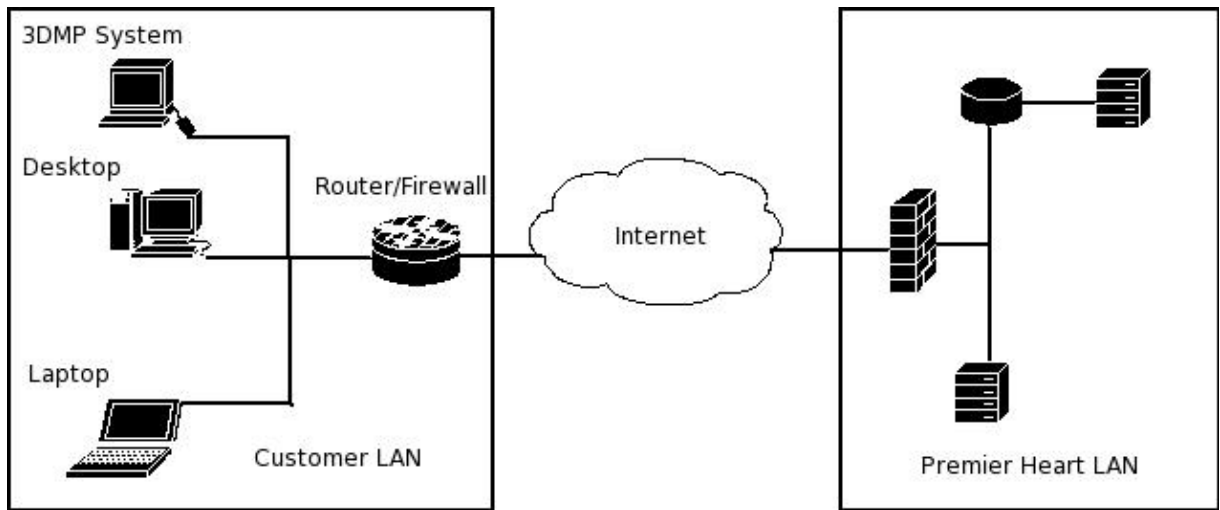
supplementary network appliances; configuration and management of servers cannot be provided by Premier Heart.

The recommended network configuration is as follows:

- a broadband internet connection
- a router connected to this internet connection **OR** a server connected to this internet connection
- a switch/hub connected to the router/server
- the 3DMP connected to the switch/hub

### Home or Personal Network

A standard home setup would be as follows:

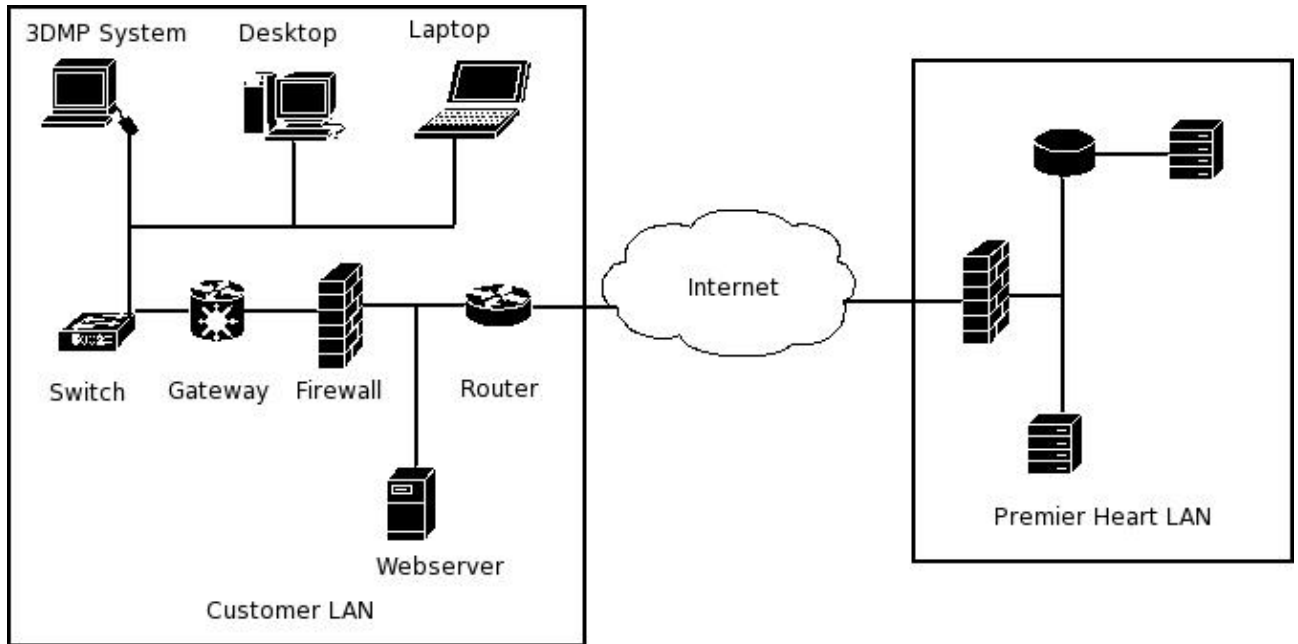


### Home Setup

*The ISP provides the internet connection and a small router. The router has a hub or switch built in, and provides DHCP. The 3DMP machine is connected to one of these ports.*

### Small Office Network

A standard small office setup would be as follows:



### Small Office Setup

*The ISP provides the internet connection and a router. The office provides a firewall and a gateway with two network cards: one connected to the firewall, and one connected to a switch/hub. The gateway provides DHCP to local machines connected to the hub. The 3DMP machine is connected to one of these ports.*

### Network Hardware

Any standard router, switch, or hub will work with the 3DMP machine. It is recommended that the customer acquire their network hardware from a reputable manufacturer, such as

- Linksys
- Netgear
- Belkin
- D-Link

Standard gateway servers and firewalls will work with the 3DMP machine, provided they allow unrestricted access to outbound TCP ports 443 and 80.

### Wireless Networks

Only wireless cards provided by Premier Heart are supported. Any standard 802.11b/g routers and hubs will work with these cards. It is recommended that the customer obtain their wireless hardware from a reputable vendor, and that the hardware supports WEP encryption and MAC address filtering.

Currently Premier Heart only supports 64-bit and 128-bit WEP security.

### **Captive Portals/Networks**

Captive networks require that a user authenticate via a web browser in order to gain internet access for the machine.

The 3DMP system has a web browser which can be used for this purpose. The web browser can be accessed by right-clicking on the desktop background (the GUI must be moved or shaded in order to do this) and selecting the "Premier Heart Web Site" option.

### **Proxy Servers**

Outbound connections via proxy servers are unsupported. System administration functions will not work over a proxy server connection, and the Wingate proxy server is known to interfere with the HTTPS traffic required for normal operation, even when tunnelled.

### **Printer Connection**

Only printers which are connected directly to the 3DMP machine via parallel port or USB are officially supported by Premier Heart.

Networked printers and print servers, such as HP JetDirect, or a server providing access to printers via the LPD or IPP protocols, may work with the system but are officially unsupported.

Printers shared from a Windows system via "printer sharing", or servers providing access to printers via the SMB protocol, are known to not work and are officially unsupported.

### **Supported Printers**

Premier Heart recommends using a printer make and model which is mature and which has a good reputation, such as the HP line of Deskjet and Laserjet printers.

## Startup Menu

When the 3DMP machine first starts you will briefly be presented with the Startup menu.

GNU GRUB version 0.95 (638K lower / 260032K upper memory)



Use the ↑ and ↓ keys to select which entry is highlighted.  
Press enter to boot the selected OS or 'p' to enter a  
password to unlock the next set of features.



### 3DMP Application

The default behavior for the Startup menu is to pause for three seconds and then launch the 3DMP application. This standard behavior requires no intervention on behalf of the user for daily use.

### System Administration

This option provides access to the System Administration Menu, which allows configuration of the network, updating of software and other administration operations. Only a qualified system or network administrator should choose this option.

### Technician's Menu

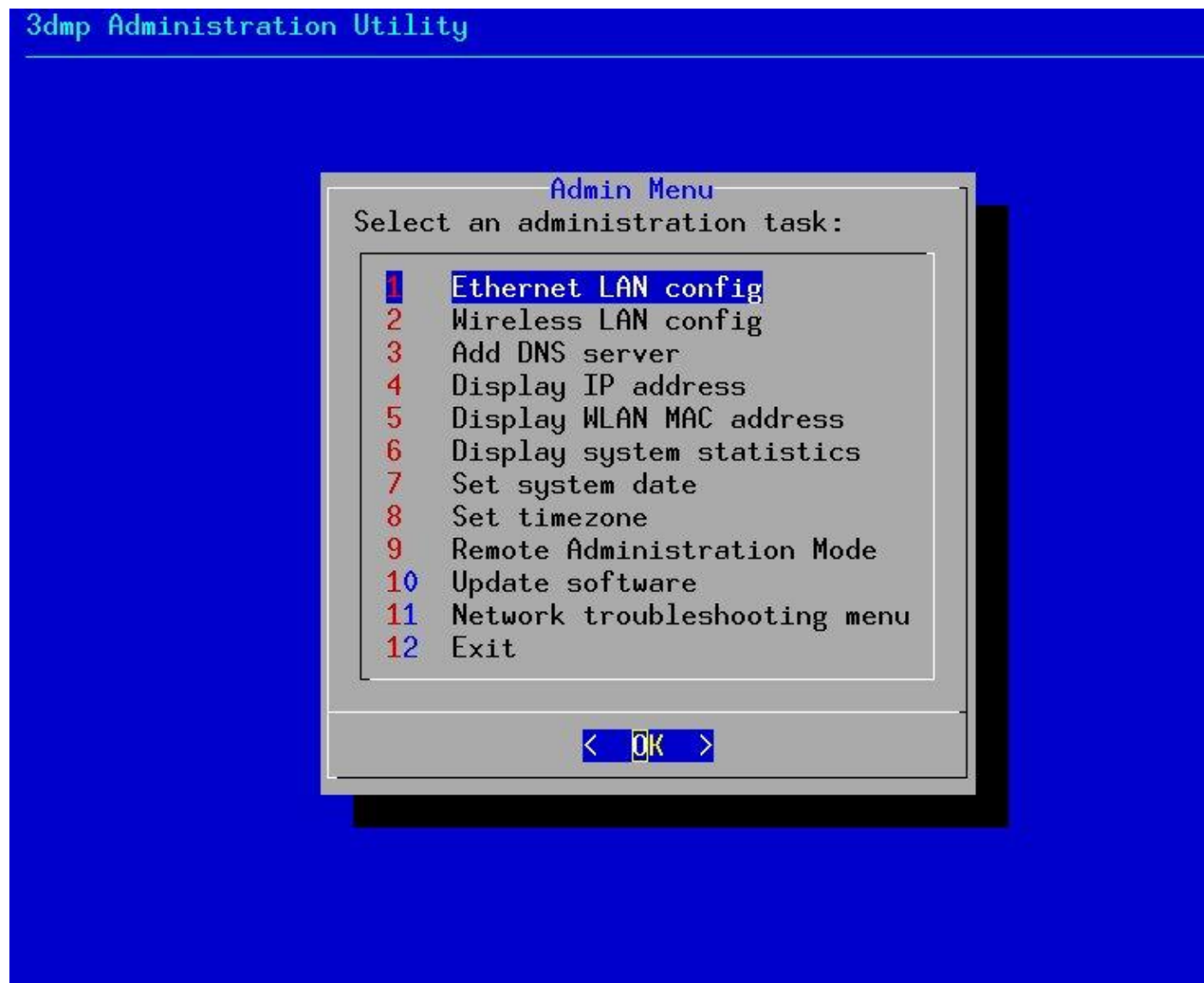
This option provides access to the Technician Menu, and is for use ONLY by Premier Heart distributors or technical staff. Choosing this option could render the system inoperable.

### Local Recovery

This option is for use ONLY by trained Premier Heart technical staff. Choosing this option could do irreparable harm to the 3DMP system.

## System Administration Menu

The System Administration Menu is used for configuring the system and for viewing system information. It should only be used by a qualified network or system administrator, or under the direction of trained Premier Heart support staff.

**Ethernet LAN config**

The ethernet card in the system can be configured with this option; the system supports DHCP and static configuration. Only a qualified network or system administrator should select this option.

**Wireless LAN Config**

If the system has shipped with a wireless networking card, it can be configured with this option. The system supports Ad-Hoc and Managed modes, as well as 64-bit and 128-bit WEP encryption. Only a qualified network or system administrator should select this option.

**Add DNS server**

This option will display the DNS servers which the system has been configured to use; it also provides the

option of adding a DNS server to the existing list of DNS servers. It can be used to manually add DNS servers, in the event that the DHCP server has not provided DNS server information, or the local DNS servers are not adequate.

### **Display IP address**

This option will display the IP address of the system. If both an ethernet card and a wireless card are present, this option will display the IP address of the interface being used to connect to the internet.

### **Display WLAN MAC address**

This option will display the MAC address of the wireless card, if one is installed. This is for the convenience of sites whose wireless networks use MAC address filtering.

### **Display system statistics**

This option will display various statistics, such as the version of the 3DMP application software, the number of patients stored locally, and the amount of free disk space on the system.

### **Set system date**

This option can be used to set the system date and time.

### **Set timezone**

This option can be used to set the timezone of the system.

### **Remote Administration Mode**

This option should be used only under the direction of Premier Heart support staff. When selected, it displays the IP address of the machine, which may be required in order to provide Premier Heart with remote access to the machine. The system will then start a screensaver while remote administration mode is enabled. To exit the screensaver and remote administration mode, press the *Ctrl*, *Alt*, and *Backspace* keys simultaneously.

### **Update software**

This option is used to obtain the latest versions of the 3DMP application and all system software. Premier Heart will contact all customers when an update is available. Customers should not select this option unless they have been informed that updated software is available.

### **Network troubleshooting menu**

This option displays the Network Troubleshooting Menu, which contains operations that can be performed to diagnose network connectivity problems. See the Network Troubleshooting Guide.

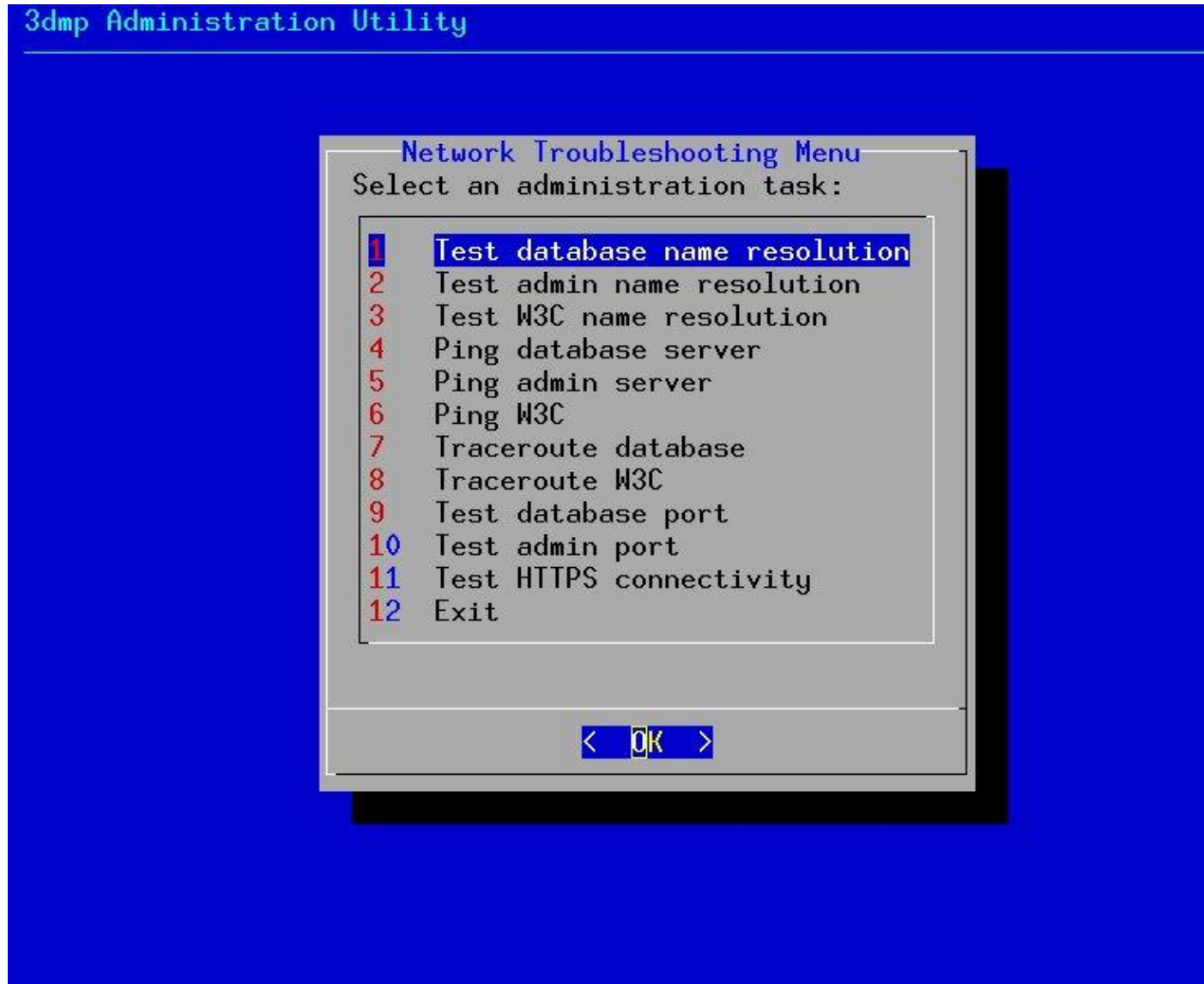
### **Exit**

This option exits the System Administration menu and reboots the system.

## Network Troubleshooting Menu

The Network Troubleshooting Menu can be used by system administrators and support personnel to diagnose problems connecting the 3DMP system with the Premier Heart database server.

The operations available on this menu only provide information; they do not change the state or configuration of the 3DMP system in any way. More information can be found in the [Network Troubleshooting](#) section.



### Test database name resolution

This option will use the UNIX host utility to query the A (address) records for the Premier Heart database server. It tests whether the DNS servers used by the 3DMP system can resolve the URL needed for normal GUI operation.

### **Test admin name resolution**

This option will use the UNIX host utility to query the A (address) records for the Premier Heart admin server. It tests whether the DNS servers used by the 3DMP system can resolve the URL needed for software updates and remote administration.

### **Test W3C name resolution**

This option will use the UNIX host utility to query the A (address) records for the W3C webserver. It tests whether the DNS servers used by the 3DMP system can resolve well-known internet URLs.

### **Ping database server**

This option will use the UNIX ping utility to connect to the Premier Heart database server. It determines if the database server is up, and if packets from the 3DMP system can reach it.

### **Ping admin server**

This option will use the UNIX ping utility to connect to the Premier Heart admin server. It determines if the admin server is up, and if packets from the 3DMP system can reach it.

### **Ping W3C**

This option will use the UNIX ping utility to connect to the W3C webserver. It determines if packets from the 3DMP system can reach well-known internet sites.

### **Traceroute database**

This option will use the UNIX traceroute utility to connect to the Premier Heart database server. It will list each gateway or router encountered on the way, and can be used to determine which intervening gateway or router is responsible for delays or loss of connectivity during normal GUI operation. NOTE: the route information for the Premier Heart database and admin servers will be identical; this menu item can be used to troubleshoot both.

### **Traceroute W3C**

This option will use the UNIX traceroute utility to connect to the W3C webserver. It will list each gateway or router encountered on the way, and can be used to determine which intervening gateway or router is responsible for delays or loss of connectivity to the internet in general.

### **Test database port**

This option will attempt to connect to port 443 on the Premier Heart database server. It can be used to determine whether a firewall is properly allowing outbound TCP connections that are required for normal GUI operation.

### **Test admin port**

This option will attempt to connect to port 443 on the Premier Heart admin server. It can be used to determine whether a firewall is properly allowing outbound TCP connections that are required for software updates and remote administration.

**Test HTTPS connectivity**

This option will attempt to fetch a web page from the Premier Heart database server using the HTTPS protocol. It can be used to determine if the network traffic required for normal GUI operation is possible.

**Exit**

This option will exit from the Network Troubleshooting Menu.

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## Network Troubleshooting Guide

### 1. Test internet connectivity

Reboot the system to get the System Administration Menu. Select the *Network troubleshooting menu* option; this will bring up the Network Troubleshooting Menu.

Select the *Ping W3C* option; this will send 3 ICMP ECHO packets to the *w3.org* webserver.

If this test succeeds, then the machine can connect to the internet; test Premier Heart connectivity.

If this test fails, then test DNS resolution.

### 2. Test Premier Heart connectivity

Select the *Ping database server* option; this will send 3 ICMP ECHO packets to the Premier Heart database server.

If this test succeeds, then the machine can connect to the database; test outbound port connectivity.

If this test fails, then test DNS resolution.

### 3. Test name server (DNS) resolution

Select the *Test W3C name resolution* option; this will attempt to get the internet address record for the host *www.w3.org*.

If this test fails, the DNS server is not working correctly; consult your system administrator, ISP, or system manual as appropriate.

If this succeeds, select the *Test database name resolution* option; this will attempt to get the internet address record for the Premier Heart database server.

If the database test fails, the DNS server does not recognize the Premier Heart domain names; either the DNS tables need to be updated, or the Premier Heart DNS server is down. Consult your system administrator, ISP, or system manual to update the DNS tables; contact Premier Heart technical support if the Premier Heart domain cannot be resolved from other networks.

If the database test succeeds, and there are no routing problems, then this is probably a firewall issue — for example, the firewall might not allow outgoing ICMP packets, might only allow outbound traffic to specific hosts, or might not allow outbound traffic from unknown IP addresses. Consult your system administrator, ISP, or system manual as appropriate.

### 4. Test outbound port 80/443

Select the *Test database port* option. This will attempt to open port 443 on the Premier Heart database server.

If this test succeeds, then the machine can connect to the proper port on the database server; test HTTPS connectivity.

If this test fails, and there are no routing problems, dns resolution problems, or database connectivity issues, then there may be a firewall issue -- the firewall is preventing outbound connections on port 443. Consult your system administrator, ISP, or system manual as appropriate.

### 5. Test HTTPS connectivity

Select the *Test HTTPS connectivity* option. This will attempt to download a page from the Premier Heart database server via the HTTPS (SSL over HTTP) protocol.

If this test succeeds, and the GUI does not connect to the database, then it is likely that the GUI configuration has become corrupt. Contact Premier Heart technical support.

If this test fails, and there are no routing problems, port connectivity issues, dns resolution problems, or database connectivity issues, then some network component might be interfering with the SSL traffic. This could be a firewall or a proxy server which modifies the packets in transit. Consult your system administrator, ISP, or system manual as appropriate.

### 6. Identify routing problems

Select the *Traceroute database* option. This will display all gateways and routers between the system and the Premier Heart database server.

If there are delays or connectivity drops in the traceroute output (e.g., it continuously displays '\* \* \*'), then there is a routing issue at the last router or gateway reported by traceroute. Contact the administrator of that server or your ISP as appropriate.