

**Firmware Updates**  
**Model 24 / 44 / 42**  
**Cryogenic Temperature Controllers**

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### **Printing History**

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### **Certification**

Cryogenic Control Systems, Inc. (Cryo-con) certifies that this product met its published specifications at the time of shipment. Cryo-con further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology (NIST).

### **Warranty**

This product is warranted against defects in materials and workmanship for a period of one year from date of shipment. During this period Cryo-con will, at its option, either repair or replace products which prove to be defective.

For products returned to Cryo-con for warranty service, the Buyer shall prepay shipping charges and Cryo-con shall pay shipping charges to return the product to the Buyer.

However, the Buyer shall pay all shipping charges, duties, and taxes for products returned to Cryo-con from another country.

### **Warranty Service**

For warranty service or repair, this product must be returned to a service facility designated by Cryo-con.

### **Limitation of Warranty**

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by the Buyer, Buyer supplied products or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

The design and implementation of any circuit on this product is the sole responsibility of the Buyer. Cryo-con does not warrant the Buyer's circuitry or malfunctions of this product that result from the Buyer's circuitry.

In addition Cryo-con does not warrant any damage that occurs as a result of the Buyer's circuit or any defects that result from Buyer-supplied products.

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### **Safety**

The Model 24 does not contain any user serviceable parts. Do not open the enclosure. Do not install substitute parts or perform any unauthorized modification to the product. For service or repair, return the product to Cryo-con or an authorized service center.

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## **Appendix B: Updating Instrument Firmware**

Starting with Firmware Revision 3.00, Cryo-con's Model 44, 42 and 24 products have the ability to update their internal firmware in the field. For earlier versions, please contact Cryo-con.

Updates require the use of the Cryo-con Firmware Update Utility software and a hex file containing the updated firmware. These are available on the Internet.

**ⓘ Note:** Updating firmware in any instrument is not entirely without risk. Please only perform the procedure when some down time is available.

The update will abort on the detection of a hardware malfunction. Also, the update may change instrument features that you are currently using in a different way. Factory defaults settings are restored that will erase any existing user calibration curves or PID tables.

### **Discussion**

Cryo-con instruments have two blocks of flash type program memory. In the standard configuration, the Internal block contains a boot-loader program and the External block contains the actual instrument firmware.

During the normal power-up sequence, the boot-loader will test the external flash memory and then transfer execution to it in order to run the instrument's firmware. From there, the Cryo-con firmware update utility can be used to update instrument's firmware.

The firmware update sequence is as follows:

1. Connect the LAN port of the instrument to your PC, turn the instrument ON and then run the FWutility.exe.
2. When you click the Connect button, the PC will connect to the instrument using TCP/IP. If there is an error, a dialog box will appear. Correct the problem and re-try.
3. While connected, the instrument will still be functioning normally. Click on the Set Flash Mode button to place the instrument in the firmware update mode. In this mode, the instrument is executing the boot-loader from the Internal flash memory and is waiting to program the External memory with the new firmware.
4. Click Connect again and then click the Program / Verify button to start the update process.
5. When the update process is complete, the instrument will automatically reset itself and start running the updated firmware.

## Updating unit firmware

Before starting, be sure you have the **FWutility.exe** file and a hex file that contains the desired firmware update.

On the instrument, check the current hardware and firmware revision by pressing the System key and scrolling down to the revision field. A typical display is:

FW Ver: 3.00D

meaning that the instrument has firmware revision 3.00 and hardware revision D.

The name of the hex file is used to identify the firmware update. For example:

M24C\_301.hex

specifies that this is revision 3.01 for a Model 24 with hardware revision C.

**ⓘ Note:** The flash loader software does NOT check the hex file for compatibility with the target instrument. Please be sure that you are using the correct file.

## Connecting a PC to the instrument

It is recommended that you connect the instrument directly to a PC using a LAN Crossover cable. The standard LAN patch cable is designed to connect your PC to a hub and will not work when used to connect to an instrument. The Crossover cable has the transmit and receive lines reversed, which allows direct connection to an instrument. These cables should be clearly marked with the word 'Crossover'.

From the PC, open the network connections dialog, select the network adapter that you are using with the Cryo-con instrument and select "Internet Protocol (TCP/IP). In the TCP/IP dialog box, select 'Use the following IP' addresses and enter following:

IP address: 192.168.1.10

Subnet mask: 255.255.255.0

Other fields are not used. Click OK. This should allow you to communicate with the instrument.

**ⓘ** The advanced user can configure the Ethernet connection in any convenient way. The above procedure is given because it is known to work. The instrument will keep the assigned IP through the entire update process. However, when the update is complete, factory defaults are restored and the IP will be set to 192.168.1.5.

### Loading Firmware

Start the firmware update by running the Cryo-con Firmware Utility. This will launch a dialog box as shown here.

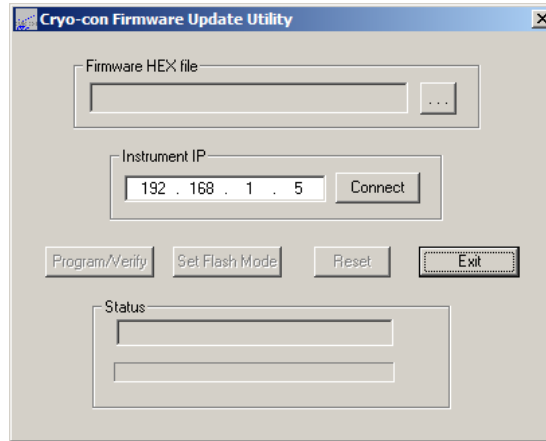
The instrument's default IP will appear in the dialog box. This can be changed if necessary.

Click the **Connect** button. The status box should update to indicate a connection, but the instrument display will not change.

Next, the firmware update file needs to be selected. Click on the browse button (. . .) to launch a file selection dialog.

Select the firmware hex file and click **Open**. The Firmware HEX file field will be updated with the file name.

Also, the **Set Flash Mode** button will become active.



**Caution:** Once you click the **Set Flash Mode** button, the instrument will enter the firmware update mode and will not function normally again until the entire firmware update process is complete without error. Be sure you have the correct hex file before proceeding.

Click the **Set Flash Mode** button to set the instrument into the flash programming mode. The instrument will reset and start in the flash load mode. This is indicated by the display shown.

**Listening at:  
192.168.1.5**

Since the instrument was reset, click **Connect** again to re-establish contact. This will activate the **Program/Verify** button. The instrument will now display Connected...

Click the **Program/Verify** button to start the firmware download.

Status will be indicated on the instrument's display. First, the flash memories will be erased and then, individual records are programmed and verified.

**Erasing Memory...**

There are 6800 records in a typical file and the programming process takes about ten minutes.

When programming is complete, the unit will automatically reset and begin running the updated firmware. Factory defaults are also restored.

**Programming Flash...  
Record: 1124**

You can power the instrument OFF during the programming process. This will require that you re-start the entire process when you power ON. Once the download progress has started, the instrument will power-up in the boot loader mode and will not run the normal instrument firmware until the entire download process has completed without error.

If an error occurs, an error message will display on the instrument's front panel for 20 seconds and then an alert box will show on the PC.

Types of errors are: 1) Failure to erase flash memory. 2) Write error and 3) Verify error.

If the error persists after several programming attempts, there is a hardware problem and you will need to contact Cryo-con.