

**COGNEX**  
Vision for Industry®



# INSTALLING THE IN-SIGHT™ 3000



## Copyright, Trademarks, Patents

*The software described in this document is furnished under license, and may be used or copied only in accordance with the terms of such license and with the inclusion of the copyright notice shown on this page. Neither the software, this document, nor any copies thereof may be provided to or otherwise made available to anyone other than the licensee. Title to and ownership of this software remains with Cognex Corporation or its licensor. Cognex Corporation assumes no responsibility for the use or reliability of its software on equipment that is not supplied by Cognex Corporation. Cognex Corporation makes no warranties, either express or implied, regarding the described software, its merchantability or its fitness for any particular purpose.*

*The information in this document is subject to change without notice and should not be construed as a commitment by Cognex Corporation. Cognex Corporation is not responsible for any errors that may be present in either this document or the associated software.*

Copyright © 2000-2002 Cognex Corporation.  
All Rights Reserved.

*This document may not be copied in whole or in part, nor transferred to any other media or language, without the written permission of Cognex Corporation.*

Cognex P/N 597-0003-02

*The hardware and portions of the software described in this document may be covered by one or more of the following U.S. patents. Other U.S. and foreign patents are pending.*

<b>In-Sight</b>	Patents pending
<b>Hardware</b>	4,972,359; 5,526,050; 5,657,403; 5,793,899
<b>Vision Tools</b>	5,495,537; 5,548,326; 5,583,954; 5,602,937; 5,640,200; 5,717,785; 5,742,037; 5,751,853; 5,768,443; 5,796,868; 5,818,443; 5,825,483; 5,825,913; 5,845,007; 5,859,466; 5,872,870; 5,909,504

*The following are registered trademarks of Cognex Corporation:*

Cognex  
Cognex, Vision for Industry  
In-Sight "crosshair" logo

*The following are trademarks of Cognex Corporation:*

The Cognex logo  
In-Sight

*Other product and company names mentioned herein are the trademarks, or registered trademarks, of their respective owners.*

## Regulations/Compliance

### Declaration of Conformity

**Manufacturer** Cognex Corporation  
One Vision Drive  
Natick, MA 01760 USA

Declares this -marked product

**Product Number** In-Sight 3000

**Complies With** 73/23/EEC Low Voltage Directive  
89/336/EEC Electromagnetic Compatibility Directive

**Compliance Standards** EN 60950:1992  
Electrical Safety  
A1:1993, A2:1993, A3:1995  
  
EN 55022  
RF Emissions  
Information Technology  
  
EN 50082-1  
EMC Immunity Standard

**European Representative** Cognex France  
Immeuble le Patio  
104 avenue Albert 1er  
92563 Rueil Malmaison  
France

### Safety



LISTED  
(UL 1950)  
51KJ

UL Certification marks are present on products

# Table of Contents

<b>Introduction</b> .....	<b>1</b>
<b>Precautions</b> .....	<b>2</b>
<b>In-Sight 3000 Configurations</b> .....	<b>3</b>
Standalone (Non-Network) Configuration .....	4
Standalone In-Sight Network Configurations .....	5
Configurations Using a CAT5 Crossover Cable .....	5
Configurations Using Switches/Routers .....	6
Factory Network Configurations .....	7
<b>Installing In-Sight PC Host Software</b> .....	<b>8</b>
<b>Connecting the In-Sight 3000</b> .....	<b>9</b>
<b>Adding an In-Sight 3000 to a Network</b> .....	<b>12</b>
Installing to a DHCP Network.....	12
Installing to a Non-DHCP Network.....	13
Configuring Windows Network Settings.....	13
Configuring In-Sight 3000 Network Settings.....	17
Verifying the In-Sight 3000 Network Installation .....	20
<b>Specifications</b> .....	<b>21</b>
Processor Specifications .....	21
SERIAL Port Specifications .....	22
Discrete I/O Specifications .....	23
LIGHTS Port Specifications .....	25
CONTROL PAD Connector Specifications .....	26
Processor Dimensional Specifications.....	27
Camera Specifications .....	28
Trigger and Strobe Output Specifications.....	29
Camera Dimensional Specifications .....	31
Control Pad Dimensional Specifications .....	32
CAT5 Cable Specifications.....	33
<b>Appendix A: Network Settings</b> .....	<b>34</b>

## List of Figures

Figure 1. In-Sight 3000 Standalone Configuration .....	4
Figure 2. In-Sight 3000 – In-Sight 1000 Network .....	5
Figure 3. Standalone In-Sight Network with Switch/Router.....	6
Figure 4. Factory Network with In-Sight Subnet.....	7
Figure 5. Connections for Standard and Optional Components.....	9
Figure 6. Network Dialog Protocols Tab.....	14
Figure 7. Select Network Protocol Dialog.....	15
Figure 8. Microsoft TCP/IP Properties Dialog .....	16
Figure 9. System and Settings Menus .....	17
Figure 10. Network Dialog.....	18
Figure 11. Logon Dialog.....	20
Figure 12. Serial Port Pin Numbers.....	22
Figure 13. Discrete I/O Port Pin Numbers.....	23
Figure 14. Discrete Input Schematic (built-in inputs only) .....	24
Figure 15. Discrete Output Schematic (built-in outputs only) .....	24
Figure 16. LIGHTS Port Pin Numbers.....	25
Figure 17. CONTROL PAD Port Pin Numbers .....	26
Figure 18. In-Sight Processor Dimensions.....	27
Figure 19. Trigger Input and Strobe Output Pin Numbers.....	29
Figure 20. Trigger/Strobe Schematic .....	30
Figure 21. Camera Dimensions .....	31
Figure 22. Control Pad Dimensions .....	32

## List of Tables

Table 1. In-Sight 3000 Processor General Specifications .....	21
Table 2. Serial Port Pin Numbers and Assignments .....	22
Table 3. Discrete I/O Pin Numbers and Assignments .....	23
Table 4. LIGHTS Port Pin Numbers and Assignments.....	25
Table 5. CONTROL PAD Port Pin Numbers and Assignments.....	26
Table 6. In-Sight 3000 Camera General Specifications .....	28
Table 7. Trigger Input and Strobe Output Pin Numbers and Assignments.....	29
Table 8. CAT5 Network Cable Wiring .....	33
Table 9. CAT5 Cable Pairing .....	33



## Introduction

The In-Sight™ 3000 is a compact, network-ready machine vision system for automated inspection, measurement, identification, alignment, and robot guidance applications on the factory floor. The In-Sight 3000 provides an intuitive spreadsheet interface for configuring and monitoring any In-Sight sensor without using a PC. Use the In-Sight 3000 to configure sensors on the local network, or remotely on another part of the network. The spreadsheet also allows local or remote monitoring of any In-Sight sensor's operation during runtime without using a PC.

This manual provides detailed information related to installing the In-Sight 3000 and testing the installation. This information appears in the following sections:

- ❑ *Precautions*
- ❑ *In-Sight 3000 Configurations*
- ❑ *Installing In-Sight PC Host Software*
- ❑ *Connecting the In-Sight 3000*
- ❑ *Adding an In-Sight 3000 to a Network*
- ❑ *Specifications*

Other resources with information about the In-Sight 3000 and its spreadsheet interface include:

- *Getting Started with In-Sight*, Cognex P/N 590-6368 (English), 590-6368F (French), 590-6368J (Japanese), or 590-6368G (German)
- *In-Sight Guide and Reference*, an on-line HTML Help file provided on the In-Sight CD-ROM.
- In-Sight computer-based tutorials provided on CD-ROM with In-Sight starter accessories kits.
- The In-Sight Online Support and Learning Center ([www.cognex.com/support/In-Sight.asp](http://www.cognex.com/support/In-Sight.asp)).

**Note:** Only registered In-Sight users have access to this website.



## Precautions

Observe these precautions when installing the In-Sight 3000 to reduce the risk of injury or equipment damage:

- Do not connect the In-Sight 3000 camera or processor to a power source other than 24VDC. Any other voltage creates a risk of fire or shock and can damage the In-Sight hardware. Always observe the polarity marked on the In-Sight 3000 processor.
- Do not connect or disconnect In-Sight hardware to any equipment that is connected to a power source. Installing or removing “live” equipment can damage In-Sight 3000 components.
- Do not connect the In-Sight 3000 processor to a camera other than the In-Sight camera specified in this document. Connecting a camera other than an In-Sight camera to the processor can damage the camera, the In-Sight processor, or both.
- Do not connect an In-Sight 1000 sensor to the CAMERA port on the In-Sight 3000 processor. Connecting an In-Sight 1000 sensor an In-Sight 3000 CAMERA port can damage the sensor, the processor, or both.
- Do not install the In-Sight 3000 in locations that directly expose it to environmental hazards such as excessive heat, dust, moisture, humidity, impact, vibration, corrosive substances, flammable substances, or static electricity.
- Do not route cables and wires connecting In-Sight hardware close to high-voltage power sources. Route cables and wires away from high-voltage power sources to reduce the risk of damage or malfunction.
- Do not open the In-Sight 3000 processor or camera. These devices do not contain user-serviceable parts. Do not make electrical or mechanical modifications to the In-Sight hardware. Unauthorized modifications violate your warranty.



## **In-Sight 3000 Configurations**

The In-Sight 3000 can operate as a standalone system and as a host system on a network.

For the purposes of the instructions in this manual, an In-Sight network is an In-Sight 3000 connected over Ethernet to any combination of the following devices:

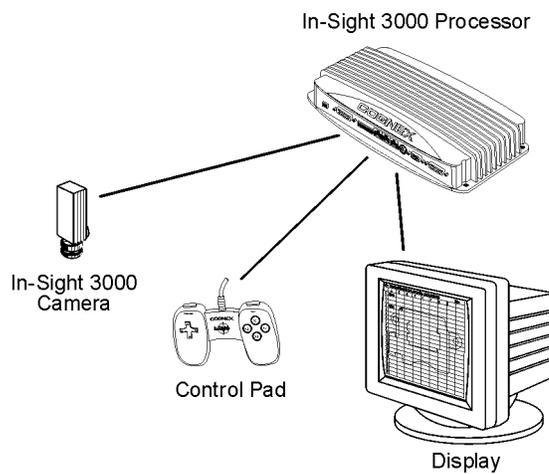
- one or more In-Sight 3000s
- one or more In-Sight 1000 sensors
- one or more PCs running In-Sight PC Host software.

The following sections present information related to setting up the In-Sight 3000 system in each of its basic configurations.

- Standalone (Non-Network) Configuration*
- Standalone In-Sight Network Configurations*
- Factory Network Configurations*

## Standalone (Non-Network) Configuration

A standalone (non-network) In-Sight 3000 configuration does not include connections to PCs, other In-Sight sensors, Ethernet switches, or any other network devices. Figure 1 shows this basic configuration.



**Figure 1. In-Sight 3000 Standalone Configuration**

The non-network, standalone configuration in Figure 1 requires a VGA monitor and In-Sight control pad to configure applications and monitor operation. There is no network connection, so the number of jobs that can be stored is limited. Images and data must be sent to remote devices for storage over a serial port, as well as jobs in excess of the limit of local storage.

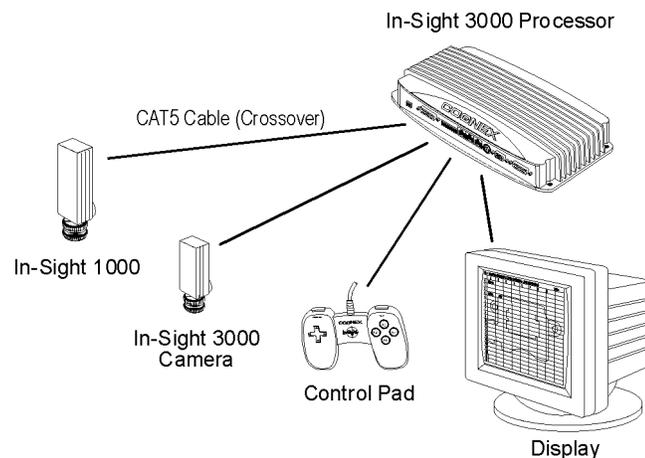
## Standalone In-Sight Network Configurations

Standalone In-Sight network configurations include connections to other network devices (PCs, other In-Sight 3000s, or switches), but not to the larger, factory network. The following sections present information related to standalone In-Sight network configurations.

- ❑ *Configurations Using a CAT5 Crossover Cable*
- ❑ *Configurations Using Switches/Routers*

### Configurations Using a CAT5 Crossover Cable

You can create a standalone In-Sight 3000 network using a CAT5 crossover cable to connect to another In-Sight 3000, an In-Sight 1000 sensor, or a PC running In-Sight PC Host software. Figure 2 shows an In-Sight 1000 connected directly to an In-Sight 3000 processor by a CAT5 crossover cable.



**Figure 2. In-Sight 3000 – In-Sight 1000 Network**

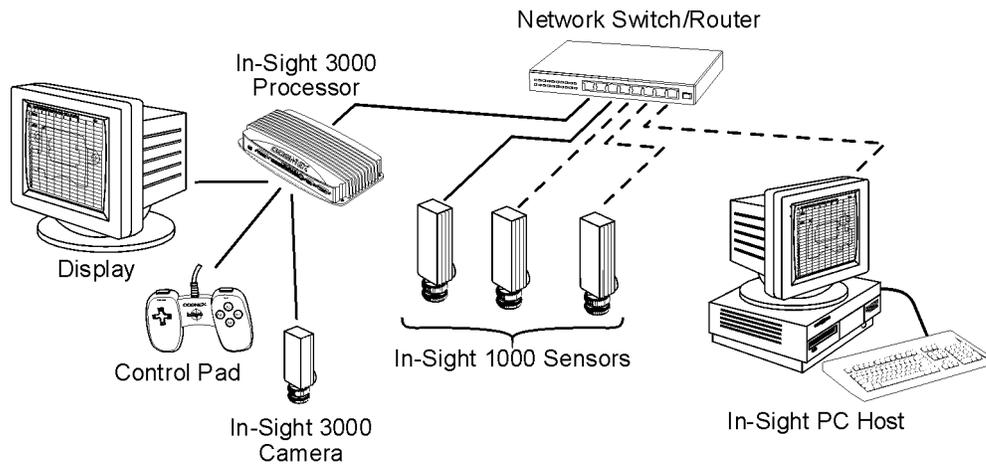
For the standalone network configuration shown in Figure 2, the operator would use the display and In-Sight control pad to configure applications and monitor performance.

For unlimited job and image storage and data logging, instead of connecting an In-Sight 1000 to the In-Sight 3000 (Figure 2), connect a PC (with a monitor, keyboard and mouse) running In-Sight PC Host via CAT5 cable. Because users can configure applications and monitor performance with an In-Sight PC Host, the monitor and In-Sight control pad shown in Figure 2 would be optional.

## Configurations Using Switches/Routers

You can create a wide variety of standalone In-Sight networks using one or more network switches or routers and straight-pinned CAT5 cables. The only limit on the size of this type of network is the number of switches or routers you connect and the number of connections each switch or router provides.

The standalone network shown in Figure 3 includes two optional In-Sight 1000 sensors and an optional In-Sight PC Host, as indicated by the dashed lines connecting them to the switch/router.



**Figure 3. Standalone In-Sight Network with Switch/Router**

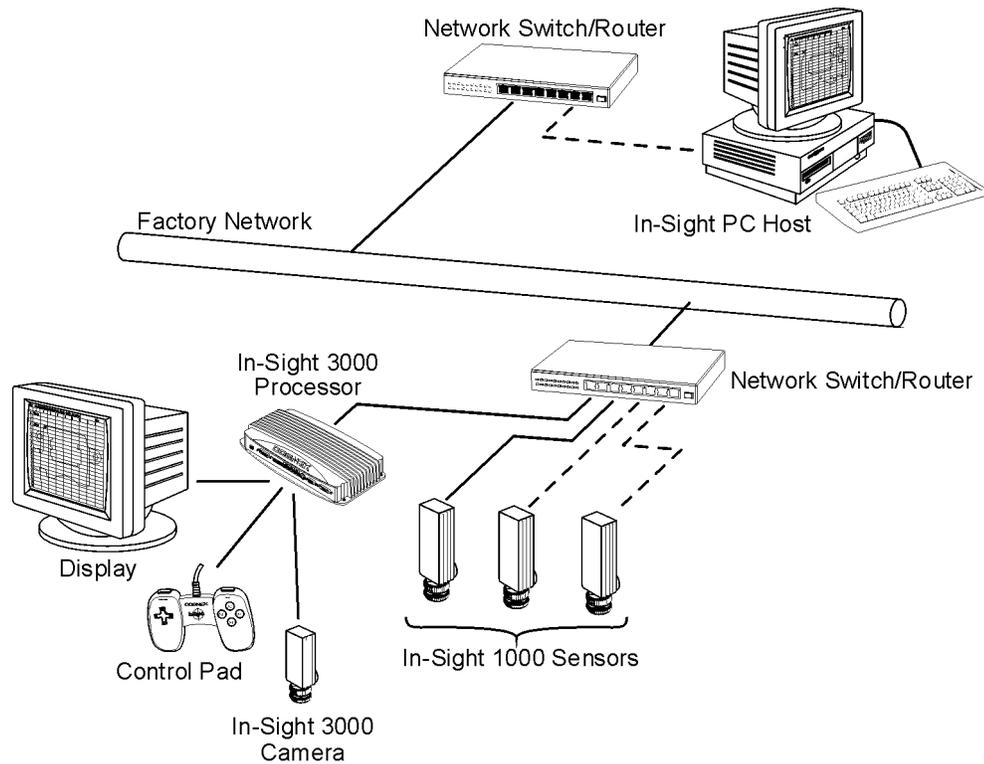
For the network in Figure 3, the control pad and display allow the user to configure the In-Sight 3000 and In-Sight 1000s, and the In-Sight PC Host provides job, image and data storage, and an additional display. The network switch/router could also be connected to another network switch/router, which in turn could have a similar complement of network devices.

Any In-Sight system on the network can be configured from the In-Sight 3000 or the In-Sight PC Host, if used.

## Factory Network Configurations

As with standalone networks, you can create a virtually unlimited number of In-Sight subnets connected to a factory network, each of virtually unlimited size. Connecting the In-Sight network to the factory network allows users throughout an enterprise to access production data on a real-time basis.

The In-Sight subnet shown in Figure 4 optionally includes two In-Sight 1000 sensors and an In-Sight PC Host, as indicated by the dashed lines connecting them to the switch/router.



**Figure 4. Factory Network with In-Sight Subnet**

For networks that cover large areas, an In-Sight 3000 located on each subnet allows for local job configuration and image display without a PC.



## Installing In-Sight PC Host Software

To communicate between an In-Sight 3000 and a PC, In-Sight PC Host software must be installed. This software is included on the CD-ROM shipped with your system.

To use the In-Sight PC Host interface, a PC must have a network card that supports 10/100 Base-T Ethernet TCP/IP communications, and one of these Microsoft operating systems:

- Windows® NT/XP/2000/ME/98SE

The PC must also have Internet Explorer 4.0 or higher installed to open the *In-Sight Guide and Reference* HTML help file.

**Note:** In-Sight PC Host software will work only on a local network that includes an In-Sight 1000 or In-Sight 3000.

### ***To install In-Sight PC Host software on a Windows PC:***

1. Shut down any applications running on your PC.
2. Insert the In-Sight installation CD-ROM into your PC's CD-ROM drive. If the install program starts automatically, follow the setup dialogs as they appear on screen. If the install program does not start automatically:
  - a. Click Start, click Run, then click Browse.
  - b. In the browse window, select the PC's CD-ROM drive, then select SETUP.EXE.
  - c. Click Open, then click OK.

The default installation directory is C:\INSIGHT2.

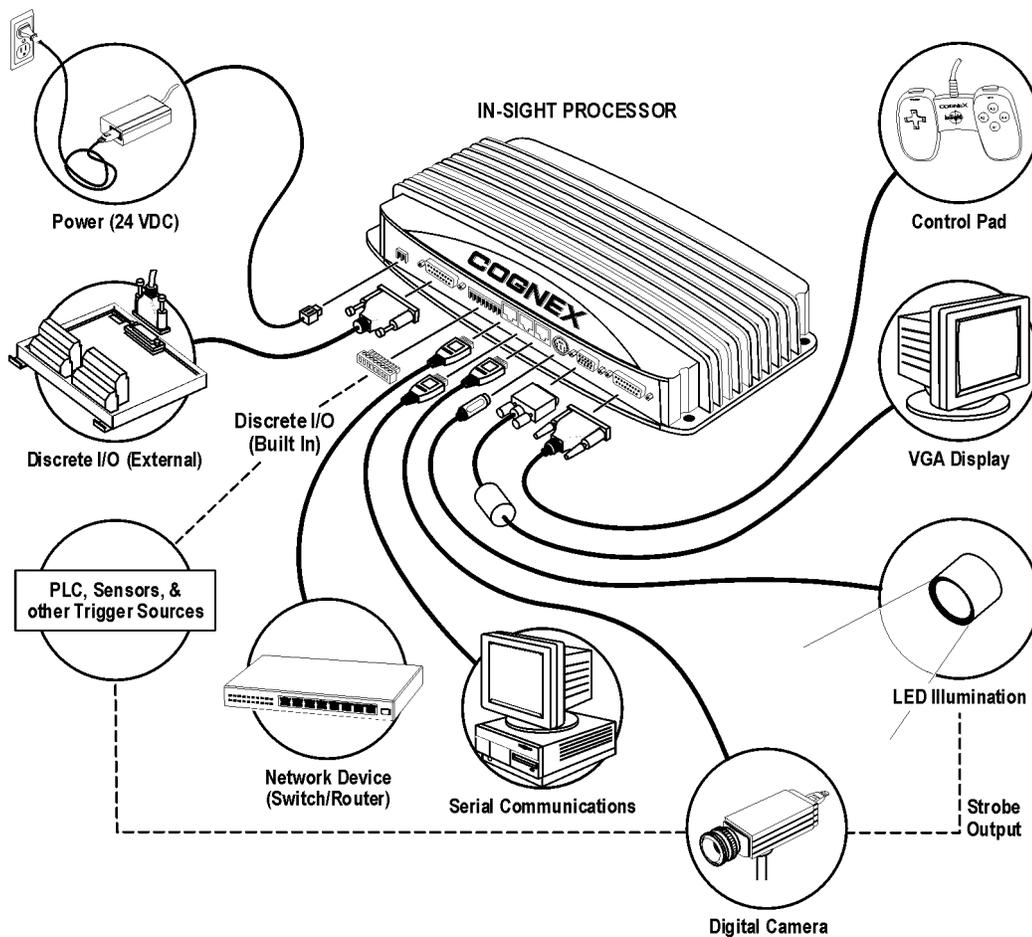
3. When the installation program is complete, remove the CD from the CD-ROM drive.
4. Verify the In-Sight PC Host software installation by opening the Start menu, opening the Programs menu, opening the In-Sight program group, then selecting In-Sight PC Host. The In-Sight PC Host window will appear, displaying the In-Sight spreadsheet.
5. Verify the *In-Sight Guide and Reference* installation by opening the Start menu, opening the Programs menu, opening the In-Sight program group, then selecting In-Sight Help. If the *In-Sight Guide and Reference* does not open, verify you are using Internet Explorer version 4.0 or higher. If not, use Service Pack 4 to update your browser.

**Note:** Open the RELNOTES.DOC file for current information about In-Sight, including changes In-Sight PC Host software makes to your Windows PC.

**Note:** Registered In-Sight PC Host users can obtain updated versions of the online documentation at [www.cognex.com/insight/support](http://www.cognex.com/insight/support).

# Connecting the In-Sight 3000

This section presents information related to connecting the In-Sight 3000 to standard and optional components. Figure 5 shows the general configuration of these components. Refer to this figure when following the installation instructions. For a complete list of options and accessories, contact your Cognex sales representative.



**Figure 5. Connections for Standard and Optional Components**

The components you connect to the In-Sight 3000 depends on your configuration (pages 3-7).



## ***Installing the In-Sight 3000***

---

### ***To connect the In-Sight 3000 to standard components:***

1. Plug the Control Pad into the In-Sight processor's CONTROL PAD connector.
2. Plug the video cable for the VGA monitor or flat-panel display into the In-Sight processor's VGA connector.
3. Attach a C-Mount lens to the In-Sight 3000 camera. Installing a lens will allow you to see the In-Sight 3000 acquire live video images. The exact focal length needed depends on the working distance and the field of view required in your machine vision application.
4. Plug one end of the camera cable into the camera's RJ-45 connector and the other end into the In-Sight processor's CAMERA port.

**CAUTION: ALWAYS POWER DOWN THE IN-SIGHT PROCESSOR BEFORE CONNECTING OR DISCONNECTING THE CAMERA. "HOT PLUGGING" THE CAMERA CAN DAMAGE THE IN-SIGHT HARDWARE.**

5. Attach the wires from a 24VDC power supply to the 2-pin terminal plug and insert the plug into the 24VDC receptacle.

**CAUTION: NEVER CONNECT VOLTAGES OTHER THAN 24VDC. ALWAYS OBSERVE THE POLARITY MARKED ON THE IN-SIGHT PROCESSOR.**

### ***To verify the standard connections:***

1. Turn on the VGA monitor.
2. Apply power to the In-Sight processor. If the green power status LED does not light up, disconnect the power and check for 24VDC and correct polarity. Reconnect the power and try again.
3. The monitor should now display the In-Sight start-up screen, followed by a blank spreadsheet. If not, check the monitor and its connections.
4. Press the top action button (A3) on the Control Pad to display the System menu. If the menu does not appear, check the Control Pad connection.
5. Press the bottom action button (A1) to display a live image.
6. Adjust the camera and lens until the image is focused:
  - If the image is completely black, check that the lens aperture is open, the camera is properly connected, and there is sufficient light on the subject.
  - If the image is blurry, completely gray, or completely white, adjust the camera's focus, aperture, and working distance until the display shows a sharp image.

To stop the live video test, press any button on the Control Pad.



***To connect the In-Sight 3000 to optional components:***

1. Attach the wires of an external trigger source to pins 1 and 2 on the 4-pin terminal plug and insert the plug into the camera (page 29).
2. Connect a Cognex light module:
  - a. Plug the Variable Light Adapter's (Cognex P/N CLA-2000-01) 8-pin connector into the In-Sight processor's LIGHTS port (page 25).
  - b. Insert the adapter's 7-pin connector into the mating connector on the light.
3. Attach the wires from a strobe controller to pins 3 and 4 on the 4-pin terminal plug and insert the plug into the camera (page 29).
4. Connect an RS-232 serial device:
  - a. Plug the Serial Adapter's RJ-45 connector (Cognex P/N 300-0277-012) into the In-Sight processor's SERIAL1 port (page 22).
  - b. Plug one end of a serial cable into the serial adapter's DB-9 connector and the other into the remote serial device.
5. Connect built-in discrete I/O:
  - a. Attach the I/O wires to the 8-pin terminal plug. Follow the pinout marked on the In-Sight processor (page 23).
  - b. Insert the plug into the In-Sight processor's I/O receptacle.
6. Connect the I/O Expansion Module (Cognex P/N CIO-2350-00):

**CAUTION: THE I/O EXPANSION MODULE MUST HAVE THE SAME GROUND POTENTIAL AS THE IN-SIGHT PROCESSOR'S CHASSIS. ANY DIFFERENCE IN POTENTIAL CAN DAMAGE THE EQUIPMENT. IF YOU CONNECT A GROUND WIRE TO THE I/O MODULE'S GROUND SCREW, THEN THAT GROUND MUST HAVE THE SAME POTENTIAL AS THAT OF THE IN-SIGHT PROCESSOR.**

- a. Plug the I/O Expansion Module's cable into its 26-pin connector and the In-Sight processor's EXTERNAL I/O port.
- b. Connect the I/O wires to the I/O Expansion Module. Follow the pinout marked on the I/O module.

***To connect the In-Sight 3000 to a network:***

If you are connecting to an Ethernet switch or router, plug one RJ-45 connector on a straight-pinned CAT5 Network cable (yellow if supplied by Cognex) into the ENET receptacle (Figure 5) and plug the other RJ-45 connector into the switch. If you are connecting directly to an In-Sight sensor or In-Sight PC Host, plug one end of a CAT5 crossover cable into the ENET receptacle and the other end into the other device's Ethernet receptacle.



## Adding an In-Sight 3000 to a Network

As previously described, there are many possible In-Sight network configurations. The specific procedure for adding an In-Sight 3000 to a network depends on whether or not a **Dynamic Host Configuration Protocol** (DHCP) server determines how the In-Sight 3000 is recognized on the network.

A DHCP server automatically configures an In-Sight 3000 with a network IP Address and Subnet Mask. To add an In-Sight 3000 to a network using a DHCP, simply connect the processor to the network and supply power; no manual configuration of the network settings is required. Because the typical standalone In-Sight network will not include a DHCP server, for standalone networks the In-Sight 3000's settings will usually need to be configured manually.

The following sections describe how to use the In-Sight interface to add an In-Sight 3000 to a network.

- ❑ *Installing to a DHCP Network*
- ❑ *Installing to a non-DHCP Network*
- ❑ *Verifying the In-Sight 3000 Network Installation*

### Installing to a DHCP Network

The In-Sight 3000 is pre-configured for an existing network with a DHCP server. After connecting the CAT5 network cable and supplying power (pages 10 and 11), the DHCP server will automatically detect the In-Sight 3000, configure its settings, and add it to the network.

**NOTE:**      **When installing the In-Sight 3000 to an existing network, consult your network administrator to determine whether a DHCP server is available.**

For an In-Sight 3000 connected to a network with a DHCP server, a user can configure only one network setting: Host Name. A Host Name is an "alias" for the In-Sight 3000 IP Address, and appears in any list of host names in the In-Sight interface. If you do not enter a new Host Name, the In-Sight 3000 will appear on the network with the default Host Name (see page 19, step 7).

**NOTE:**      **If you installed the In-Sight 3000 to a DHCP network, proceed to *Verifying the In-Sight 3000 Network Installation* (page 20).**



## Installing to a Non-DHCP Network

To install an In-Sight 3000 to a new network, or to an existing network that does not use a DHCP server, you must manually configure network settings. The following sections present information related to configuring network settings.

- ❑ *Configuring Windows Network Settings*
- ❑ *Configuring In-Sight 3000 Network Settings*

Before proceeding, verify the In-Sight 3000 is connected, by a CAT5 crossover cable or by CAT5 straight-pinned cable through an Ethernet switch/router directly to an In-Sight system.

## Configuring Windows Network Settings

If your In-Sight network includes an In-Sight PC Host, you will need to manually configure the Windows network settings.

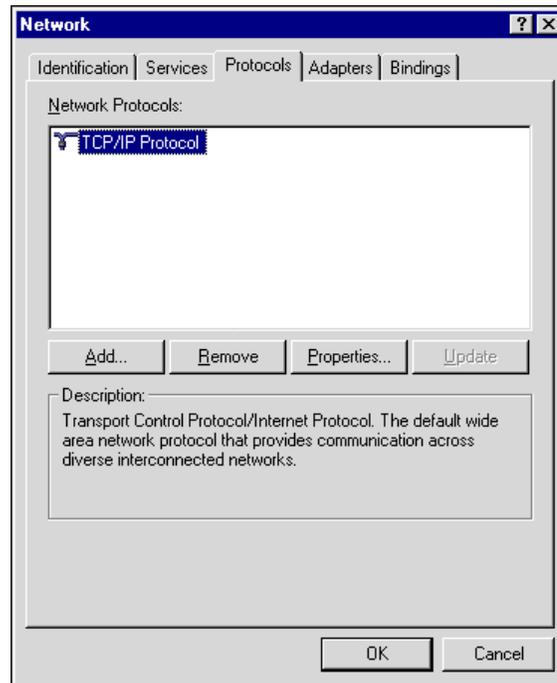
### ***To configure Windows networking settings:***

1. Verify the PC has a TCP/IP protocol installed.

**Note:**        **The following instructions apply to a PC running Windows NT 4.0 or higher. The dialog windows and appropriate input are slightly different for a PC running Windows XP/2000/ME/98SE.**

- a. Close all programs on the PC except Windows NT.
- b. Click Start, then Settings, then Control panel. The Control Panel icon group opens.
- c. Click the Network icon. The Network dialog opens.

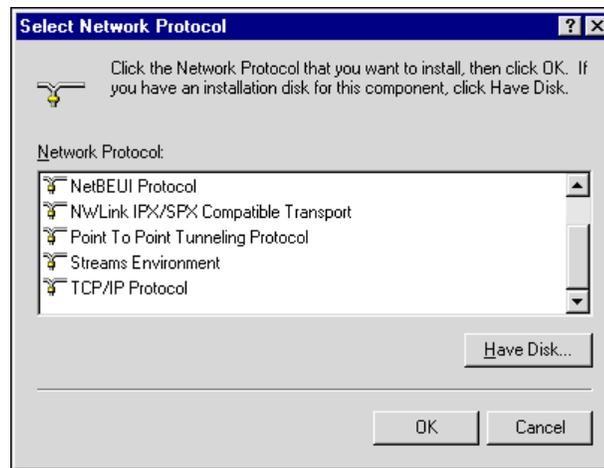
- d. Select the Protocols tab (Figure 6).



**Figure 6. Network Dialog Protocols Tab**

If TCP/IP Protocol appears in this list, skip steps e and f.

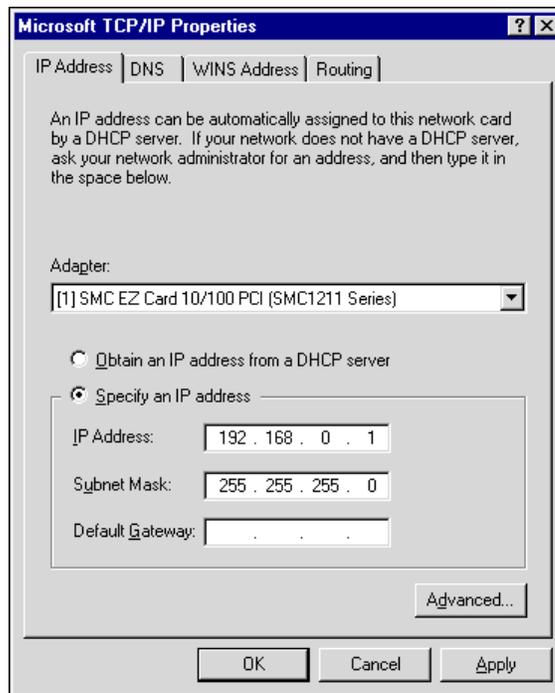
- e. If TCP/IP is not on the list of installed protocols, click Add. The Select Network Protocol dialog opens (Figure 7).



**Figure 7. Select Network Protocol Dialog**

- f. Select TCP/IP and click OK. Windows NT will install the protocol and return to the Network dialog.

2. Configure the IP Address.
  - a. Highlight TCP/IP Protocol in the Protocols tab and click Properties. The Microsoft TCP/IP Properties dialog opens (Figure 8):



**Figure 8. Microsoft TCP/IP Properties Dialog**

**Note:** The specific adapter(s) in the drop down list (Figure 8) will depend on the adapters actually installed on the PC and recognized by Windows.

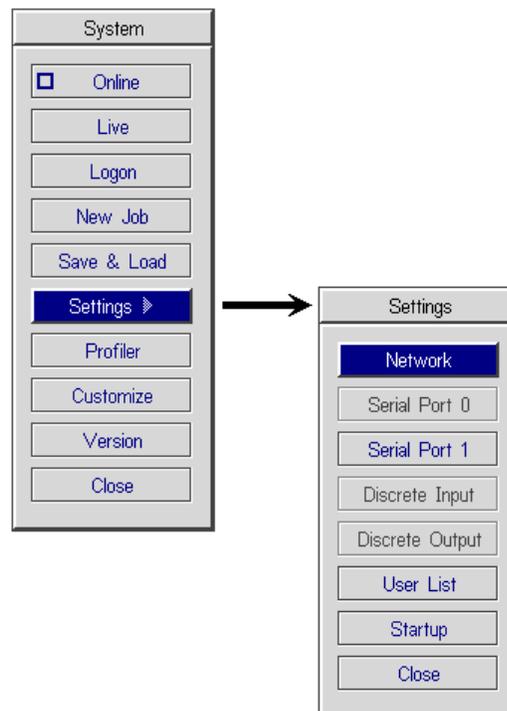
- b. Click the Specify an IP address radio button, input an appropriate IP Address and Subnet Mask for your network (see Appendix A: Network Settings), then click OK. Windows will return to the Network dialog.
- c. Click OK. Restart Windows if prompted to do so.

## Configuring In-Sight 3000 Network Settings

When installing an In-Sight 3000 on a network that does not include a DHCP server, you must manually configure the In-Sight 3000 network settings.

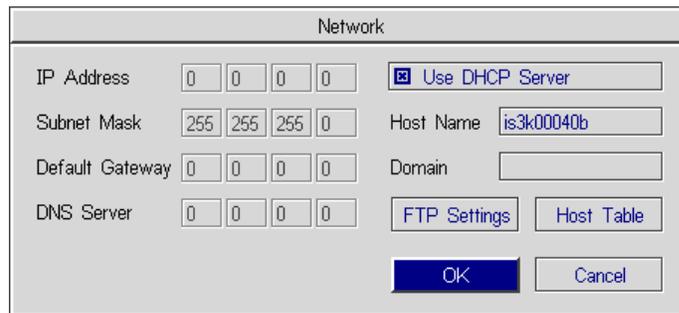
**To configure the In-Sight 3000 to a non-DHCP server network:**

1. Supply power to the In-Sight 3000.
2. From the In-Sight spreadsheet, open the System menu and select Settings (Figure 9).



**Figure 9. System and Settings Menus**

3. Select Network to open the Network dialog (Figure 10).



The image shows a 'Network' dialog box with the following fields and controls:

- IP Address:** Four input boxes, each containing '0'.
- Subnet Mask:** Four input boxes containing '255', '255', '255', and '0'.
- Default Gateway:** Four input boxes, each containing '0'.
- DNS Server:** Four input boxes, each containing '0'.
- Use DHCP Server:** A checked checkbox.
- Host Name:** A text box containing 'is3k00040b'.
- Domain:** An empty text box.
- Buttons:** 'FTP Settings', 'Host Table', 'OK', and 'Cancel'.

**Figure 10. Network Dialog**

4. Uncheck the Use DHCP Server checkbox.
5. Enter a valid IP Address for the In-Sight 3000 on the network. Every In-Sight on the network must be assigned a unique IP Address consistent with the addressing scheme in use on the network. Refer to Appendix A for more information on assigning an IP Address, or consult your network administrator.
6. Enter a Subnet Mask for the local network. The Subnet Mask specifies which parts of the In-Sight 3000's IP Address are the same for all hosts on the local network, and which are unique to each host. The default Subnet Mask, 255.255.255.0, is appropriate for most users. Refer to Appendix A, or consult your network administrator for more information.



7. Optionally enter a Host Name. A Host Name is an alias for the In-Sight 3000 IP Address, and appears in any list of host names in the In-Sight interface. Every In-Sight 3000 is shipped with a unique Host Name. The Host Name format is "is3kxxxxxx", where "xxxxxx" corresponds to the last 24 bits of the **Media Access Control** (MAC) address. For example, an In-Sight 3000 with the MAC address 00-d0-24-00-04-0b has a Host Name of "is3k00040b". If you do not enter a new Host Name, the In-Sight 3000 will appear on the network with the default Host Name. You may change the Host Name later.

Additional information related to the Host Name can be found in Appendix A: Network Settings.

8. Enter the optional settings in this step only if required by your application.
  - a. Enter a Default Gateway if the In-Sight 3000 you are installing will need to communicate with a device on another subnet. A Default Gateway routes data packets from a device on the local subnet to a device on another subnet.
  - b. Enter a DNS Server if you want to specify a Domain Name Service (DNS) server. A Domain name (i.e., yourcompany.com) is an alias for an IP address (i.e., 198.232.76.19). A DNS server maintains the data on corresponding domain names and IP addresses. The DNS Server field determines which host your In-Sight 3000 contacts (by IP address) in response to a given Domain Name.
  - c. Select Use DHCP Server if you want to re-install your In-Sight 3000 onto a network that uses a DHCP server. Use DHCP Server determines whether In-Sight automatically configures TCP/IP using DHCP (checked) or manually using the settings in the Network dialog (unchecked). See page 12 for information related to installing an In-Sight 3000 to a network with a DHCP server.
  - d. Enter a Domain to configure or monitor the In-Sight 3000 you are installing using an In-Sight 3000 or In-Sight PC Host that is not part of the local network. A Domain determines the string appended to a host name to make a **Fully Qualified Domain Name** (FQDN).

Additional information related to these settings can be found in Appendix A: Network Settings.

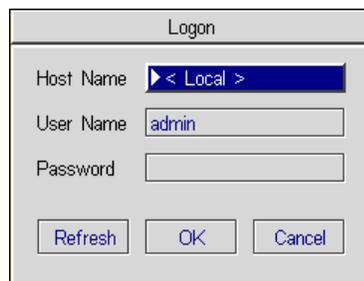
The remaining settings in the Network Dialog, FTP Settings and Host Table, are advanced network settings that are described in the *In-Sight Guide and Reference* located on the In-Sight CD-ROM shipped with your system.

9. Click OK to accept the changes and return to the Settings menu.
10. Click Close, then cycle power to the In-Sight 3000 to implement the changes to the network settings.

## Verifying the In-Sight 3000 Network Installation

*To verify the In-Sight 3000 has been successfully configured for the network:*

1. Supply power to the In-Sight 3000 and the local display. If the In-Sight 3000 is connected to the network, the boot-up screen will show the MAC Address, Host Name, Domain Name, IP Address, Subnet Mask, Gateway and DNS Server prior to the display of the In-Sight spreadsheet. If the In-Sight 3000 is not connected to the network, these items will not appear.
2. Open the System menu and click Logon to open the Logon dialog (Figure 11).



**Figure 11. Logon Dialog**

3. Select the Host Name field to open the drop-down list of In-Sight systems on the network. If the In-Sight 3000 is connected to the network, the Host Name list will contain the names of other In-Sight systems on the local network. If an expected host name does not appear, click the Refresh button.

Select a name, then click OK. A message will appear while the In-Sight 3000 logs on to the In-Sight system you selected. The In-Sight spreadsheet will then appear. The Host Name of the system you are logged on to is displayed in the lower-left corner of the spreadsheet.

4. Open the System menu and select Live to view an acquired image over the network. If the image appears, the In-Sight 3000 has a fully functional network connection.

If the In-Sight 3000 does not have a fully functional network connection, verify the Windows and In-Sight settings. For Windows, verify the network protocol is TCP/IP (page 14) and the IP Address and Subnet Mask are appropriate for your network (page 16). In the In-Sight Network dialog, verify the IP Address is valid and the same as in Windows. Also verify the Subnet Mask is valid.

This completes the basic installation procedure of an In-Sight 3000 onto a network. For information on using your networked In-Sight 3000, refer to *the In-Sight Guide & Reference*, an HTML help file included on your In-Sight CD-ROM.



# Specifications

The following sections present specifications of the In-Sight 3000 processor and camera.

- Processor Specifications
- Camera Specifications

## Processor Specifications

A summary of In-Sight 3000 specifications appears below in Table 1.

**Table 1. In-Sight 3000 Processor General Specifications**

Specification	Description
Model Number	Cognex In-Sight 3000
Part Number	800-5745-1
Processors	<ul style="list-style-type: none"><li>■ Vision Processing: Texas Instruments C-6000 series DSP architecture</li><li>■ Networking: Motorola Power PC architecture</li></ul>
Memory	<ul style="list-style-type: none"><li>■ Job &amp; program storage: 4 MB non-volatile flash memory</li><li>■ Image acquisition and processing: 16 MB SDRAM</li><li>■ VGA display: 1 MB</li></ul>
Input	<ul style="list-style-type: none"><li>■ 10-button Control Pad with a 3-m (10 ft) cable</li><li>■ Keyboard and mouse entry and navigation from a PC using In-Sight PC Host software</li></ul>
Display	<ul style="list-style-type: none"><li>■ 640 x 480 VGA output through a standard 15-pin D-sub connector</li><li>■ Color graphics overlay</li></ul>
I/O	<ul style="list-style-type: none"><li>■ Built-in: 2 discrete inputs and 2 discrete outputs (Max voltage: 24V; max current: 50 mA)</li><li>■ External: 8 discrete inputs and 8 discrete outputs (requires optional I/O Expansion Module)</li></ul>
Communications	<ul style="list-style-type: none"><li>■ One RJ-45 port using RS-232C protocol (RJ-45 to DB-9 adapter supplied) up to 115Kb.</li><li>■ Ethernet (10/100 MBits/sec) TCP/IP protocol</li></ul>
Light Control	<ul style="list-style-type: none"><li>■ LED/strobe lights power/control (requires optional Cognex light module &amp; Strobe Light Adapter)</li></ul>
Power Consumption	<ul style="list-style-type: none"><li>■ 24 ± 5% VDC, 1 A (includes the camera, lights, and an I/O Expansion module). Connected by screw terminals on a detachable 2-pin terminal plug.</li></ul>
Mechanical	<ul style="list-style-type: none"><li>■ Cast-aluminum enclosure; no moving parts</li><li>■ Four ¼-in (6-mm) mounting holes</li><li>■ Dimensions:<ul style="list-style-type: none"><li>• 292.6 (width) x 142.5 (depth) x 45.5 mm (height)</li><li>• 11.52 (width) x 5.61 (depth) x 1.79 in (height)</li></ul></li><li>■ Weight: 1060 g (37.1 oz)</li></ul>
Environmental	<ul style="list-style-type: none"><li>■ Operating temperature: 10 to 50°C</li><li>■ Operating humidity: 10 to 90%, non-condensing</li><li>■ Storage temperature: -10 to 65°C</li><li>■ Storage humidity: 10 to 90%, non-condensing</li></ul>

## Installing the In-Sight 3000

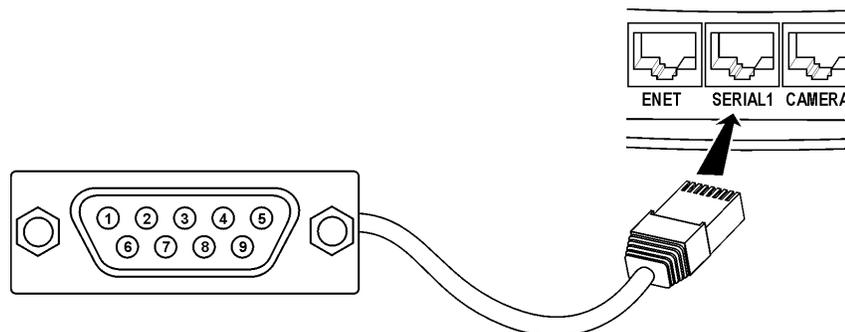
The following sections present detailed specifications of the In-Sight 3000 processor.

- ❑ *Serial Port Specifications*
- ❑ *Discrete I/O Specifications*
- ❑ *LIGHTS Port Specifications*
- ❑ *CONTROL PAD Connector Specifications*
- ❑ *Processor Dimensional Specifications*

## SERIAL Port Specifications

In-Sight provides a high-speed (115 kbaud) asynchronous serial port (SERIAL1) for communication with a PC or other devices (Figure 12). This port observes the RS-232C protocol through an RJ-45 connector.

To accommodate a DB-9 device, In-Sight includes a serial adapter cable (P/N CIO-2050-00) with an RJ-45 connector on one end and a DB-9 connector on the other. Use a standard serial cable (not null modem) when connecting a serial device to In-Sight.



**Figure 12. Serial Port Pin Numbers**

Table 2 contains the signal name for each pin labeled in Figure 12.

**Table 2. Serial Port Pin Numbers and Assignments**

Pin	Signal Name	Pin	Signal Name
1	DCD	6	DSR
2	RX data	7	RTS
3	TX data	8	CTS
4	DTR	9	Unused
5	Ground		

## Discrete I/O Specifications

In addition to the built-in trigger input and strobe output on the camera (page 29), In-Sight also provides up to ten discrete inputs and ten discrete outputs for general-purpose use. Two inputs and two outputs are built into the In-Sight processor, which provides optical isolation for the signals. The remaining eight inputs and outputs require the optional I/O Expansion Module.

Each discrete I/O signal is electrically independent. By default, polarity is active-high, so the transition from 0 to 24VDC indicates ON. You can invert the polarity (to active-low) through In-Sight's Discrete Input and Discrete Output dialogs.

Connect the built-in discrete I/O through a detachable 8-pin plug (Cognex P/N 182-0463 or Phoenix Connector #1803633) as shown in Figure 13.

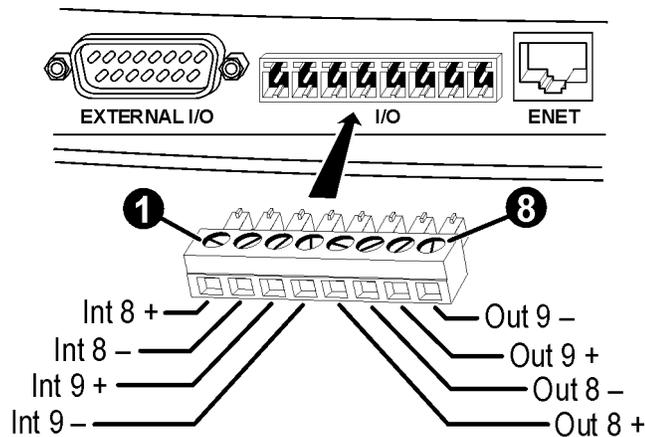


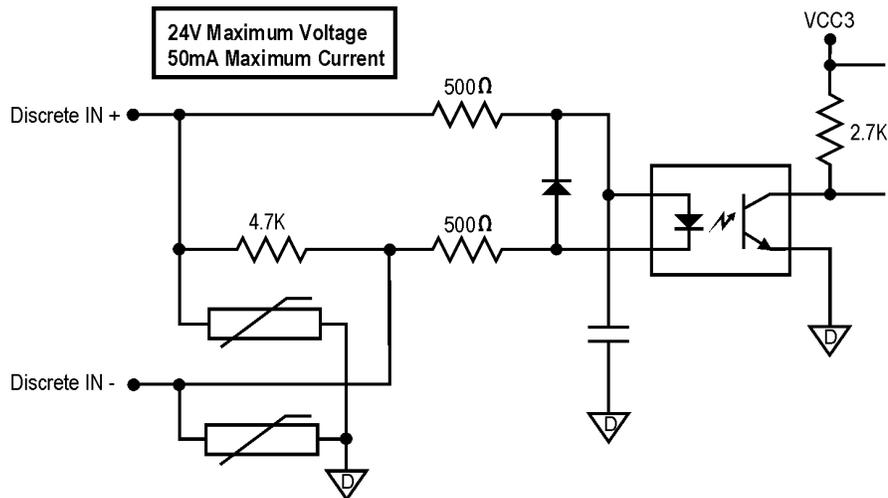
Figure 13. Discrete I/O Port Pin Numbers

Table 3 contains the signal name for each pin labeled in Figure 13.

Table 3. Discrete I/O Pin Numbers and Assignments

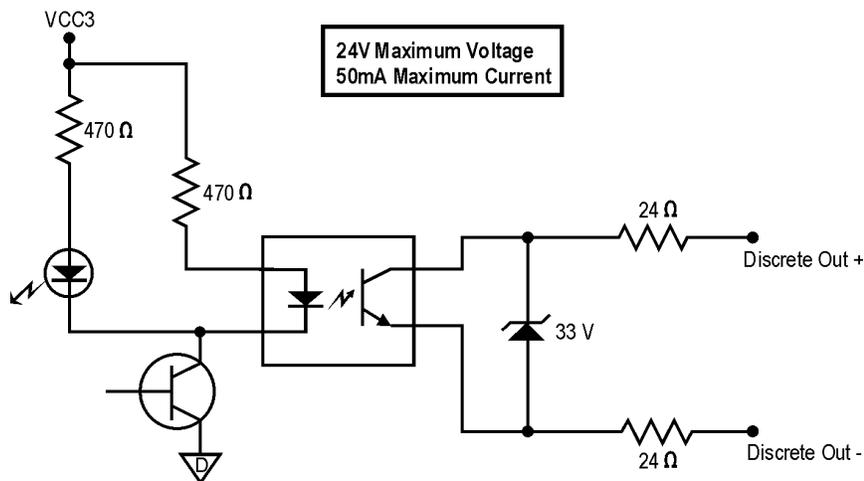
Pin	Signal Name	Pin	Signal Name
1	IN 8 +	5	OUT 8 +
2	IN 8 -	6	OUT 8 -
3	IN 9 +	7	OUT 9 +
4	IN 9 -	8	OUT 9 -

Figure 14 is the electrical schematic for the built-in discrete inputs.



**Figure 14. Discrete Input Schematic (built-in inputs only)**

Figure 15 is the electrical schematic for the built-in outputs.

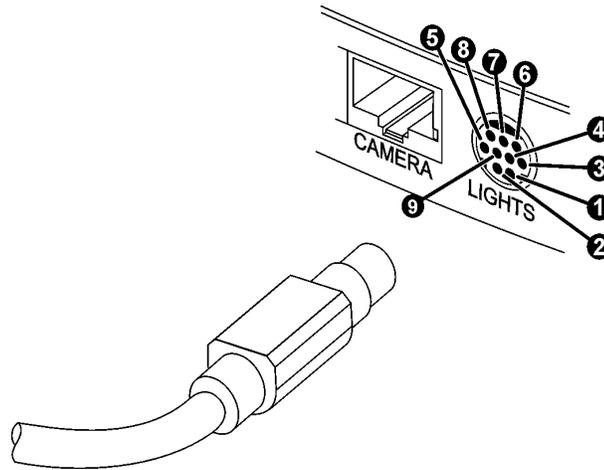


**Figure 15. Discrete Output Schematic (built-in outputs only)**

For information related to the I/O Expansion Module, refer to the *I/O Expansion Module Installation and Reference* (Cognex P/N 590-6283).

## LIGHTS Port Specifications

The In-Sight 3000 provides power to supported LED illumination systems through its LIGHTS port. Figure 16 provides pin numbers and assignments for the LIGHTS port.



**Figure 16. LIGHTS Port Pin Numbers**

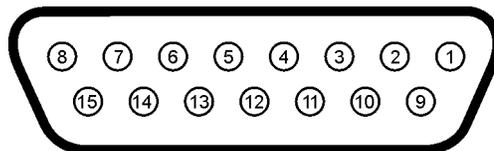
Table 4 contains the signal name for each pin labeled in Figure 16.

**Table 4. LIGHTS Port Pin Numbers and Assignments**

Pin	Signal Name	Pin	Signal Name
1	Light 0, channel 0, 0 to 60 mA	6	+24VDC, channel 1, 0 to 60 mA max
2	+24VDC, channel 0, 0 to 60 mA max	7	Light 1, channel 1, 0 to 60 mA
3	Light 0, channel 1, 0 to 60 mA	8	+24VDC, channel 1, 0 to 60 mA max
4	+24VDC, channel 0, 0 to 60 mA max	9	Ground (unused by 8-pin plugs)
5	Light 1, channel 0, 0 to 60 mA	Shield	Ground

## CONTROL PAD Connector Specifications

The In-Sight 3000 provides for data input through its CONTROL PAD port. Figure 17 provides pin numbers and assignments for the CONTROL PAD port.



**Figure 17. CONTROL PAD Port Pin Numbers**

Table 5 contains the signal name for each pin labeled in Figure 17.

**Table 5. CONTROL PAD Port Pin Numbers and Assignments**

Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
1	Power, +5 VDC	6	Analog 1 (cursor)	11	Analog 2 (cursor)
2	Button 1	7	Button 2	12	Ground
3	Analog 0 (cursor)	8	Not connected	13	Analog 3 (cursor)
4	Ground	9	Power, +5 VDC	14	Button 4
5	Ground	10	Button 3	15	Not connected

**Note:** The control pad connector is electrically compatible with most analog 2-axis, 4-button PC game pad devices. Disable the game pad's "turbo" mode if it causes erratic behavior when used with In-Sight.

## Processor Dimensional Specifications

**Note:** Dimensions are in millimeters (inches).

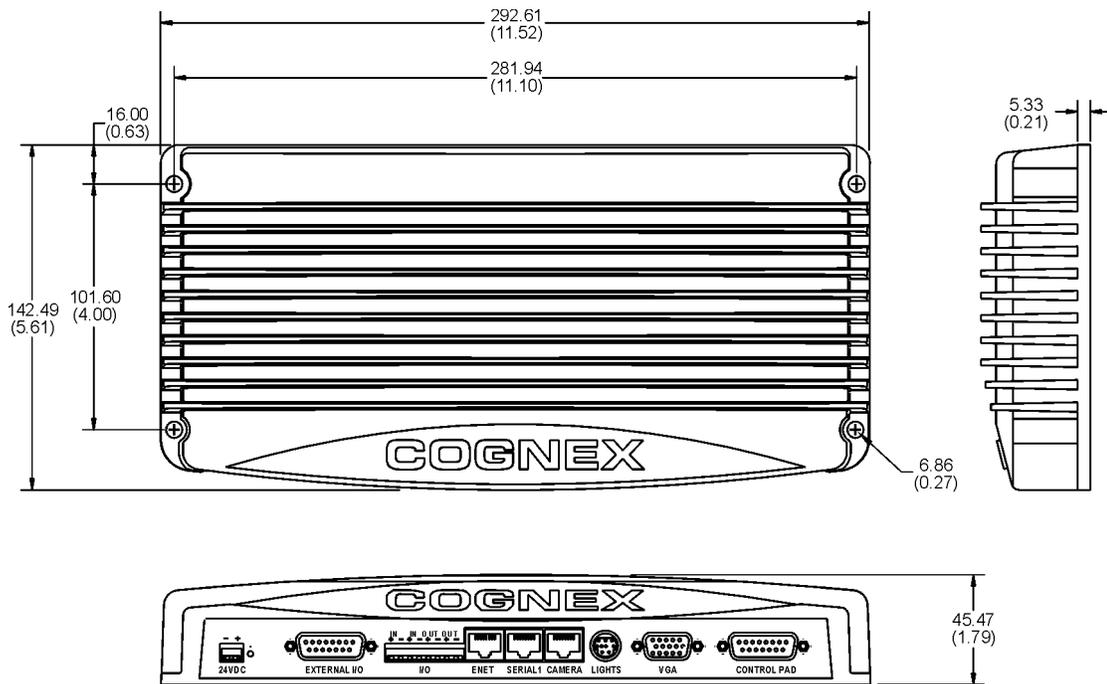


Figure 18. In-Sight Processor Dimensions



## Camera Specifications

A summary of In-Sight 3000 camera specifications appears below in Table 6.

**Table 6. In-Sight 3000 Camera General Specifications**

Specification	Description
Part Number	800-5715-1
Acquisition	<ul style="list-style-type: none"><li>■ Rapid reset, progressive scan, and partial acquisition modes</li><li>■ Up to 30 full frames per second</li><li>■ Up to 640 x 480 image size, with 256 gray levels (8 bits per pixel)</li></ul>
Sensor	<ul style="list-style-type: none"><li>■ 1/3-inch CCD (4.8 x 3.6 mm, 6 mm diagonal)</li><li>■ 307,200 pixels (640 x 480 image)</li><li>■ Square pixels, 7.4 x 7.4 <math>\mu</math>m</li><li>■ Electronic shutter speed: 0.064-1000 ms</li></ul>
Lens	C-mount lens
I/O	<ul style="list-style-type: none"><li>■ Trigger input: low (0.0-0.8 VDC) to high (3-24VDC); 50 mA maximum current</li><li>■ Strobe output: 10-mA pulse, duration of two horizontal scan lines (128 <math>\mu</math>sec)</li><li>■ Connected through a detachable 4-pin terminal plug</li></ul>
Mechanical	<ul style="list-style-type: none"><li>■ Dimensions (excludes lens, includes mounting block) Length: 93 mm (3.65 in), Width: 39 mm (1.52 in), Height: 43 mm (1.7 in)</li><li>■ Aluminum housing</li><li>■ Weight: 160 g (5.6 oz)</li></ul>
Mounting	<ul style="list-style-type: none"><li>■ Non-conductive plastic mounting block with 1/4-20 threaded hole and two M6 threaded holes</li></ul>
Environmental	<ul style="list-style-type: none"><li>■ Operating Temperature: 10 to 45°C</li><li>■ Operating Humidity: 10 to 90% non-condensing</li><li>■ Storage Temperature: -10 to 65°C</li><li>■ Storage Humidity: 10 to 90% non-condensing</li></ul>
Cable	RJ-45 to RJ-45, shielded twisted pair. Available lengths: 4.5 m (15 ft), 9.1 m (30 ft), 15.2 m (50 ft)
Gain and Offset	Controlled by software
Power	12 VDC, supplied by the In-Sight processor

The following sections present detailed specifications of the In-Sight 3000 camera.

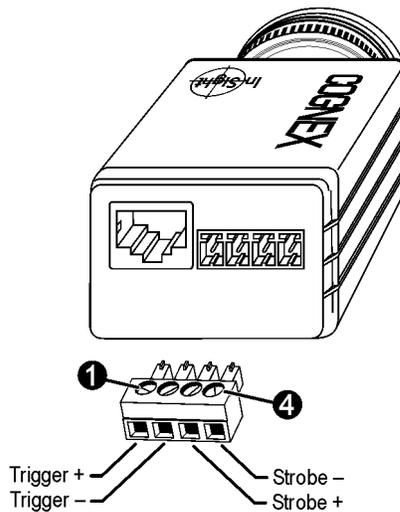
- *Trigger and Strobe Output Specifications*
- *Camera Mechanical Specifications*

## Trigger and Strobe Output Specifications

To activate the on-camera trigger, apply a transition voltage to the trigger input. The transition voltage should be from the range 0.0-0.8 VDC to the range 3-24VDC, with a maximum 50 mA current.

To trigger a strobe device, the camera generates a strobe output signal when it is ready to integrate light. The signal is a 10 mA pulse with a duration of about two horizontal scan lines (128  $\mu$ sec). During this interval, the camera's optocoupler switch is closed. The device to be activated should be optically isolated.

Figure 19 provides trigger input and strobe output pin numbers and assignments.



**Figure 19. Trigger Input and Strobe Output Pin Numbers**

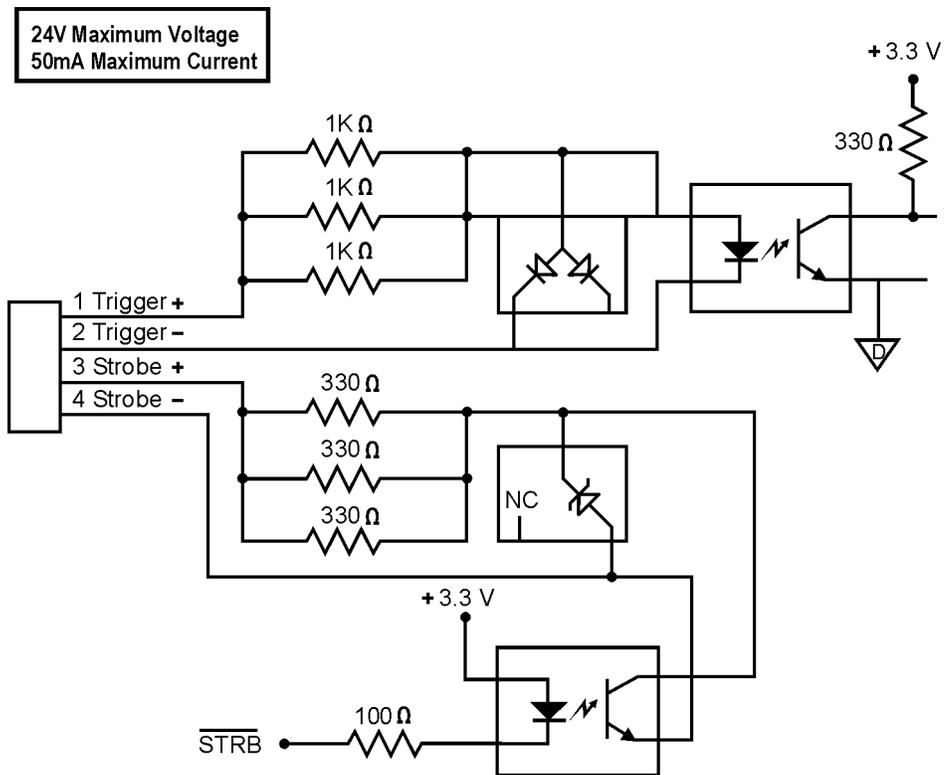
Table 7 contains the signal name for each pin labeled in Figure 19.

**Table 7. Trigger Input and Strobe Output Pin Numbers and Assignments**

Pin	Signal Name	Pin	Signal Name
1	Trigger +	3	Strobe +
2	Trigger -	4	Strobe -

**Installing the In-Sight 3000**

Figure 20 is a schematic of the Trigger/Strobe circuitry.



**Figure 20. Trigger/Strobe Schematic**

## Camera Dimensional Specifications

Note: Dimensions are in millimeters (inches).

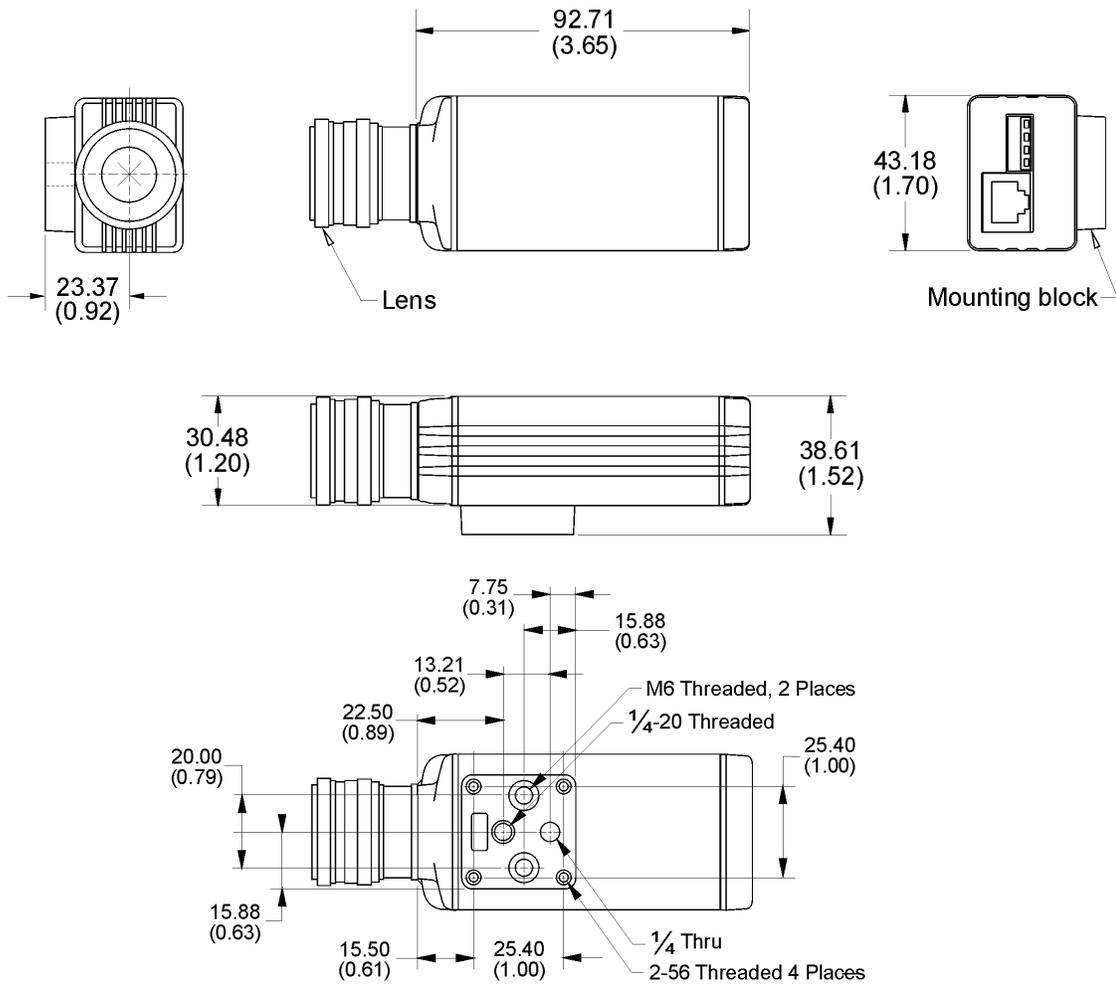
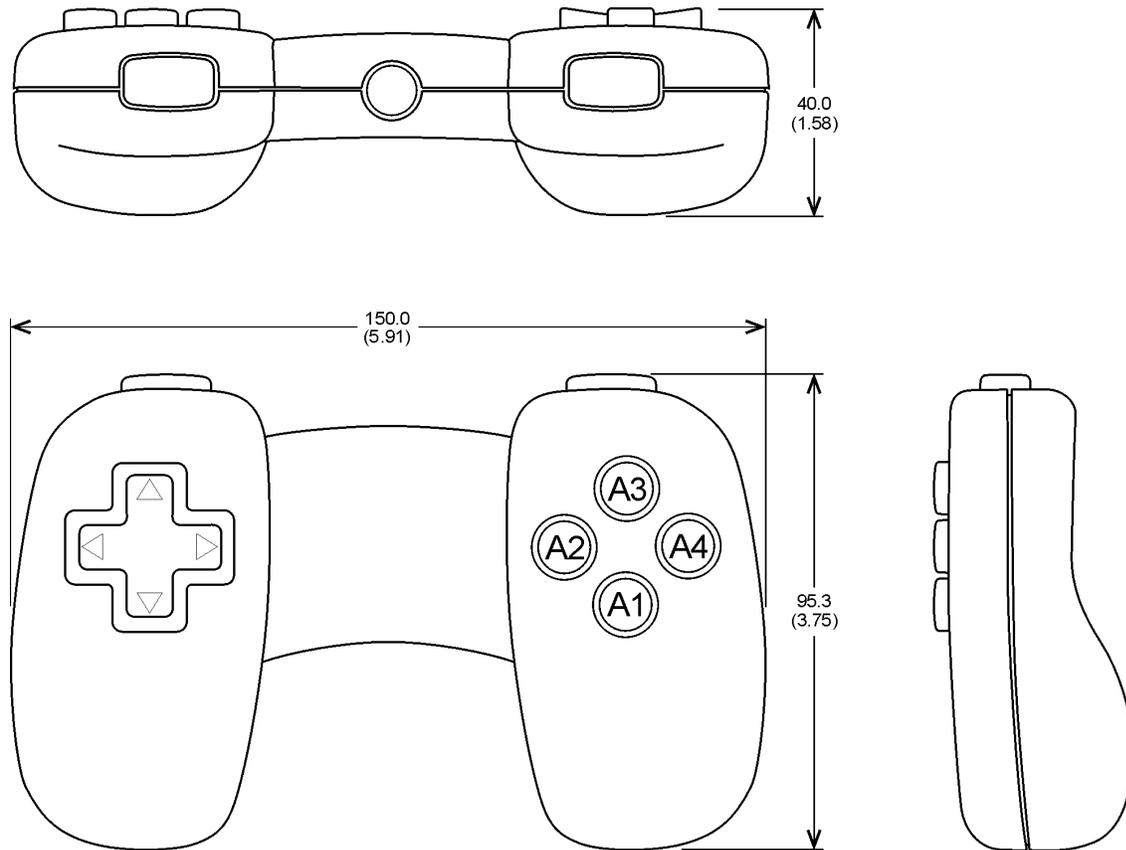


Figure 21. Camera Dimensions

## Control Pad Dimensional Specifications

**Note:** Dimensions are in millimeters (inches).



**Figure 22. Control Pad Dimensions**



## CAT5 Cable Specifications

Cognex-supplied Category 5 network patch cable meets CAT5/CAT5e specifications. The wiring for Cognex-supplied cable are shown in Table 8.

**Table 8. CAT5 Network Cable Wiring**

Standard Straight-Pin Cable	Optional Crossover Cable
1 — 1	1 — 3
2 — 2	2 — 6
3 — 3	3 — 1
4 — 4	4 — 5
5 — 5	5 — 4
6 — 6	6 — 2
7 — 7	7 — 8
8 — 8	8 — 7

The standard pairing for Cognex-supplied CAT5/CAT5e cable, 568-B Standard Pairing, is shown in Table 9.

**Table 9. CAT5 Cable Pairing**

Pair #	Wire Pairs
1	4 — 5
2	1 — 2
3	3 — 6
4	7 — 8



## Appendix A: Network Settings

The information in this appendix applies to In-Sight 3000 network settings. You can configure these settings from an In-Sight 3000 or In-Sight PC Host.

### IP Address

Like the MAC address (page 19), the IP (Internet Protocol) Address uniquely identifies the In-Sight 3000 on the network. Unlike the MAC address, the IP address must be assigned automatically by a DHCP server or manually by the user. To manually connect the In-Sight 3000 to an existing network, match the address to the existing numbering scheme. When creating a network specifically for In-Sight, we recommend the following numbering system (extracted from an MSDN document):

- 10.0.0.0/8**      The 10.0.0.0/8 private network is a class A network ID that allows valid IP addresses from 10.0.0.1 to 10.255.255.254. The 10.0.0.0/8 private network has 24 host bits which can be used for any subnetting scheme within the private organization. The default Subnet Mask is 255.0.0.0.
  
- 172.16.0.0/12**      The 172.16.0.0/12 private network can be interpreted either as a block of 16 class B network IDs or as a 20-bit assignable address space (20 host bits) which can be used for any subnetting scheme within the private organization. The 172.16.0.0/12 private network allows valid IP addresses from 172.16.0.1 to 172.31.255.254. The default Subnet Mask is 255.255.240.0.
  
- 192.168.0.0/16**      The 192.168.0.0/16 private network can be interpreted either as a block of 256 class C network IDs or as a 16-bit assignable address space (16 host bits), which can be used for any subnetting scheme within the private organization. The 192.168.0.0/16 private network allows valid IP addresses from 192.168.0.1 to 192.168.255.254. The default Subnet Mask is 255.255.0.0

When DHCP is enabled, this field is grayed out and displays the value assigned by DHCP.



## **Subnet Mask**

The Subnet Mask identifies which portions of the IP number are the network portion and which are the host portion. A value of 255.255.255.0 (a class C mask) identifies 24 bits for the network portion and 8 bits for the host portion.

255.0.0.0	Class A	8 network/24 host
255.255.0.0	Class B	16 network/16 host
255.255.255.0	Class C	24 network/8 host

When DHCP is enabled, this field is grayed out and displays the value assigned by DHCP.

## **Default Gateway**

A gateway is a device that routes data packets from a device on the local subnet to a device on another subnet. For example, if an In-Sight 3000 will need to communicate with a device on another subnet, enter the address of the gateway device in the Default Gateway field. However, if an In-Sight 3000 will need to communicate only with devices on the local subnet, do not enter an address for the Default Gateway (leave the field all zeros).

## **DNS Server**

A Domain name (i.e., yourcompany.com) is an alias for an IP address (i.e., 198.232.76.19). A DNS (Domain Name Server) maintains the data on corresponding domain names and IP addresses. The DNS Server field determines which host is contacted (by IP address) in response to a given Domain Name.

## **DHCP Server**

The DHCP Server check box determines whether In-Sight uses DHCP (Dynamic Host Configuration Protocol) on start up or if the values in the Network Settings dialog configure TCP/IP. Check this box only if a DHCP server is running on the local network. If a DHCP server does not respond within 60 seconds, the system will boot without network support enabled.

In a production environment, use static IP numbers instead of placing a check in the DHCP Server check box. Using static IP numbers removes the need for a DHCP server on the local network and eliminates intermittent DHCP traffic.

The In-Sight restores the settings for static IP assignment when this box is unchecked.



## **Host Name**

Host Name determines the name that is visible to other In-Sight systems through the host browsing dialogues.

This field does not automatically reflect the name given by the DHCP server or referenced through the DNS server. When the DHCP server supplies a host name, it is ignored in favor of a user supplied name or the default host name (see installation section).

## **Set the Domain Name**

An In-Sight 3000 must have a FQDN (page 23) to be configured or monitored through an In-Sight 3000 or In-Sight PC Host that is not part of the local network. The Domain field sets the string that appends to a host name to make a FQDN. For example, setting the Domain to **yourcorp.com** yields the following results:

- if a host name is **system1**, the FQDN for lookup is **system1.yourcorp.com**.
- if a host name is **system1.yourcorp.com**. (note the period at the end), the FQDN for lookup is **system1.yourcorp.com**.

Appending the period to the end of the host name prevents redundancy in appending the Domain name to the FQDN (i.e., **system1.yourcorp.com** would become **system1.yourcorp.com.yourcorp.com**).

When the Use DHCP Server check box is enabled, this field is grayed out and displays the value assigned by the DHCP server.

*Installing the In-Sight 3000*

**COGNEX**  
Vision for Industry®

[www.cognex.com/products/InSight/default.asp](http://www.cognex.com/products/InSight/default.asp)



P/N 597-0003-02