Johnson Controls

CK721-A

Network Controller

Factory Field Upgrade

CK721-A VERSION 2.10 FACTORY FIELD UPGRADE MANUAL

INTRODUCTION

This document describes how to factory field upgrade the CK721-A controller firmware to Release 2.10. This is the only supported method for upgrading CK721-A controllers in the field when a P1000, P1500, or P2000 host update has failed and the controller constantly reboots (the controller does not come back online with the host). For standard CK721-A firmware upgrade procedures, refer to the *CK721-A Version 2.10 Software Release Notes* (24-10349-32). The upgrade method described in this document does not require the host.

SYSTEM REQUIREMENTS

The following hardware and software are required to factory field upgrade the CK721-A firmware:

- PC running Microsoft® Windows XP Professional or Windows 2000 Professional

---

NOTE
You will be required to change various Windows settings on this PC. To minimize any future issues you may encounter as a result of these changes, we recommend using a substitute computer (i.e. not the PC you use day-to-day).

- RS232 Null Modem Cable (DB9F/F) – Black Box EYN257T-0015-FF or equivalent

- 10/100Base-T CAT5 Ethernet Cross-over Cable (or a standard CAT5 straight-through cable if connecting to a hub/switch) – Black Box EVCRB82-0020 or equivalent

- The **CK721a_Factory_FieldUpdate_FW_2-10.exe** self-extracting archive file located on the CK721-A Version 2.10 Upgrade CD or on the following FTP site:

ftp://cardkey:cardkey2000@ftp2.johnsoncontrols.com/cardkey-out/CK721&RDR2S/CK721a/CK721a-2-10/

- Terminal Emulation Software (Tera Term Pro Preferred) – To use the free Tera Term Pro software, download and install Version 2.3 from the following site:

    http://hp.vector.co.jp/authors/VA002416/teraterm.html

NOTE

The Tera Term Pro terminal emulation software was used in the development of this document. Use of other terminal emulation programs may differ.

Cable Wiring

Null Modem Cable

The null modem cable provides an RS-232 serial connection from the CK721-A RS232C A port to the computer's COM port.

Connector 1 Pinout	Connector 2 Pinout
3 TX	2 RX
2 RX	3 TX
7 RTS	8 CTS
8 CTS	7 RTS
5 SG	5 SG
6 DSR	4 DTR
4 DTR	6 DSR

TX = Transmit
RX = Receive
RTS = Request to Send
CTS = Clear to Send
SG = Signal Ground
DSR = Data Set Ready
DTR = Data Terminal Ready

Ethernet Cross-over Cable

The Ethernet cross-over cable provides an network connection from the CK721-A Ethernet port directly to the computer's network port.

Connector 1 Pinout	Connector 2 Pinout
1 RX+	3 TX+
2 RX-	6 TX-
3 TX+	1 RX+
6 TX-	2 RX-

TX = Transmit
RX = Receive

Ethernet Straight-through Cable

The Ethernet straight-through cable provides an network connection from the CK721-A Ethernet port to the computer's network port via a hub or switch.

Connector 1 Pinout	Connector 2 Pinout
1 TX+	1 RX+
2 TX-	2 RX-
3 RX+	3 TX+
6 RX-	6 TX-

TX = Transmit
RX = Receive

PC TO CK721-A CONTROLLER CONNECTIONS

Connect the PC to the CK721-A controller according to the following steps:

1. Connect the RS232 Null Modem Cable to the PC's **COM 1** or **COM 2** port (see Figure 1). Connect the other end of the cable to the CK721-A's **RS232C A** port.

2. Connect the cross-over Ethernet cable to the PC's network port. Connect the other end of the cable to the CK721-A's **Ethernet** port.

   A cross-over Ethernet cable is used to directly connect the PC to the CK721-A. Use straight-through Ethernet cables if connecting to the CK721-A via a switch or hub.
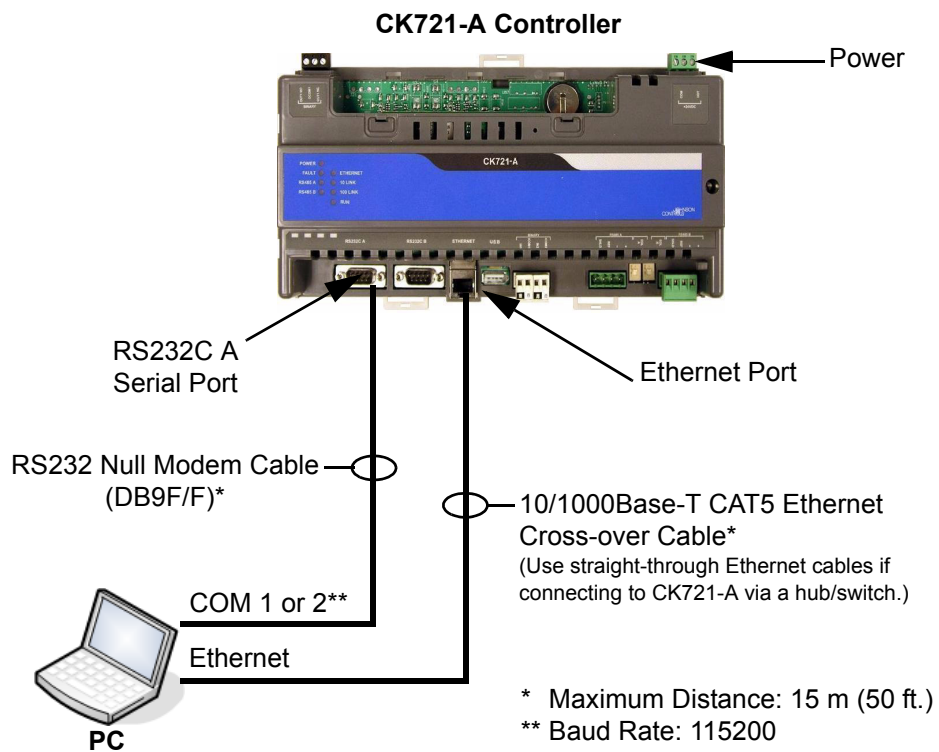

Figure 1: PC to CK721-A Controller Connections

PC CONFIGURATION

Once you have properly connected the PC to the CK721-A controller, you are ready to configure the PC. Configuring the PC consists of the following steps:

- Copying and running the CK721-A Version 2.10 self-extracting archive file (see page 5)

- Changing the computer name (see page 5)

- Verifying file and printer sharing for Microsoft networks is enabled (see page 6)

- Changing the computer's IP address (see page 7)

- Creating a Windows limited/restricted user account (see page 8)

- Verifying Windows file sharing is enabled (see page 12)

NOTE

Installing the CK721-A firmware takes approximately 15 minutes per controller, once the PC has been properly configured. Configuring the PC takes approximately 15 minutes and must only be performed once.

⚠ Before changing the PC name and IP address settings of your PC, write
CAUTION down the current settings (see the following table). This enables you to re-configure the PC with the original settings once you have finished upgrading the CK721-A controller(s). Failure to revert to the original settings may result in PC network issues or other problems related to the configuration changes.

The following table provides a quick reference of the required PC configuration changes:

PC Setting	Current Setting	Change to . . .
Computer Name		Factory
Workgroup		FACTORYWG
File and Printer Sharing for Microsoft Networks		Enabled
IP Address		192.168.2.1
Subnet Mask		255.255.255.0

Create a New User Account:
  Name
  Password
  Type
	N/A	
		updater
		master
		Limited/Restricted

C:\Shared directory		File sharing enabled
Windows XP Firewall* Exceptions – File and Printer Sharing		Enabled
*This manual covers the setting changes for Windows XP Firewall. If other Firewall software is installed on your computer, you must **disable** it before proceeding with the firmware upgrade.		

NOTE

Windows XP Professional with Service Pack 2 was used in the development of these instructions. Older versions of Windows XP Professional will differ.

➤ **To Copy and Run the CK721-A Version 2.10 Self-Extracting Archive File:**

1. Copy the **CK721a_Factory_FieldUpdate_FW_2-10.exe** file to the PC's **C:** directory.

2. Double-click the archive file.

   The WinZip Self-Extractor dialog box appears.

3. Verify that **C:** is listed in the **Unzip to folder** field.

4. Click **Unzip**.

   The self-extracting archive file will save the CK721-A Version 2.10 firmware files into the following directory structure:

   C:\Shared\ck721a

   The following files will be available in the **ck721a** subdirectory:

   1image.bin
   2image.bin
   fs.tar
   load1.bat
   load2.bat
   load.bat
   sendnto.exe

5. Click **OK** when the files successfully extracted message appears.

➤ **To Change the Computer Name:**

NOTE

You must have administrator rights to change the computer name.

---

1. Locate **My Computer**. Right-click over it and select **Properties**.

2. On the System Properties dialog box:

   Windows XP Users: Select the **Computer Name** tab and click **Change**.

   Windows 2000 Users: Select the **Network Identification** tab and click **Properties**.

3. Enter Factory in the **Computer name** field.

4. In the **Member of** box, select the **Workgroup** radio button. For the Workgroup name, enter `FACTORYWG`.
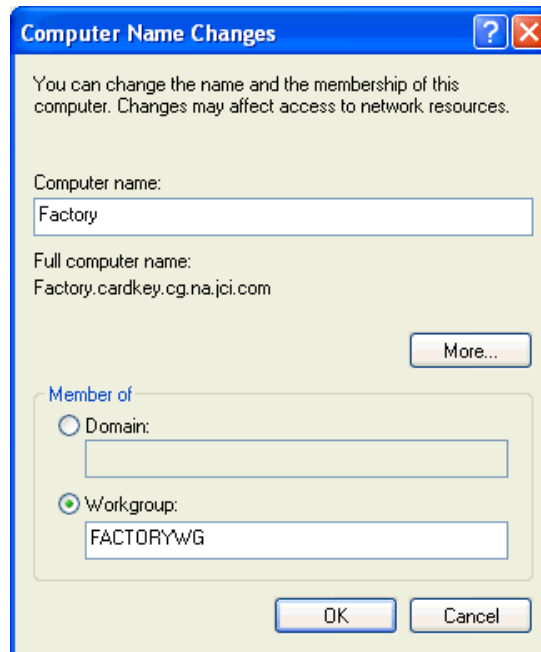

5. Click **OK**.

6. Click **OK** on the workgroup welcome and restart computer message boxes.

7. Click **OK** on the System Properties dialog box.

8. Click **Yes** to restart your computer.

➤ **To Verify File and Printer Sharing for Microsoft Networks is Enabled:**

1. Locate **My Network Places**. Right-click over it and select **Properties**.

2. Right-click over **Local Area Connection** and select **Properties**.

3. On the Local Area Connection Properties dialog box, verify that the **File and Printer Sharing for Microsoft Networks** check box is enabled.
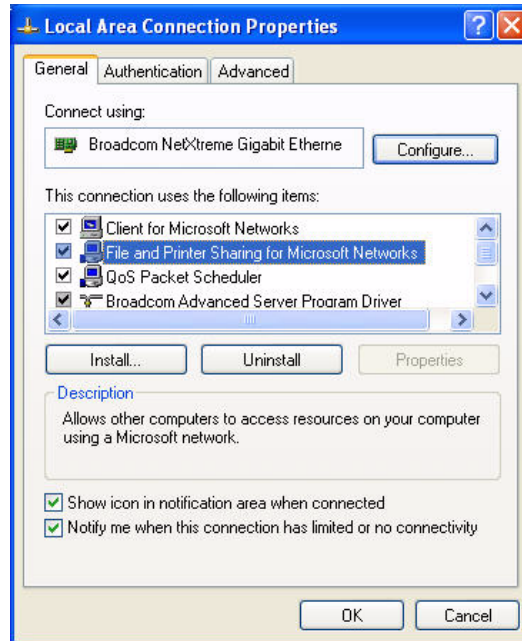
4. Keep the Local Area Connection Properties dialog box open and continue with the next section.

➤ **To Change the Computer's IP Address:**

1. On the Local Area Connection Properties dialog box, select **Internet Protocol (TCP/IP)**.
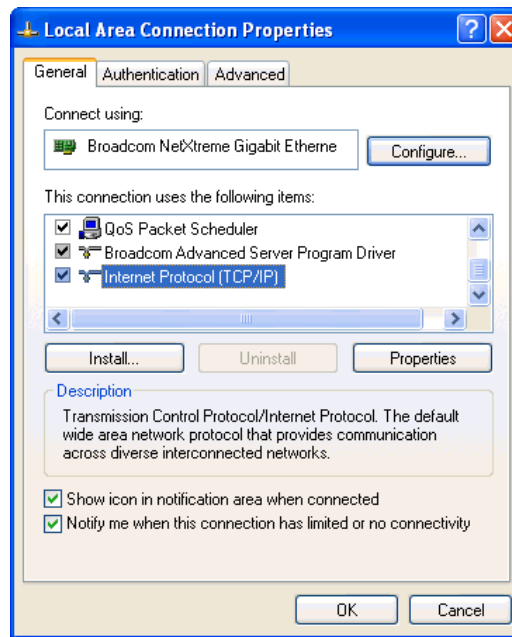
2. Click **Properties**.

3. On the Internet Protocol (TCP/IP) Properties dialog box, select the **Use the following IP address** radio button.

4. Enter the following IP Address: `192.168.2.1`

5. Press the **<Tab>** key.

6. Verify that the following Subnet mask appears: `255.255.255.0`
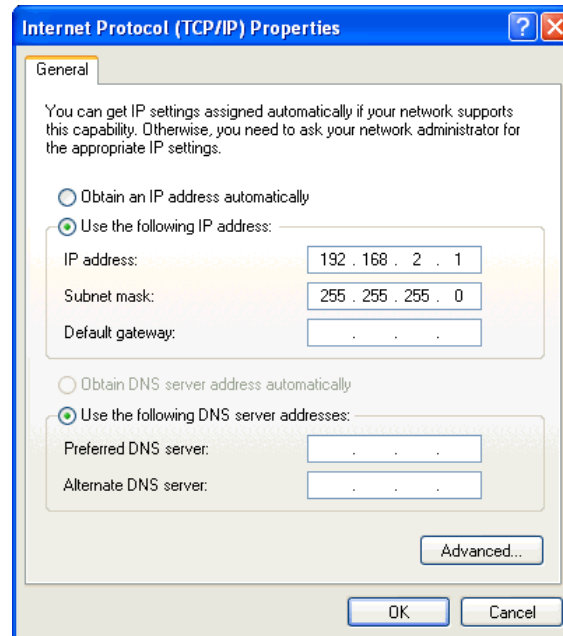
7. Click **OK**.

8. *Windows XP Users:* Click **Close**.
   Windows 2000 Users: Click **OK**.
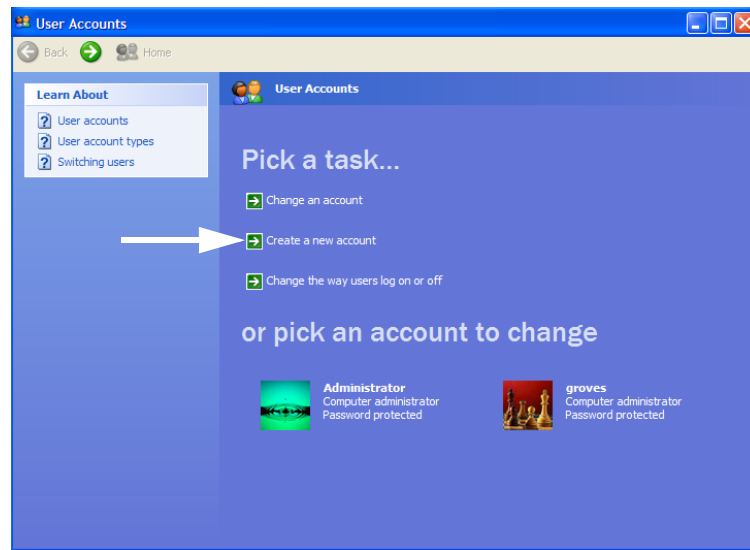
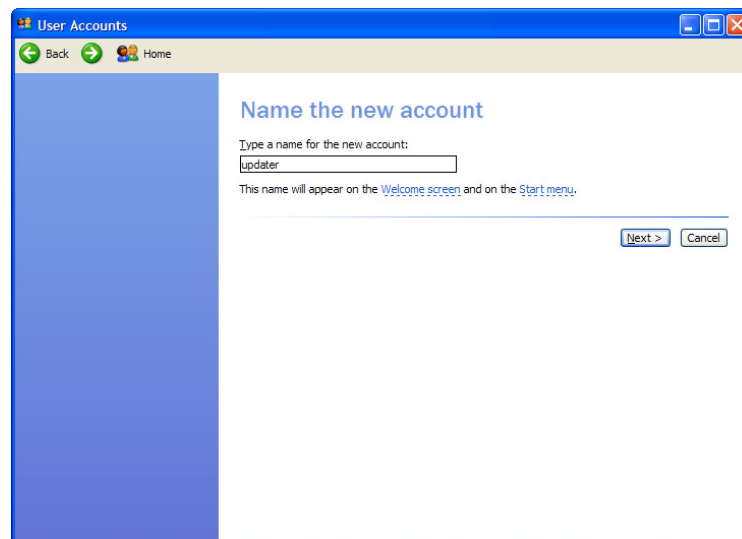➤ **To Create a Windows Limited User Account (Windows XP Users):**

NOTE
If you are using Windows 2000 Professional, see page 11.

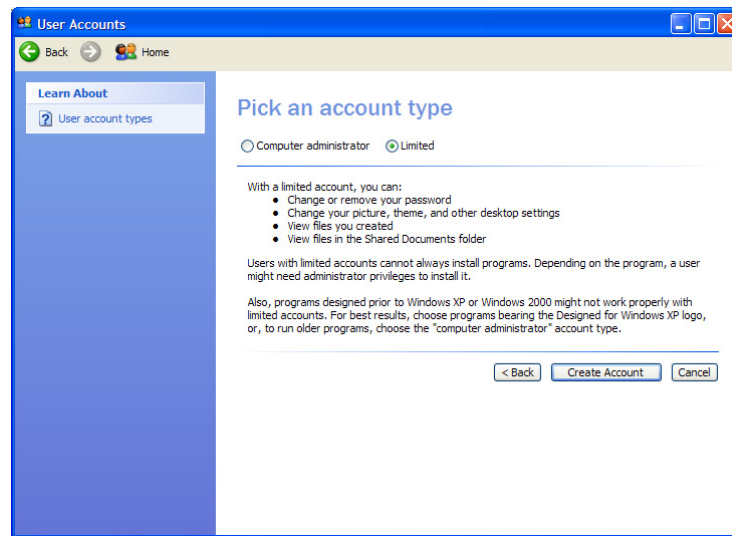1. From the Windows Control Panel, double-click **User Accounts**.

2. On the User Accounts window, click the **Create a new account** link.

3. On the Users and Passwords dialog box, click **Add**.

4. On the Name the new account page, enter `updater` and click **Next**.

5. On the Pick an account type page, select **Limited**.

6. Click **Create Account**.

7. On the User Accounts window, select the new **updater** account.

8. On the What do you want to change about updater's account page, select the **Create a password** link.
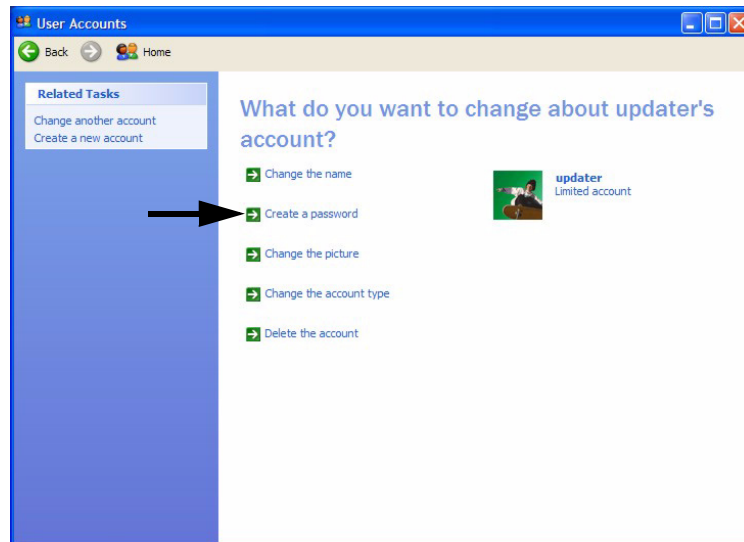
9. On the Create a password for updater's account page, enter `master` as the password. Enter the password again to confirm.

10. Click **Create Password**.

➤ **To Create a Windows Limited User Account (Windows 2000 Users):**

1. From the Windows Control Panel, double-click **User and Passwords**.

2. On the Users and Passwords dialog box, verify that the **Users must enter a user name and password to use this computer** check box is enabled.

3. Click **Add**.
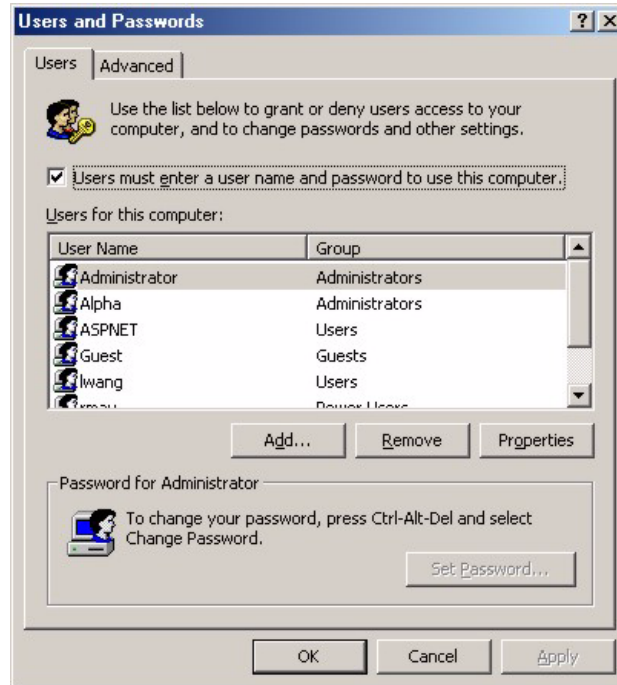
4. On the Add New User dialog box, enter `updater` in the **User name** field and click **Next**.

5. Enter `master` as the password. Enter the password again to confirm and click **Next**.
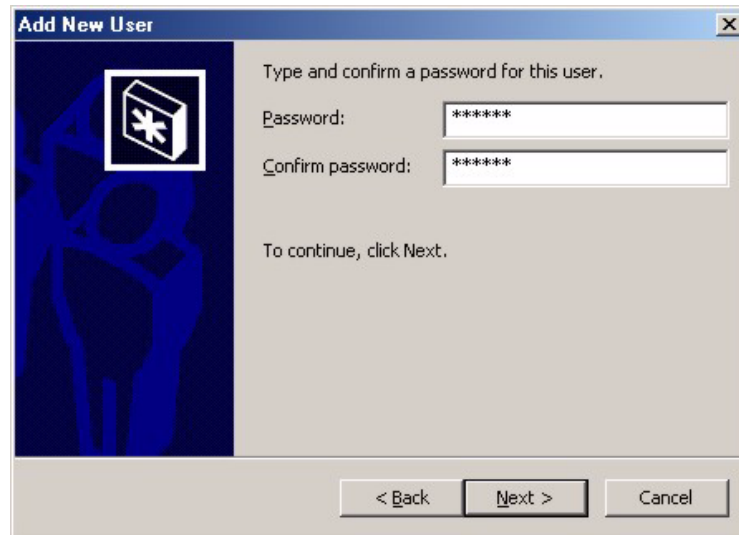
6. Select the **Restricted user** radio button and click **Finish**.


7. Click **OK** on the Users and Passwords dialog box.

➤ **To Verify Windows File Sharing is Enabled:**

1. On the **C:** drive, right-click over the **Shared** directory and select **Properties**.
2. On the Shared Properties dialog box, select the **Sharing** tab.

3. *Windows XP Users*: Select the **Share this folder on the network** check box. Continue with step 4.

Windows 2000 Users: Select the **Share this folder** radio button and click **OK**. Skip to the "Tera Term Pro Configuration" section on page 14.
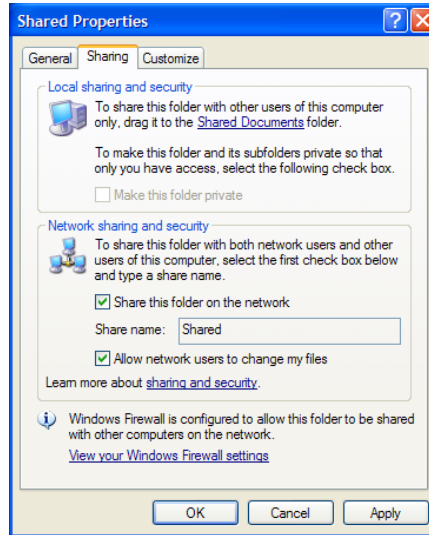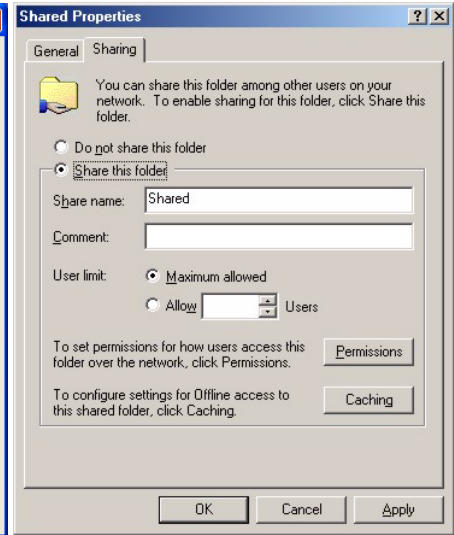

| Windows XP (SP2) | Windows 2000 |

4. Select the **Allow network users to change my files** check box and click **Apply**.

5. Click the **View your Windows Firewall settings** link.

6. On the Windows Firewall dialog box (General tab):

■ If the Windows Firewall is set to **OFF**, click **Cancel** to close the Windows Firewall dialog box. Skip to the "Tera Term Pro Configuration" section on page 14.

■ If the Windows Firewall is set to **ON**, continue with step 7.
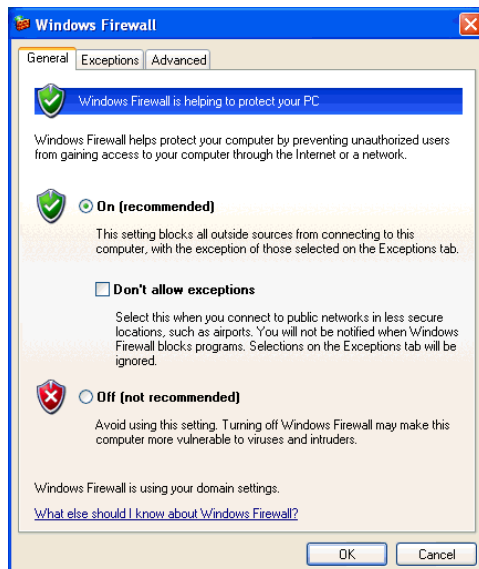
7.   On the Windows Firewall dialog box, select the **Exceptions** tab.

8.   Select the **File and Printer Sharing** check box.
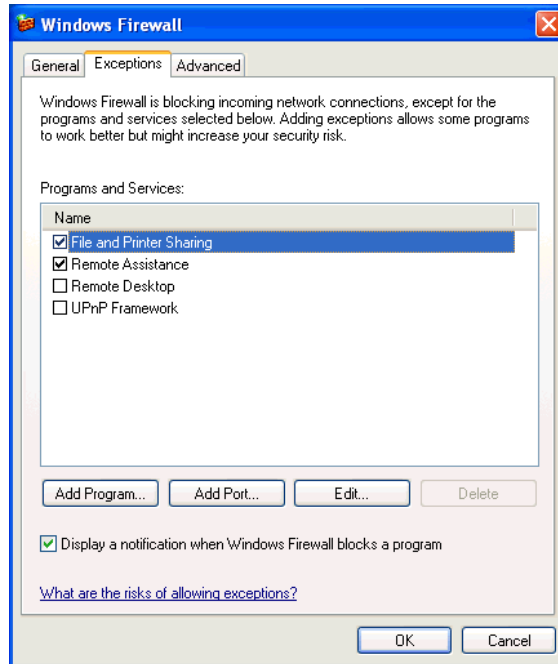
9.   Click **OK**.

10. Click **OK** on the Shared Properties dialog box.

TERA TERM PRO CONFIGURATION

This section provides instructions on configuring Tera Term Pro. If your configuration settings currently match the settings required to perform the upgrade, you may skip this section. The required settings are:

■   Connect to serial port: COM1 or COM2 (depending on the COM port you are using)

■   Serial port baud rate: 115200

■   Scroll buffer: 10,000 lines

NOTE
Once Tera Term Pro is configured according to the following instructions, the settings will take effect each time you launch the application.


➤   **To Configure Tera Term Pro:**

1.   Open Windows Explorer®.

2.   Access the following directory: **C:\Program Files\TTERMPRO**

3. Delete the **TERATERM.INI** file.

4. Launch Tera Term Pro.

5. On the Tera Term: New connection dialog box, select the **Serial** radio button and the **COM1** or **COM2** port, depending on the COM port you are using. Click **OK**.
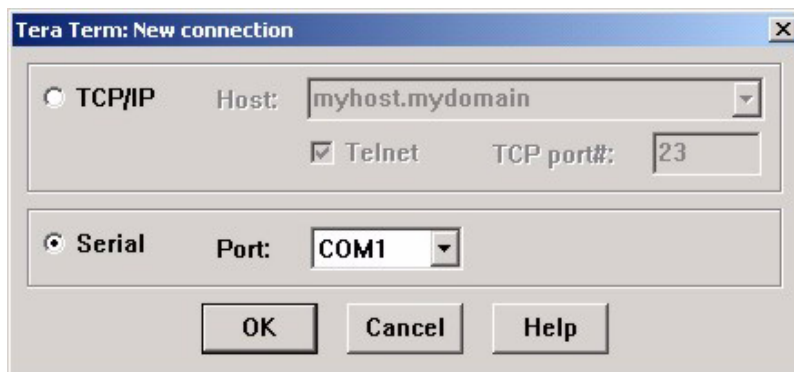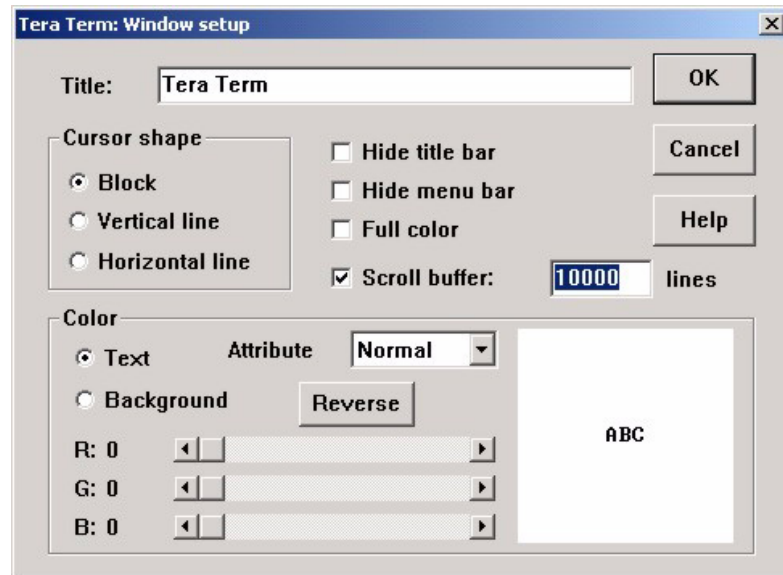

6. From the menu bar, select **Setup>Serial Port**.

7. On the Tera Term: Serial port setup dialog box, select **115200** from the **Baud rate** drop-down list. Click **OK**.
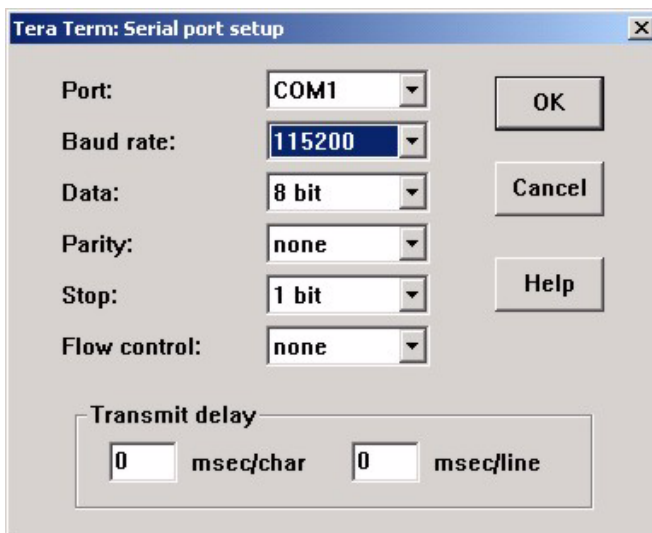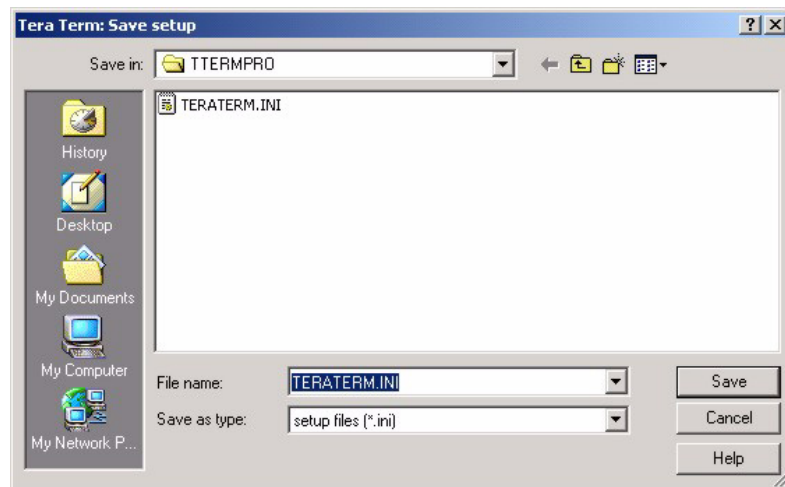

8. From the menu bar, select **Setup>Window**.

9. On the Tera Term: Window setup dialog box, change the number of **Scroll buffer lines** to `10,000` and click **OK**.

10. From the menu bar, select **Setup>Save setup**.

11. On the Tera Term: Save setup dialog box, navigate to **C:\Program Files\TTERMPRO** and click **Save**.

NOTE

Use Tera Term Pro to view the current controller configuration settings. Write down the current settings. You will need to restore these settings when you complete the firmware upgrade (see "Restoring the Controller's Configuration Settings" on page 23).

FIRMWARE VERSION 2.10 INSTALLATION

Once you set up the PC and Tera Term pro, you are ready to install the CK721-A Version 2.10 firmware.

> ⚠ **CAUTION**
> If the firmware upgrade fails, the CK721-A controller will **not** be operational until the firmware can be successfully installed. This poses a high security risk to the building and its occupants. Before proceeding, discuss the potential security issue with the building's Security Manager.

NOTE

Installing the CK721-A firmware takes approximately 15 minutes per controller, once the PC has been properly configured. Configuring the PC takes approximately 15 minutes and must only be performed once.

---

1. Launch Tera Term Pro to establish a Telnet login session to the CK721-A controller.

2. Cycle power to the CK721-A by unplugging the power connector and then re-plugging it into the CK721-A power port (see Figure 1 on page 3).

   If the controller is already powered down, simply plug in the connector to power up the controller.

3. When the following message appears, **press <S> within 10 seconds**.
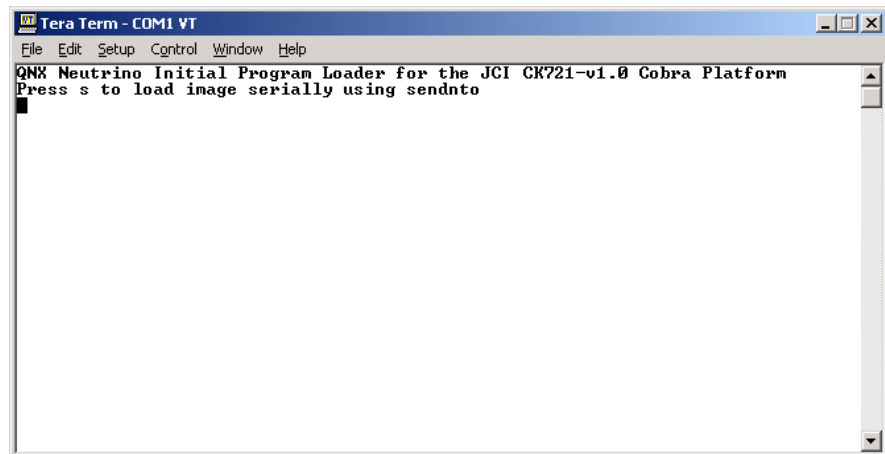
   If this message does not appear, the CK721-A controller cannot be updated due to a hardware problem. Contact Johnson Controls Technical Support at (805) 582-3117 between the hours of 8:00 a.m. to 5:00 p.m. Pacific Standard Time, Monday through Friday, for assistance.

   If the 10 second time period expires before pressing **<S>**, cycle the power on the CK721-A controller. Wait for the message to appear again and press **<S>**.
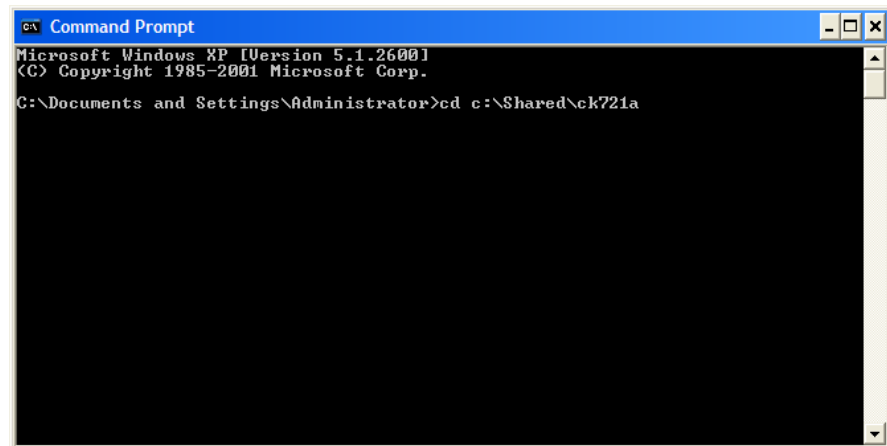
If you press **<S>** within the specified time, a "Download now" message appears.
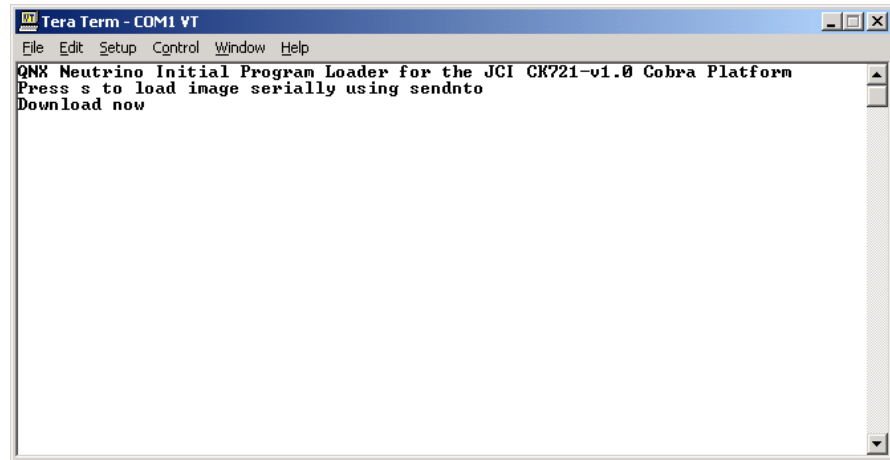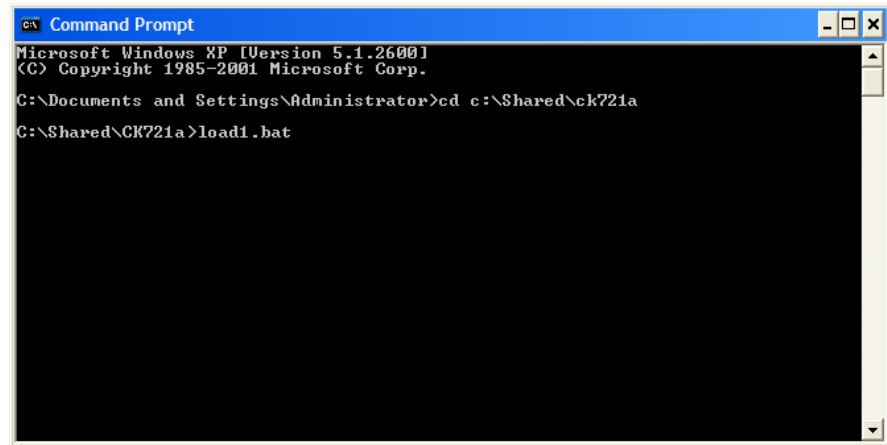

4. Close Tera Term Pro.

   The Tera Term program must be closed in order to free the COM port for the initial firmware download.

5. Open a DOS window by selecting the following:
   Start>Programs>Accessories>Command Prompt

6. At the DOS prompt, enter the following command and press **<Enter>**:

   ```
   cd c:\Shared\ck721a
   ```

7. Enter one of the following commands and press **<Enter>**:

    `load1.bat` (if PC is connected to CK721-A via **COM 1**)
    `load2.bat` (if PC is connected to CK721-A via **COM 2**)
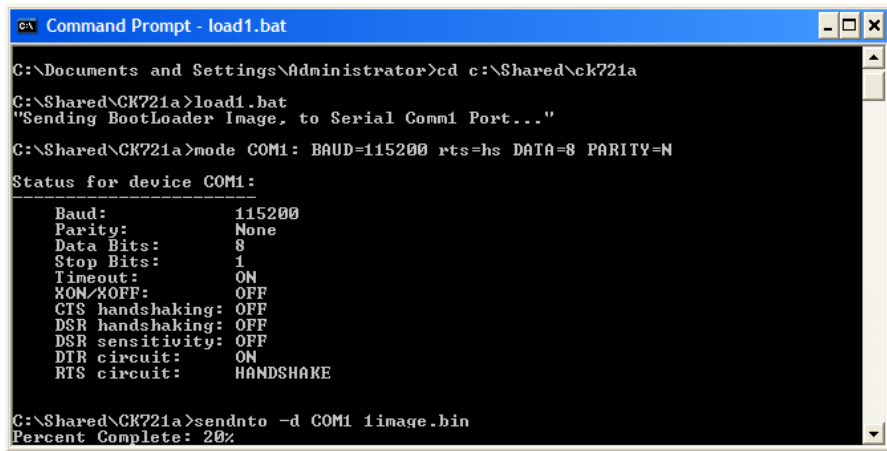
```
Command Prompt                                          _ □ ×
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Administrator>cd c:\Shared\ck721a

C:\Shared\CK721a>load1.bat
```

A Percent Complete message appears.

```
Command Prompt - load1.bat                              _ □ ×
C:\Documents and Settings\Administrator>cd c:\Shared\ck721a

C:\Shared\CK721a>load1.bat
"Sending BootLoader Image, to Serial Comm1 Port..."

C:\Shared\CK721a>mode COM1: BAUD=115200 rts=hs DATA=8 PARITY=N

Status for device COM1:
-----------------------
    Baud:             115200
    Parity:           None
    Data Bits:        8
    Stop Bits:        1
    Timeout:          ON
    XON/XOFF:         OFF
    CTS handshaking:  OFF
    DSR handshaking:  OFF
    DSR sensitivity:  OFF
    DTR circuit:      ON
    RTS circuit:      HANDSHAKE


C:\Shared\CK721a>sendnto -d COM1 1image.bin
Percent Complete: 20%
```

8. When the **load1.bat** or **load2.bat** procedure is completed, launch Tera Term Pro soon after to establish a Telnet login session to the CK721-A controller.

The CK721-A firmware download actions appear on the Tera Term window. Verify that you see the same data as shown in the following screen capture.

When the firmware download process is completed, the CK721-A will reboot and a Login prompt will appear on Tera Term Pro.

If Tera Term Pro does not display a Login prompt, the firmware installation has failed (see the "Troubleshooting" section for more information).

9. Verify the CK721-A firmware version number. If the installation was successful, the firmware version will be listed as **2.10**. The CK721-A firmware version appears a few lines above the Login prompt (see the highlighted area of the previous screen capture).

   If the version number is not 2.10, then the firmware installation failed (see the "Troubleshooting" section for more information).

10. Repeat the steps in this section for each controller you will be upgrading.

Troubleshooting

If the firmware installation fails, answer the following troubleshooting questions:

1. **Are you are using the correct cable types?**

    For example, are you using the correct network cable (straight-through vs. cross-over)? Check the pin connections if you constructed the cables yourself. See "Cable Wiring" on page 2 for more information.

2. **Did you correctly connect the serial null modem and network cables to the CK721-A and computer?**

    See Figure 1 on page 3.

3. **Does your computer have Firewall software installed (besides Windows XP Firewall)?**

    If so, you must disable it in order to successfully upgrade the CK721-A firmware.

4. **Is file sharing enabled on your computer?**

    See page 6.

5. **Did you correctly configure your computer?**

    Review the required changes to your PC settings on page 4. Verify the settings on your computer are correct.

6. **Does one of the following messages appear on the terminal emulation software interface instead of the Login prompt during the upgrade installation process?**

    cp: Can't open source file. (/root/ck721a/2image.bin): Permission denied

    OR

    tar: Can't open source file. (/root/ck721a/fs.tar): Permission denied

    If so, the upgrade has failed. Follow the instructions in "Advanced Security Setting Modification" on page 22.

If the firmware installation still fails after performing the previous troubleshooting steps, the CK721-A controller has experienced a hardware failure. Return the defective controller to Johnson Controls by initiating a Return Material Authorization (RMA). To do this, contact your Johnson Controls Representative or enter an RMA at this Employee Portal site:

http://spcweb.cg.na.jci.com/rma

Advanced Security Setting Modification

The instructions in this section should be performed only if the firmware download process has failed and one of the following messages appears on the terminal emulation software interface:

cp: Can't open source file. (/root/ck721a/2image.bin): Permission denied

<div align="center">OR</div>

tar: Can't open source file. (/root/ck721a/fs.tar): Permission denied

➤ **Windows XP Users:**

1. Launch Windows Explorer®.

2. From the menu bar, select **Tools>Folder Options**.

3. On the Folder Options dialog box, select the **View** tab.

4. De-select the **Use simple file sharing (Recommended)** check box and click **OK**.

5. On the **C:** drive, right-click over the **Shared** directory and select **Properties**.

6. On the Shared Properties dialog box, select the **Security** tab.

7. Click **Advanced**.

8. On the Advanced Security Settings for Shared dialog box, select the **Replace permission entries on all child objects with entries shown here that apply to child objects** check box.
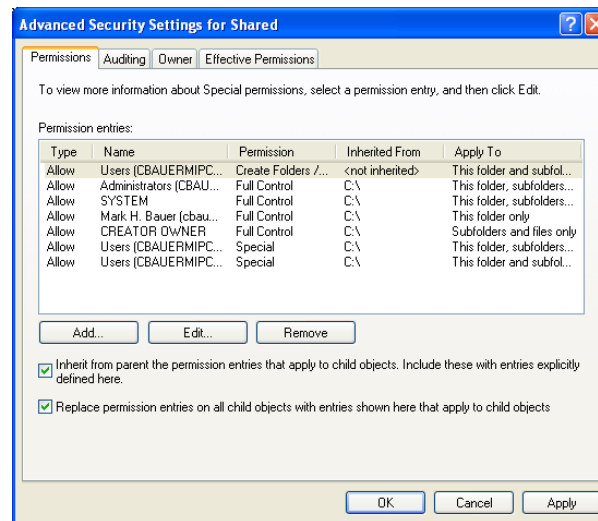
9. Click **Apply** and then **OK**.

10. Install the firmware according to the instructions starting on page 17.

➤ **Windows 2000 Users:**

1. Launch Windows Explorer®.

2. On the **C:** drive, right-click over the **Shared** directory and select **Properties**.

3. On the Shared Properties dialog box, select the **Security** tab.

4. Click **Advanced**.

5. On the Advanced Security Settings for Shared dialog box, select the **Replace permission entries on all child objects with entries shown here that apply to child objects** check box.
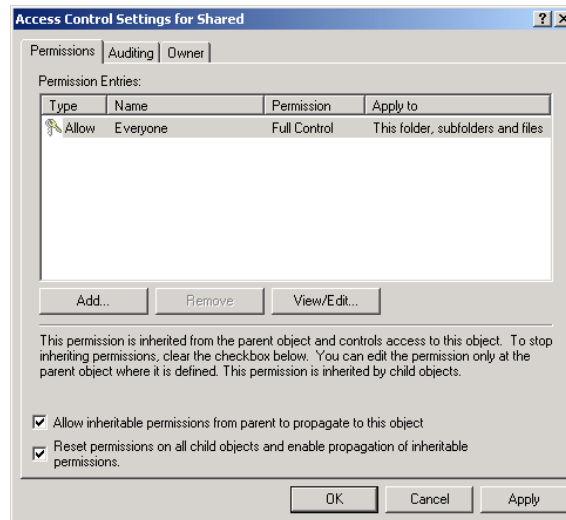
6. Click **Apply** and then **OK**.

7. Install the firmware according to the instructions starting on page 17.

RESTORING THE CONTROLLER'S CONFIGURATION SETTINGS

Use Tera Term Pro to configure the upgraded CK721-A controllers for operation. You must configure each controller before connecting it to the Johnson Controls Security Management System (SMS). When preparing a CK721-A for operation, you must:

■ Enter the IP address of the CK721-A

■ Enter the netmask of the CK721-A

■ Enter the IP address of the Johnson Controls SMS

■ Configure port numbers as follows:

• For P2000 Release 2.1 and higher, configure the **Download Port** number, the **Upload Port** number, and the **Priority Port** number to match those defined at the P2000 Server.

- For P2000 Redundancy systems, the default port numbers must be set as:
  - Download Port Number   41014
  - Upload Port Number   41013
  - Priority Port Number   41012
- For P1000 Servers (any version), P1500 Servers (any version), and P2000 Release 2.0 and lower, the default port numbers must be set as:
  - Download Port Number   1198
  - Upload Port Number   1199
  - Priority Port Number   1200

- Modify the network polling rate, if needed

- Modify the route information, if needed

- Modify the network polling delay, if needed

NOTE

Once the IP addresses are assigned at the controller, they cannot be changed from the Johnson Controls SMS.

Once each controller has been configured for operation, reconnect each controller to the SMS host. For details on preparing a CK721-A controller for operation and connecting to the host, refer to the *CK721-A Network Controller Installation and Operation Manual*.

CK721-A VERSION 2.10 DATABASE DOWNLOAD

After the updated CK721-A controller has reconnected to the SMS host (controller on-line), download all databases to the updated controller. Please refer to the respective host's user manual for details on how to download the databases to a controller.

The controller is now ready for normal operation.

To ensure that the downloaded databases remain in the controller in the case of a power and battery failure, you may want to invoke the controller's "write to flash" feature. After writing to flash, the controller will reboot. Please refer to the respective host's user manual for details on how to invoke the controller's "write to flash" feature.

NOTE

Always wait at least 5 minutes after the host download has been completed (that is, after the download queue count goes down to 0), before performing a "write to flash" operation.

RE-CONFIGURING THE PC

After the databases have been downloaded to the controller and the system appears to be operating normally, re-configure your PC and return it to its original settings (see page 4).

You have finished the firmware upgrade procedure.