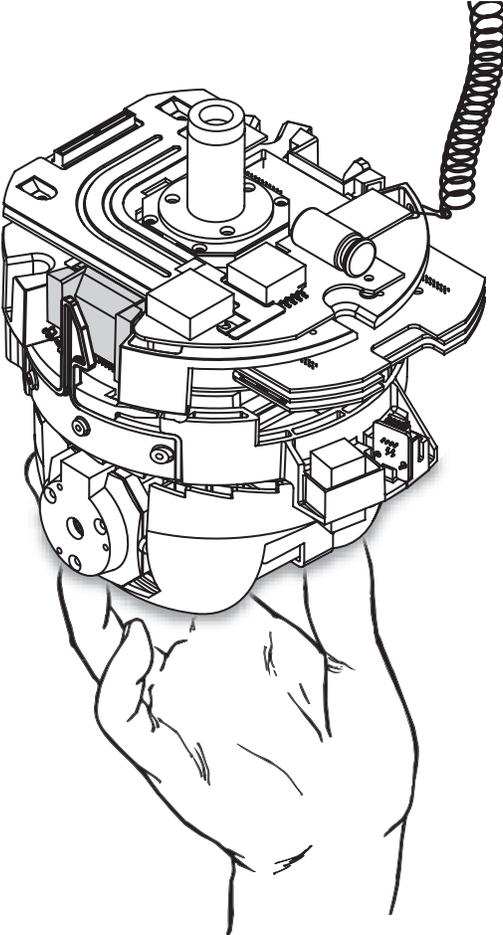


Legend

# Installation Manual



**Copyright** Copyright © 2006, GE Security Inc. All rights reserved.

This document may not be copied or otherwise reproduced, in whole or in part, except as specifically permitted under US and international copyright law, without the prior written consent from GE.

Document number: **1052026B** (February 2006)

**Disclaimer** THE INFORMATION IN THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. GE ASSUMES NO RESPONSIBILITY FOR INACCURACIES OR OMISSIONS AND SPECIFICALLY DISCLAIMS ANY LIABILITIES, LOSSES, OR RISKS, PERSONAL OR OTHERWISE, INCURRED AS A CONSEQUENCE, DIRECTLY OR INDIRECTLY, OF THE USE OR APPLICATION OF ANY OF THE CONTENTS OF THIS DOCUMENT. FOR THE LATEST DOCUMENTATION, CONTACT YOUR LOCAL SUPPLIER OR VISIT US ONLINE AT [WWW.GESECURITY.COM](http://WWW.GESECURITY.COM).

This publication may contain examples of screen captures and reports used in daily operations. Examples may include fictitious names of individuals and companies. Any similarity to names and addresses of actual businesses or persons is entirely coincidental.

**Trademarks and patents** GE and the GE monogram are registered trademarks of General Electric. Legend product and logo are trademarks of GE Security.

Other trade names used in this document may be trademarks or registered trademarks of the manufacturers or vendors of the respective products.

**Software license agreement** GE software supplied with GE products is proprietary and furnished under license and can be used or copied only in accordance with the license terms.

THE ENCLOSED PROGRAM IS FURNISHED SUBJECT TO THE TERMS AND CONDITIONS OF THIS AGREEMENT. RETENTION OF THE PROGRAM FOR MORE THAN 30 DAYS, OPENING OF THE SEALED WRAPPER, IF ANY, SURROUNDING THE PROGRAM, OR USE OF THE PROGRAM IN ANY MANNER WILL BE CONSIDERED ACCEPTANCE OF THE AGREEMENT TERMS. IF THESE TERMS ARE NOT ACCEPTABLE, RETURN THE UNUSED PROGRAM AND ANY ACCOMPANYING DOCUMENTATION TO GE FOR A FULL REFUND OF THE LICENSE FEE PAID. (FOR INFORMATION REGARDING THE RETURN OF PROGRAMS ENCODED OR INCORPORATED WITHIN EQUIPMENT, CONTACT THE NEAREST GE SALES OFFICE.)

**Intended use** Use this product only for the purpose it was designed for; refer to the data sheet and user documentation. For the latest product information, contact your local supplier or visit us online at [www.gesecurity.com](http://www.gesecurity.com).

**FCC compliance** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

# Contents

<b>Preface</b> .....	<b>v</b>
Conventions used in this document .....	v
Safety terms and symbols .....	v
References .....	vi
<b>Chapter 1. Introduction</b> .....	<b>1</b>
<b>Installation overview</b> .....	<b>2</b>
<b>Product description</b> .....	<b>2</b>
<b>Product contents</b> .....	<b>2</b>
<b>System requirements</b> .....	<b>3</b>
Operational requirements .....	3
Minimum load requirements .....	5
Cable requirements .....	5
Cable management .....	6
Power requirements .....	7
Power cable size and length requirements .....	7
<b>Chapter 2. Installing the housing and cables</b> .....	<b>9</b>
<b>Various mounting and housing styles</b> .....	<b>10</b>
<b>Flush-mount housings</b> .....	<b>11</b>
Preparing the mounting surface .....	11
Installing the housing .....	12
<b>Pendant-mount housings</b> .....	<b>14</b>
Preparing the mounting surface .....	14
Installing the housing .....	15
<b>Preparing the cables</b> .....	<b>17</b>
<b>Chapter 3. Wiring and addressing the dome</b> .....	<b>19</b>
<b>Components used for basic and advanced operation</b> .....	<b>20</b>
<b>Wiring the housing board</b> .....	<b>21</b>
<b>Installing the cable ring</b> .....	<b>24</b>
<b>Addressing the camera site and setting the protocol</b> .....	<b>25</b>
<b>Setting the termination</b> .....	<b>27</b>
<b>Chapter 4. Installing the camera assembly and bubble</b> .....	<b>29</b>
<b>Installing the camera assembly</b> .....	<b>30</b>
<b>Installing the bubble</b> .....	<b>32</b>
<b>Chapter 5. Using passcodes</b> .....	<b>35</b>
<b>Passcodes off by default</b> .....	<b>36</b>
<b>Turning on passcodes</b> .....	<b>36</b>

<b>Chapter 6.</b>	<b>Troubleshooting, maintenance, support</b>	<b>39</b>
	<b>Troubleshooting</b>	<b>40</b>
	Diagnostic LEDs	40
	Common installation issues	41
	<b>Maintenance</b>	<b>42</b>
	Rebooting versus resetting a dome	42
	Cleaning the bubble	43
	Spare parts list	44
	<b>Contacting technical support</b>	<b>45</b>
	Online publication library	45
<b>Appendix A.</b>	<b>Installing the individual mounts</b>	<b>47</b>
	<b>GEA-102 wall-mount arm</b>	<b>48</b>
	Installing the wall-mount arm	48
	Opening the conduit hole	51
	<b>GEA-114 T-bar ceiling support kit</b>	<b>53</b>
	Installing the T-bar ceiling support kit	54
<b>Appendix B.</b>	<b>Differences of earlier boards</b>	<b>57</b>
	Identifying earlier and later boards and cards	58
	Component placement on Rev-A housing boards	59
	Cable connections to Rev-A housing boards	60
	Wired Rev-A housing boards in domes	61
	Protocols and addressing for Rev-A housing boards	62
	Termination switches for Rev-A housing boards	63
<b>Appendix C.</b>	<b>Tyco/AD wiring</b>	<b>65</b>
	Verifying dome software and AHC firmware versions	66
	Wiring Tyco/AD keypads to Legend domes	66

## Preface

This is the *GE Legend Installation Manual*. It provides an overview of the product and detailed instructions explaining how to install all models. There is also information describing how to contact technical support if you have questions or concerns. For programming and operation instructions, refer to the *Legend User Manual*.

To use this document effectively, you should have the following minimum qualifications:

- a basic knowledge of CCTV systems and components; and
- a basic knowledge of electrical wiring and low-voltage electrical connections.

Read these instructions and all ancillary documentation entirely before installing or operating this product. The most current versions of this and related documentation may be found on our website. Refer to [Online publication library](#) on page 45 for instructions on accessing our online publication library.

**Note:** A qualified service person, complying with all applicable codes, should perform all required hardware installation.

## Conventions used in this document

The following conventions are used in this document:

<b>Bold</b>	Menu items and buttons.
<i>Italic</i>	Emphasis of an instruction or point; special terms.
	File names, path names, windows, panes, tabs, fields, variables, and other GUI elements.
	Titles of books and various documents.
<i>Blue italic</i>	(Electronic version.) Hyperlinks to cross-references, related topics, and URL addresses.
Monospace	Text that displays on the computer screen.
	Programming or coding sequences.

## Safety terms and symbols

These terms may appear in this manual:

 <b>CAUTION:</b>	<i>Cautions</i> identify conditions or practices that may result in damage to the equipment or other property.
 <b>WARNING:</b>	<i>Warnings</i> identify conditions or practices that could result in equipment damage or serious personal injury.

## References

If you want to investigate related topics, these other documents may prove helpful:

- GE Security. *Legend User Manual* (1052027)
- GE Security. *KTD-405 Controller Keypad User Manual* (1036547)
- GE Security. *Networking Cable Types Technical Reference Guide* (1047213)
- GE Security. *ASCII Protocol Reference Manual* (1038010)
- GE Security. *Legend v2.1.9 Software Upgrade Installation Instructions* (1054754)
- GE Security. *Legend AHC Retrofit Installation Instructions* (1055588)

# Chapter 1 Introduction

This chapter provides an overview of your Legend dome system, including product contents and system requirements.

In this chapter:

- Installation overview* ..... 2
- Product description* ..... 2
- Product contents* ..... 2
- System requirements* ..... 3
  - Operational requirements* ..... 3
  - Minimum load requirements* ..... 5
  - Cable requirements* ..... 5
  - Cable management* ..... 6
  - Power requirements* ..... 7
  - Power cable size and length requirements* ..... 7

## Installation overview

The installation of domes has been made much easier with many of innovations that are now available in the Legend™ line of domes. All coaxial and UTP connections are built into the housing, and programming and addressing are stored in the housing. Housing memory allows you to replace cameras or move them between housings without having to reprogram them for each new site, because the camera will operate using the housing memory. As you install the first dome, you will find many other enhancements that make installation easier and quicker.

The general steps for installing your dome include:

- preparing the mounting surface and installing the mount (if used) and housing;
- preparing the cables and wiring the housing;
- addressing the camera site, setting the protocol, and setting the termination;
- installing the camera assembly; and
- installing the bubble.

## Product description

Legend is a line of advanced PTZ domes. Besides powerful cameras, Legend domes feature SilkTrak™ direct-drive positioning for smoother camera travel, a graphical programming interface for easier customization of camera settings, passcodes for protection against unauthorized access, and an Ethernet connection for flashing software upgrades over a standard IP network using a standard web browser.

The Legend protocol is backward compatible with the Digiplex protocol. You can replace older domes in an existing Digiplex system with Legend domes. You must, however, replace the entire dome (camera and housing), because the hardware is not backward compatible.

Be aware that Legend has greater power requirements than does CyberDome. Refer to [Power requirements](#) on page 7 and [Power cable size and length requirements](#) on page 7.

For additional details, refer to the data sheet and the *Legend User Manual* (1052027), which provides the programming instructions for all of the dome's features.

## Product contents

The Legend system consists of the following:

- 1 housing
- 1 package containing 4 connectors (one 2-pin for power, one 4-pin for data, one blue 12-pin for six alarms, and one green 12-pin for two alarms, two relays, and UTP video), and 1 small screw driver
- 2 manuals (installation and user, which covers programming and operation)
- 1 PTZ camera assembly
- 1 bubble (mirror bubbles are shipped with cotton gloves for special handling)
- 1 mount (wall-mount and flush-mount versions only)

You may receive the package contents in one large carton containing three boxes (four with wall-mount versions), or if shipped individually, you may receive three (or four) separate boxes. One box will contain the

housing, connectors, and manuals. The PTZ assembly, bubble, and mount (for wall-mount versions) are each shipped in separate boxes.

Inspect the package and contents for visible damage. If any components are damaged or missing, do not use the unit; contact the supplier immediately. If you need to return the unit, you must ship it in the original box.

Spare parts can be purchased for the domes. See *Spare parts list* on page 44.

## System requirements

For proper operation, adhere to the following operational, load, cable, and power requirements for Legend domes.

### Operational requirements

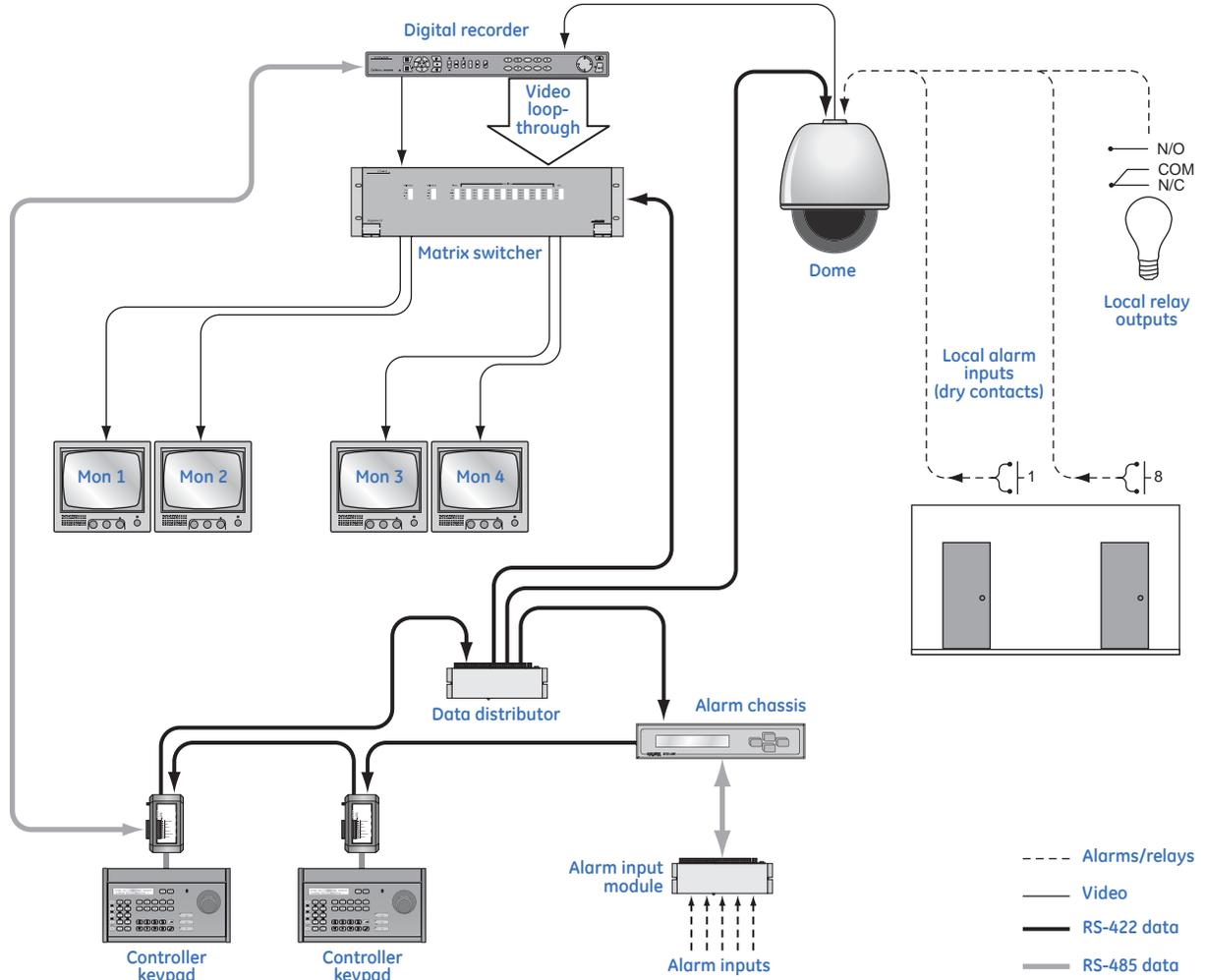
Legend contains a built-in receiver that decodes commands originating from a compatible controlling device, such as a keypad or ASCII control software. A minimum of one keypad, which is the most common controlling device, is required for operation. See *Figure 1*. From the keypad, an operator can pan, tilt, and zoom the camera, find presets, and start macros and ShadowTours. A typical advanced system is shown in *Figure 2* on page 4. For additional details, refer to the data sheet, user manual, or application guide.

---

*Figure 1. Basic system*



Figure 2. Typical advanced system



## Minimum load requirements

Table 1 lists the load requirements for all Legend dome configurations.



**CAUTION:** For safety, the mounting surface, hardware, and procedure used for securing the dome must support the weight of the dome, mount (if used), cables, and any structural or environmental vibration according to local codes.

Table 1. Minimum load requirements of dome configurations

Minimum load	Dome configuration
100 lb.	<ul style="list-style-type: none"> <li>Rugged, cast aluminum pendant-mount housing (with any mount)</li> <li>Heavy duty housing (with any mount)</li> <li>Pressurized housing (with any mount)</li> <li>Swing-arm mount (with any dome)</li> </ul>
50 lb.	All other dome and mount configurations

## Cable requirements

Table 2 lists the requirements for the cables that connect to the dome.



**CAUTION:** When flashing software upgrades to the dome over a standard IP network via the dome's Ethernet connection, ensure that the network is secured from unauthorized access. Consider connecting the Ethernet cable only when you are flashing the dome, unless you have the dome connected to a secure, isolated network.

Table 2. Cable requirements

Operation	Cable requirement	Length	
		feet	meters
<b>Alarms and relays</b>	22 to 26 gauge (0.64 to 0.4 mm) unshielded, two-conductor, twisted-pair (UTP) cable		
<b>Data</b>	<b>For RS-422:</b> 22 gauge (0.64 mm) <i>unshielded</i> , two-conductor, twisted-pair (UTP) cable	10,000	3,000
	<b>For RS-485:</b> 22 gauge (0.64 mm) <i>shielded</i> , two-conductor, twisted-pair (STP) cable	3,000	900
<b>Ethernet</b> (for flashing software upgrades)	CAT-5 Ethernet cable (without cable boots)	385	100
<b>Power</b>	24 VAC cable. To determine the size of cable needed for individual applications, see <a href="#">Power cable size and length requirements</a> on page 7.		
<b>Video</b>	75 ohm coaxial cable; or 22 gauge (0.64 mm) unshielded, two-conductor, twisted-pair (UTP) cable <b>Note:</b> Use only crimp-on BNC connectors. Do not use screw-on connectors.		

**Note:** When using unshielded twisted-pair cable for video and data, the wires can share the same jacket but must remain separate twisted pairs.

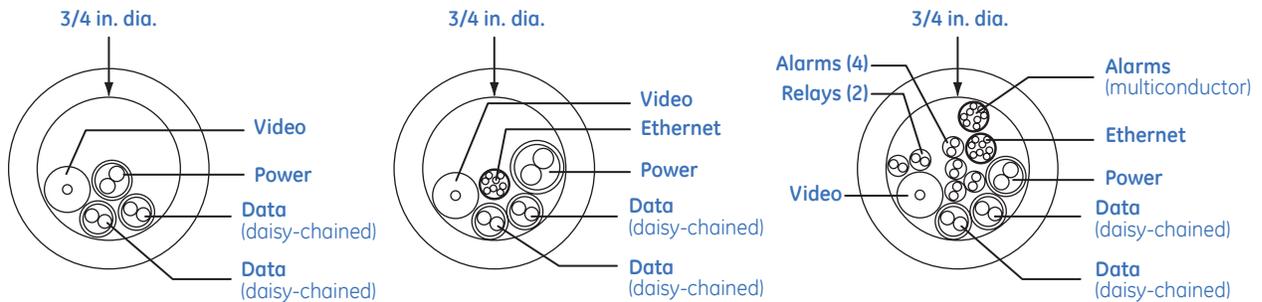
## Cable management

Follow all local codes for cable management. As a general rule, you can fill a cable conduit to a maximum of 60% of its capacity. You must maintain 40% free space. A variety of factors will determine how many cables you can run into the dome. Capacity limitations include:

- number of cables
- size of the cables
- number of alarms and relays wired
- use of single-conductor or multiple-conductor cable
- use or lack of use of a junction box

Figure 3 provides an illustration of the cable capacity of three typical applications. *It is important to note that all cables of the same gauge are not of the same diameter.* Manufacturer, shielding, and rating affect the actual diameter of cables of the same gauge. GE leaves the selection of the appropriate cable to the discretion of the installer who is working with the local codes of the installation site.

Figure 3. Three acceptable typical cabling scenarios



**Percentage conduit fill = 31%**

**Includes:**

- Video: one 59U/6U coaxial (0.24 in. dia.)
- Data: two 20 AWG UTP (0.19 in. dia.)
- Power: one 18 AWG UTP (0.21 in. dia.)
- Ethernet: none
- Alarms: none
- Relays: none

**Percentage conduit fill = 38%**

**Includes:**

- Video: one 59U/6U coaxial (0.24 in. dia.)
- Data: two 20 AWG UTP (0.19 in. dia.)
- Power: one 16 AWG UTP (0.25 in. dia.)
- Ethernet: CAT-5 (0.16 in. dia.)
- Alarms: none
- Relays: none

**Percentage conduit fill = 53%**

**Includes:**

- Video: one 59U/6U coaxial (0.24 in. dia.)
- Data: one 20 AWG UTP (0.19 in. dia.)
- Power: one 18 AWG UTP (0.21 in. dia.)
- Ethernet: CAT-5 (0.16 in. dia.)
- Alarms: 24 AWG UTP (0.11 in. dia.)
- Relays: 24 AWG UTP (0.11 in. dia.)

**Note:** The diameters for cables of the same gauge will vary per manufacturer, rating, and shielding. So be aware that you may get more or fewer cables within the 60% conduit fill requirement depending on the cables that you select.

## Power requirements

All Legend domes require a 24 VAC power supply to operate the domes' PTZ, camera, and heater/blower, if present. The startup and running power requirements vary depending on the model (*Table 3*).

Be aware that Legend domes have greater power requirements than do CyberDomes, which may require new cabling when replacing CyberDomes with Legend domes.



**CAUTION:** Use only a Class 2 power supply of the required output rating as listed on individual units and specified.

*Table 3. Power requirements at 24 VAC ( $\pm 4$  VAC) operating voltage*

Model	Start-up power	Running power
Dome without heater/blower	30 W	16 W
Dome with heater/blower	60 W	36 W
Rugged and HD dome with 25 W heater/blower	100 W	66 W

## Power cable size and length requirements

Using the proper gauge of power cable will ensure proper operation and avoid voltage drops. See *Table 4* for the recommended cable gauge for varying maximum cable lengths for the different models of domes.

*Table 4. Recommended power cable gauges based on maximum lengths for an operating voltage of 24 VAC ( $\pm 4$  VAC)*

Wire gauge		Domes without heater/blower (30 W)		Domes with heater/blower (60 W)		HD domes with heater/blower (100 W)	
AWG	mm <sup>2</sup>	feet	meters	feet	meters	feet	meters
10	2.60	1565	477	780	238	470	143
12	2.05	985	300	490	149	295	90
14	1.62	620	189	310	94	185	56
16	1.29	390	119	195	59	115	35
18	1.02	245	75	120	37	70	21
20	0.81	150	46	75	23	45	14
22	0.64	95	29	45	14	25	8



# Chapter 2 Installing the housing and cables

This chapter provides instructions for installing the housing and cables.

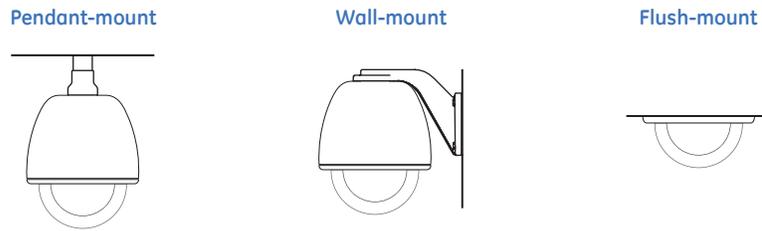
In this chapter:

- Various mounting and housing styles* ..... 10
- Flush-mount housings* ..... 11
  - Preparing the mounting surface* ..... 11
  - Installing the housing* ..... 12
- Pendant-mount housings* ..... 14
  - Preparing the mounting surface* ..... 14
  - Installing the housing* ..... 15
- Preparing the cables* ..... 17

## Various mounting and housing styles

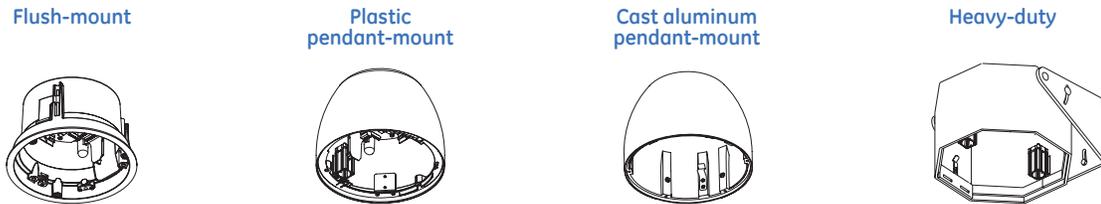
There are three basic mounting styles: pendant, wall, and flush. A pendant-mount lowers a dome from a ceiling, a wall-mount extends a dome from a wall, and a flush-mount raises a dome's bubble even with a ceiling. See *Figure 4*. This document provides the instructions for all mounting styles.

*Figure 4. Basic mounting styles*



There are four basic housing styles: flush-mount, plastic pendant-mount, cast aluminum pendant-mount, and heavy-duty (*Figure 5*). Installation is generally the same for all housing styles. There are some differences, such as how the bubble rings attach to the housings (*Figure 18* on page 33). Where differences exist, the instructions will specify.

*Figure 5. Basic housing styles*



## Flush-mount housings

Flush-mount and pendant-mount housings require different preparation of the mounting surface and different installation procedures of the housings. Follow the instructions given here for flush-mount housings.



**CAUTION:** The flush-mount housing is for indoor applications only. Do not expose it to moisture, or the unit may be damaged.

### Preparing the mounting surface

Following are the steps for preparing the mounting surface if you are mounting the housing directly into a solid surface that does not require reinforcement. If the mounting surface does require reinforcement, first install a GEA-113 T-bar ceiling panel or a GEA-114 T-bar support kit. Instructions for installing the GEA-114 are available in this manual (*GEA-114 T-bar ceiling support kit* on page 53). If you are installing a GEA-113, refer to the instructions that came with the panel (1052914).



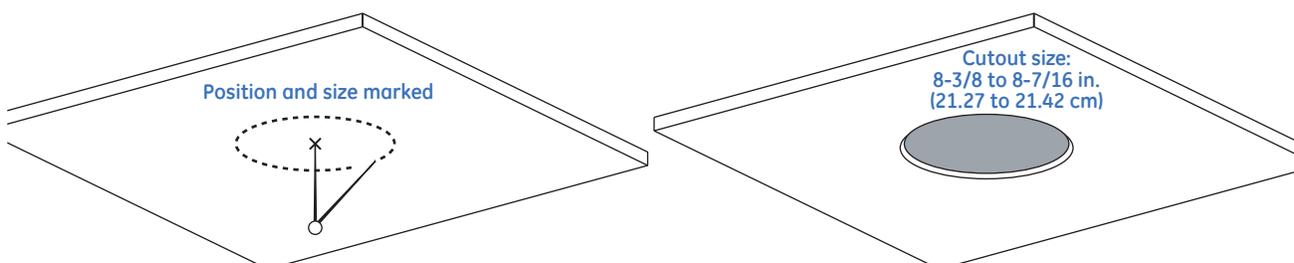
**CAUTION:** For all installations, heed these cautions:

- Complete all installation steps before supplying power to the dome.
- To ensure proper operation of a PTZ unit, install the mount level.
- For safety, the mounting surface, hardware, and procedure used for securing the dome must support the weight of the dome, mount (if used), cables, and any structural or environmental vibration according to local codes. See **Table 1, Minimum load requirements of dome configurations** on page 5.

To prepare the mounting surface, see *Figure 6* and do the following:

1. Mark the position and size of the housing pass-through hole on the mounting surface. The size of the cutout for the pass-through must be 8-3/8 to 8-7/16 in. (21.27 to 21.42 cm).
2. Following all local codes, cut the housing pass-through hole.
3. Make sure that the facility cables (data, video, power, and alarm/relay) for the dome comply with the recommendations provided in *Cable requirements* on page 5.
4. Feed the facility cables through the housing pass-through hole in the mounting surface.
  - Pull enough cable to make connections. You can always cut off unneeded length later.
  - How many cables you have depends upon how many alarms and relays you are connecting in addition to the video, data, and power cables, and whether you will be installing an Ethernet cable for flash upgrades. See *Wiring and addressing the dome* on page 19.

*Figure 6. Preparing the mounting surface for flush-mount housings being mounted into solid surfaces not requiring reinforcement*



## Installing the housing

With the surface prepared and/or the mount now installed, install the housing.

To install the housing, see *Figure 7* on page 13 and do the following:

1. Remove either conduit knockout (side or top) in the housing.
2. Hold the housing up near the housing pass-through of the mount or cutout.
3. Connect a steel safety cable, if required by local codes.
  - a. Obtain a steel safety cable of 0.125 in. (3 mm) maximum diameter that complies with local codes.
  - b. Snip off the nipple that opens access to the safety cable clip.
  - c. Feed your safety cable through the exposed hole.
  - d. Secure one end of the safety cable into the safety clip surrounding the exposed hole inside the housing.
  - e. Secure the other end of the safety cable to the building superstructure.



**WARNING:** DO NOT run any cables next to the heaters. Doing so could damage the dome or cause an electrical fire.

---

4. Feed the facility cables through the conduit hole of the housing. Allow enough cable length to make connections. *Figure 7* on page 13 shows how the cables run through the housing.

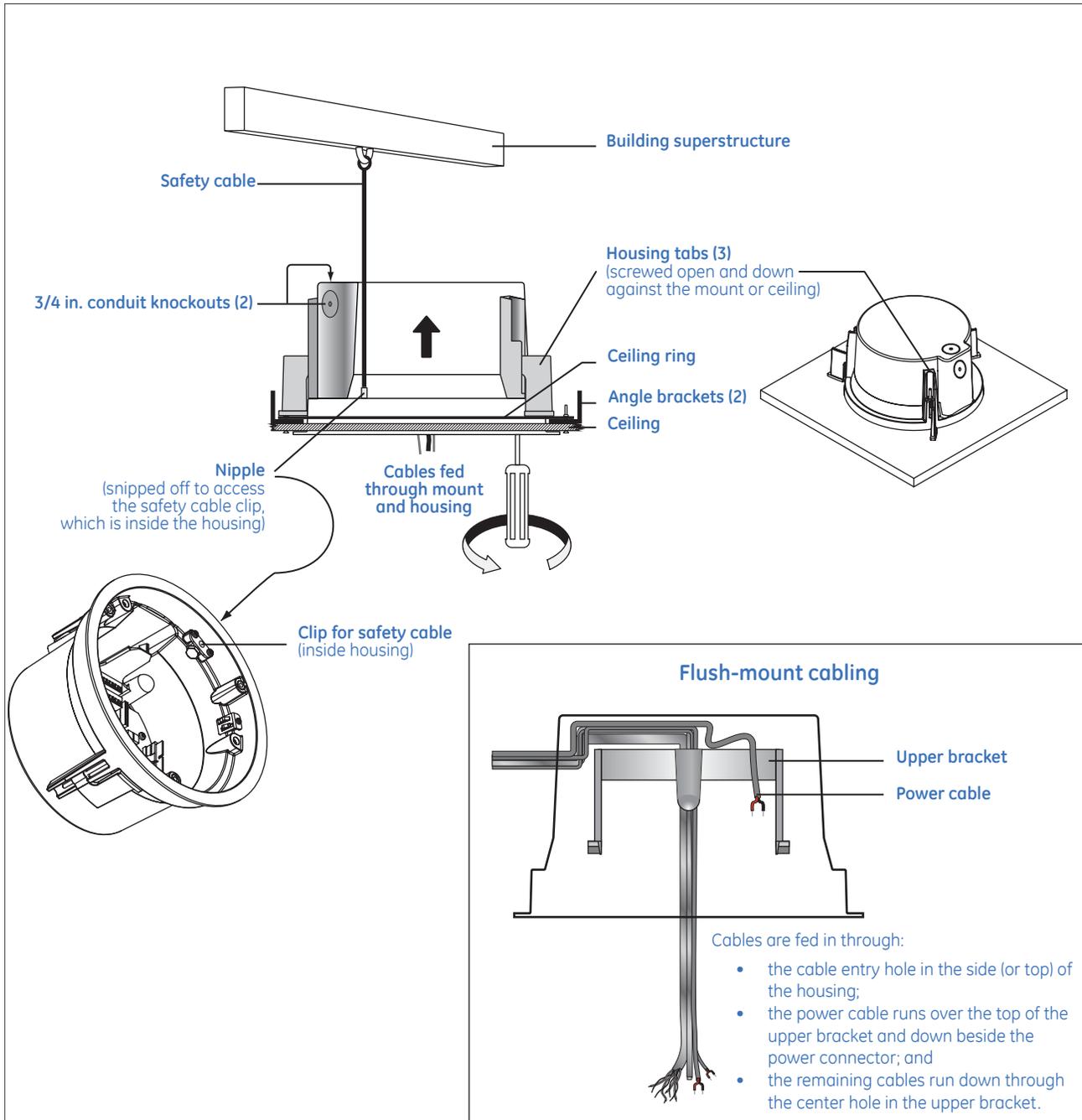


**CAUTION:** For safety, the mounting surface, hardware, and procedure used for securing the dome must support the weight of the dome, mount (if used), cables, and any structural or environmental vibration according to local codes. See **Table 1, [Minimum load requirements of dome configurations](#)** on page 5.

---

5. Attach the housing to the mount or ceiling by screwing the housing tabs open and down.

Figure 7. Installing the flush-mount housing



## Pendant-mount housings

Pendant-mount and flush-mount housings require different preparation of the mounting surface and different installation procedures of the housings. Follow the instructions given here for pendant-mount housings.

Pendant-mount housings can be mounted to a pipe to lower them from a ceiling or to a wall-mount arm to extend them from a wall. Instructions are provided in this document for both mounting methods.

### Preparing the mounting surface

Following are the steps for preparing the mounting surface if you are mounting the housing to a pipe. If you are mounting the housing to the GEA-102 wall-mount arm, instructions for installing the GEA-102 are available in this manual ([Installing the wall-mount arm](#) on page 48). If you are installing one of the other mounts, refer to the instructions that came with the mount.



**CAUTION:** For all installations, heed these cautions:

- Complete all installation steps before supplying power to the dome.
  - To ensure proper operation of a PTZ unit, install the mount level.
  - For safety, the mounting surface, hardware, and procedure used for securing the dome must support the weight of the dome, mount (if used), cables, and any structural or environmental vibration according to local codes. See [Table 1, Minimum load requirements of dome configurations](#) on page 5.
- 

To prepare the mounting surface:

1. Following all local codes, install the pipe.
2. Make sure that the facility cables (data, video, power, and alarm/relay) for the dome comply with the recommendations provided in [Cable requirements](#) on page 5.
3. Feed the facility cables through the pipe in the mounting surface.
  - Pull enough cable to make connections. You can always cut off unneeded length later.
  - How many cables you have depends upon how many alarms and relays you are connecting in addition to the video, data, and power cables, and whether you will be installing an Ethernet cable for flash upgrades. See [Wiring and addressing the dome](#) on page 19.

## Installing the housing

With the pipe or mount now installed, install the housing.

If you are installing the housing outdoors and onto a pipe, you must install the rubber water-sealing boot that provides an additional layer of water protection. Applying PTFE thread sealing tape (for example, Teflon® tape) to the pipe is required as a first layer of protection.



**CAUTION:** Avoid getting rain or moisture in the housing so that the electronic components on the PCBs are not damaged.

---

To install the housing to a pipe or mount, see *Figure 8* on page 16 and do the following:

1. If you are installing the housing outdoors and onto a pipe:
  - a. Spray the pipe with soapy water.
  - b. Slide the rubber boot onto the pipe and above the threads.
  - c. Wrap the pipe threads with the supplied PTFE thread sealing tape in the direction that the dome will screw onto the pipe. Overlap the tape and cover the threads.
  - d. After you have attached the housing in the following steps, slide the rubber boot down the pipe and fit it securely over the housing's flange.
2. Hold the housing up near the pipe or mount. If you installed the GEA-102 wall-mount arm, make sure that the safety chain is securely attached (*GEA-102 wall-mount arm* on page 48).



**WARNING:** DO NOT run any cables next to the heaters. Doing so could damage the dome or cause an electrical fire.

---

3. Feed the facility cables through the dust seal in the top of the housing. Allow enough cable length to make connections. *Figure 8* on page 16 shows how the cables run through the housing.

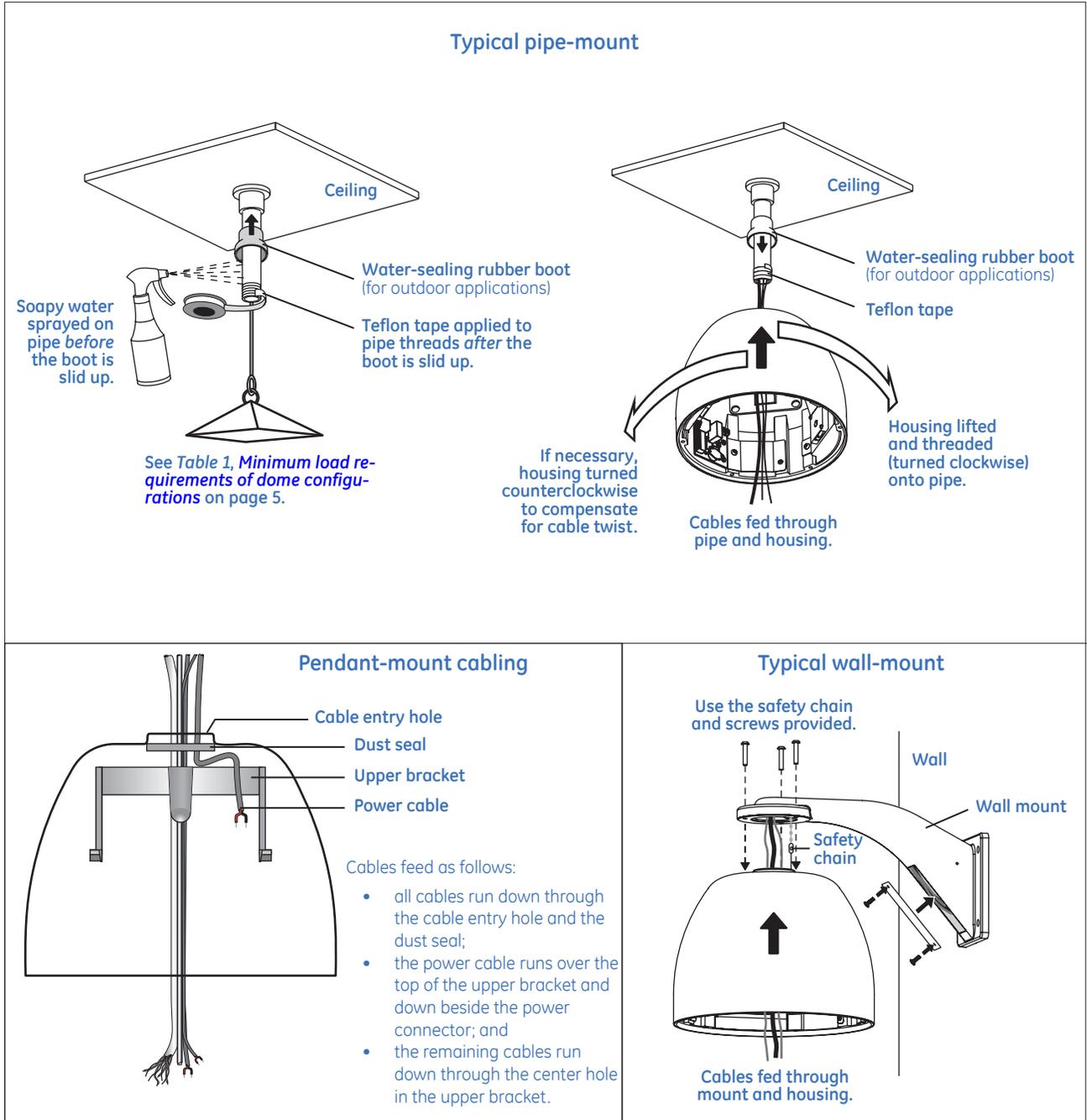


**CAUTION:** For safety, the mounting surface, hardware, and procedure used for securing the dome must support the weight of the dome, mount (if used), cables, and any structural or environmental vibration according to local codes. See **Table 1, *Minimum load requirements of dome configurations*** on page 5.

---

4. Attach the housing to the pipe or mount.
  - For pipe installations, thread the housing onto the pipe. If necessary, first turn the housing counterclockwise to compensate for the cable twisting.
  - For wall-mount installations, use the fasteners that were provided with the mount.

Figure 8. Installing the pendant-mount housing

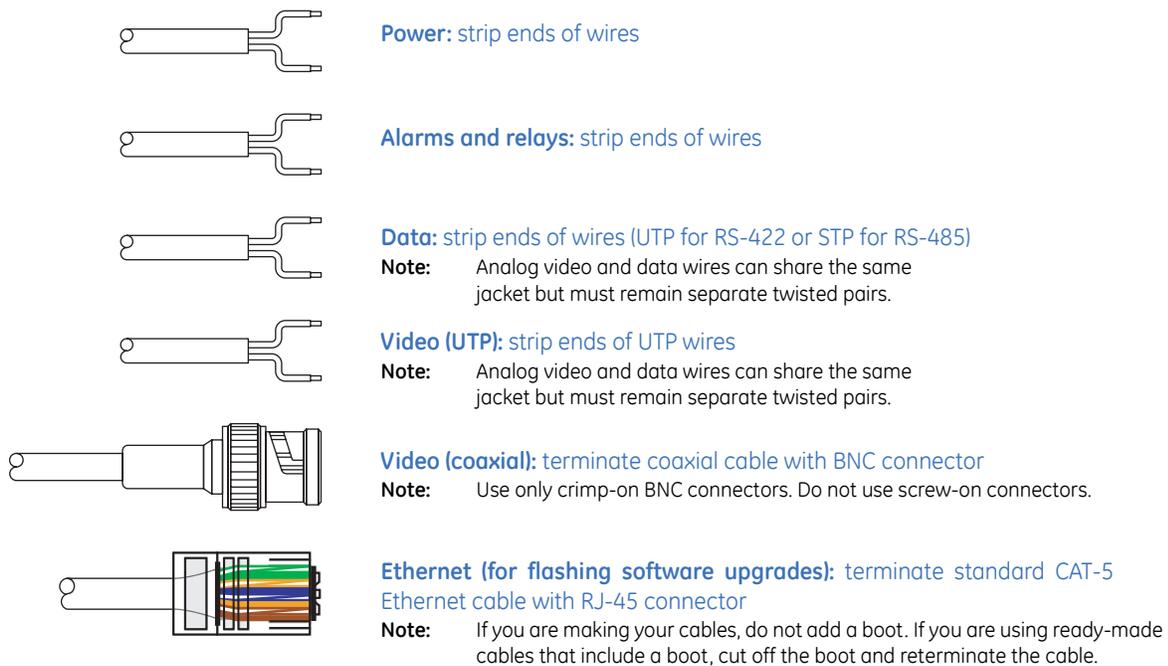


## Preparing the cables

Which and how many cables you will be preparing depends upon whether you are setting up your dome to transmit video via its coaxial or UTP source, how many alarms and relays you are connecting in addition to the video, data, and power cables, and whether you will be installing an Ethernet cable for flash upgrades.

To prepare the facility camera cables, terminate the cable ends as shown in *Figure 9*.

Figure 9. Prepared cables





# Chapter 3 Wiring and addressing the dome

This chapter provides instructions for how to wire and address the dome. There are two boards attached up inside of the housing that you will be handling while you wire and address the dome. The larger board is the housing board and the smaller board is the active housing card (AHC).

In this chapter:

- Components used for basic and advanced operation* . . . . . 20
- Wiring the housing board* . . . . . 21
- Installing the cable ring* . . . . . 24
- Addressing the camera site and setting the protocol* . . . . . 25
- Setting the termination* . . . . . 27

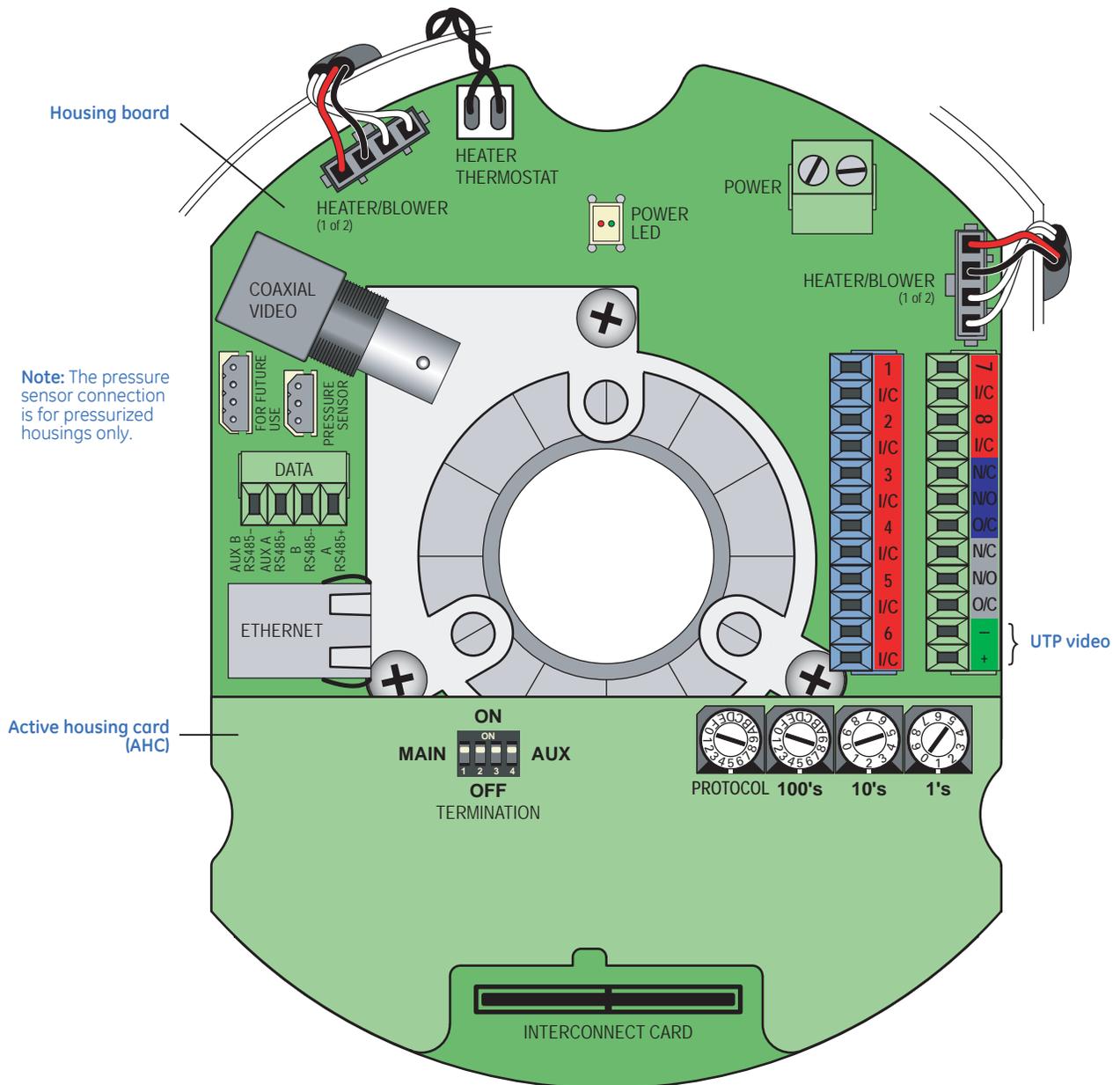
**Note:** If you have earlier Legend domes, see **Appendix B, Differences of earlier boards** for the correct placement and wiring of components on the housing boards. Be aware that the terminal strip providing the UTP video connections has been flipped upside down in later domes. Read the decal to ensure that you connect to the correct terminals.

## Components used for basic and advanced operation

For basic operation, you need to connect data, video, and power cables to the components in the dome shown in *Figure 10*. For advanced operation, you can also connect any combination of Ethernet, alarm, or relay cables to the dome. How many cables you will be feeding into the housing depends upon how many alarms and relays you are connecting in addition to the video, data, and power cables, and whether you will be installing an Ethernet cable to flash upgrades. For pipe capacity, see *Cable management* on page 6.

The dome uses RS-422 for data communication. It is compatible with RS-485 systems. Remember that STP cable is used for RS-485 and UTP cable is used for RS-422. See *Cable requirements* on page 5.

Figure 10. View of housing boards attached to upper bracket as viewed from below the housing with factory-installed cables



## Wiring the housing board

To wire the housing board, see *Figure 11* on page 22 and *Figure 12* on page 23 and do the following:



**WARNING:** DO NOT run any cables next to the heaters. Doing so could damage the dome or cause an electrical fire.

1. Connect the facility *data* cables to the main connections, which are the orange B and A terminals on the provided green 4-pin terminal strip. The AUX connections (yellow B and A terminals) are wired only if you want streaming position reporting or are using the Tyco/AD (RS-422) protocol. The main data connections on the terminal strip are for control wires that are coming in from the keypad. You may also daisy-chain the data signal on to additional domes.

If you are installing RS-485 data, float the shield at the dome and ground it at the keypad.

To wire a Tyco/AD (RS-422) keypad to the dome, see [Tyco/AD wiring](#) on page 65. For details about streaming position reporting, see the *Legend User Manual* (1052027).

2. Connect the facility *video* cable.
  - If you are installing UTP video, use the provided green 12-pin UTP terminal strip. It provides connections for UTP video, in addition to alarms 7 and 8 and relays 1 and 2.

**Note:** If you have earlier Legend domes, be aware that the terminal strip providing the UTP video connections has been flipped upside down in later domes. Read the decal to ensure you connect to the correct terminals.
  - If you are installing coaxial video, locate the BNC connector.

**Note:** Use only crimp-on BNC connectors. Do not use screw-on connectors.
3. Connect the facility *power* cable. Make sure that the power cable is fed over the top of the upper bracket and down beside the power connector. Use the provided 2-pin power terminal strip. If you are using a heavier gauge cable, ensure that it is properly seated in the connector. Power in the Legend domes is not polarity sensitive.

When power is received by the housing board through the power connection, the housing board's diagnostic power LED will appear orange. There are additional diagnostic LEDs that indicate the proper installation of the camera assembly (see [Installing the camera assembly and bubble](#) on page 29).

4. If you are installing alarms and relays, connect the *alarm* and *relay* cables to the two provided 12-pin terminal strips. One is blue and one is green.
  - Use dry contacts for alarms.
  - Use relays with a maximum operating voltage of 30 VAC, 30 VDC at 0.5 A.

**Note:** Because of space constraints, if you are installing more than five alarms and/or relays, use a multiconductor cable instead of individual single-pair cables.



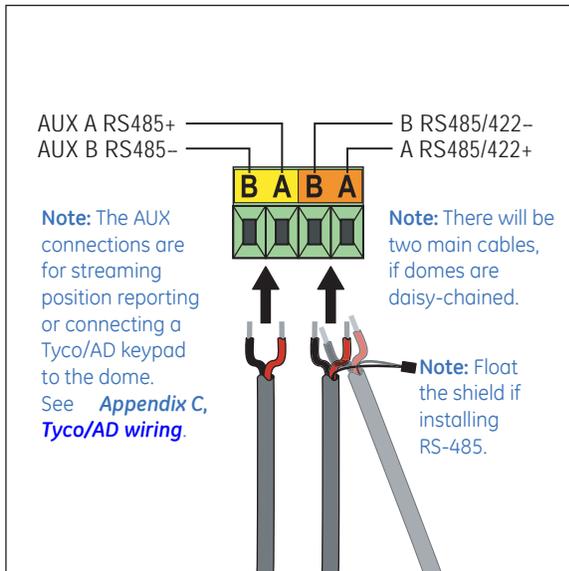
**CAUTION:** When flashing software upgrades to the dome over a standard IP network via the dome's Ethernet connection, ensure that the network is secured from unauthorized access. Consider connecting the Ethernet cable only when you are flashing the dome, unless you have the dome connected to a secure, isolated network.

5. If you want to flash software upgrades to the dome, connect the Ethernet cable.

Figure 11. Connecting the data, video, power, and alarm/relay cables

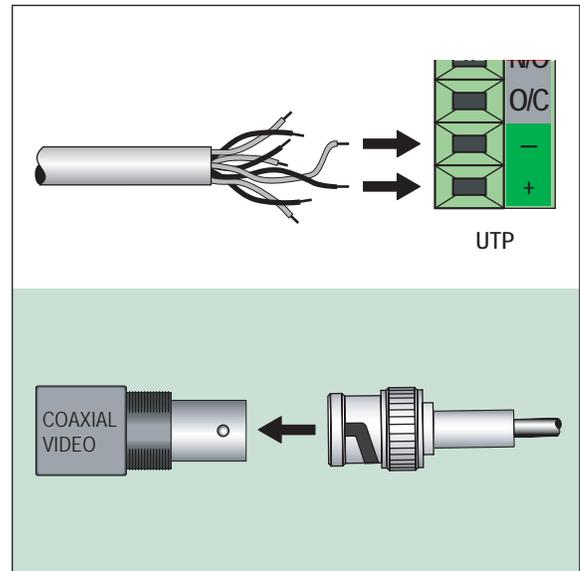
### Data connections

Choice of UTP for RS-422 or STP for RS-485

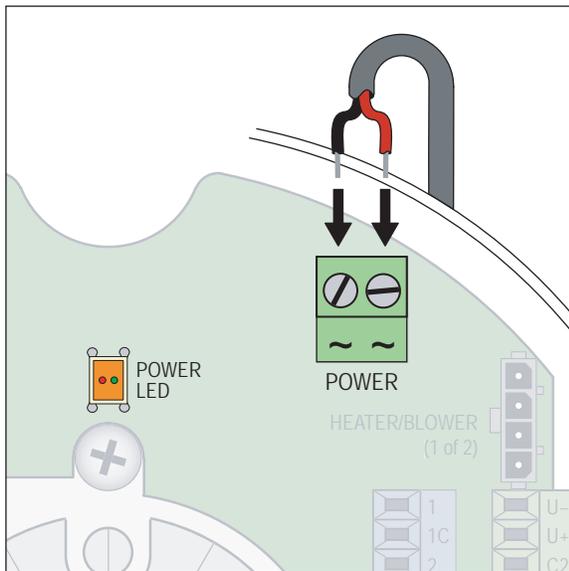


### Video connections

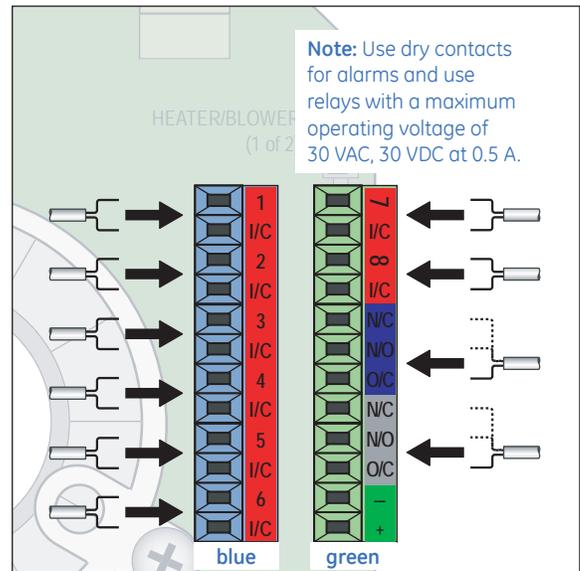
Choice of UTP or coaxial



### Power connections



### Alarm/relay connections



**Note:** You can also connect the Ethernet cable to flash software upgrades to the dome ([Figure 12](#) on page 23).



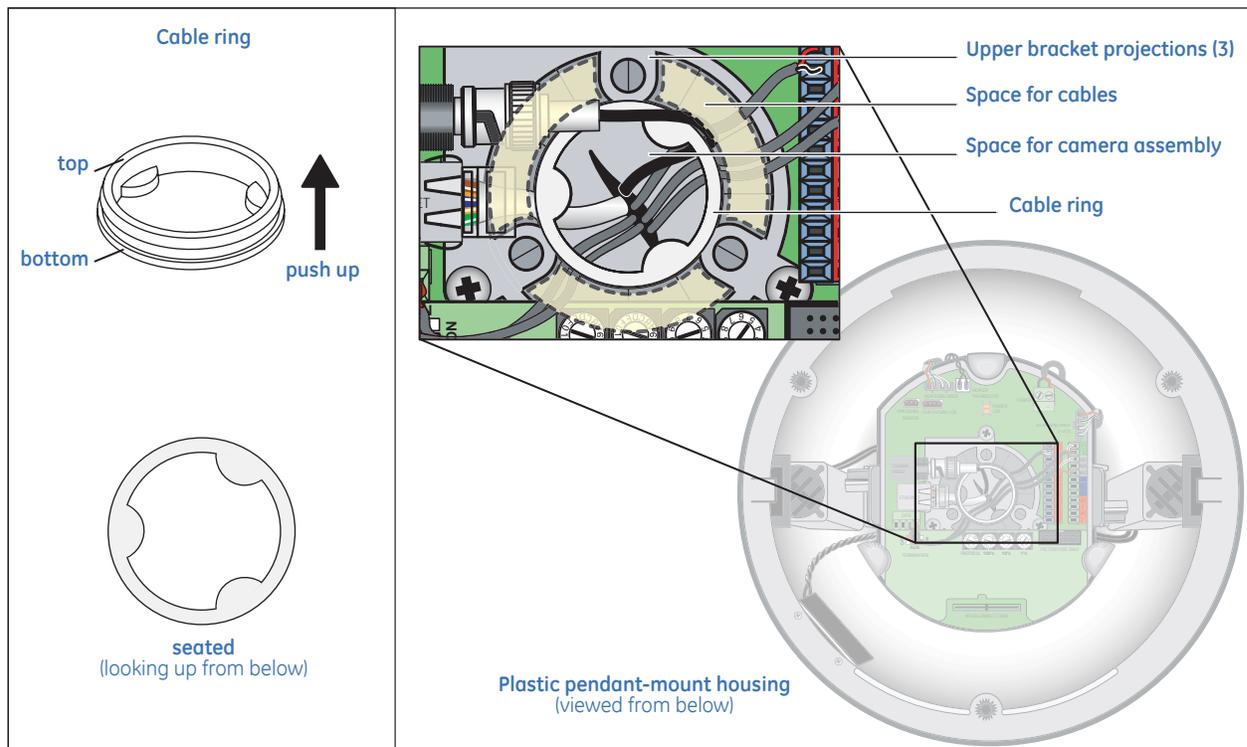
## Installing the cable ring

The cable ring moves the cables away from the center of the housing so that the camera assembly installs easily and no wires are pulled loose.

To install the cable ring, see *Figure 13* and do the following:

1. Install all cables as stated in *Wiring the housing board* on page 21.
2. Orient the cable ring with its top side pointing up.
3. Push the cable ring up into the housing until it is seated between the three projections of the upper bracket at the cable entry hole.
4. Ensure that the cable ring moved all cables away from the center of the housing so that the camera assembly installs easily.

Figure 13. Installing the cable ring



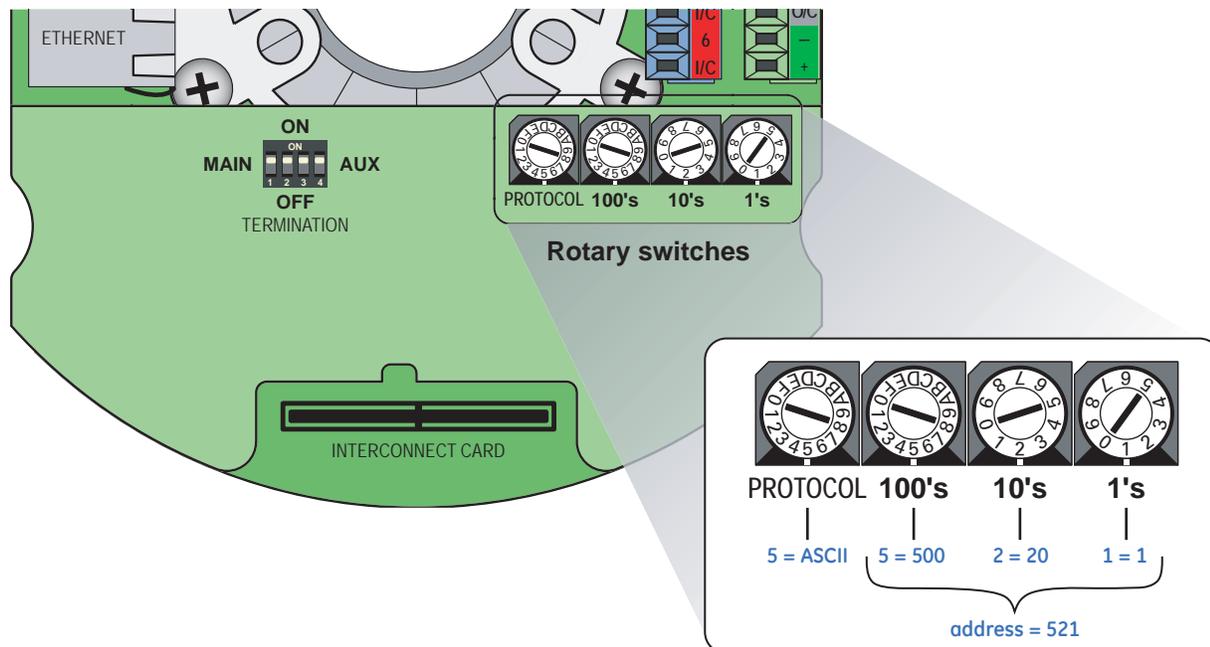
## Addressing the camera site and setting the protocol

The dome provides rotary switches for setting the camera's site address and communication protocol. Site addresses can be numbered from 0 to 1599.

To set the camera's site address and protocol, see *Figure 14* and *Table 5* on page 26 and do the following:

1. Locate the rotary switches. They are on the smallest and lowest board that is attached to the upper bracket up inside the housing. This smallest board is the active housing card (AHC). See *Figure 10* on page 20.
2. Determine which position numbers or letters on the three rightmost switches must be added together to equal the site number.
3. Determine which position number or letter on the leftmost switch is needed to set the protocol.
4. Align the needed characters on each switch with the switch's white marker. Be careful that any tool you use to turn the rotary switches does not slip and damage any board components.

*Figure 14. Example of setting a camera's site address and protocol switches for address 521 and ASCII protocol*



With the addition of new protocols, the assignments of the rotary protocol switch have changed (*Table 5*). Be aware that if you were using the Pelco D 2400 baud protocol, which was originally assigned to position 6, you will need to change the rotary switch setting in the housing. It is now incorporated into the Pelco D autobaud protocol and assigned to position 9.

Table 5. Equivalent values for the settings of the rotary switches

Protocol switch		100s switch		10s switch		1s switch	
Setting	Value	Setting	Value	Setting	Value	Setting	Value
0	Digiplex (RS-422) at 4800 baud	0	000	0	00	0	0
1	Impac (RS-485) at 9600 baud	1	100	1	10	1	1
2	For future use	2	200	2	20	2	2
3	For future use	3	300	3	30	3	3
4	For future use	4	400	4	40	4	4
5	ASCII at 9600 baud	5	500	5	50	5	5
6	For future use	6	600	6	60	6	6
7	Ultrak at 9600 baud (even parity)	7	700	7	70	7	7
8	Pelco P at 4800 baud	8	800	8	80	8	8
9	Pelco D autobaud at 2400, 4800, and 9600	9	900	9	90	9	9
A	Tyco/AD (RS-422) at 4800 baud	A	1000				
B	For future use	B	1100				
C	For future use	C	1200				
D	For future use	D	1300				
E	For future use	E	1400				
F	For future use	F	1500				

## Setting the termination

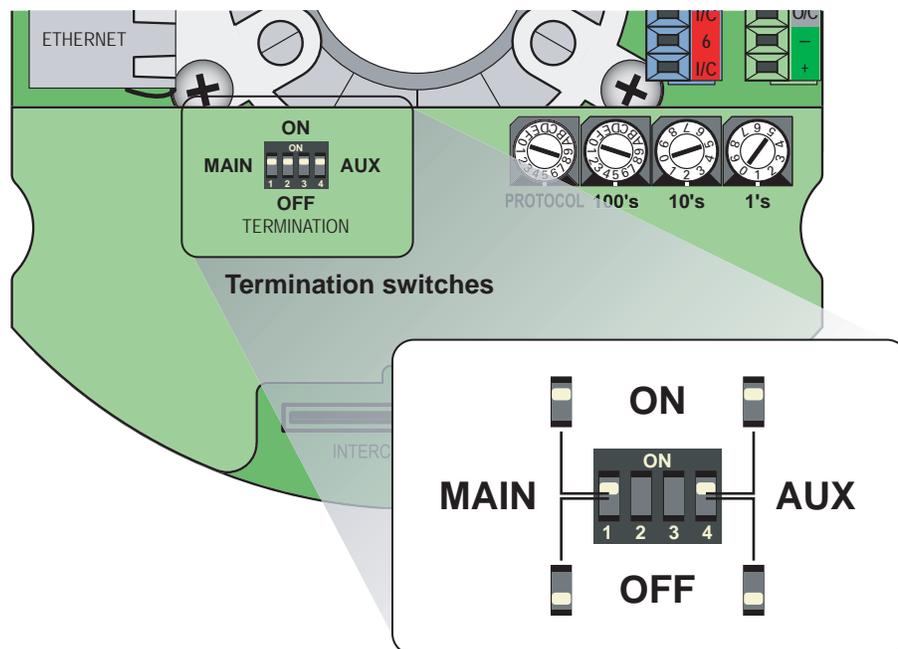
You must set the termination of the data signal in each dome (or device) to on or off. Only two of the four switches (1 and 4) on the DIP are used (*Figure 15*). Switches 2 and 3 are not used at this time, so it does not matter whether they are set to on or off. MAIN is for the dome input and AUX is for an auxiliary device output. The AUX connections are wired only if you want streaming position reporting or are using the Tyco/AD (RS-422) protocol. To wire a Tyco/AD (RS-422) keypad to the dome, see *Tyco/AD wiring* on page 65. For details about streaming position reporting, see the *Legend User Manual* (1052027).

To set the termination, see *Figure 15* and do the following:

- Set the termination to ON if the dome or device is the final receiver location for the data signal.
- Set the termination to OFF if the data signal needs to loop out to other domes or devices.

**Note:** The switches are set to ON by default. You need to turn them OFF if you are looping the data signal.

Figure 15. Termination switches





# Chapter 4 Installing the camera assembly and bubble

This chapter provides instructions for installing the camera assembly and bubble.

In this chapter:

- Installing the camera assembly* ..... 30
- Installing the bubble* ..... 32

## Installing the camera assembly

Most people can install the camera assembly with one hand. If you need to use two hands, do so.

After installation, the drive mechanism pauses for up to 30 seconds, then it performs a PTZ self-test and initializes. **DO NOT** move the camera while it is self-testing and initializing. After the self-test, the drive mechanism operates continuously.

You do not need to power down the dome or stop the camera's movement before removing the camera assembly. Just remember that the heaters may be hot, so comply with the caution label and do not touch them.

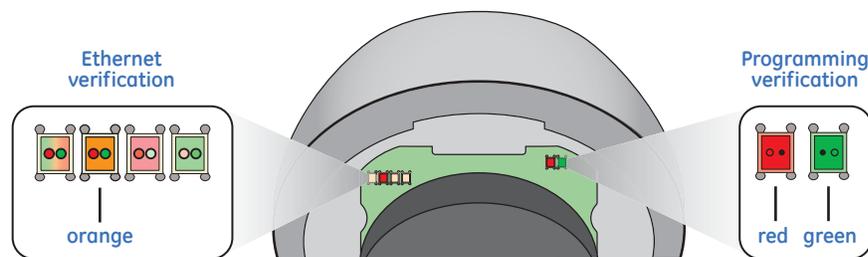
Be prepared for the PTZ self-test that immediately follows the installation of the camera assembly. You can expect the PTZ to do the following:

- Pause for up to 30 seconds before beginning the self-test.
- Take from 3 to 5 seconds for the self-test.
- Travel to find its reference points, while initializing itself, during the self-test.

To install the camera assembly, see *Figure 17* on page 31 and do the following:

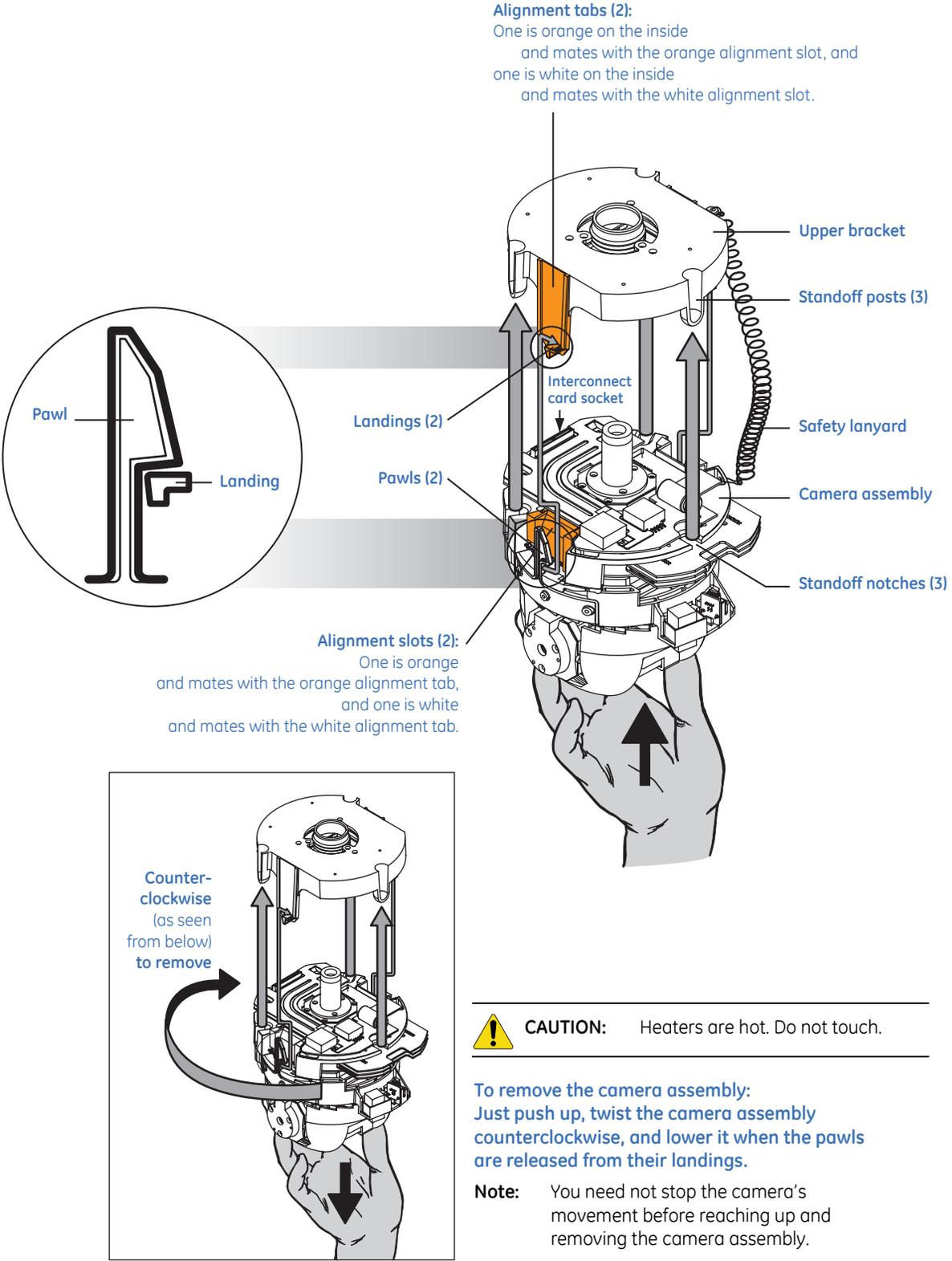
1. To protect the lens, leave the lens cap on the camera until you have finished the installation.
2. Attach the safety lanyard to the camera assembly to suspend it safely while you continue working.
3. Align the camera assembly with the housing.
  - Align the two color-coded alignment tabs with the two color-coded alignment slots.
  - Note:** The alignment tabs are color-coded and of two different widths to help prevent reversed installation.
  - Align the three standoff posts with the three standoff notches.
4. Push the camera assembly straight up so that the interconnect card slips easily into its socket and each of the two pawls (one on either side of the camera assembly) comes to a solid rest on the landing of each of the two alignment tabs. If the camera assembly is not level, remove and reinstall it.
5. If the dome is powered, observe the diagnostic LEDs (*Figure 16*) to verify that the camera assembly has been properly plugged in and powered. If the LEDs are not appropriately lit, reseal the camera assembly for a proper connection. The LEDs on the right side of the dome are for programming verification. The LED on the left should be red and the LED on the right should be green and blinking once per second. This communicates that the dome's programming has started and is running. The LEDs on the left side of the dome are for Ethernet verification. If you have Ethernet connected to the dome, the second LED in the group of four should be orange with the other LEDs showing activity.

Figure 16. Diagnostic LEDs that show that the camera assembly is properly plugged in and powered



6. Observe the PTZ self-test for proper operation. **DO NOT** move the camera until it is done initializing itself.
7. Remove the lens cap.

Figure 17. Installing the camera assembly



## Installing the bubble

There are a variety of bubbles and housings. The interlocking clips and safety cables may vary, but all bubbles have them.



**CAUTION:** To prevent damage, do not touch the bubble with your bare hands, do not place the bubble face down on any surface, and protect the bubble from dust. Oil and acid residue from your hands can etch some bubble surfaces and is difficult to remove. Use a scratch-resistant cloth or gloves when handling the bubble.

---

To attach the bubble to the housing, see *Figure 18* on page 33 and do the following:

1. Fasten the bubble safety cable to the housing's safety clip.
2. Swing the bubble up to the housing and align the bubble's screws with the housing's bubble screw holes.

If you are installing a plastic pendant-mount housing, there are alignment guides on the housing ring that straddle the rear-facing screw hole of the bubble ring.

3. Use the following guidelines for tightening the bubble screws.
  - If you are installing a plastic pendant-mount or flush-mount housing, the bubble screws are self-locking, quarter-turn captive screws and *require only a quarter turn to tighten*.

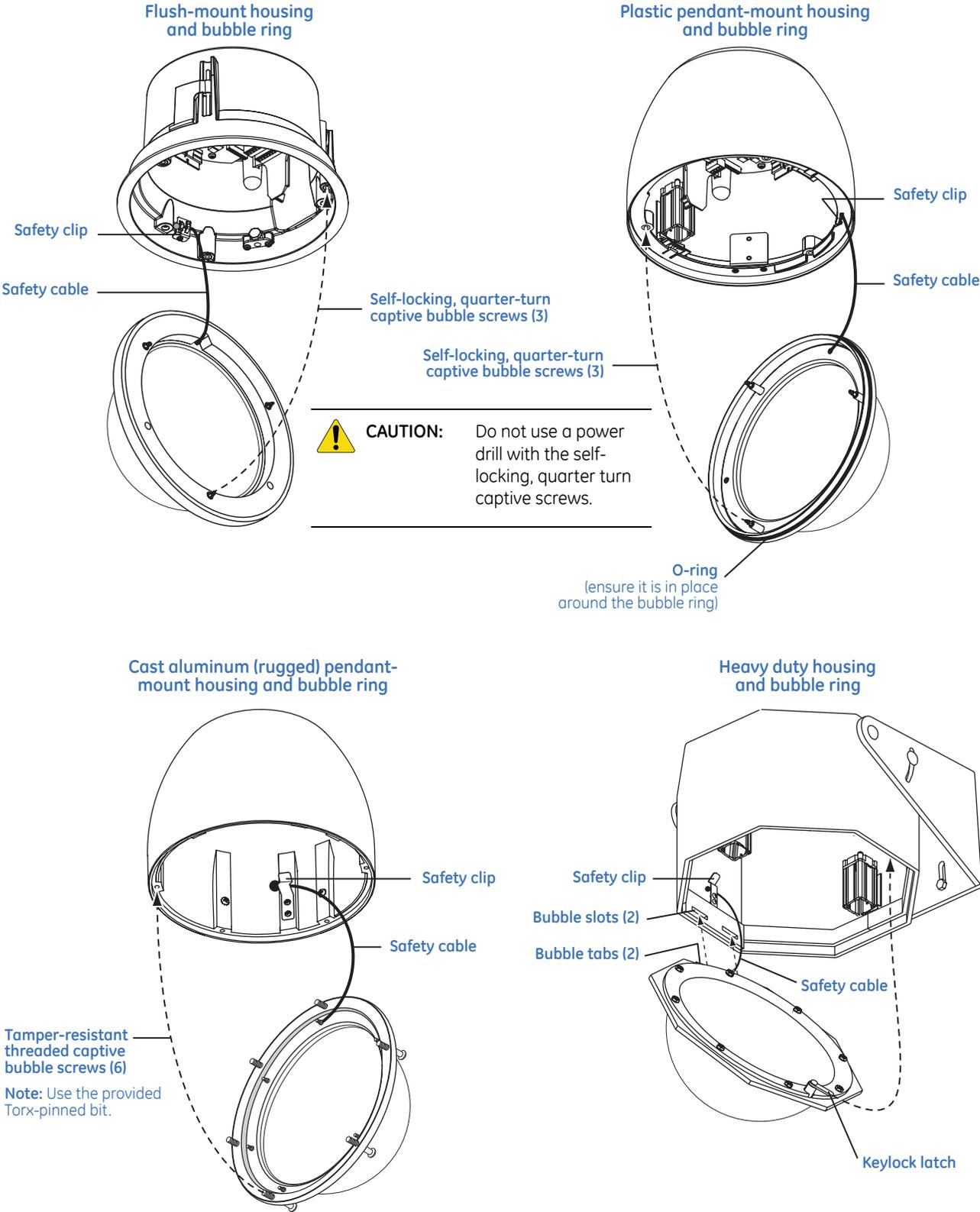


**CAUTION:** Do not use a power drill with the self-locking, quarter-turn captive screws. A power drill can strip the heads of the screws or the inside of the screw inserts (in the housing) enough to necessitate replacing the housing.

---

- If you are installing a flush-mount housing, the bubble ring contains a foam pad that requires you to push up while turning the screws.
  - If you are installing the bubble on a rugged vandal-resistant housing, the screws are tamper-resistant and require the provided Torx-pinned bit for tightening. Do not tighten these screws to more than 17 lb. in (192 cNm) torque.
4. Clean any fingerprints off of the bubble. See *Cleaning the bubble* on page 43.

Figure 18. Attaching the bubble to the housing (cameras not shown to show safety clips clearly)





# Chapter 5 Using passcodes

This chapter provides instructions for turning on the passcodes for the dome. Using passcodes is optional. They are off by default.

In this chapter:

- Passcodes off by default* ..... 36
- Turning on passcodes* ..... 36

## Passcodes off by default

Legend domes ship with the passcodes turned off. When you enter the programming interface for the first time during installation and go to the *Passcode* page under the *Setup* menu, the passcode fields are blank. Blank passcode fields mean the passcodes are turned off (disabled). You can choose to enter passcodes into the blanks. This turns passcodes on (enables them) and a passcode will be required to enter the programming interface the next time you access it.

The passcodes control who has access to the features of your dome (see *Turning on passcodes*). Only the installer through the installer passcode has permission to turn on, turn off, or change the passcodes. If no passcodes are programmed, all users are given installer access and are not required to log on. If only the Admin and Operator passcodes are programmed, then anyone can still access the entire programming interface as an installer, since the Installer passcode was not programmed.

## Turning on passcodes

You can turn on one installer passcode, one admin passcode, and one operator passcode. They have the following permissions:

**Installer:** The installer passcode allows access to all dome features.

**Admin:** The admin passcode allows access to all dome features, except passcodes and firmware upgrades.

**Operator:** The operator passcode allows no access until it is granted access to specific features on an area-by-area basis.



**CAUTION:** If you use passcodes, record them in a secure place. If you forget the passcodes for a dome, you will need to send the dome back to the factory so that it can be reset by the factory with no passcodes.

---

To access the programming interface and turn on passcodes, do the following:

1. At the normal display, press and hold the **set** ( ← ) key on the keypad until you hear a beep and the programming code display appears on the keypad's LCD.

Figure 19. Normal display (programming interface accessed)



2. At the *ENTER PROGRAMMING CODE* display, enter the programming access code by pressing the **9**, **5**, **1**, and **seq** keys.

Figure 20. ENTER PROGRAMMING CODE display

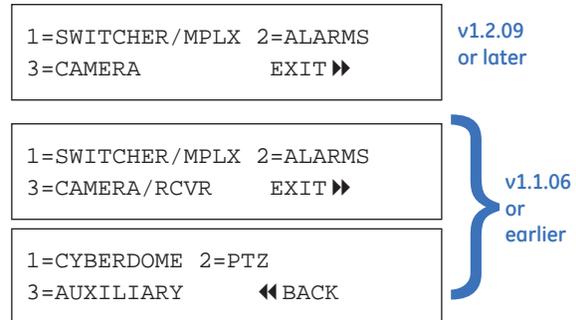


This code is the same for all GE keypads.

- At the equipment selection display, press **3** to select CAMERA (keypad v1.2.09 or later) or CAMERA/RCVR (keypad v1.1.06 or earlier).

If you have an older keypad (v1.1.06 or earlier), you will have a second equipment selection display, at which you need to press **1** for CYBERDOME.

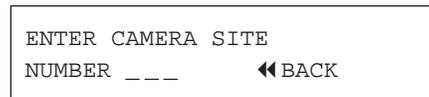
Figure 21. Equipment selection display



- At the *ENTER CAMERA SITE NUMBER* display, enter the number for the camera site you are programming. This is a 3-digit number (for example, 007, 021, 243).

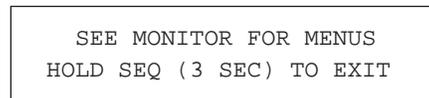
You can enter one, two, or three digits and press **set** ( ← ).

Figure 22. ENTER CAMERA SITE NUMBER display



- Continue entering commands with the joystick.

Figure 23. SEE MONITOR FOR MENUS display



- Since passcodes are turned off by default, upon initial installation you can directly access the programming interface without a passcode (Figure 24).

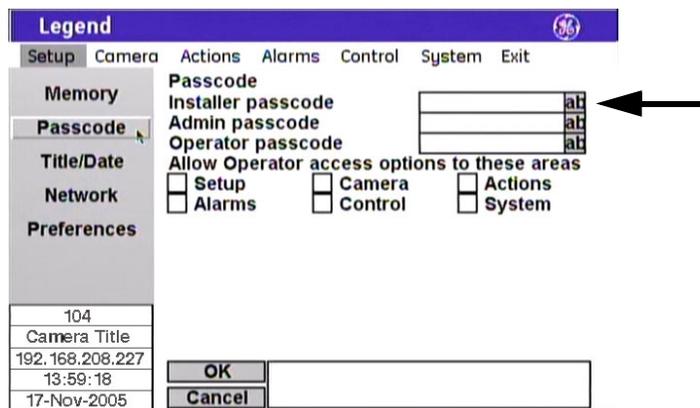
**Note:** For complete instructions for navigating and programming the programming interface, refer to the *Legend User Manual*(1052027).

Figure 24. First screen of programming interface when passcodes are turned off



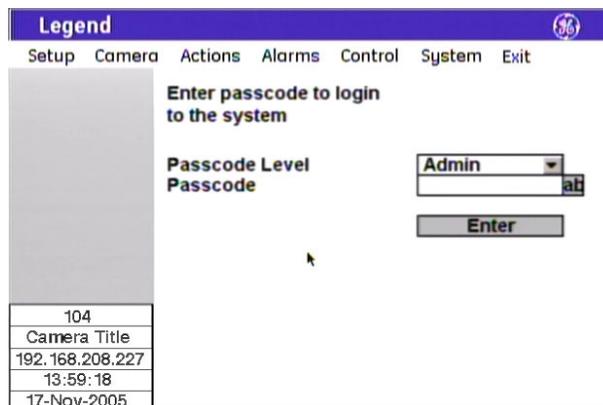
7. Turn on the desired passcodes (*Figure 25*):
  - a. Select **Setup** and **Passcode**.
  - b. Select the **ab** (keyboard) icon next to the Installer passcode.
  - c. Select the digits for a unique passcode. There is an 4-digit limit.
  - d. Select **Done**.
  - e. Record the passcode in a secure location.
  - f. Program other passcodes as desired.
  - g. Select **OK**.

Figure 25. Passcode screen of the programming interface



The next time users access the programming interface, they will have to enter the appropriate passcode (*Figure 26*) to program those features that they have been given permission to program.

Figure 26. First screen of programming interface when passcodes are turned on



# Chapter 6 Troubleshooting, maintenance, support

This chapter provides information to help you troubleshoot problems, perform simple preventive maintenance procedures, and contact technical support in case you need assistance with your GE equipment.

In this chapter:

- Troubleshooting* ..... 40
  - Diagnostic LEDs* ..... 40
  - Common installation issues* ..... 41
- Maintenance* ..... 42
  - Rebooting versus resetting a dome*..... 42
  - Cleaning the bubble* ..... 43
  - Spare parts list* ..... 44
- Contacting technical support* ..... 45
  - Online publication library* ..... 45

## Troubleshooting

This section provides information to help you diagnose and solve various problems that may arise while configuring or using your GE product and offers technical support contacts in case you need assistance. (See [Contacting technical support](#) on page 45.)

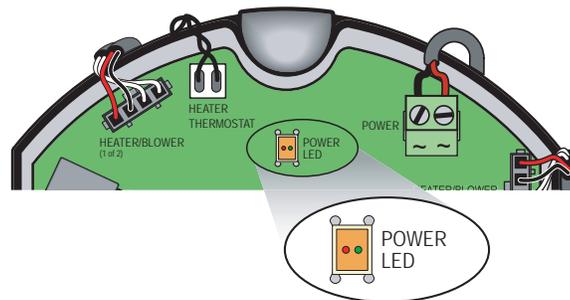
### Diagnostic LEDs

There are diagnostic LEDs that are visible underneath the dome. The housing board LED is visible before you install the camera assembly. The camera assembly LEDs are visible after you install the camera assembly.

#### Housing board power indication

When power is received by the housing board through the power connection, the housing board's diagnostic power LED will appear orange. It appears orange because the red and green internal LEDs both illuminate. The housing board power LED is located on the PC board that is attached to the underside of the upper bracket. It can be seen before the camera assembly is installed. See *Figure 27*.

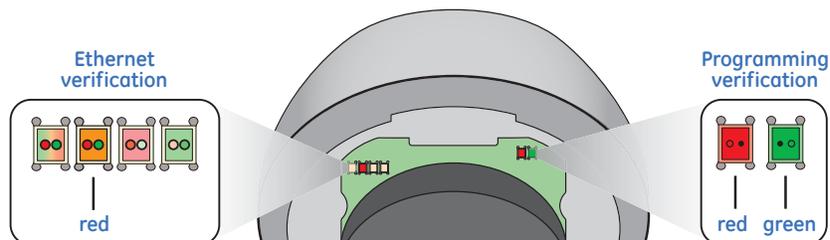
*Figure 27. Housing board power indication*



#### Camera assembly power indication

After the camera assembly has been installed and powered, there are two sets of diagnostic LEDs visible from below the camera (*Figure 28*). If the LEDs are not appropriately lit, reseal the camera assembly for a proper connection. The LEDs on the right side of the dome are for programming verification. The LED on the left should be red and the LED on the right should be green and blinking once per second. This communicates that the dome's programming has started and is running. The LEDs on the left side of the dome are for Ethernet verification. If you have an Ethernet connection, the second LED in the group of four should be red.

*Figure 28. Diagnostic LEDs that show that the camera assembly is properly plugged in and powered*



## Common installation issues

Following are the most common troubleshooting issues and their solutions.

**Note:** For programming and operating issues, refer to the *Legend User Manual* (1052027) and the user manual for your controller keypad.

- *The dome is resetting during power-up, not powering up at all, or powering up but not operating as expected.*

Verify that you are supplying sufficient power for your model of dome. See [Power requirements](#) on page 7.

- *The diagnostic LEDs are not illuminating.*

First, look at and feel the camera assembly to make sure that it is fully engaged with the upper bracket. Remember that the alignment tabs and slots are color coded. Is orange engaged with orange and white with white? Are the pawls seated on their corresponding landings? Is the interconnect card fully seated into its socket? If not, remove and reinstall the camera assembly. See [Installing the camera assembly and bubble](#) on page 29.

If that doesn't work, then check the power cable and verify that it is properly connected. See [Wiring the housing board](#) on page 21.

- *Video is not appearing on the monitor screen.*

First, look at the LEDs that are visible below the dome and verify that the unit is powered and that the programming is running. See [Camera assembly power indication](#) on page 40. If the dome is not powered or the programming is not running properly, remove and reinstall the camera assembly. See [Installing the camera assembly and bubble](#) on page 29.

If the video still does not appear, then check the video cable and verify that it is properly connected. For UTP video, ensure that the + and - ends of the cable are correctly connected to maintain the polar sensitivity of the UTP video cable. See [Wiring the housing board](#) on page 21.

- *There is video, but no PTZ control.*

First, verify the address of the dome. You can do this easily by pressing and holding the *view* key on the KTD-405 keypad. The dome's information will be displayed on the monitor screen. If necessary, correct the address and/or protocol using the procedure in [Addressing the camera site and setting the protocol](#) on page 25.

If you still don't have control of the video, verify that the data cable is properly connected. See [Wiring the housing board](#) on page 21.

Finally, try resetting (cycling) the power to the dome by turning the power off then on.

## Maintenance

Perform the following maintenance, when necessary or directed to.

### Rebooting versus resetting a dome

Rebooting a dome requires that you have valid communication between the keypad and the dome. You can reset a dome with or without valid communication between the keypad and dome.

#### Resetting the dome

You can reset the dome whether or not you have valid communication between the keypad and the dome.

To reset the dome, cycle the power to the dome by turning the power off then on.

#### Rebooting the dome

You can only reboot Legend domes from GE KTD-405 keypads.

To reboot a dome, do the following from the KTD-405 keypad:

1. At the normal display (CAMERA #/MONITOR #), press and hold the **set** ( ← ) key on the keypad until you hear a beep and the programming code display appears on the keypad's LCD.
2. At the *ENTER PROGRAMMING CODE:* display, enter the reset access code by pressing the **1, 4, 7, 6,** and **seq** keys.
3. At the *RESET TO DEFAULTS?* display, press **iris +** for yes.
4. At the display that asks what to reset, press **3** to select CAMERA.
5. At the *RESET CAMERA #? ARE YOU SURE?* display, press **iris +** to select yes.

The camera reboots in about 60 seconds. You will see the *RESETTING CAMERA #* display on the keypad LCD and the color bars and splash screen on the monitor screen as the camera reinitializes itself.

## Cleaning the bubble

Use the following procedures for cleaning the bubble. Be aware that the interior of the bubble requires extra care in cleaning. Use only the procedures provided below.



For warranty protection, comply with this section's bubble handling procedures.

**CAUTION:** To prevent damage, do not touch the bubble with your bare hands, do not place the bubble face down on any surface, and protect the bubble from dust. Oil and acid from your hands can etch some bubble surfaces and are difficult to remove. Use a scratch-resistant cloth or gloves when handling the bubble.

---

### Cleaning the exterior of the bubble

To clean the exterior of the bubble:

Use any nonabrasive cleaning cloth and a cleaning agent that is safe for use on polycarbonate or acrylic plastic. Liquid or spray cleaner/wax suitable for fine furniture is acceptable.

Do not use this procedure for cleaning the interior of the bubble. See [Cleaning the interior of the bubble](#).

### Cleaning the interior of the bubble

To clean the interior of the bubble:

- To remove dust and other surface contaminants, first use clean, dry, pressurized air to gently blow off loose material.
- To remove heavier contaminants, rinse the bubble with water and immediately dry it with clean, dry, pressurized air to prevent water spots.
- To remove stubborn contaminants, use a “wick” to clean the bubble’s surface. To make the wick:
  - a. Use a high-quality, soft paper towel.
  - b. Roll a section of the paper towel into a tightly wound tube, tear the tube in half, and wet a fuzzy end with 75% standard rubbing or isopropyl alcohol.
  - c. Hold the bubble with its opening facing downward and wipe the interior with the wick (held at its dry end) using a circular motion starting from the outside and spiraling into the center.
  - d. Use a new wick for each of two additional passes over the bubble.

## Spare parts list

Table 6 provides a listing of all parts that can be replaced or retrofitted for the dome.

Table 6. Purchasable spare parts

Part name	Item number
Bracket, upper	1048840
Bubble, flush-mount, clear acrylic	IDB-2102
Bubble, flush-mount, smoke acrylic	IDB-2103
Bubble, flush-mount, chrome acrylic	IDB-2104
Bubble, flush-mount, gold acrylic	IDB-2105
Bubble, pendant-mount, clear acrylic	IDB-2202
Bubble, pendant-mount, smoke acrylic	IDB-2203
Bubble, pendant-mount, chrome acrylic	IDB-2204
Bubble, pendant-mount, gold acrylic	IDB-2205
Bubble, rugged pendant-mount, clear acrylic	IDB-2402
Bubble, rugged pendant-mount, smoke acrylic	IDB-2403
Bubble, rugged pendant-mount, chrome acrylic	IDB-2404
Bubble, rugged pendant-mount, gold acrylic	IDB-2405
Bubble, rugged pendant-mount, clear polycarbonate	IDB-2422
Bubble, rugged pendant-mount, smoke polycarbonate	IDB-2423
Bubble, heavy-duty, clear acrylic	IDB-2502
Bubble, heavy-duty, clear polycarbonate	IDB-2522
Bubble, heavy-duty, smoke polycarbonate	IDB-2523
Heater/fan kit with bracket (12 watt for plastic pendant-mount housing)	1053068
Heater/fan kit with bracket (23 watt for rugged, cast aluminum pendant-mount housing)	1053069
Housing, flush-mount	IDH-5101
Housing, pendant-mount, plastic	IDH-5201
Housing, pendant-mount, plastic with heater/fan	IDH-5202
Housing, pendant-mount, cast aluminum (rugged)	IDH-5401
Housing, pendant-mount, cast aluminum (rugged) with heater/fan	IDH-5402
Housing, pendant-mount, pressurized with sensor and heater/fan	IDH-5603
Housing, heavy duty, wall-mount	IDH-5501
Housing, heavy duty, wall-mount with heater/fan	IDH-5502
Housing, heavy duty, parapet-mount with heater/fan	IDH-5504
O-ring for bubble ring (only for the plastic pendant-mount housing)	1048938
PCB, interconnect (kit with clip)	1053110
PCB, housing	1047470
PCB, active housing	1047473
Thermostat (18 awg, 55° – 65°)	1052019

## Contacting technical support

For assistance installing, operating, maintaining, and troubleshooting this product, refer to this document and any other documentation provided. If you still have questions, you may contact technical support during normal business hours (Monday through Friday, excluding holidays, between 6 a.m. and 5 p.m. Pacific Time).

Table 7. Sales and support contact information

	Sales	Technical support
<b>Phone</b>	<b>Toll-free:</b> 888.GESECURity (888.437.3287 in the US, including Alaska and Hawaii; Puerto Rico; Canada). Outside the toll-free area: 503.885.5700.	
<b>E-mail</b>	info@gesecurity.com	generaltech@ge.com
<b>Fax</b>	800.483.2495	<b>541.752.9096</b> (available 24 hours a day)

**Note:** Be ready at the equipment before calling for technical support.

## Online publication library

Another great resource for assistance with your GE product is our online publication library, available to all of our customers. To access the library, go to our website at the following location:

<http://www.gesecurity.com>

In the **Tools** area at the top, click the [Publication Library](#) link. After you register and log on, you may search through our online library for the documentation you need.<sup>1</sup>

---

1. Many GE documents are provided as PDFs (portable document format). To read these documents, you will need Adobe Acrobat Reader, which can be downloaded free from Adobe's website at [www.adobe.com](http://www.adobe.com).



# Appendix A Installing the individual mounts

This appendix provides the installation instructions for the mounts that are shipped with the dome kits, which includes the wall-mount arm and the T-bar support kit. Instructions for all other mounts (arms, adapters, and brackets) are shipped with those mounts.

In this appendix:

<i>GEA-102 wall-mount arm</i> .....	48
<i>Installing the wall-mount arm</i> .....	48
<i>Opening the conduit hole</i> .....	51
<i>GEA-114 T-bar ceiling support kit</i> .....	53
<i>Installing the T-bar ceiling support kit</i> .....	54

## GEA-102 wall-mount arm

The cast aluminum wall-mount arm is used to mount a dome to a vertical surface. It is for indoor or outdoor use and mates with both the plastic indoor and cast aluminum outdoor pendant housings. It can be attached directly to a vertical surface or mated with a bracket (corner-mount, pole-mount, or roof-mount). Instructions for mating this mount to the various brackets are provided in the instructions for those brackets. The following instructions explain how to install the wall-mount arm directly to a vertical surface.

### Installing the wall-mount arm

To install the wall-mount arm, see the corresponding figures and do the following:



**CAUTION:**

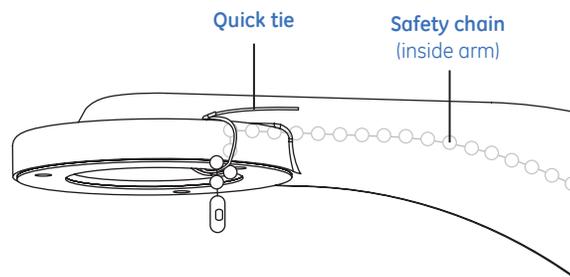
For all installations, heed these cautions:

- Complete all installation steps before supplying power to the dome.
- To ensure proper operation of a PTZ unit, install the mount level.
- For safety, the mounting surface, hardware, and procedure used for securing the dome must support the weight of the dome, mount (if used), cables, and any structural or environmental vibration according to local codes. See **Table 1, Minimum load requirements of dome configurations** on page 5.

- 
1. The facility cables usually come out of the mounting surface and enter the arm through the rear opening in the base. If the cables are attached externally to the mounting surface and need to enter the arm through the side, open the conduit hole in the side of the arm with the instructions given in [Opening the conduit hole](#) on page 51.
  2. The factory secures the end of the safety chain to the collar opening with a quick tie (*Figure 29*). To keep the safety chain from slipping into the arm, leave the safety chain tied until you attach the dome to the arm.

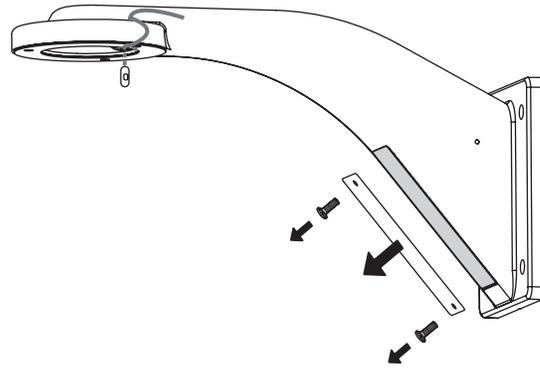
---

*Figure 29. Leaving the safety chain tied*



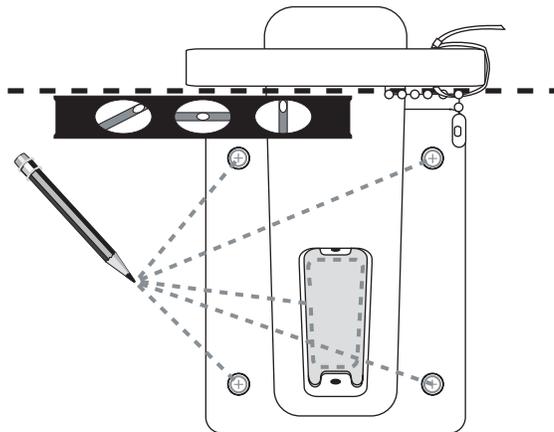
3. Remove the access cover (*Figure 30*).

*Figure 30. Removing the access cover*



4. Using the arm as a template, place it level against the mounting surface and mark the position of the mounting holes, and if needed, the cable entry hole (*Figure 31*).

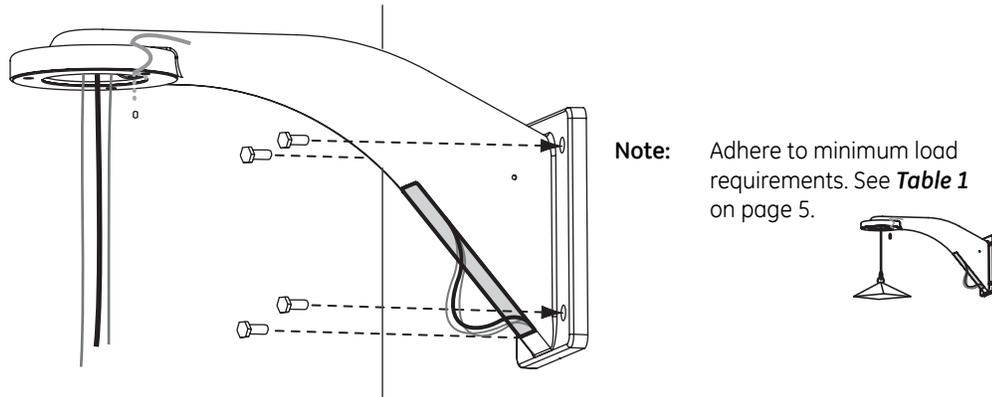
*Figure 31. Marking the mounting and cable entry holes*



5. Following all local codes, drill and prepare the mounting holes, and if needed, cut the cable entry hole.
6. Feed the cables through the cable entry hole in the mounting surface or through the conduit attached to the opened conduit hole, and up through the arm.
  - Pull enough cable to make connections. You can always cut off unneeded length later.
  - Do not terminate the cables yet. Otherwise, they will not fit through the dust seal of the housing.
  - How many cables you pull depends upon how many alarms and relays you are connecting in addition to the video, data, and power cables, and whether you will be installing an Ethernet cable for flash upgrades. See [Wiring and addressing the dome](#) on page 19.

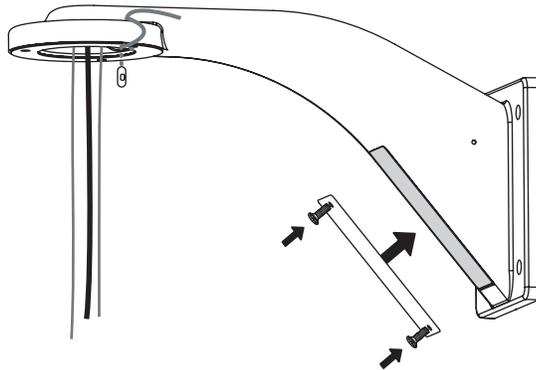
7. Securely fasten the arm to the mounting surface with the appropriate fasteners (*Figure 32*). Again, ensure that it is level.

*Figure 32. Fastening the arm to the mounting surface*



8. If needed, seal all mounting holes so that no moisture can leak into the mounting surface.
9. Push inside the arm or pull taut any looped cables that are extending out of the access area.
10. Reattach the cover (*Figure 33*).

*Figure 33. Reattaching the access cover*

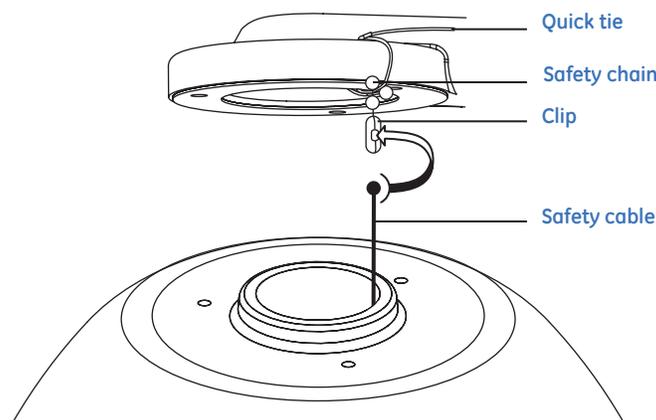


11. Before you attach the housing to the arm, attach the housing safety cable to the arm safety chain (*Figure 34*).

**Note:** The safety cable for rugged housings is metal and for plastic housings is a beaded cord.

- a. Cut the quick tie on the safety chain.
- b. Hold the housing near the arm's collar.
- c. Slide the ball of the safety cable into the clip of the safety chain.
- d. Ensure that the safety chain and cable can bear the housing's weight.
- e. Lower the housing until the safety chain and cable are taut.

*Figure 34. Attaching the housing safety cable to the arm safety chain*



12. Return to *Installing the housing* on page 15 to finish installing the dome.

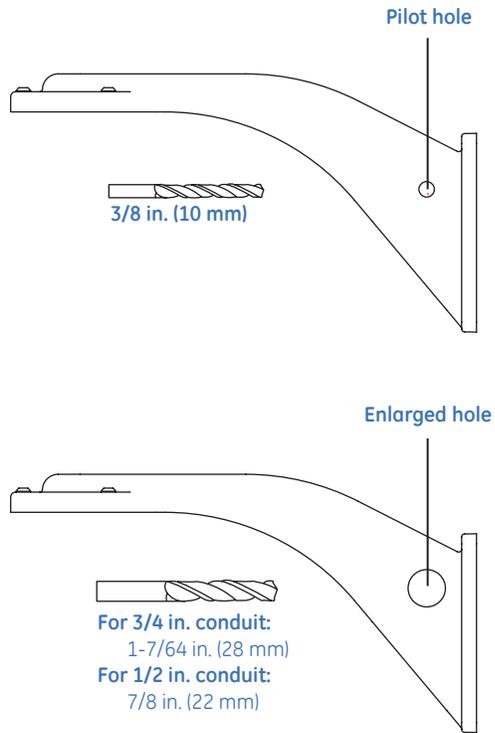
## Opening the conduit hole

Open the conduit hole for a 3/4 in. or 1/2 in. conduit connector, if you need to bring the facility cables in through the side of the arm.

To open the conduit hole, see *Figure 35* on page 52 and do the following:

1. Locate the dimple on the side of the arm.
2. Drill a 3/8 in. (10 mm) pilot hole through the dimple.
3. Enlarge the pilot hole to 1-7/64 in. (28 mm) for a 3/4 in. conduit connector or to 7/8 in. (22 mm) for a 1/2 in. conduit connector.
4. Return to step 2 of *Installing the wall-mount arm* on page 48.

Figure 35. Opening a conduit hole



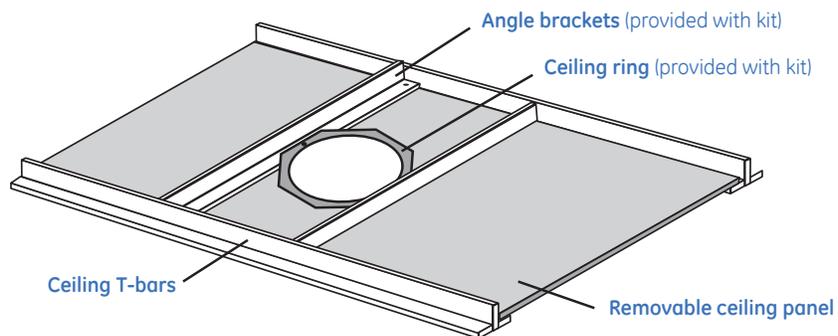
## GEA-114 T-bar ceiling support kit

The T-bar support kit is used to install a flush-mount dome into a paneled T-bar ceiling (*Figure 36*). T-bar ceilings consist of a grid of metal T-bars that support removable panels. The kit distributes the weight of the dome between the T-bars of the ceiling, instead of resting it on a panel.

### Product contents

- 1 ceiling ring
- 2 angle brackets
- mounting hardware (six 6-32 x 2-in. flathead screws)
- installation instructions

*Figure 36. Parts of a supported T-bar ceiling*



## Installing the T-bar ceiling support kit

One side of the ceiling ring is flat; the other side has two press nuts. Orient the ceiling ring as directed in the instructions.



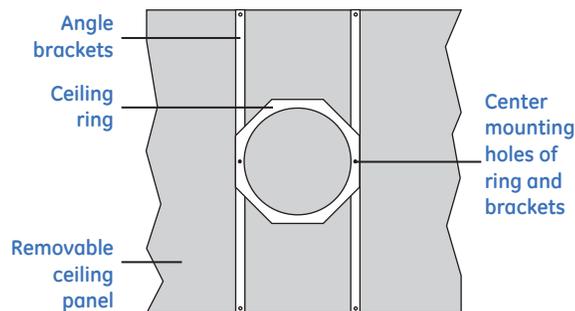
**CAUTION:** For all installations, heed these cautions:

- Complete all installation steps before supplying power to the dome.
- To ensure proper operation of a PTZ unit, install the mount level.
- For safety, the mounting surface, hardware, and procedure used for securing the dome must support the weight of the dome, mount (if used), cables, and any structural or environmental vibration according to local codes. See **Table 1, Minimum load requirements of dome configurations** on page 5.

To install a T-bar ceiling support kit, see the corresponding figures and do the following:

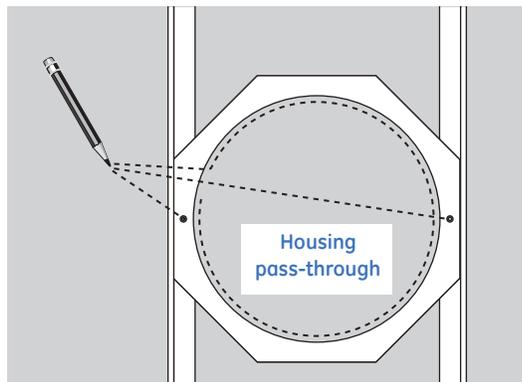
1. Remove the removable ceiling panel where the flush-mount housing will be installed.
2. Center the angle brackets and ceiling ring (flat side to the brackets) on the removable ceiling panel aligning their center mounting holes (*Figure 37*).

*Figure 37. Aligning the angle brackets and ceiling ring on the panel*



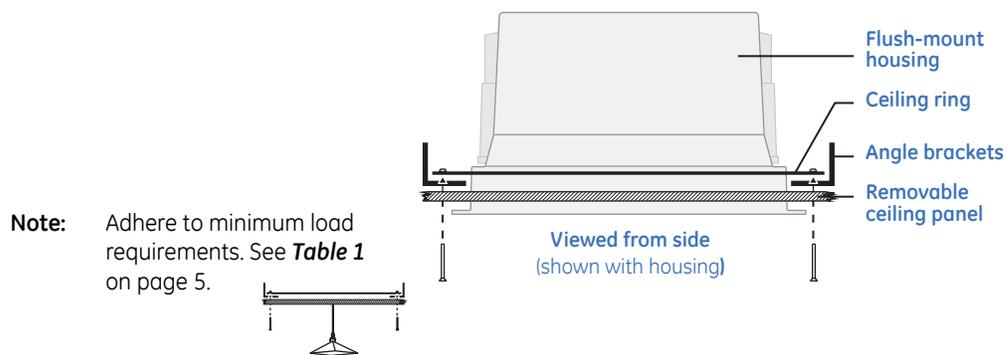
3. Using the ceiling ring as a template, mark the position of the center mounting holes and the housing pass-through hole on the removable ceiling panel (*Figure 38*).

*Figure 38. Marking the mounting holes and housing pass-through hole*



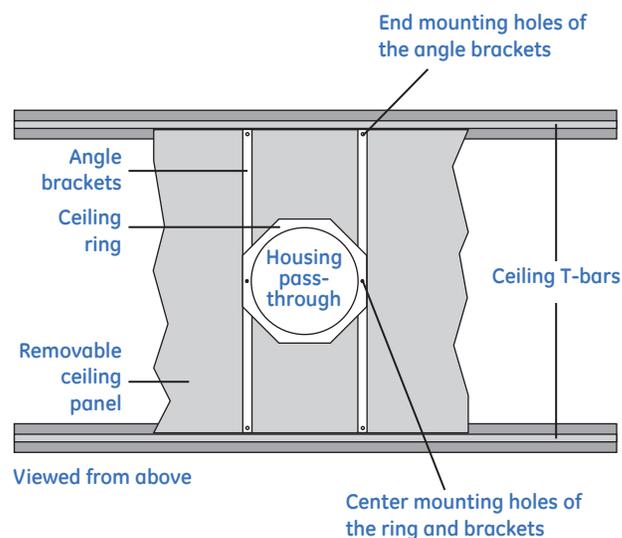
4. Following all local codes, drill the mounting holes (use a 3/16 in. drill bit) and cut the housing pass-through hole. Drill/cut all holes perpendicular to the panel and be careful not to overcut the housing pass-through hole.
5. Reset the angle brackets and ceiling ring on the removable ceiling panel aligning the center mounting holes of the brackets and ring with the drilled holes in the panel. Remember that the flat side of the ceiling ring lays on the angle brackets.
6. Using two of the fasteners provided, fasten the ceiling ring and the brackets to the panel through the center mounting holes (*Figure 39*). Tighten until snug, but not overtight.

*Figure 39. Fastening the support kit onto the removable ceiling panel*



7. Using the last four of the fasteners provided, fasten the ends of the angle brackets to the ceiling panel.
8. Reinstall the panel in the ceiling (*Figure 40*).

*Figure 40. Installed T-bar support kit*



9. Return to *Installing the housing* on page 12 to finish installing the dome.



## Appendix B Differences of earlier boards

This appendix lists the differences that exist with the earlier housing boards for the protocol assignments and the placement and wiring of components. See [Wiring and addressing the dome](#) on page 19 for the complete wiring instructions and precautions, along with the current protocol assignments, for later boards.

In this appendix:

<i>Identifying earlier and later boards and cards</i> . . . . .	58
<i>Component placement on Rev-A housing boards</i> . . . . .	59
<i>Cable connections to Rev-A housing boards</i> . . . . .	60
<i>Wired Rev-A housing boards in domes</i> . . . . .	61
<i>Protocols and addressing for Rev-A housing boards</i> . . . . .	62
<i>Termination switches for Rev-A housing boards</i> . . . . .	63

## Identifying earlier and later boards and cards

There are two boards attached up inside of the housing that you will be handling while you wire and address the dome (*Figure 10* on page 20 and *Figure 12* on page 23). The larger board is the housing board and the smaller board is the active housing card (AHC). You can find the revision numbers for the housing boards by looking at the designation that is printed on them. *Table 8* lists examples of earlier and later board revision numbers.

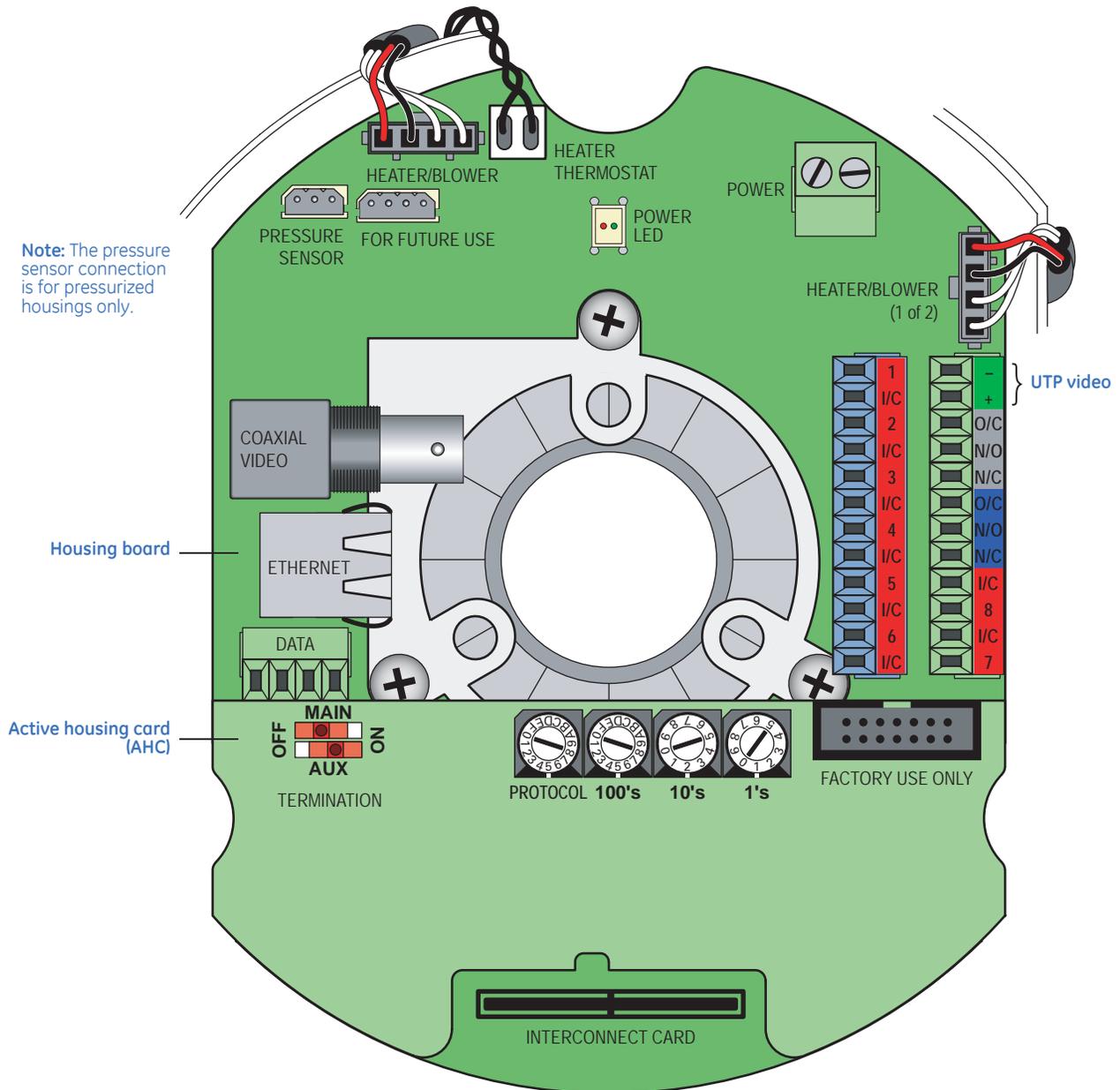
*Table 8. Earlier and later version numbers of the housing boards and active housing cards*

Boards	Versions	Example printed designations
Housing board	<b>Earlier:</b> Revision A boards from 2004	1047469A 12-04 REV-A05
	<b>Later:</b> Revision C boards from 2005	1047469 08-05 REV-C02
Active housing card (AHC)	<b>Earlier:</b> Revision A cards from 2004	1047472A 12-04 REV-A04
	<b>Later:</b> Revision B cards from 2005	1047472 10-05 REV-B02

# Component placement on Rev-A housing boards

Figure 41 shows the different placement of the components that exist on the earlier Rev-A housing boards.

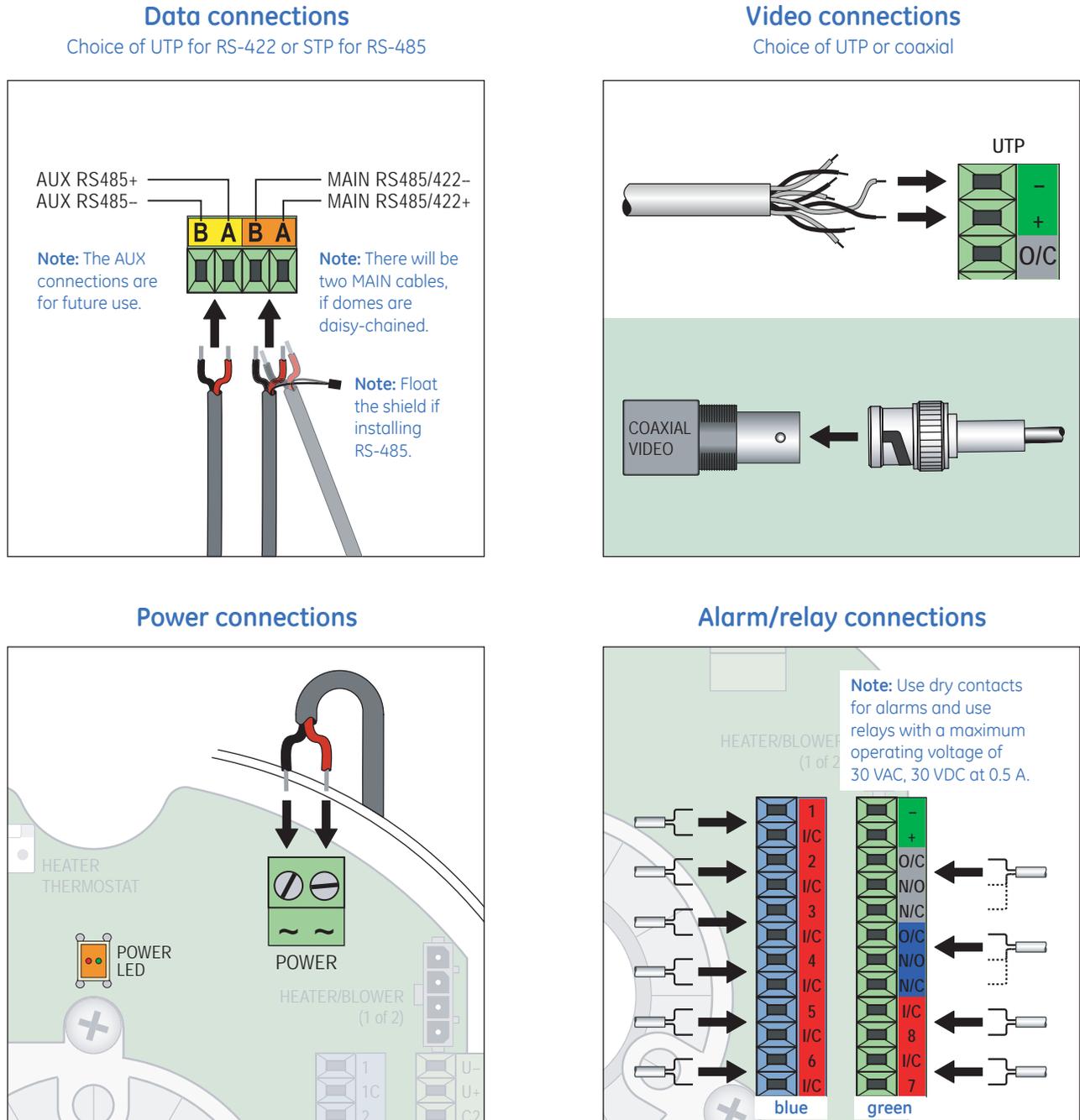
Figure 41. View of housing boards attached to upper bracket as viewed from below the housing with factory-installed cables



## Cable connections to Rev-A housing boards

Figure 42 shows the correct wiring of the components for data, video, power, alarms, and relays on the earlier Rev-A housing boards.

Figure 42. Connecting the data, video, power, and alarm/relay cables

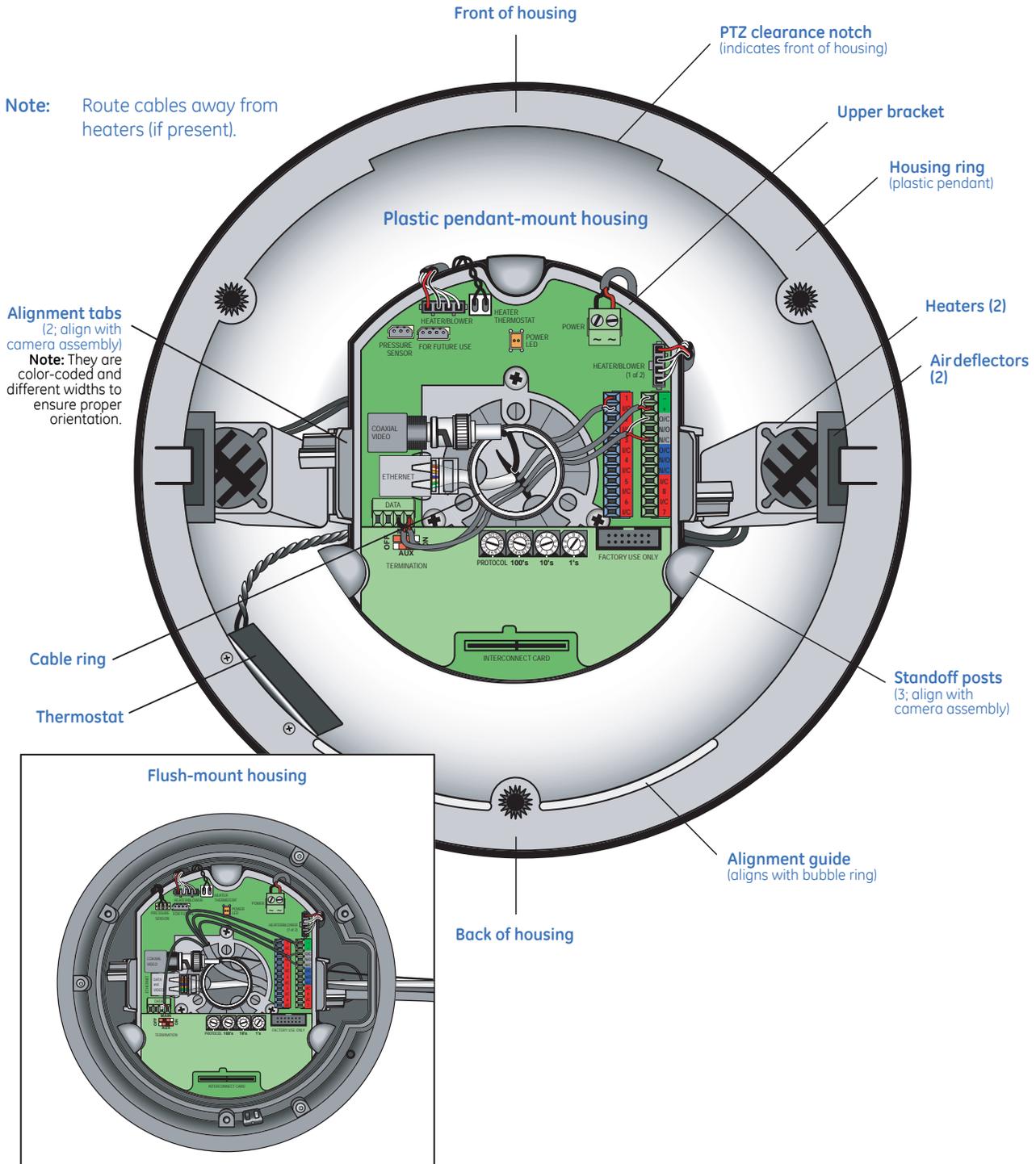


**Note:** You can also connect the Ethernet cable to flash software upgrades to the dome (Figure 43 on page 61).

# Wired Rev-A housing boards in domes

Figure 43 shows the earlier Rev-A housing boards completely wired and located up inside sample housings.

Figure 43. Completed wiring in housings



## Protocols and addressing for Rev-A housing boards

Figure 44 and Table 9 shows the addressing and the different protocol assignments of the rotary switches that exist on the earlier Rev-A housing boards.

Figure 44. Setting the camera's site address and protocol (diagram shows address 521 with ASCII protocol)

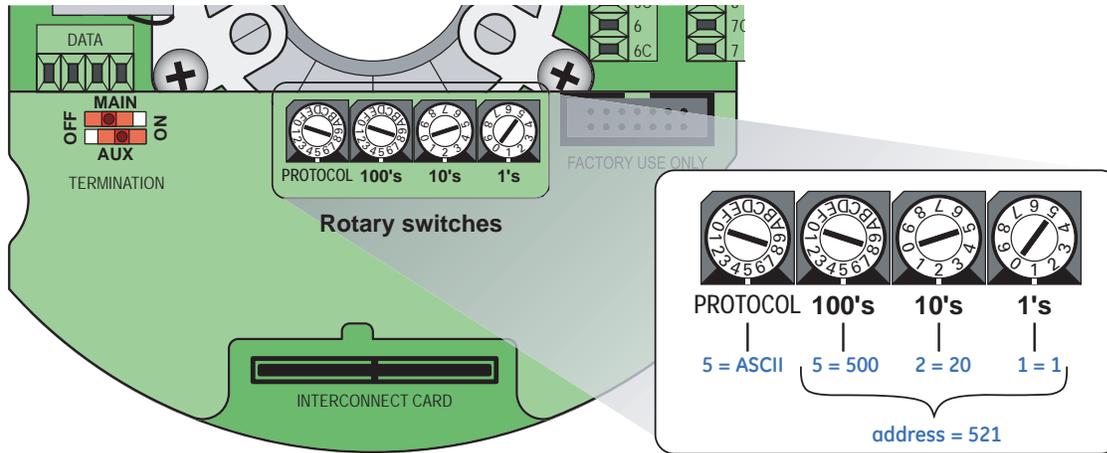


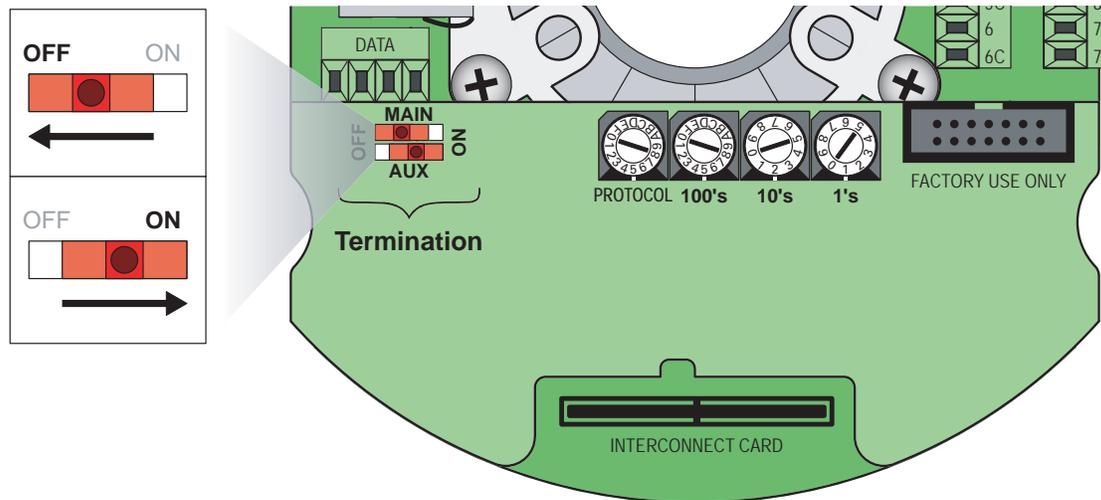
Table 9. Equivalent values for the settings of the rotary switches

Protocol switch		100s switch		10s switch		1s switch	
Setting	Value	Setting	Value	Setting	Value	Setting	Value
0	Digiplex (RS-422) at 4800 baud	0	000	0	00	0	0
1	Impac (RS-485) at 9600 baud	1	100	1	10	1	1
2	For future use	2	200	2	20	2	2
3	For future use	3	300	3	30	3	3
4	For future use	4	400	4	40	4	4
5	ASCII at 9600 baud	5	500	5	50	5	5
6	Pelco D at 2400 baud	6	600	6	60	6	6
7	Ultrak at 9600 baud (even parity)	7	700	7	70	7	7
8	For future use	8	800	8	80	8	8
9	For future use	9	900	9	90	9	9
A	For future use	A	1000				
B	For future use	B	1100				
C	For future use	C	1200				
D	For future use	D	1300				
E	For future use	E	1400				
F	For future use	F	1500				

## Termination switches for Rev-A housing boards

Figure 45 shows the different termination switches that exist on the earlier Rev-A housing boards and how to correctly set them. With the earlier Rev-A housing boards, the AUX termination switch is not used as the AUX data cable connections are also not used. Therefore, it does not matter whether the AUX termination switch is on or off.

Figure 45. Termination switches





## Appendix C Tyco/AD wiring

This appendix provides the instructions for wiring Tyco/AD keypads to Legend domes.

In this appendix:

<i>Verifying dome software and AHC firmware versions</i> .....	66
<i>Wiring Tyco/AD keypads to Legend domes</i> .....	66

## Verifying dome software and AHC firmware versions

In order to operate Legend domes with Tyco/AD (RS-422) keypads, your domes must be installed with v2.1.9 (or later) software and the active housing cards (AHCs) in the domes must be installed with v7 (or later) firmware.

To verify the software version of the domes and the firmware version of the installed AHCs:

1. Select **System** and **Status** in the menus of the graphical programming interface. Refer to the *Legend User Manual* (1052027) for details about using the programming interface.
2. Scroll down to the *Site info* and *AHC info* sections.

## Wiring Tyco/AD keypads to Legend domes

If your domes have the correct dome software and AHC firmware (*Verifying dome software and AHC firmware versions*), then connect your Tyco/AD keypads to the data connections of the domes as shown in *Figure 46* and *Table 10*.

Be aware that you lose streaming position reporting out of the AUX ports while you have Tyco/AD keypads wired to Legend domes.

Figure 46. Tyco/AD keypad wiring to Legend domes

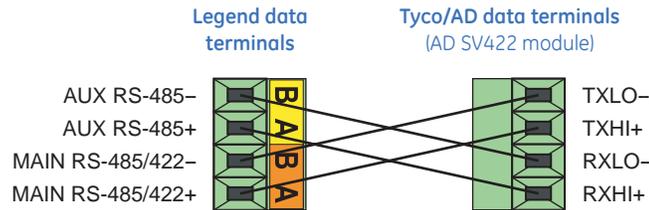


Table 10. Tyco/AD keypad wiring to Legend domes

Legend data (AHC v7 or later)			Tyco/AD data (AD SV422 module)	
AUX RS-485-	to		RXLO-	
AUX RS-485+	to		RXHI+	
MAIN RS-485/422-	to		TXLO-	
MAIN RS-485/422+	to		TXHI+	

# Index

	<b>A</b>		<b>G</b>	
addressing .....		25, 26, 62	graphical programming interface.....	36
	<b>B</b>		<b>H</b>	
boards			housings	
<i>active housing card (AHC)</i> .....		19, 20, 59	<i>aluminum pendant-mount</i> .....	10
<i>differences between earlier and later</i> .....		57	<i>flush-mount</i> .....	10, 11, 13
<i>earlier revisions</i> .....		58	<i>heavy-duty</i> .....	10
<i>housing</i> .....		19, 20, 21, 59	<i>mounting styles</i> .....	10
<i>later revisions</i> .....		20	<i>pendant-mount</i> .....	10, 14, 16
bubbles .....		32, 33	<i>plastic pendant-mount</i> .....	10
<i>cleaning</i> .....		43	<i>with completed wiring</i> .....	23, 61
	<b>C</b>		<b>L</b>	
cable			LEDs .....	21, 30, 40
<i>management</i> .....		6	load requirements.....	5
<i>preparation</i> .....		17		
<i>requirements</i> .....		5	<b>M</b>	
cable ring.....		24	maintenance .....	42
camera assembly .....		30	mounting surface	
<i>diagnostic LEDs</i> .....		30	<i>for flush-mount housings</i> .....	11
<i>installation</i> .....		30, 31	<i>for pendant-mount housings</i> .....	14
<i>PTZ self-test</i> .....		30	mounts.....	47
<i>removal</i> .....		31	<i>GEA-102 wall-mount arm</i> .....	48
connections			<i>GEA-114 T-bar ceiling support kit</i> .....	53
<i>alarms</i> .....		21, 22, 60	<b>O</b>	
<i>AUX</i> .....		21, 22, 60	operation	
<i>data</i> .....		21, 22, 60	<i>advanced</i> .....	20
<i>Ethernet</i> .....		21	<i>basic</i> .....	20
<i>MAIN</i> .....		22, 60	operational requirements.....	3
<i>main</i> .....		21		
<i>power</i> .....		21, 22, 60	<b>P</b>	
<i>relays</i> .....		21, 22, 60	passcodes .....	36
<i>video</i> .....		21, 22, 60	power	
conventions .....		v	<i>cable size and length requirements</i> .....	7
	<b>D</b>		<i>requirements</i> .....	7
daisy chain .....		22, 60	preface.....	v
diagnostic LEDs.....		21, 30, 40	product	
	<b>F</b>		<i>contents</i> .....	2
float shield.....		22, 60	<i>description</i> .....	2
			programming interface.....	36

protocols.....25, 26, 62  
 PTFE thread sealing tape .....15  
 PTZ self-test.....30  
 publication library.....45

**R**

rebooting the dome .....42  
 references ..... vi  
 requirements  
     *cable* .....5  
     *load*.....5  
     *operational* .....3  
     *power*.....7  
     *power cable size and length* .....7  
     *system* .....3  
 resetting the dome .....42

**S**

safety cautions  
     *bubble* .....32, 43  
     *cables*.....12, 15, 21  
     *captive screws* .....32, 33  
     *Ethernet* .....5, 21  
     *heaters* .....12, 15, 21, 31  
     *installation*.....11, 14, 48, 54  
     *load*.....5, 12, 15  
     *moisture* .....11, 15  
     *passcodes*.....36  
     *power supplies*.....7  
     *warranty* .....43  
 safety terms and symbols.....v  
 spare parts list .....44  
 streaming position reporting .....21  
 system requirements .....3

**T**

technical support .....45  
 termination .....27, 63  
 troubleshooting .....40  
 Tyco/AD keypad wiring to dome .....21, 66