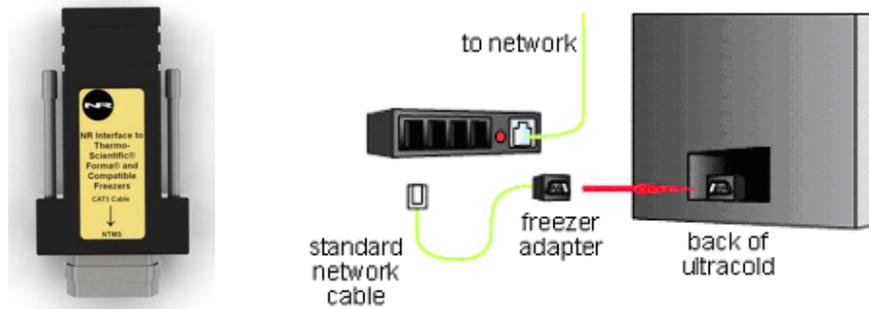Networked Robotics Corp.
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Networked Robotics Interface to Thermo Scientific® Forma® and Compatible Ultra-low Temperature Freezers (#30003)

This interface enables remote network data collection from Thermo Scientific® Forma® ultracold (-80°C) freezers. The interface is used in conjunction with the Networked Robotics NTMS (Network Telemetry Monitoring System) hardware and with Networked Robotics' Tempurity™ System software. Tempurity is designed for network-based data collection and monitoring in FDA-regulated environments including pharmaceutical, medical, and food industries.

Description

The Networked Robotics Forma and Compatible Freezer Interface enables the network-based data collection of temperatures directly from the serial data communications port of these freezers. This product is appropriate for most Forma-brand ultracold (-80°C) freezer models with serial ports and some compatible brands and models including older VWR® freezers. Forma 8600-series ultracold models do not support direct data collection with this product. Use a Networked Robotics TPL3U temperature probe (Product #30012) or a Networked Robotics RTD probe (Product #30014) to acquire temperature data from these models.

Packing List

This package includes the basic hardware you will need to connect the Forma-compatible freezer to the NTMS.

- (1) Networked Robotics Forma-compatible Adapter
- (2) RJ-45 Coupler for extensions
- (3) CAT5 cable

Data Collection from Multiple Monitored Devices

Because each NTMS4 unit has 4 measurement ports, data from 4 compatible ultracolds, or any other types of scientific instruments or sensors can be collected simultaneously. Only a single monitored device, a direct connection to a Forma-compatible ultracold freezer is shown in the

figure above. See the hardware manuals of other Networked Robotics products for a description of how data is collected from other types of scientific instruments and sensors.

Hardware Installation

The Networked Robotics Forma freezer interface is attached to the serial port on the back panel of the Forma freezer and to the Networked Robotics NTMS network hardware as shown in the diagram above. There are three major steps in the installation of this product:

1) Physical installation
2) Configuration of Networked Robotics NTMS hardware to which the freezer is attached
3) Manual testing of data collection via the network

Each of these steps should be performed successfully before attempting to configure and monitor real-time freezer data via the Tempurity System. Detailed information on configuring data collection in Tempurity is available in the Tempurity Systems User's Guide (Networked Robotics document number "Tempurity-04-0006.5)" on the Networked Robotics web site.

1. Physical Installation

Cables
Use a Cat5 cable to connect the adapter to the NTMS measurement port as shown in the diagram above. Plug the 9-pin adapter into the serial port at the back and bottom of the Forma-compatible freezer. Forma freezers sometimes have two 9-pin connectors, one used to transmit alarm status via contact closures, and the other for serial data transmission. Be careful to connect to the serial-port 9-pin adapter and not the remote alarm adapter. Alarm contact connectors on the freezer are DB9-male whereas the serial connectors are DB9-female. Your Forma interface adapter may come as a two-piece unit, including a connector and a gender-changer end. Do not remove the gender changer and mistakenly plug the adapter into the contact closure alarm port.

Forma Freezer Front Panel Setup
No setup steps are necessary to ensure that the ultracold freezer sends data appropriately. Just plug the interface in at the back of the unit as described above.

(Note: If you are using a Networked Robotics DCP probe(Product #30008) instead of, or in combination with this direct interface then your entries on the front panel for alarm criteria are important for recognizing the correct alarm conditions. When using this type of interface you must set the allowable high and low alarm levels on the front panel as appropriate for the samples in the freezer.)

Extensions
The ultracold freezer can be as far as 400 feet away from the Networked Robotics NTMS network hardware. You can easily extend the length of any connection using the included RJ-45 coupler and CAT5 cable. You can also mount your NTMS network hardware in a network closet, and "patch" the connection to an ultracold freezer using a standard wall plate in your lab or office.
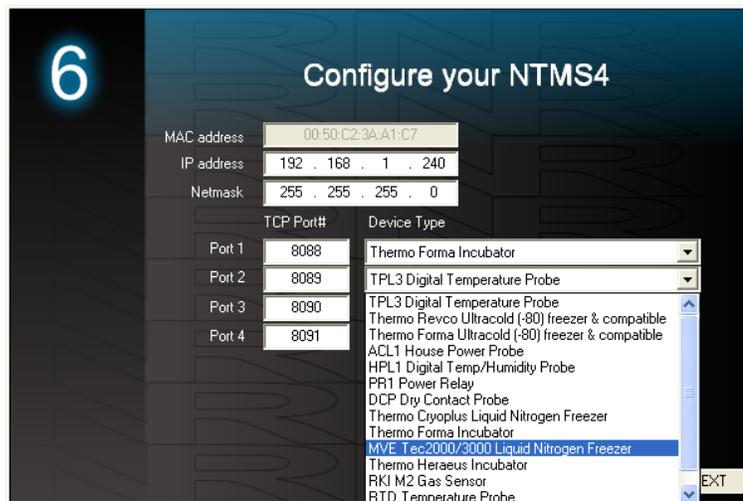
2. Configuring the NTMS

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 and verify that the NTMS to which the interface is attached is discovered. This NTMS must be running firmware revision 2.0 or higher. If it is not, stop the installation and upgrade your NTMS hardware's firmware with the NTMS Upgrade Wizard ⬚ available from the Networked Robotics download-page. There are special precautions needed when upgrading an NTMS running firmware version 1.x to firmware version 2.0 or higher.
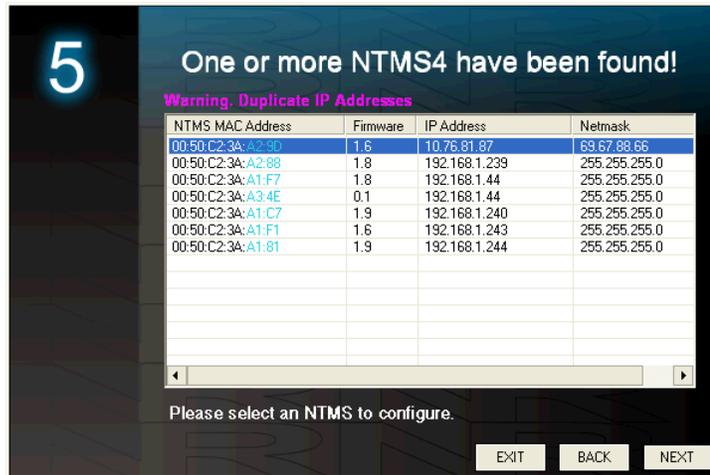
2. Select the NTMS to which the interface is attached, and proceed to the "NEXT" screen. (IP addresses must be set properly for your institution. If you are uncertain about the IP address to use, check with your network administrator.)
3. Click on the NTMS measurement port where the probe is connected, and under the "Device Type" drop down, select "Thermo Forma Ultracold (-80) freezer & compatible".


4. Click "NEXT" to complete the NTMS configuration.

3. Testing Data Collection through the Network

Once the configuration is complete as described above we recommend testing the ability to make network temperature and other measurements by using the "Telnet" utility from any PC. This commonly-used network utility sends simple network commands that will elicit a temperature from the ultracold freezer.

On Windows 7 clients you may need to enable the Telnet utility as follows:1 Start 2 Control panel 3 Turn Windows Features on or off 4 Check "Telnet Client" 5 Press Ok.

1. From Windows choose "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 as selected by your use of the NTMS Configuration Wizard as described above.
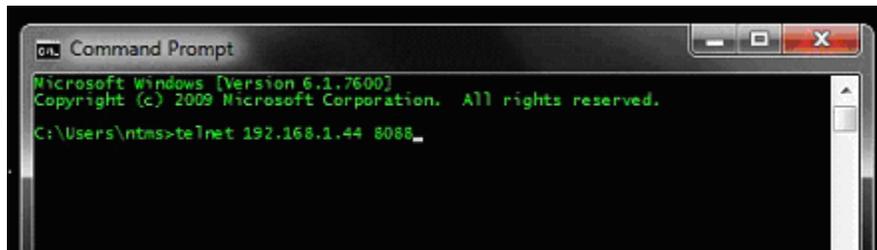
3. If you are successfully connected through the network you will see a blank screen.
4. Type a capital "T", the command character for this interface. A temperature and the associated checksum value should be returned. For more about debugging network connections to monitored devices see the Tempurity System User's Guide.

For use with the Tempurity System, you will need to add the network address (IP address and network port address) of the new monitored device (the ultracold freezer) to the Tempurity Server configuration. See the Tempurity System User's Guide and the section on server configuration for more information. The control character for this interface is "T" for temperature.

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

Operation

The NTMS network hardware continually reads temperatures and other data from the freezer(s). The most recent values obtained by the NTMS from the freezer are available for network requests by the Tempurity System. Each reading takes about 3 seconds which is the worst-case time accuracy of the reading. The Tempurity System then requests the most recently obtained data from the NTMS at intervals controlled by the Tempurity Server.

Alternatives for Temperature Data Collection

As an alternative method of temperature data collection, you have the option of using the Networked Robotics TPL3U probe (Product #30012), a version of the digital Networked Robotics TPL3 for -80 environments, or the RTD probe (Product #30014), an analog sensor that measures temperature via resistive techniques. See the Hardware Manual for the Networked Robotics RTD probe for more information.

If you wish to store only alarm information, you may wish to use the Networked Robotics DCP probe (Product #30008) for data collection from the alarm contact connector on

Forma freezers. See the Manual for the Networked Robotics DCP probe for more information.

Reference

Unique IDs

Unique IDs are not supported via this direct interface as they are for Networked Robotics proprietary sensors.

Communications Specifications

The RS232 connection between the Forma-compatible freezer and the NTMS operates at 1200 ,8.n 2 stop bits speed and parity.

Physical Specifications

Weight:	34 grams
Length:	6.35 cm
Width:	3.18 cm
Height:	1.90 cm

Support

If you need assistance with your Forma-compatible Interface or other products, contact Networked Robotics by phone at 877-FRZ-TEMP (877-379-8367) or by email at support@networkedrobotics.com