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Networked Robotics Interface to Thermo Fisher Scientific® HeraCell VIOS incubators and Forma 4000-Series Incubators using the Networked Robotics NTMS4p

This product enable remote network data collection from Thermo Fisher Scientific® Heraeus® HeraCell and Thermo Fisher Scientific® Forma® 4000-series incubators. They are designed for use with Networked Robotics' NTMS (Network Telemetry Monitoring System) hardware and Networked Robotics' Tempurity™ System software. The Tempurity System is engineered for data collection and monitoring in FDA-regulated environments including the pharmaceutical, medical, and food industries.



Description

This product enables real-time network data collection and monitoring of trending temperature, carbon dioxide concentration, oxygen concentration, and relative humidity status by a single direct connection to the USB data communications port of the incubator. Some HeraCell incubators support temperature and carbon dioxide concentration only depending on the options ordered. The data that is collected and stored in the Tempurity System is the same as the data that is displayed on the front panel of the incubator.

This product is designed for use with the Heraeus Vios line, models 160i and 250i, may also be used with 150i and 240i models that were shipped with the USB option, and with 4000-series Forma water-jacketed incubators.

Packing List

This package includes the hardware that you will need in order to connect the incubator to the NTMS.

- (1) Networked Robotics NTMSp
- (1) MicroUSB power supply for NTMSp
- (1) RJ-45 coupler for network cable extensions
- (1) CAT5 cable
- (1) Standard USB A male to USB B male cable per incubator

Hardware Installation

There are three major steps in the installation of this hardware:

- 1) Physical installation
- 2) Configuration of the Networked Robotics NTMS hardware
- 3) Manual testing of data collection via the network

Each of these steps, especially manual testing through the network, as described below, should be performed successfully before attempting to configure real-time data collection via the Tempurity System. Detailed information on configuring this “monitored device” through Tempurity is available in the Tempurity System’s User’s Guide (Networked Robotics document number “Tempurity-04-0006.5”) on the Networked Robotics web site.

1. Physical Installation

Set the BAUD Rate on the Incubator Front Panel

Using the front panel controls set the USB data rate of your incubator to 9,600 BAUD. Consult the operating manual of the incubator for detailed instructions.

MAC addresses

The wired and wireless MAC addresses are included in the shipment with a separate printed sheet for each NTMS4p. If your IT group requires MAC addresses to be registered provide this number to them.

Connect the NTMS4p to the Incubator USB Port

Connect the standard USB cable from the NTMSp in any one of the four USB ports on the interface and plug the other end into the USB port on the incubator. Port 1 will be the upper left USB port when looking at USB ports. Port 2 is below 1.

Connect the standard Cat5 cable to the NTMS4p and to a network connection in your office. The full Mac address of the NTMSp is included in the shipping documentation. Some institutions require the Mac address to be authorized on their network. If so work with your IT group to authorize the address.

Connect the microUSB power supply to the NTMS4p and to a standard wall outlet.

After this is done wait 1 to 2 minutes for the NTMS4p to power up. Once it is powered you will be able to access it via the NTMS Configuration Wizard on your computer. Use the wizard to change the static IP and subnet mask as appropriate for your institution and set the instrument type as described below.

The NTMSp is capable of wifi data collection if your wireless routers use WPA or WPA2 authentication. To use this product wirelessly you will use the NTMS

Configuration Wizard to authenticate to the wireless router. If needed email support@networkedrobotics.com and we will walk you through how to set up wireless networking.

You may need to restart the device with everything connected if you experience any problems.

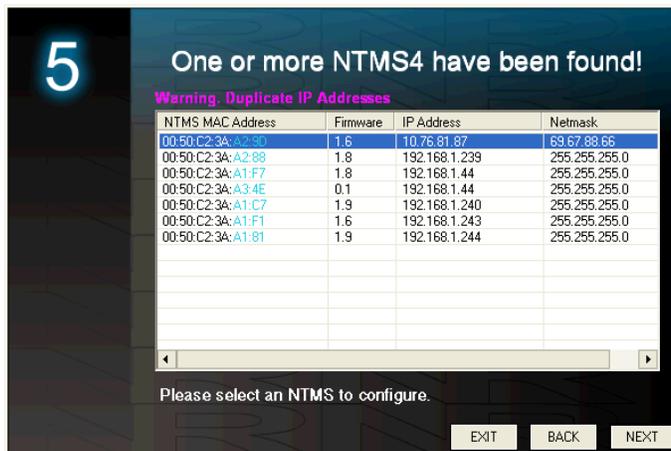
Extensions

You can easily extend the length of any instrument connection using USB cable extensions.

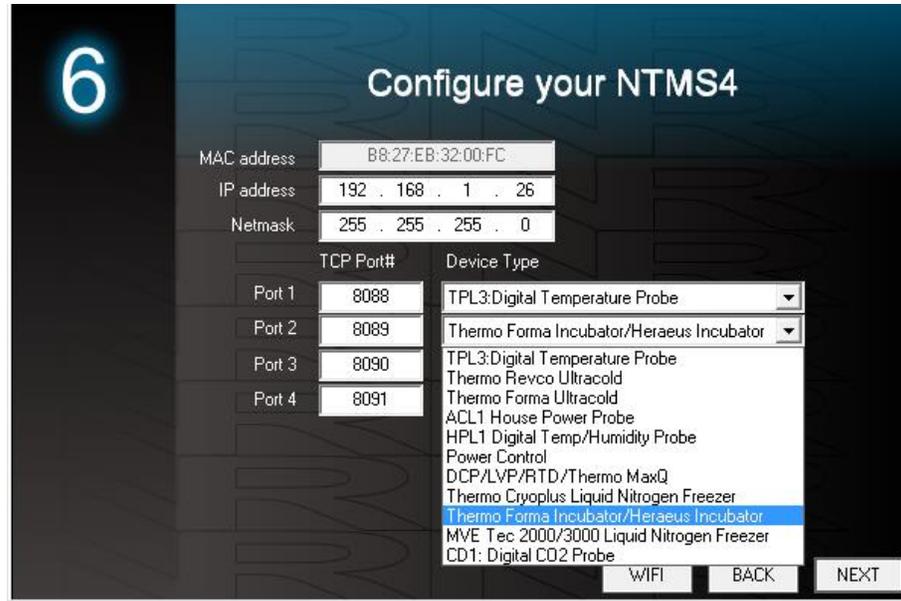
1. Configuring the NTMS for Data Collection

Configure your NTMS network hardware for data collection from this instrument. This is done by running the latest version of the NTMS Configuration Wizard  from any PC that is on the same subnet as the NTMS to be configured. You can obtain the configuration wizard from the “download” section of the Networked Robotics web page. New sensor and interface types are being added periodically to the wizard so the screens below may change.

1. Run the wizard from the same local area network as the NTMS and verify that the NTMS is discovered. Both NTMS4p and NTMS4i units will be discovered. NTMS units show the last two pairs of numbers in their MAC address, called octets, on their cases. NTMS4i version units start with the octets 00-50-C2-3A. NTMS4p units start with the octets B8-27-EB.



2. Select the NTMS, and proceed to the “NEXT” screen.
3. Enter the correct static IP address and subnet mask for your facility.
4. Click on the NTMS measurement port where the probe is connected, and under the “Device Type” drop down, select the Thermo Forma Incubator option. The adapter is configured to work with either HeraCell or Forma Incubators through the Networked Robotics’ Forma data interface type.



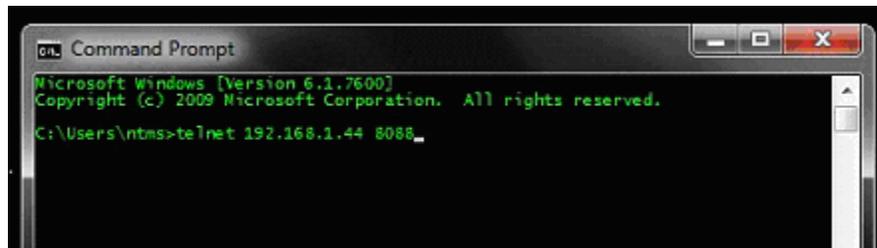
5. Click “NEXT” to complete the NTMS configuration.

2. Testing Data Collection Manually through the Network

Once the configuration is complete we recommend manually testing the ability to make network temperature, CO₂, O₂, and humidity measurements by using the “Telnet” utility from any PC. This commonly-used network utility sends simple network commands that will elicit readings from the HeraCell incubator. For more about debugging network connections see the appendix of the Tempurity System User’s Guide.

On Windows 7,8,10 clients you may need to enable the Telnet utility as follows: 1 Start 2 Control panel 3 Programs 4 Turn Windows Features on or off 5 Check “Telnet Client” 6 Click Ok

1. From Windows click “START”, then “RUN”, and then type “CMD” and return.
2. At the black screen type “Telnet” + *IP Port* (where *IP* is the IP address and *Port* is the network port address (e.g.8088) as selected by your use of the NTMS Configuration Wizard in screen 6 as described above.)



3. If you are successfully connected through the network you will see a blank screen.
4. Type a capital “T”, “C”, “O”, or “H” the command characters for this device. A value for the associated query should be returned. Temperature, carbon dioxide, and oxygen concentration return trending values. “H” returns a status code (0 or 1) indicating whether a low humidity condition exists.

If a value is not returned, check network parameters, network ports, firewalls and connections and try again before attempting to configure data collection using the Tempurity System software.

Operation

NTMS4p network hardware continually reads data from the Heracell/Forma Interface. Each reading takes about 5 seconds. The most recent values are available for network requests by the Tempurity System.

Temperature, carbon dioxide and oxygen readings are fully trending when used with a supported instrument. The relative humidity reading is a status only and indicates only in a yes/no way whether a low humidity condition exists. A zero reading indicates normal humidity. A reading of one indicates that a low humidity condition exists. See your incubator's operating manual for a description of "normal" vs. "alarm" humidity levels.

An attempt to access oxygen concentrations when not supported by the unit will yield a -999.9 reading. On models with no "i" suffix humidity readings always yield 0. The Tempurity System should not be configured for continuous data collection from unsupported internal sensors.

Reference

Communication

Data Rate

USB 9600 (in older versions 57600 Baud)

Physical Specifications

NTMS4p

Network Data Rate:	10/100 MBS Ethernet
Wireless Network:	802.11n
USB:	USB 2.0
Bluetooth:	4.1 Classic, Low Energy

Weight: 99.2 grams (3.5 ounces)

Length: 95.2 mm (3.75 inches)

Width: 71.1 mm (2.8 inches)

Height: 23.4 mm (.92 inches)

All measurements do not include dual-lock backing

Performance and Accuracy

This product reports the values as that are obtained directly from the Heracell or Forma incubator. These values correspond to the values that are displayed on the front panel of the instrument. Accuracy is per manufacturer's specifications. Follow the manufacturer's instructions for calibration.

This interface rounds data produced by the interface to the nearest 1 decimal point in order to match the front panel display of the incubator which also rounds values to the same precision.

Support

If you need assistance with your Networked Robotics Interface to the Heraeus Heracell or Forma-4000-series class of incubators or other products, contact Networked Robotics by phone at 877-FRZ-TEMP (877-379-8367) or by email at support@networkedrobotics.com

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