ECHOTRAC SOUNDERS

TROUBLESHOOTING GUIDE
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Revision History

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0.1	05-30-2008	P. Oostenrijk	Initial version – draft

Approved

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1   INTRODUCTION

The Troubleshooting Guide for Echotrac sounders is created to provide step-by-step instructions for resolving potential symptoms or problems that users may come across. From this point forward, the term *symptom* will be used in this document as a synonym for the term *problem*.

1.1   Purpose

The purpose of this document is to collect symptoms and provide easy to follow instructions to assist in finding the problem. When the symptom has been identified, step-by-step instructions should lead to a resolution.

1.2   Scope

The content of this document is focused on symptoms and solutions. Therefore, this document is intended for those people who will be providing technical support for Echotrac sounders. All parties are expected to comprehend the contents of this document.

1.3   Glossary

OHSI   Odom Hydrographic Systems Incorporated

1.4   References

[1]   Title: Technical Specification Ethernet Interface
         Author(s):   Patrick Oostenrijk
         Report no: N/A
         Version: 1.8
         Date: 2008-05-28

2   GENERAL INFORMATION

The first step in trying to troubleshoot one or more symptoms is to collect information about the current situation. This may also be referred to as the *environment variables*.

2.1   Environment variables

The environment variables are very important for several reasons:

- If the symptom disappears or is resolved, the original environment variables must be restored to verify that the symptom does not return.

- If the symptom cannot be localized, then an Odom technician or certified Odom service centre will request the environment variables to be able to provide technical support.

2.2   Checklist environment variables

The table below shows a checklist of environment variables.

Description	Examples
Computer	Laptop, Desktop, Model: DELL, Compaq, HP, etc.
Operating System	Windows 2000, XP
Echo sounder	Echotrac MK3, CV100, CV200, CV300, CVM, Hydrotrac
Echo sounder firmware version	
Echo sounder serial number	
Control Program	Odom eChart, Echotrac Control Program
Control Program version	
Auxiliary systems	GPS, DGPS, Motion Sensor, System model
Cables	Serial, Serial null-modem, Straight UTP, Cross-over UTP
Cable devices, brand name and model	Network Hub, Switch or Router, i.e.: D-Link switch DGS-2205

NOTES:
Computer
Certain laptops are known to have network auto-negotiation problems.

Operating System
This is important to know because different Operating Systems may have different functionality and/or bugs.

Echo sounder
Depending on the echo sounder model, a different diagnostic approach may be required.

Firmware / Serial numbers
This information can be used to obtain the original firmware with which the unit was released and also allows technicians to determine if the unit requires modifications to support a different firmware version.

Auxiliary Systems and Cables
Knowing which external systems are used and how they are connected will assist a technician to determine the cause of a problem. For example: certain GPS configurations can introduce performance problems with the sounder. A required, but missing null-modem can result in data not being received/transmitted.

3   CONNECTIVITY

The next step, after collecting the general information or environment variables, is to verify all the connections.

3.1   Serial cables

On certain Echotrac sounders you may need to use a null-modem adapter or null modem serial cable when connecting a GPS or Motion Sensor.

<Affected sounders: to be defined>

3.2   Network cables

There are several options when using network cables between a computer and an echo sounder. Exceptions are not described here. One example of an exception is that some network devices can detect whether a network cable is either a straight or crossover cable, and are able to adjust to them.

There are basically two installation scenarios:
1.   Computer ➔ UTP network cross-over cable ➔ Echotrac sounder
2.   Computer ➔ UTP network straight cable ➔ Network device ➔ UTP network straight cable ➔ Echotrac sounder

The possible scenarios are shown step-by-step in the following diagram.

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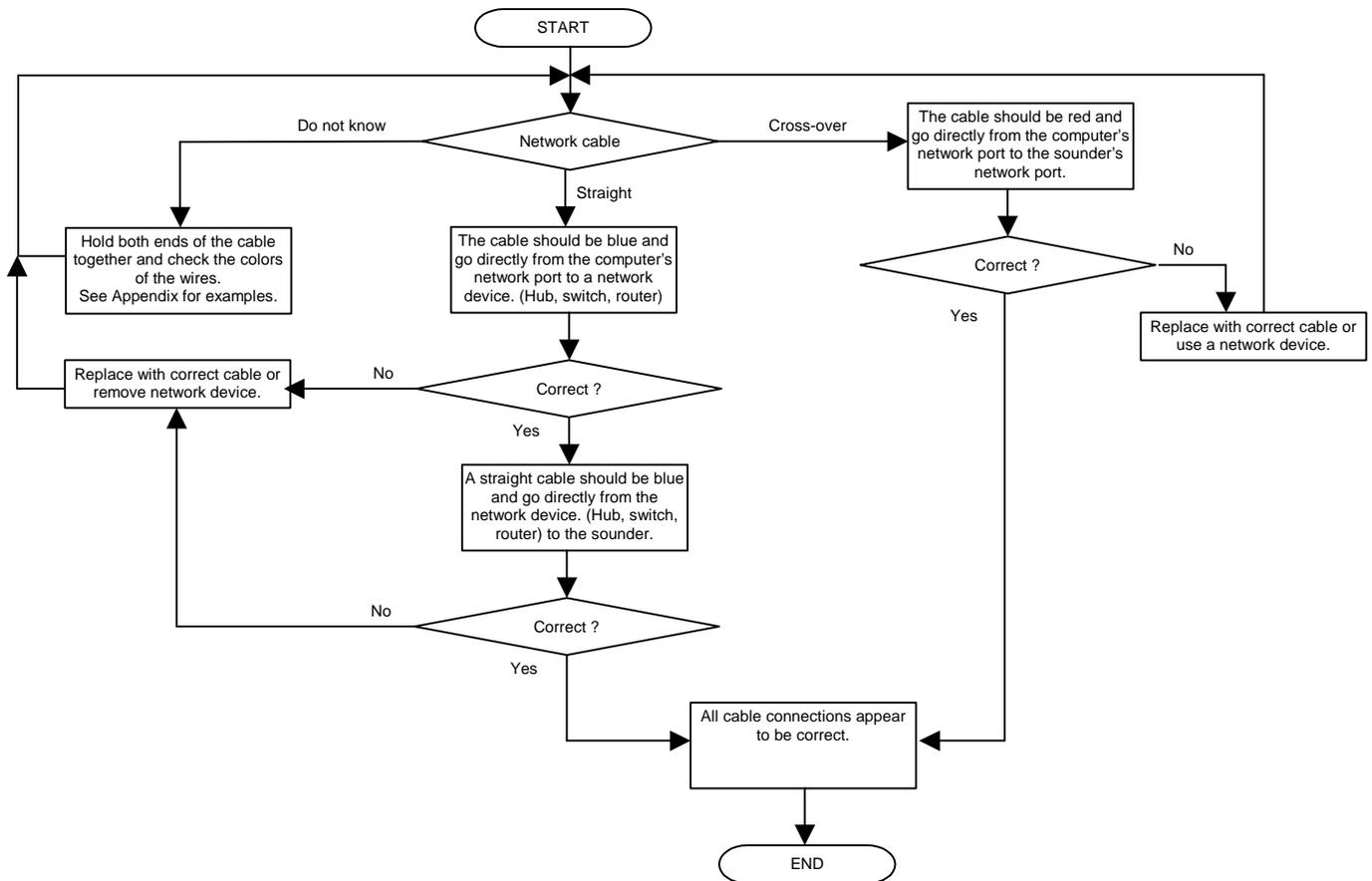
4   NETWORK CONFIGURATION

It is usually not necessary to change any network settings on the computer to be able to connect with an Echotrac sounder. However, there are two installation scenarios with their respective advantages and disadvantages to consider

There are basically two installation scenarios:

1.   **Direct**
     Computer ➔ UTP network cross-over cable ➔ Echotrac sounder

2.   **Indirect** (use of a network device)
     Computer ➔ UTP network straight cable ➔ Network device ➔ UTP network straight cable ➔ Echotrac sounder

In each scenario you can have the computer configured for either Dynamic or Static IP addressing.
Most computers use Dynamic IP addressing by default. The difference between the two modes is explained in the following sections.

4.1   Dynamic IP addressing

If dynamic IP addressing is used, Windows will try to obtain a new IP address each time it detects a network connection. When connected directly to an Echotrac sounder, powering off the unit will result in Windows detecting that there is no longer a network. As soon as the unit is powered on again, Windows will detect that there is a network again. Windows will then try to detect a server on the network with DHCP for about 3 minutes because only a server with DHCP can provide Windows with an IP address.

When the time has expired and Windows did not get an IP address, it will default to IP address 169.254.x.y.
Note: Most laptops usually require a lot less time than 3 minutes.

Direct Connection
When there is a direct connection between the computer and the Echotrac sounder, then Static IP addressing is probably the preferred network configuration. It eliminates the delay of up to 3 minutes before any application has network access.

Indirect Connection
When there is a network device between the computer and the sounder, such as a network hub, switch or router, then dynamic IP addressing should probably be the preferred network configuration. This would allow a laptop to remain compatible with its office network configuration.
When using a router or switch and dynamic addressing, Windows should reconnect quickly when started because the router or switch will retain its previous address. Even after the Echotrac sounder is powered off and Windows is closed, Windows will not need to search for a new IP address. This will only occur when the computer is powered off and on again. Dynamic or static IP addressing would be suitable in this situation, but depends on the preference of wanting to keep network settings compatible with an office network.

4.2   Static IP addressing:

The main advantage of using static IP addressing is to eliminate the delays introduced when Windows detects a network and tries to obtain an IP address from a DHCP server on the network. This delay can take up to 3 minutes each time Windows detects a new network connection.
Static IP addressing can be used to quickly communicate with Echotrac sounders; however, problems may occur if the same computer is also required to connect to other network devices. The selected IP address must be compatible for the other network devices.

Selecting a static IP address
You can choose (almost) any static IP address for your computer, examples: 169.254.xxx.yyy or 192.168.0.xxx. However, there are some exceptions such as 127.0.0.1, 255.255.255.255, aaa.bbb.200.200.

When the Control Program communicates with the Echotrac, it will automatically assign the Echotrac sounder an IP address that is based on the computer's IP address.

Examples:
If the computer has IP 169.254.21.32, then the Echotrac will use 169.254.200.200.
If the computer has IP 192.168.0.51, then the Echotrac will use 192.168.200.200.

At this time, customers/users cannot assign a default IP address to the Echotrac.
However, in the Control Program folder you will find the file ET_ports_1600.cfg. It is possible to create a copy of this file and edit it to change port numbers and IP address. After establishing communications with the sounder, you can then load this port/IP file and the sounder will accept the new IP address and port numbers. However, this process will need to be repeated every time the sounder's power is cycled.

4.3 DHCP
The Echotrac sounder does not support DHCP. Therefore, it cannot assign Windows an IP address.

4.4 Auto-negotiation
Some laptops have auto negotiation problems with 10Mb networks. This will result in bad or no communication with the sounder. To fix this, change the (Speed & Flow), of the network card, to "10Mb Full Duplex".

4.5 Network LINK light
Almost every network connector on network cards or network devices have two LED indicators for:
1. Network Speed (10/100 or 1000Mb)
2. Traffic or Link.

The LINK LED indicator will always turn on when there is a network device powered on at both ends. Whether you use a straight or cross-over cable does not matter. The LINK LED only indicates that there is a physically connection from one point to the other. If the LINK light does not come on, there is either a bad physical connection, check the following:
1. Bad connector;
2. Bent pins that do not meet the pins on network cable plug;
3. Cold solder joint;
4. Network interface chip has no power or is bad on network board.

IMPORTANT: A LINK light does not guarantee that communication is possible. Check the connectivity scenarios to make sure the correct cables are used.

Notes:
10/100 Mb Network speed is usually indicated by and orange LED.
1000 Mb Network speed is usually indicated by a green LED.
Network traffic is usually indicated by a blinking LED.
A network LINK indication is usually indicated by a separate LED.

4.6 Echotrac IP address
The Echotrac sounders use UDP/IP protocol. That means the Echotrac uses Port numbers instead of an IP address. Even though the Echotrac does not use IP addressing, the UDP/IP packet headers do have a field to put an IP address. The Echotrac will fill that field with an IP address. This is done to ensure that packets are not dropped by some switches/routers.

4.7   Wireless Network
We have noticed enabling wireless networking can sometimes introduce delays and possibly affect performance.

4.8   Firewalls
If Windows XP is used, then the firewall may be enabled. To allow an application network access, either disable the firewall or set the firewall to exempt the application that requires network access.

Also some anti-virus programs have their own built-in firewall. Even though the firewall in Windows allows the application access to the network, the anti-virus program's firewall may be blocking it.

5   SERIAL PORT COMMUNICATION

One of the alternative methods to determine the cause of the problem is to use the serial port to communicate with the sounder. The serial port can be used to try and exercise the Echotrac sounder. Depending on the results it may be possible to pinpoint in on the problem.

If there is no network communication and you receive 'failure to connect messages' from the Control Program, it is possible to send commands to the Echotrac sounder through its serial I/O port COM1.

Note: On the Echotrac CVM this serial port is labeled "Depth I/O"

The following sections describe the troubleshooting procedure step-by-step.

5.1   Serial Terminal Program

The serial port communication feature is designed to investigate Echotrac sounder settings and can be useful in diagnosing network communication problems. Serial port communication will require the use of a terminal program such as HyperTerminal or TTY. Also, a serial cable is required between the Echotrac sounder and the controlling computer.

5.2   Serial Diagnostic Message

When the serial cable is in place and the terminal program is running, the Echotrac sounder can be powered on. The Echotrac sounder will output a short diagnostic message on its serial port. This string contains firmware version numbers and firmware checksum values. The default serial port baud rate should be 19200. If unreadable characters appear in the terminal program, the sounder may have an older firmware version. Older firmware versions default to a slower baud rate of 9600. Change the baud rate in the terminal program and then power on the Echotrac sounder again. The diagnostic message should now be readable. If not, there may be a problem with the serial port. If the terminal program does not show any characters, make sure the correct com port is used on the computer.

If it appears that the Echotrac sounder does not output anything (readable or unreadable) on the Echotrac sounder's serial port at power up, please contact an Odom Hydrographic Representative or Technician for further instructions.

5.3   Echotrac Firmware Version

After the diagnostic message has been viewed successfully, be sure the Echotrac sounder's firmware version (prior to 4.xx) matches exactly that of the Echotrac Control Program. If it does not, contact an Odom Hydrographic Representative or Technician for additional instructions.

5.4   Serial Commands

Serial commands can be used to exercise the Echotrac sounder and to obtain/investigate its current settings. Commands can be sent to the Echotrac sounder through its Com1 serial I/O port in the following format:
*<control>*P *Parameter ID* <space> *Parameter Value* <enter>

Examples: *(See reference [1] for an overview of other commands)*
*<control>*P160*<space>*0*<enter>*   Command (160) turns Standby off (0), Echotrac starts sounding.
*<control>*P178*<space>*0*<enter>*   Command (178) resets the sounder to factory default settings.

After the RESET command has been sent to the Echotrac sounder, power-off and back on again. Try communicating with it again using the network connection.
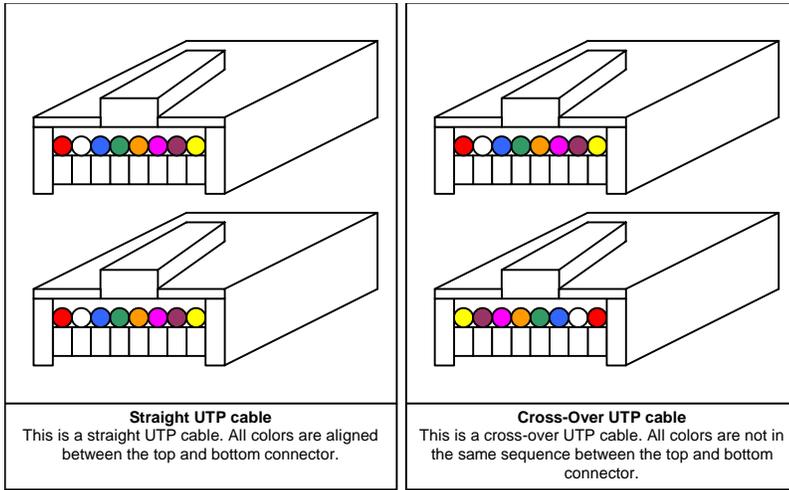
6 FACTORY RESET

If there is no network communication possible after a factory reset has been executed through the Echotrac sounder's serial port, a physical reset can be performed.

Contact an Odom Hydrographic Representative or Technician for additional instructions. The Representative or Technician will determine whether this procedure is necessary or allowed.

7 APPENDIX A: UTP CABLES

Below is an overview to show how to distinguish between straight and cross-over UTP cables.

Straight UTP cable
This is a straight UTP cable. All colors are aligned between the top and bottom connector.

Cross-Over UTP cable
This is a cross-over UTP cable. All colors are not in the same sequence between the top and bottom connector.

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8   APPENDIX B: QUICKSTART TROUBLESHOOTING GUIDE

This section provides a very short list of steps for troubleshooting. For more detailed troubleshooting information refer to the other sections in this document.

1. What is the operating system of the connecting computer ?
2. If Windows XP, is the firewall disabled or set to exempt the application / Control Program ?
    (Some virus scanners also have their own firewall that can prevent applications from allowing network access.)
3. Is the Link Light active when the Echotrac sounder is connected through its LAN connection ?
4. Is a laptop computer being used and are the LAN settings set to auto-negotiate at full duplex at 10mb ?
    (Only some laptop computers require these settings.)
5. If a static IP address has been selected, it should be similar to:192.168.100.100.
6. If a dynamic IP address is selected, it could take as long as 3 minutes before network access is possible.
7. A cross-over LAN cable is required unless the LAN cable is going through a router, switch, or hub.
8. What is the version of the Control Program being used?
    If the Echotrac Control Program is used, the version number should match that of the Echotrac sounder's firmware. Echotrac sounders shipped with the Odom eChart program do not require matching the firmware versions. However, Echotrac sounder firmware version 4.xx is highly recommended.

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