BIOPAC® Systems, Inc.
Registered to ISO 9001:2015

TROUBLESHOOTING MP150 COMMUNICATIONS

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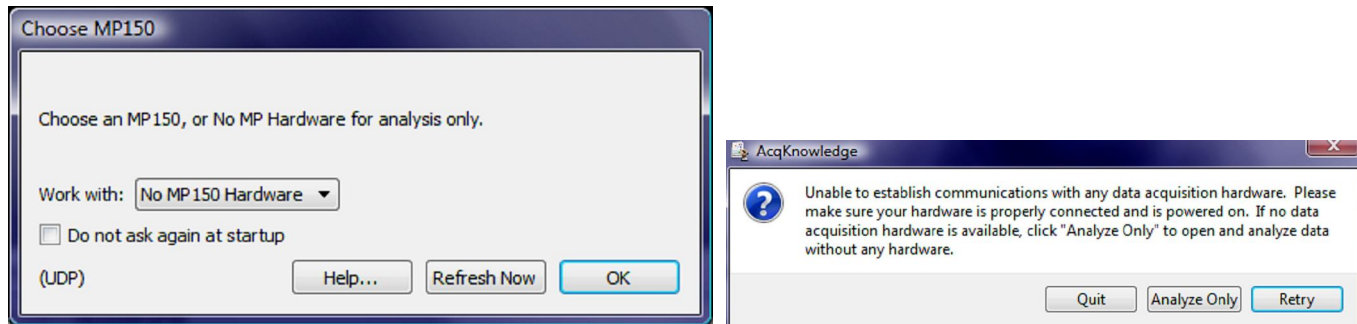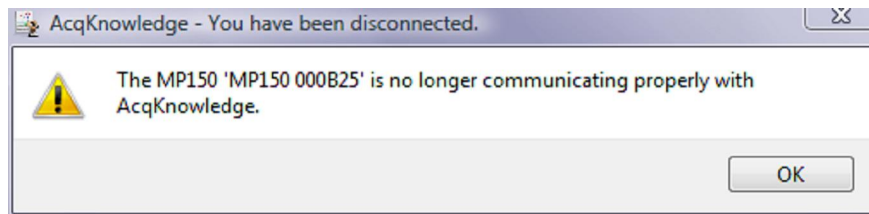info@biopac.com | **www.biopac.com**

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Introduction

MP150 communication can be compromised by a variety of factors. Typically, the symptom will be the presentation of a dialog box such as these below during software startup:


If communication is lost after it has been established, a message such as this may appear:

This document provides background information and troubleshooting steps that should help to resolve most ethernet communication problems with the MP150. The associated flow chart is designed to help identify the specific factor preventing communication.

If there is no communication with an MP150 and no dialog boxes similar in content to those above ever appear, check the "Start" button in Acq*Knowledge*. If it is inactive and symbolized with a gray circle such as: then it is likely just an Acq*Knowledge* configuration issue. Note the "Do not ask again at startup" checkbox in the first image in this document. When that box has been checked, a preference is set telling the software not to look for hardware. "Preferences" are available via the "Display" menu (in some Macintosh versions, "Preferences" are under the "Acq*Knowledge*" menu). In the pane or section devoted to "Hardware", there is a checkbox such as:
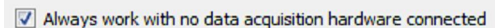
Make certain that this box is NOT checked. If it is, uncheck that box and re-start Acq*Knowledge*.

Hardware

Power Supply

The MP150 must be functional, properly powered, and connected with the correct type of cable. On the front of the device there are three status lights labeled "POWER", "ACTIVITY", and "BUSY". When the device is on, the power light should be

a steady green. A flashing POWER light indicates a problem with the device or its power supply. The power supply should provide 12 volts and at least 1.25 amps (newer units have a supply rated at 4.17 amps). As indicated on the back of the MP150, the tip of the supply's connector should be positive. BIOPAC cannot guarantee the operation of the MP150 if it is driven by a power supply not provided by us specifically for use with an MP150. If there is any doubt as to whether the correct supply is being used, the supply should be disconnected until it has been determined said supply is one with which the MP150 was designed to operate. If the power supply is appropriate for an MP150, make certain that the cable connecting the supply to the MP150 is fully inserted. Verify also that the power cord is fully plugged into a functioning electrical supply outlet.
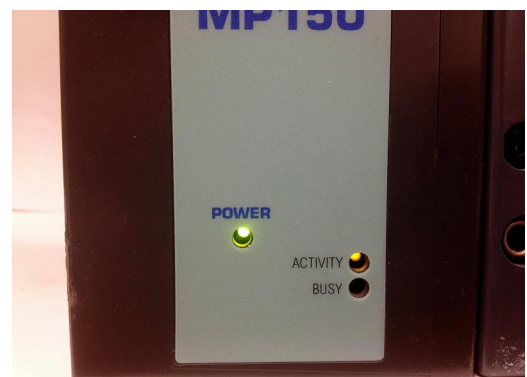
MP150 Status Lights

Fuse

If the power light is not activated by the power switch and the power supply and connections have been verified, the next step is to check the fuse. Beneath the power switch on the back of the MP150 is a gray fuse holder (see photos below). With a small slotted screwdriver, push in on the fuse holder and turn counter-clockwise one quarter of a rotation. This will disengage the fuse holder causing a spring to push it part way out. Pull the fuse holder the rest of the way out and then remove the fuse. There is a fine wire running down the center of the fuse. If that wire is visibly broken, or if an ohmmeter connected to the two end caps of the fuse indicates a high (typically "overload") resistance, then the fuse should be replaced.
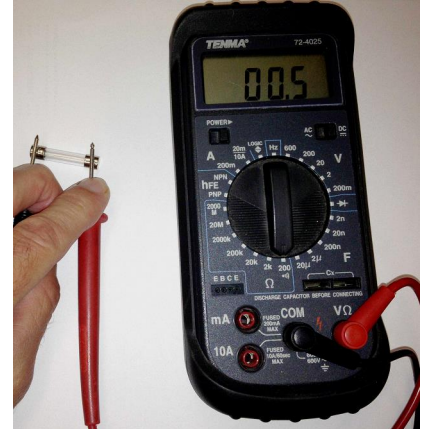

Location of fuse holder; Back of MP150

A. Removed fuse holder

B. Fuse removed from holder

Testing fuse with digital multimeter

If the fuse is not burned out and the power light will not come on when it should, then the unit must be sent back to BIOPAC Systems, Inc. for inspection/repair. Please contact BIOPAC Systems support for an RMA #.

If the power light is on steady and green as it should be, next check the other two status lights. When the unit is turned on, the Activity and Busy lights should both turn on for a brief period, then the Busy light should turn off and stay off. The Activity light should flash intermittently. On older models, Activity and Busy lights may flash alternately to indicate that the device does not detect a network connection. On more recent models, this state is indicated by a double-flashing of the Activity light. In this state, the Activity light flashes twice, pauses for a couple of seconds and repeats indefinitely.

Check the MP Systems Hardware Guide (available via the "Help" menu in Acq*Knowledge*) to determine the meanings of other patterns of the status lights on the MP150. Most of the unusual flashing patterns indicate a problem that will require the MP150 to be serviced. In that case, contact BIOPAC Systems for an RMA #. If instead the pattern indicates a network problem, continue reading this troubleshooting guide.

Ethernet Cable

Ethernet Crossover Cable

If the MP150 is connected directly to an ethernet port of the host computer, the two devices form a peer to peer network. Hence the ethernet cable that connects them should be a crossover cable. The best way to ascertain whether a cable is a crossover cable is to detach both ends, hold them at the same orientation, and look at the order of the wires within. If the two ends of the cable look the same, then the cable is a straight-through or patch cable. This type of cable is used for client-server systems. An MP150 connected to an ethernet switchbox or connected to a port in the wall should use a patch cable. Direct connection to the host computer should be through a crossover cable such as the one shown in the image above. Note that the order of the wires visible through the clear plastic housing is different at the two ends.

Firmware

If your MP150 was sold in 2004 or earlier, there is a possibility that the device is configured to use a DLC communication protocol instead of the UDP communication that current devices utilize (skip this section if you are certain your device was made after 2004). Support for DLC communication does not exist in operating systems later than Windows XP. If Acq*Knowledge* version 3.7.3 is the most recent software version used with your device, that device will require a firmware upgrade to work with a newer OS. If your MP150 has been used with Acq*Knowledge* 3.8 or 3.9, this possibility remains, although it is less likely.

MP150 Communication Type Utility

If you are using one of these older versions of Acq*Knowledge* on a computer running Windows XP, the Windows "Start" menu should allow you to find a utility program that configures the communication type that the software will try to use. Click the "Start" menu in the Windows Task bar, click "All Programs" to expand the list, and then look for an "AcqKnowledge" entry that includes the "MP Communication Type Utility" (the system used to generate the image at right has multiple Acq*Knowledge* versions installed. You should expect to find only one on your system).
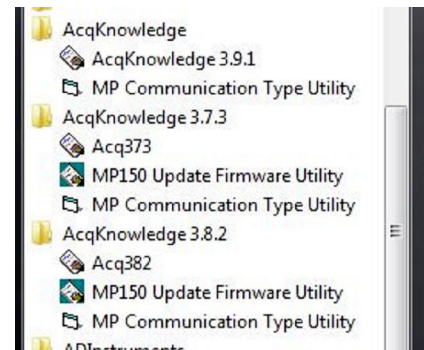
The MP Communication Type Utility presents a single dialog box that allows you to specify the type of MP device you are using and the communication protocol if the device is an MP150 (see image below). If the utility has "MP100" selected, click the "MP150" radio button. Try first with the "UDP" radio button selected. If you made any changes, click the "Switch" pushbutton, cycle the power on the MP150 (turn it off and turn it on again), and re-start Acq*Knowledge*. If the device does not communicate with UDP protocol specified by the communication type utility, try selecting DLC protocol (if you are using Windows XP or earlier), cycling the power on the MP150, and re-start Acq*Knowledge* again.
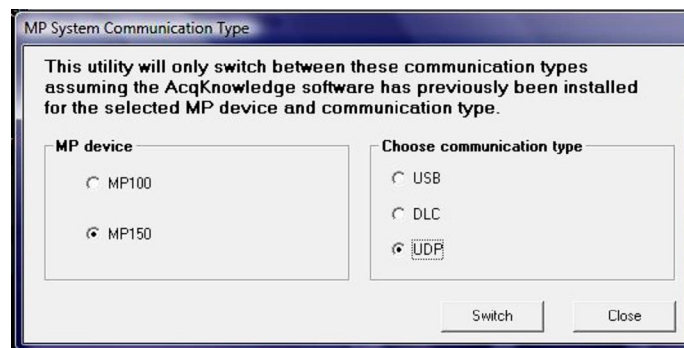
MP150 Communication Type Utility Dialog Box

If your device is old enough that it might be using DLC protocol, keep this issue in mind as you proceed through the next set of steps. It may be worthwhile to try switching communication protocols again after other potential problems have been, in principle, eliminated.

If your MP150 is being used with a computer it has not previously communicated with and that computer is running Windows XP or earlier, you might need to contact BIOPAC (support@biopac.com) to request a copy of the DLC protocol. The protocol installed by Windows will not allow MP150 communication; if the MP150 is attempting to use DLC, the DLC protocol on your host computer must be one that has been obtained from BIOPAC Systems.

Software

Network Card Driver

An inappropriate device driver for the network card is the cause of some communication problems. In most versions of Windows, there is a "Device Manager" control panel. Within that control panel is "Network adapters". Click on the "+" sign next to Network adapters to display all such devices. Find the connection corresponding to the adapter attached to the MP150. If this is the only network adapter in the host computer, disconnect the MP150 and connect the computer to the network (via a patch cable). Once there is a working network connection, right-click on the adapter that will be used for MP150 communication and choose "Update Driver Software...". Allow Windows to search the web to determine if there is a better device driver than the one that it is using.

In the Fall of 2013, MP150 systems started shipping with ethernet to USB adapters. If you are using such an adapter from us, you should make sure the device driver came from the manufacturer. The device should have the Tripp Lite logo on it. The driver for this device may be located here. Please contact BIOPAC Support if you have difficulty finding the correct driver. Scroll to "Download" and open the "Software and Tools" menu. Click the down arrow ↓ next to your current Operating System. Download and execute the file to install that driver.

Other Network Connections

If updating the network card driver does not resolve the communication issue, use the Device Manager to disable all network connections aside from the one used for the MP150. This includes any Wi-Fi connections. After making changes such as this, it is a good idea to re-boot the computer and cycle the power on the MP150 (that is, turn it off and then back on again) before retesting MP150 communication.

Fixed IP Address

Communication between host computer and MP150 should occur with the network interface configured to assign its IP address automatically. Sometimes, however, communication is established more reliably with a fixed IP address.

1. Open the "Network and Sharing Center" control panel and select the "Local Area Network" to which the MP150 is connected. This will produce a Local Area Connection Status dialog resembling the figure on the right.

2. Click the "Properties" pushbutton. It may be helpful to turn off all services aside from TCP/IP version 4 as shown below.

3. With "Internet Protocol Version 4 (TCP/IPv4)" selected, click the "Properties" button for the Local Area Connection Properties dialog box. The Properties for this protocol may be set for the use of a static IP address (see figure below right). The IP address to use is 169.254.111.111 with a Subnet mask of 255.255.0.0.
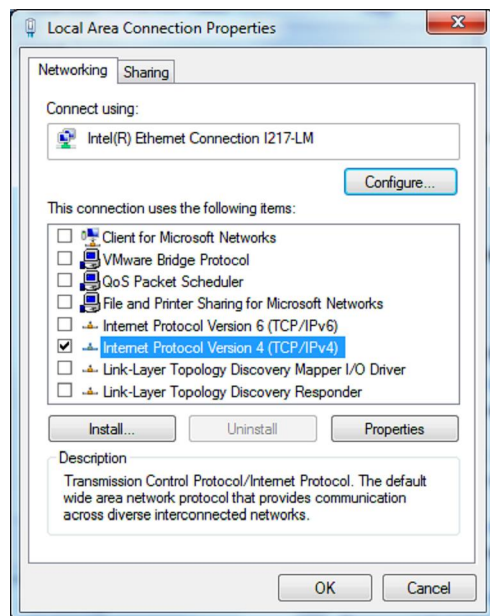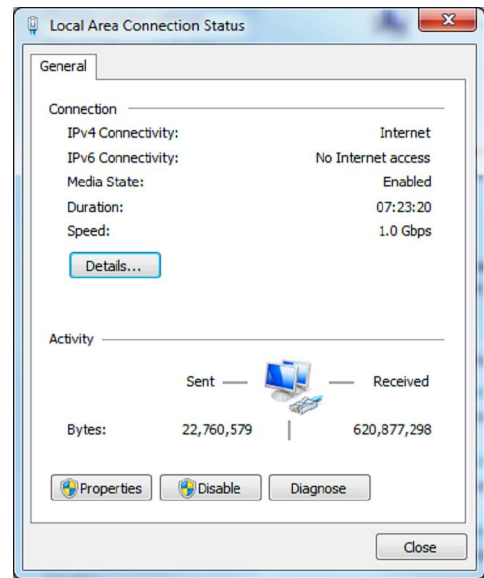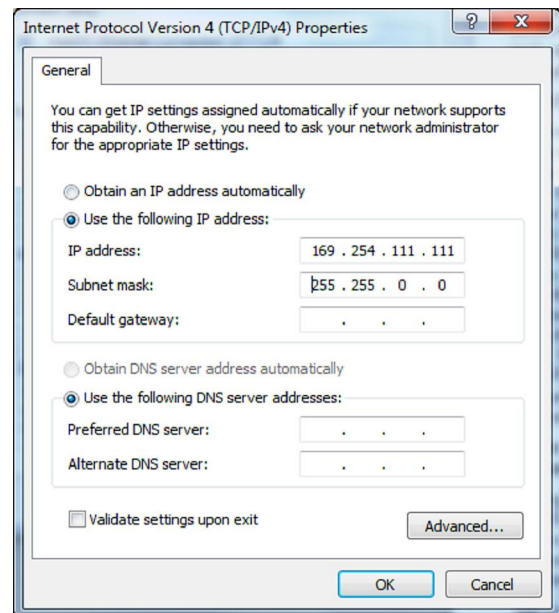
Local Area Connection Properties   *TCP/IP Version 4 Properties*

Active Suppression of Communication

Among the most frequent causes of MP150 communication failures is anti-virus or firewall software that disallows said communication. After disabling all network connections aside from the one to the MP150, the computer is safe from assault provided no infected media (flash drive, external hard drive, etc.) are connected. Therefore, all anti-virus and firewall software may be safely disabled. Third party firewalls may be involved. Make sure ALL firewall and ALL anti-virus programs are turned completely off. Then if communication is not established, re-boot the computer, cycle the power on the MP150, and start Acq*Knowledge* to try again.

If none of these steps resolve communication, the next step is to begin swapping components to ascertain where the problem might lie. If the MP150 status lights behave normally, the problem is likely to be something other than the MP150. Hence the next steps should be to find another ethernet cable and/or another computer to test.

Fine Tuning

The above recommendations are designed to locate the source of the problem. Once the source has been identified, other steps might be taken to allow MP150 communication without disrupting other functions of the system. For instance, if anti-virus or firewall software is the cause of the problem, the interfering program should be configured to allow MP150 communication without being turned all the way off. Acq*Knowledge* uses UDP ports 15000 and 15001 for communication. Anti-malware software should be set up so that it doesn't block Acq*Knowledge* from using these ports.
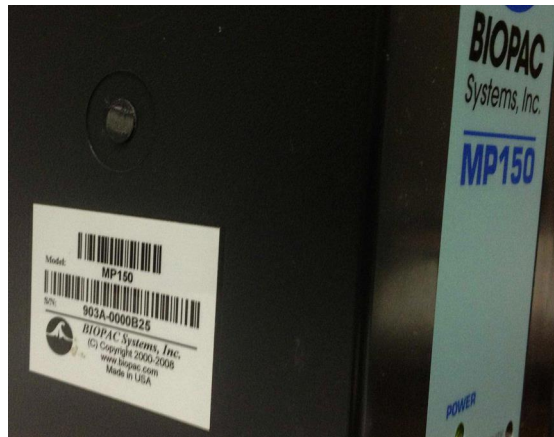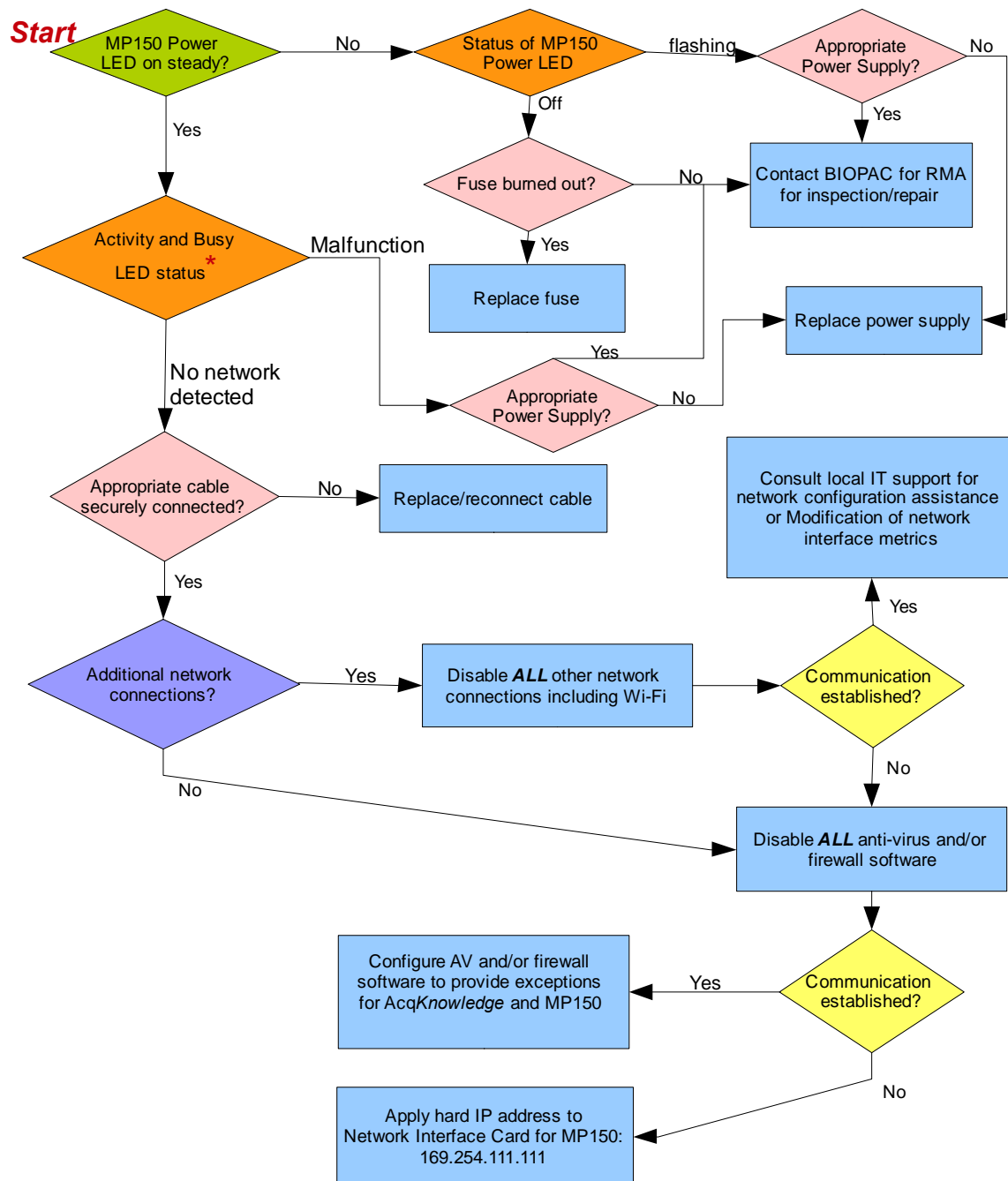

MP150 Serial Number

If turning off other network connections allows MP150 communication, the network may be reconfigured so that other network adapters can be re-enabled without hindering Acq*Knowledge*. There are three major reasons why additional network connections might prevent MP150 communication. One is the use of global IP addresses by the host network. Another is that the host network may listen for unknown devices and block communication to and from them. The last is that, when given the opportunity, Acq*Knowledge* might try to use one of the other network adapters instead of the one to which the MP150 is physically connected.

The administrators of the network can help with problems of the first two types. Provide them with the MAC address of the MP150. The first six digits of the MAC address of an MP150 are always 00 90 3D. The last six digits are the same as the last six digits of the device's serial number. The serial number is printed on a sticker on the MP150's left side. If MP150 communication can be established (e.g., with all other network cards disabled), the MAC address can also be determined from within Acq*Knowledge*. In recent versions of Acq*Knowledge*, choose "MP150 > MP150 Info..." to find the MAC address. If the MAC address is provided to network administrators, they should be instructed to make sure that the device is not blocked and that it is assigned an IP address that is in the same subnet as the ethernet card to which it is attached.

If local network configuration is deemed not to be the source of the problem, then adjusting the metrics of the network interface cards may allow multiple connections without disabling MP150 communication. Here are two methods for modifying the metrics provided that the user **has administrator privileges** on the computer. Both begin by opening the control panel "Network and Sharing Center".

Method 1: [easier but possibly less reliable] Choose the task "Manage Network Connections". Choose "Advanced Settings..." from the "Advanced" menu in the window that opens up. With the "Adapters and Bindings" tab selected in the "Advanced Settings" dialog box, make sure the connection to the MP150 is selected under "Connections". Using the upward-pointing arrow to the right of the Connections selection box, move the MP150 connection to the top of the list. Close all dialog boxes, restart the computer, and test MP150 communications again.

Method 2: [more difficult, but more likely to succeed] Click "View status" at the lower right side of the line containing the connection to the MP150. In the Status dialog box that opens, click the "Properties" button. With the "Networking" tab selected in the Properties dialog box, select "Internet Protocol Version 4 (TCP/IPv4)". Click the "Properties" button. With the "General" tab selected in this Properties dialog box, click "Advanced...". With the "IP Settings" tab selected, uncheck the "Automatic metric" checkbox, and enter "1" (without quotes) in the "Interface metric" edit box. Lower numbers correspond to higher priorities, so with this metric, this network connection should be selected first by the OS when using IPv4. Close all of the dialog boxes and restart the computer.

Start → MP150 Power LED on steady?

— No → Status of MP150 Power LED

— flashing → Appropriate Power Supply?

- No → Contact BIOPAC for RMA for inspection/repair
- Yes → Contact BIOPAC for RMA for inspection/repair

Status of MP150 Power LED — Off → Fuse burned out?

- No → Contact BIOPAC for RMA for inspection/repair
- Yes → Replace fuse

MP150 Power LED on steady? — Yes → Activity and Busy LED status *****

- Malfunction → Appropriate Power Supply?
  - Yes → Replace power supply
  - No → Replace power supply
- No network detected → Appropriate cable securely connected?
  - No → Replace/reconnect cable
  - Yes → Additional network connections?

Additional network connections?

- Yes → Disable **ALL** other network connections including Wi-Fi → Communication established?
- No → Disable **ALL** anti-virus and/or firewall software

Communication established?

- Yes → Consult local IT support for network configuration assistance or Modification of network interface metrics
- No → Disable **ALL** anti-virus and/or firewall software

Disable **ALL** anti-virus and/or firewall software → Communication established?

- Yes → Configure AV and/or firewall software to provide exceptions for Acq*Knowledge* and MP150
- No → Apply hard IP address to Network Interface Card for MP150: 169.254.111.111

* See MP Systems Hardware Guide available via the ‰Help+menu in Acq*Knowledge*. The guide contains a table describing the meaning of different LED patterns for the Activity and Busy LEDs. Under normal operation when not acquiring data, Busy LED is off, and Activity LED flashes (amber) at irregular intervals. If Activity LED double flashes at regular intervals (newer MP150s) or if Activity and Busy LEDs flash alternately (older MP150s), then MP150 does not detect that it is connected to a network.