

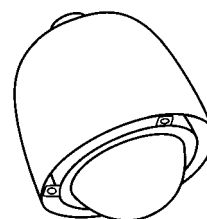
# COHU, INC. ELECTRONICS DIVISION

## Installation Manual

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CE  
FCC



**Figure 1. Model 394x-590x  
Ethernet iDome**

## **3940 IP iDome CAMERA/POSITIONER SYSTEM**

Technical Manual 6X-1070D

June 28, 2012

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[www.cohu-cameras.com/content/contactus](http://www.cohu-cameras.com/content/contactus)

[www.cohu-cameras.com](http://www.cohu-cameras.com)

[info@cohu.com](mailto:info@cohu.com)

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6X-1070D

**COHU**

**Refer to table 9 at the rear of this manual for camera specifications**

**Camera Software Support**

**Controlling this camera and viewing its video requires software running on a PC. Currently, two options are available:**

- 1. For operation of the camera during installation and setup, download WinMPC.Net from the Cohu website. This software both controls the camera and views its video.**
- 2. For the day-to-day operating software download the SDK (Software Development Kit) from the Cohu website. A programmer will then use this SDK to write the operating software for the camera.**

**A third software download is available to update firmware in the camera. This download will include DOS upload /burn software and the actual firmware updates themselves.**

**cohu-cameras.com**

**FCC STATEMENTS**

NOTE: 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. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications to this equipment not expressly approved by Cohu Electronics could void the users authority to operate the equipment.

**EMI/EMC TESTS COMPLETED**

FCC, 15B, Class A FCC, 15B, Class A EN 55022, Class A EN 61000-6-3, Class A  EN 55022, Class A	Ac Power Line Conducted Emissions Radiated Radiofrequency Emissions Power Line Conducted Emissions Signal Control dc Input/dc Output Conducted Emissions Radiated Radiofrequency Emissions	IEC 61000-4-2, A1 + A2 IEC 61000-4-3 IEC 61000-4-4 IEC 61000-4-5 IEC 61000-4-6	Electrostatic Discharge Immunity Radiated RF Field Immunity EFT / Burst Immunity Lightning Surge Immunity RF Common Mode Immunity
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## 1.0 GENERAL DESCRIPTION

The 3940 IP iDome is an integrated camera/positioner unit that combines a high performance digital signal processing camera, pan-and-tilt, and control receiver for communications into one integrated package (figure 1). A 35x lens is provided.

It communicates with Ethernet TDP packets and supplies video via Ethernet UDP packets.

An IP dome is configured to connect to a hub, switch, or router. Connecting it directly to the NIC (Network Interface Card) in a computer will require use of a crossover cable or crossover adapter.

Throughout this manual the entire assembly will typically be referred to as the “iDome” or just the “Dome.”

Specifications are contained in table 9 at the back of this manual. A model number interpretation diagram is provided in figure 2. This diagram can be used to interpret an existing model number.

### 1.1 ELECTRICAL CHARACTERISTICS

The camera uses digital signal processing. It has an internal source ID generator. Integration control plus a built-in video storage card provides full color continuous video even at very low light levels.

The iDome speeds are variable with maximums of 250° per second for pan and tilt. Pan range is a continuous 360 degrees while the tilt range is 0 to 90 degrees from the horizontal with auto-flip at the 90° point. There are 64 preset positions with a preset accuracy of 0.1 degree. When responding to standard pan-preset or manual control, the iDome can move with a pan speed of 250° per second.

This iDome will operate in temperature ranges from -34° to +50° C and with winds of up to 90 mph. The enclosure protects against salt, grime, dirt, and moisture.

The integrated receiver/driver, contained within the iDome, communicates using CoHU protocol messages. These messages control camera DSP functions and also the pan, tilt, zoom functions of the positioner. All iDome functions are operable via Ethernet serial communications.

Up to 64 pre selected scene locations can be stored for later access. These Preset locations are available for use with the Tour functions. All 64 preset positions are stored in nonvolatile memory to preserve them in the event of a power failure.

Each iDome “address” within a surveillance system can be selected electronically from the Monitoring Center. There are no mechanical dip switches to set at the camera, and each unit responds to the central command only if addressed. This provides greater integration flexibility for the designer and more dynamic camera control for the operator.

Privacy zones can be set up using polygon shaped windows drawn with the Viewer/GUI software. These blanking windows are generated electronically within the digital signal processing (DSP) and provide positive control of such areas.

Electronic image stabilization (EIS) is a standard feature for the camera module used in this dome. This EIS feature can be set to either 5 or 16 hertz to minimize the effects of slight vibrations on a Dome in certain mounting situations — such as when it is mounted on a tall pole.

### 1.2 SOFTWARE DOWNLOADS

This camera is intended for computer control and that computer must be running control and viewing software dedicated to this camera.

Two software packages related to operating the camera are available for download from the [cohu-cameras.com](http://cohu-cameras.com) website. A third package is available to update the camera firmware. These downloads are:

1. WinMPC.Net
2. Software Development Kit (SDK)
3. Firmware Updates

These packages are described below. Section 1.2.4 gives a brief functional description of the camera in relation to this software requirement.

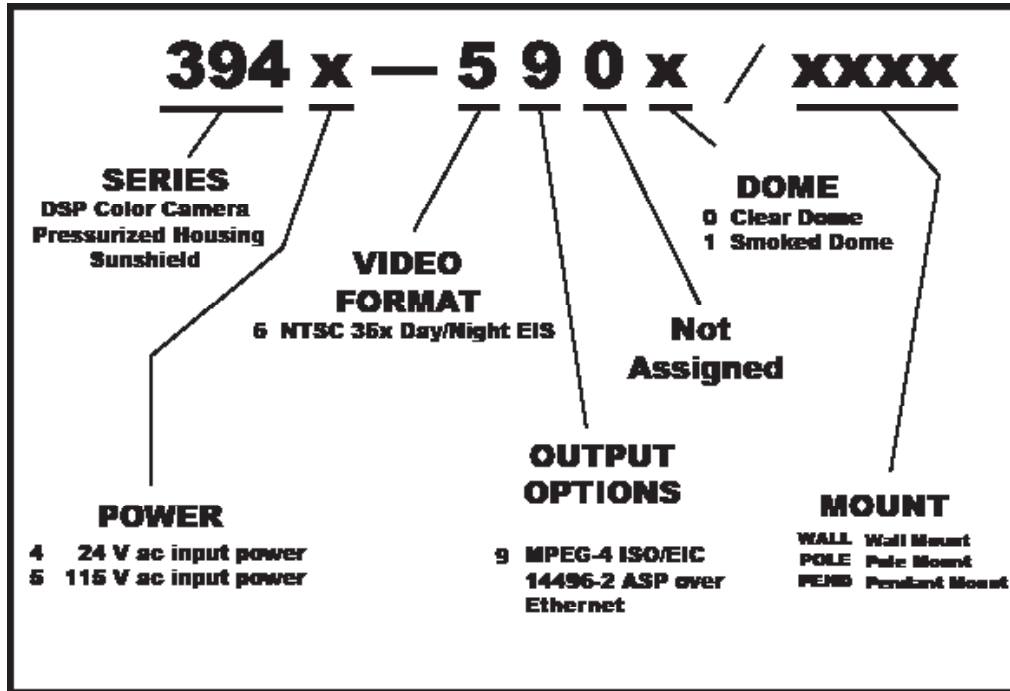
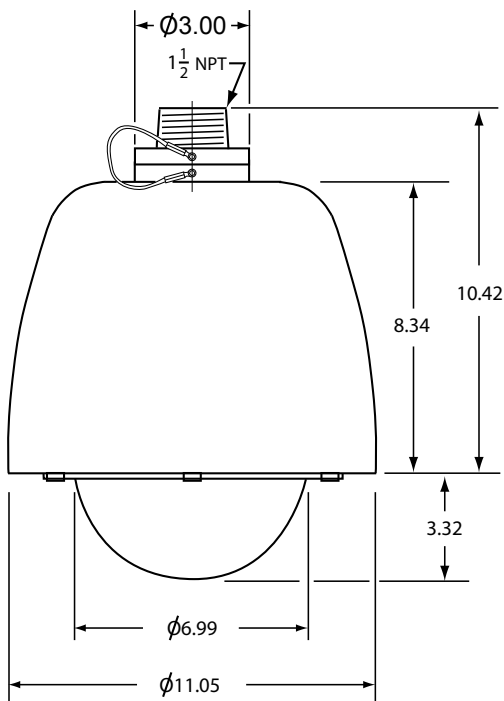


Figure 2. Model Number Interpretation Diagram



Unless otherwise noted, all dimensions in inches  
 NPT is National Pipe Thread

Figure 3. iDome Dimensions

**1.2.1 WinMPC.Net Installation and Setup Software**

For installation and setup of a camera use Cohu WinMPC.Net software. This software is not intended for the day-to-day operation of the camera. It is intended to control a single camera during installation and maintenance operations.

**1.2.2 Software Development Kit (SDK)**

A software development kit is available for those desiring to write their own software to control the iDome and to view video from the camera. This software can be downloaded from the [cohu-cameras.com](http://cohu-cameras.com) website.

**1.2.3 Firmware Update Software**

Any available firmware updates available for this camera can be downloaded from the [cohu-cameras.com](http://cohu-cameras.com) website. This download will consist of three parts:

**Table 1. Basic Mounting Arrangements**

MOUNT CONFIG.	iDOME	ARM	POLE BRACKET
Pendant	•		
Wall	•	•	
Pole	•	•	•

*NOTE: Dot ( • ) designates items supplied for each mounting configuration.*

1. A DOS upload/burn program
2. Firmware for a 8051 microcontroller
3. Firmware for a DM642 digital media processor.

**1.2.4 Functional Description**

Video generated by the camera is reduced in bandwidth using MPEG-4 compression. This compressed video is then sent via Ethernet packets on CAT-5 cable to the PC. Control commands to the camera and responses back use Ethernet communications over the same cable.

At the PC the video processing must be reversed. Ethernet packets are converted back to video and then run through MPEG-4 decompression. This decompressed video is then processed by viewer software and displayed on the screen of the computer.

In addition to this video processing in the PC, the software must send camera control commands over the Ethernet cable as previously mentioned. The PC control software must also process any responses returned from the camera.

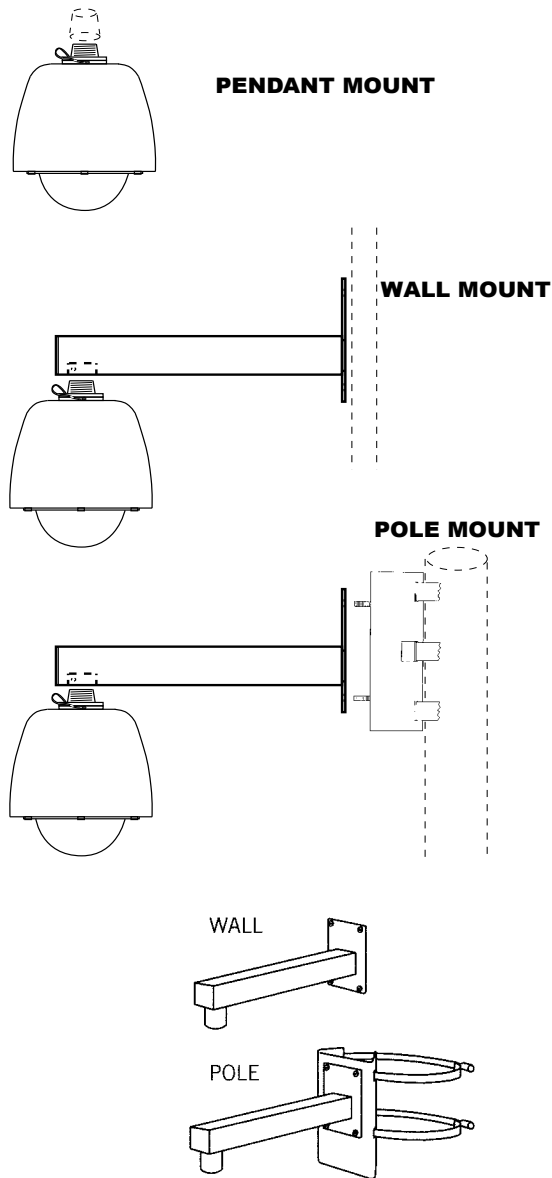
Within the iDome are an 8051 microcontroller and a DM642 digital media processor. Both these devices can be updated with firmware.

**1.3 MECHANICAL CHARACTERISTICS**

Although the iDome is a single mechanical assembly for installation purposes, it actually consists of two primary mechanical subassemblies inside the dome: (1) the camera module and (2) the positioner (pan/tilt unit).

All camera circuits are contained within a sealed and pressurized environmental dome housing having either a clear or smoked window through which the camera lens views outside scenes. This dome is fully covered by a sun shield spaced slightly away from the housing itself. This minimizes heat buildup due to sunlight. Vent holes at the top of the dome sunshield must be kept clear to maintain air flow.

The iDome is a sealed and pressurized (dry nitrogen) unit intended for indoor or outdoor use



**Figure 4. Basic Mounting Configurations**

under rain, snow, and other typical harsh weather conditions.

A sealing type MS connector is used on the housing and when mated with a similar MS type cable connector they provide a good environmental seal for the mating pins and sockets.

Both an Ethernet CAT-5e cable and a multiconductor power cable connect to a single cable plug. These two cables and the attached plug are routed to the iDome location and then passed through the mounting pendant to provide for all signal, video, and operating power connections. Pin functions and layout are shown in figure 11.

## 2.0 INSTALLATION

This section of the manual provides general instructions about installation of the iDome.

For descriptions of the various mounting arrangements to poles and buildings refer to section 6.

The actual installation should be performed by a qualified installation professional familiar with all the local code requirements and good practices for a proper installation.

Always preplan the installation to be sure that all required cabling and address assignments are completed. It may also be important to know the orientation of the iDome when it is mounted at its location. The Schrader valve (figure 16) should be accessible for adding dry nitrogen if necessary.

The model number label indicated a mechanical home reference for all iDomes. Electrical home for panning is 90° clockwise from this position as viewed from above.

Table 1 lists the three basic mounting arrangements. That pendant version consists of only the iDome itself. The wall mount version of an iDome is shipped with the wall mount arm. The pole mount version is shipped with both the wall mount arm and a pole mount bracket to which the wall mount arm attaches.



**Figure 5. Model 8540B Test Stand (23-inch height).  
( Model 8540A -not shown- provides 38-inch height)**

Section 5 of this manual covers receiving inspection, packing and return requirements for sending the iDome back to the factory, and static discharge protections. Static should mainly be of concern when working inside a unit. This manual does not cover disassembly of the Dome.

**WARNING**

The model 3945 versions of this iDome operate from 115 V ac — a voltage level that can be dangerous. When working with this model, use all appropriate care.

**2.1 EQUIPMENT SUPPLIED**

A cable connector kit (part number 1310230-011) is supplied as a loose part for mating with the connector on top the camera. Beyond that the model number of the camera determines what else is shipped with the camera.

Table 1 indicates what mounting arms and brackets may also be supplied.

**2.2 EQUIPMENT REQUIRED BUT NOT SUPPLIED**

Each installation will have unique requirements for necessary cables, equipment, and miscellaneous accessory items. This list in table 3 is the most basic items required for installing at the site location of the iDome. Some of these items can be ordered with the iDome and thus would be provided in those cases.

**2.3 POWER REQUIREMENTS**

The maximum power draw with pan/tilt motors running and the heater on is 114 watts.

There are two versions of the iDome related to voltage requirements:

- 24 V ac (Model 3944-590x / xxxx)
- 115 V ac (Model 3945-590x / xxxx)

The model number label is attached to the bottom of an iDome. (Electrical home for camera pan is 90° clockwise from this label viewed from above.)

**Table 2. Required Cable Characteristics**

<b>CONDUCTOR FUNCTION</b>	<b>TYPICAL CHARACTERISTICS</b>
<b>Ethernet</b>	2 pairs twisted, 26 AWG minimum (CAT5e cable or better)
<b>POWER</b>	115 V ac: 3-conductor, 18 AWG minimum
	24 V ac: 5 conductors, gauge determined primarily by length of cable run
<p><i>Wire gauges depend on length of the cable run. This table assumes a 115 V ac iDome has a maximum 250 foot cable run, For 24 V ac use, cable gauge 18 allows runs up to about 70 feet. 16 gauge is sufficient up to about 110 feet. The Ethernet CAT5e cable is limited to about 300 feet due to Ethernet timing considerations. Use high quality cable suitable for the intended location.</i></p>	

Basic power consumption is 37 watts. When both stepper motors are active, power consumption becomes 60 watts. When the thermostat applies power to the heaters, an additional 54 watts is consumed. Thus the maximum power draw with stepper motors both running and the heaters drawing power is 114 watts.

Power connections to the iDome are made through a dedicated power cable. This cable and the Ethernet CAT5e cable both connect to the same 18 pin MS type plug for connection with the mating camera connector.

One version of the Camera is wired for 115 V ac. Pins “U” (high) and “T” (low) are used to provide 115 V ac Camera operating power. The AC ground is pin G. The internal camera heater will require that a minimum of 2.25 amps be available (54 watts) in addition to the power required for the camera and positioner (pan/tilt) motors).

A second version of the Camera is wired for 24 V ac. Pins “B” (high) and “T” (low) are used to provide 24 V ac Camera operating power. To provide power to the internal heaters, a separate 24 V ac input is used. Pin C is (high) and pin K is (low). This heater input will require that a minimum of 2.25 amps be available (54 watts).

Ac ground for both heater power and camera power of the 24 V ac inputs is pin “G.”

**Table 3. Items Required but Typically not Supplied**

<b>ITEM</b>	<b>DESCRIPTION</b>	<b>RECOMMENDED SOURCE</b>
1	5/16 inch grade 316 stainless steel hardware	Commercial stock items
2	Cable assembly	Cohu CA-252A or CA-252B for 115 V ac models, or CA-252G for the 24 V ac model
3	Connector Sealing Tape	Coax Seal
4	Power source (114 watts)	24 V ac or 115 V ac, depending on camera model
5	Viewer & Control Software	WinMPC.Net for setup and maintenance operations
6	Mounting arm	See section 2.0 & section 7 for mounting choices

Table 2 lists basic characteristics that are required for a typical cable interconnection with the iDome.

The Ethernet conductors should be at least 26 gauge or larger twisted pairs. With these data conductors it is desired to minimize capacitance loading and thus shielded type CAT5e cables should not be used. However in problem installations with high interference levels, an overall outer shield can be used if desired. Individual shields over the twisted pairs should be the last choice. In most situations standard unshielded twisted pair (UTP) CAT5e cable can be used.

The power conductors should be as heavy a gauge as possible. Cohu cables use paralleled 22 gauge conductors for the 24 V ac power cable and 18 gauge for the 115 V ac cables.

This problem is especially acute with the 24 V ac version of the iDome since it draws much more current than the 115 V ac version. Thus 24 V ac versions typically have shorter allowable cable runs unless the power wiring is increased to a much larger size. To minimize this problem, operating power and heater power are supplied on separate inputs for a 24 V ac iDome. And even so, wires within the cable are paralleled to increase current carrying capacity. See figure 10 for an example of these paralleled power wires.

Maximum cable length for the Type CA-252G cable is 80 feet.

When the heaters turn on under thermostatic control during low ambient temperatures the voltage drops at the iDome due to resistance in

the wires. With the 24 V ac version this does not decrease operating power since it is on a separate input, but for the 115 V ac version, operating voltage cannot be allowed to drop below the requirements of the iDome when heaters are energized by the thermostat.

Power wiring of greater sizes reduces this voltage drop when heaters cycle on and off. When designing a custom installation it is best to perform a few Ohm's Law calculations to determine what is the minimum allowable size for power wiring. Length of power wires both to and from the camera must be considered when doing these calculations.

And remember that the CAT5e Ethernet cable to the iDome cannot be longer than about 300 feet due to Ethernet timing considerations.

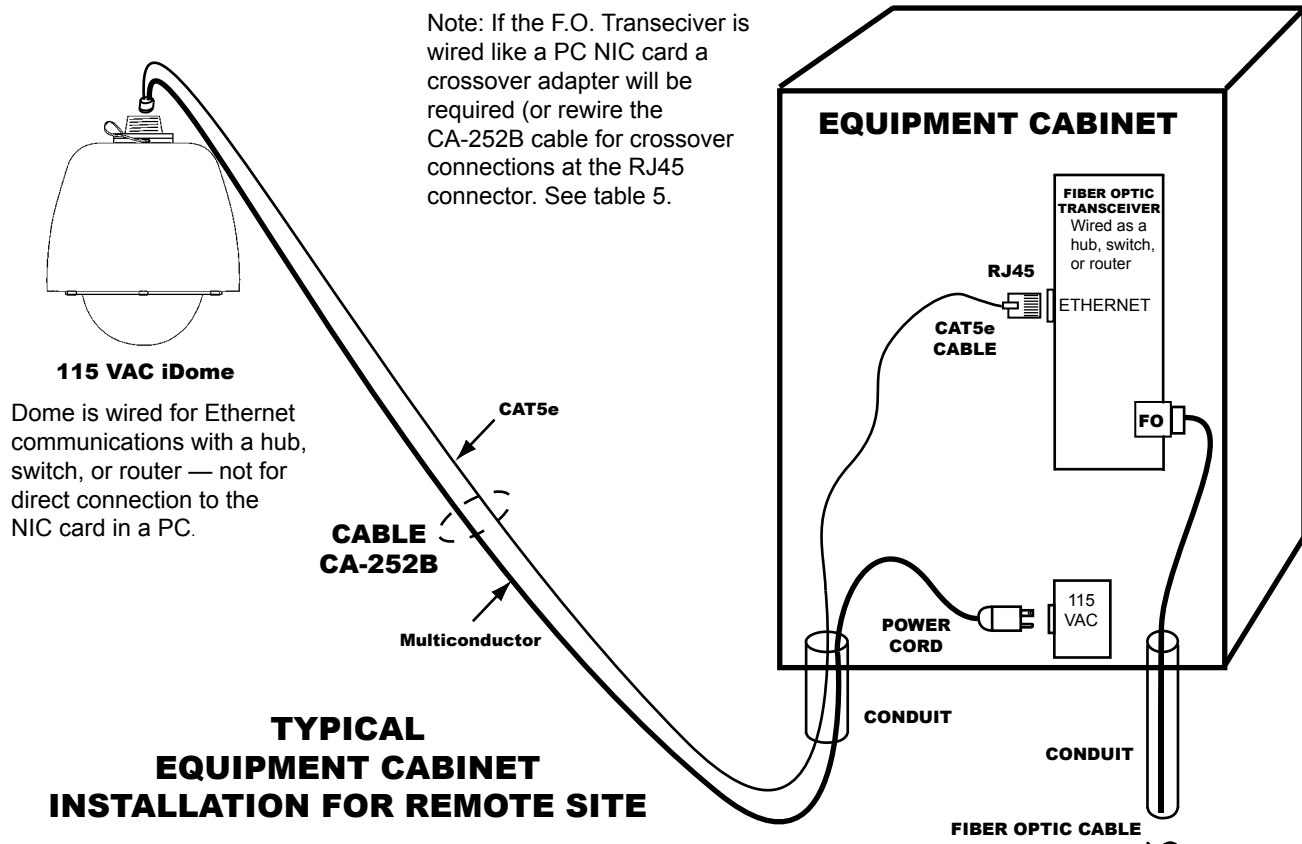
**2.4 CABLING REQUIREMENTS**

Table 4 lists typical cables available for use with the iDome. This table summarizes the characteristics of each cable. "Prepped" in the table indicates that the wire leads are stripped and pre tinned with solder for attachment to a terminal strip or similar device.

Note that two of these cables are listed for use with 115 V ac iDomes only.

Cable CA-252G is for the 24 V ac versions of the iDome. Note that the maximum length of this cable is 80 feet due to power demands of the heaters, but longer lengths could become an issue for the camera power, too.





**Figure 6. Interconnection Diagram, iDome to Equipment Cabinet (typical)**

Assembly/wiring diagrams for the cables are shown in figures 8 through 10. Figure 11 shows connector pin locations related to both 115 and 24 V ac versions of the iDome.

A cable connected to the iDome usually routes to equipment in a nearby junction box or equipment cabinet from where another cable continues back to the system control station. Fiber optic cable is often used for this link back to a central location.

Pre-plan all system cabling for an installation. Before an iDome is bolted in place, the cable from the junction box or cabinet must be available to attach to the iDome at its mounting location.

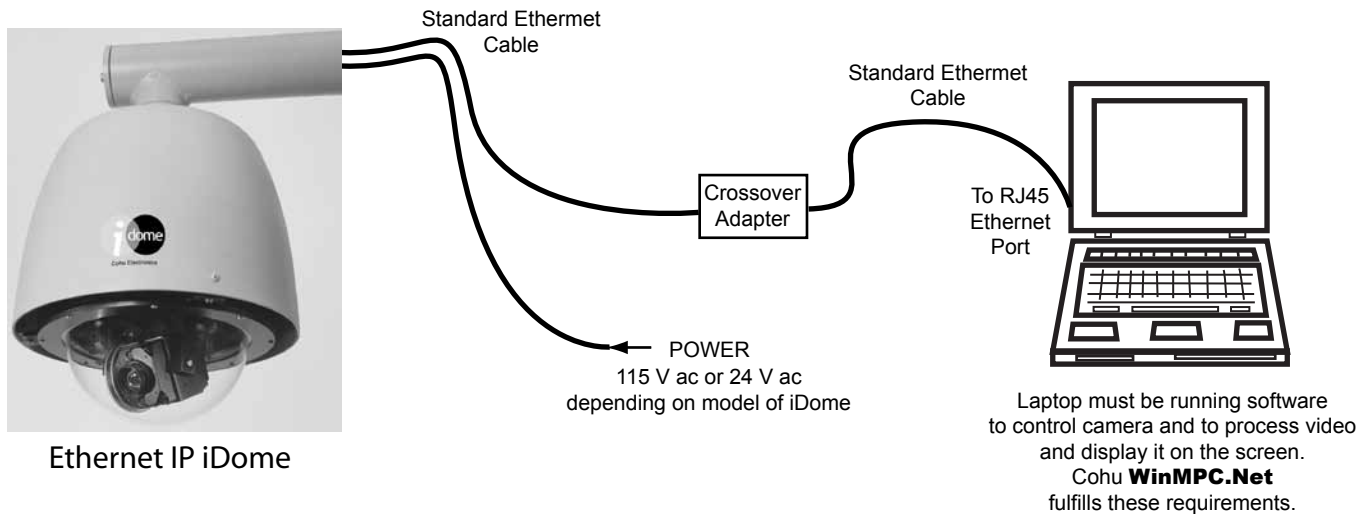
To install a 115 V ac iDome use either cable CA-252A or cable CA-252B. (figures 8 and 9). The pinout configuration for 115 V ac is shown at the left on figure 11.

To install a 24 V ac iDome, use cable CA-252G. The pinout configuration for 24 V ac, is shown at the right in figure 11.

Table 2 lists some basic characteristics for conductors in typical cables. Two considerations related to the cables are:

1. degradation of signal quality on the Ethernet cable due to cable effects and interference signals and
2. voltage drop on power wiring.

Use of a properly installed CAT5e Ethernet cable should eliminate any problems with that cable. It is important not to use more than 40 pounds pulling tension on the CAT5e cable when pulling through conduit, raceways, or any other location. Stretching the cable changes its characteristic. Note that when



Field Setup for Local Communications with Ethernet IP iDome

**Figure 7. Local Operation Test Setup**

using locally purchased CAT5e cable the maximum pulling tension may be 26 pounds or lower. Check the data sheet.

Also, tight radius bends and routing the cable near sources of interference can cause a decreased rate of successful Ethernet packets on the cable. The bend radius for this cable should be at least 0.3 inch.

The power cable must have sufficient gauge wires (or wires paralleled) to maintain a voltage level at the iDome for both camera power circuits and for the heater circuits.

Table 7 is a pin function list of the 24 V ac iDome and table 8 is a list of pin functions for the 115 V ac version. Be sure to know which operating voltage an iDome requires before applying power to a unit. A model number sticker on the base ring under the iDome can be used to determine its operating voltage.

Also, iDomes operating from 24 V ac use pin B as the camera circuits “high” input and pin “T” as the low input. Heater power for a 24 V ac iDome connects to pins “C” (high) and “K” (low). Heaters draw 65 watts when they are cycled on.

When connecting camera power and heater power to the same 24 V ac source be sure to connect both high leads and both low leads to their respective terminals on the power supply.

Figure 11 shows a connector kit for the cable plug. It also lists pin functions for wiring both 24 V ac and 115 V ac cables. When wiring to the Ethernet pins, be sure to consider whether they should be wired for the NIC card in a PC or for system connections to a hub, switch, router, or similar device.

An enlarged view of the rear of the plug shows the solder cups to which solder connections are made. This mating side of this plug interconnects with the corresponding connector on top of the dome.

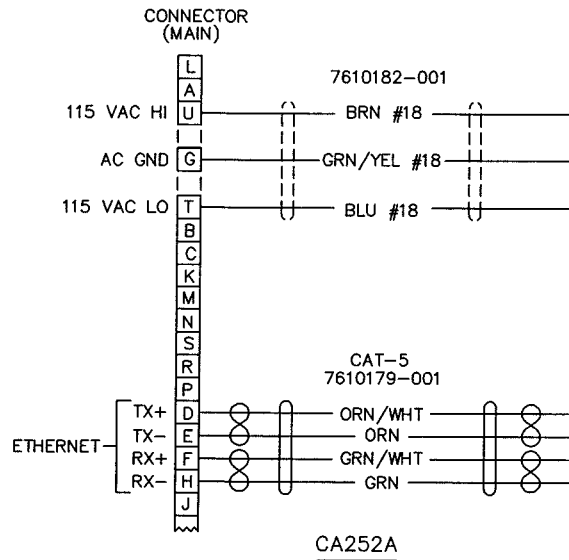
The wiring side of this cable plug has the same pin orientation the iDome connector pins when looking at the top of the iDome.

**2.4.1 115 V ac IP Video Cables**

Two cables are available for iDomes operating from 115 V ac power. The maximum length of either cable should not exceed 250 feet.

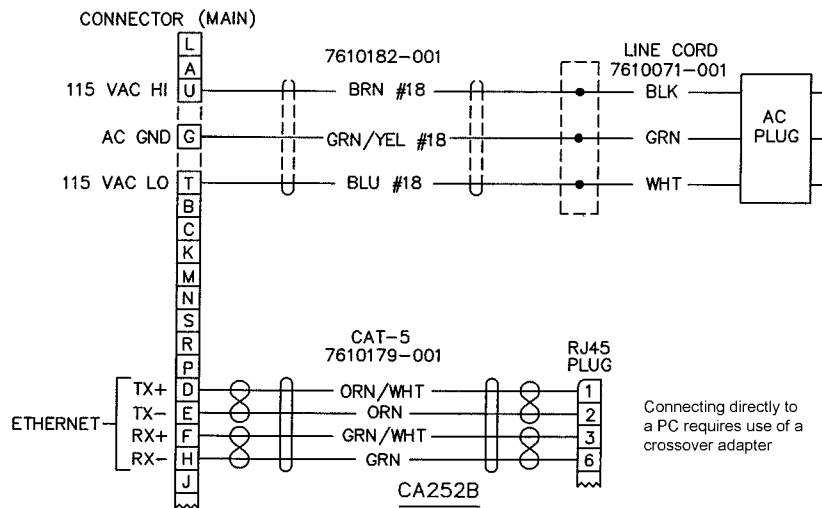
*Text continued on page 12*

**CA252A**  
**115 V ac**



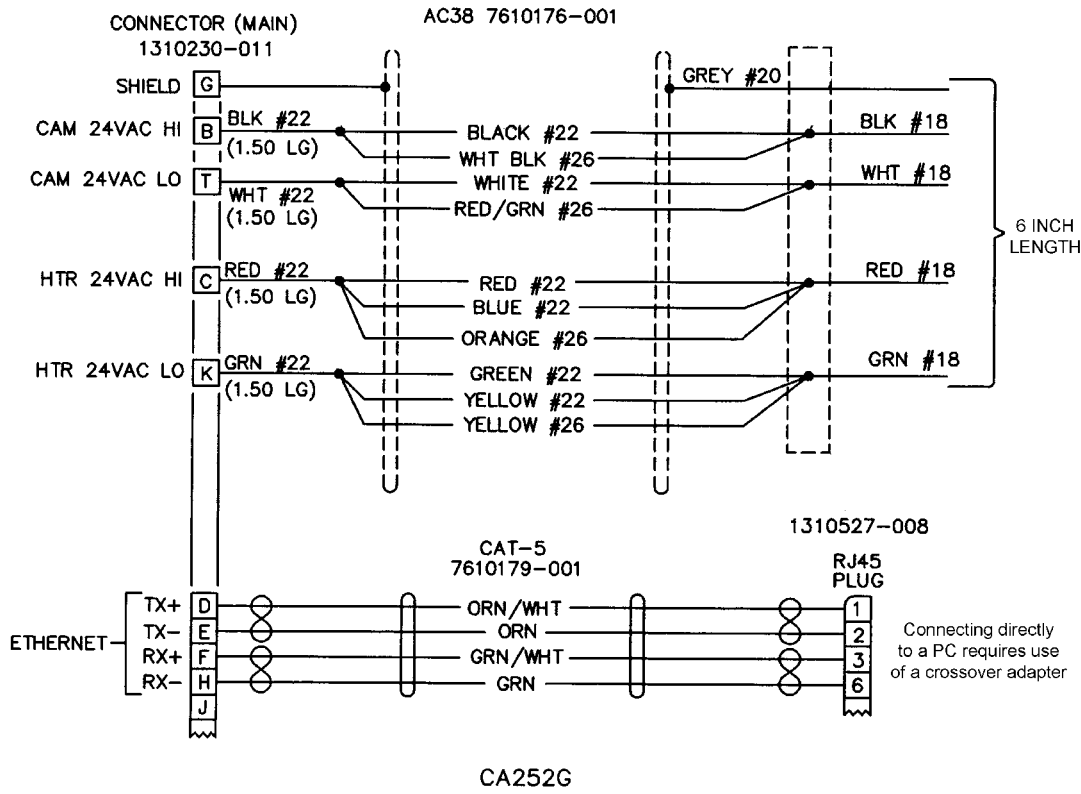
**Figure 8. Type CA-252A Cable (Stripped Power & Ethernet Leads)**

**CA252B**  
**115 V ac**



**Figure 9. Type CA-252B Cable (115 V ac Plug & RJ-45 Ethernet Plug)**

**CA252B**  
**24 V ac**



**Figure 10. Type CA-252G Cable, 24 V ac (Stripped Power Leads & RJ-45 Ethernet Plug)**

Figure 8 (CA-252A) shows a cable with stripped leads for on-site wiring of 115 V ac power and Ethernet as required.

Figure 9 (CA-252B) shows a cable providing a standard 115 V ac power plug and an Ethernet RJ-45 connector. When wired as shown, this RJ-45 connector should only be connected to a hub, switch, or router. Connecting it to a PC will require the use of a crossover adapter.

**2.4.2 24 V ac IP Video Cables**

Cable CA-252G (figure 10) is for use with the 24 V ac version of the iDome.

Camera operating power is provided on one pair of wires and heater power on a second pair. Cable length is limited to 80 feet due to the current draw of the heaters.

**2.4.3 Connector Sealing**

Even though the connector used with this camera is designed to maintain a weather tight seal with its mating system cable plug, it is recommended that for additional protection against moisture in severe conditions a sealing wrap be used on the connectors.

Coax Seal is the recommended product:

[www.coaxseal.com](http://www.coaxseal.com)

[sales@coaxseal.com](mailto:sales@coaxseal.com)

**United States: 1-800-241-8171**

**or international: 1-828-293-2222**

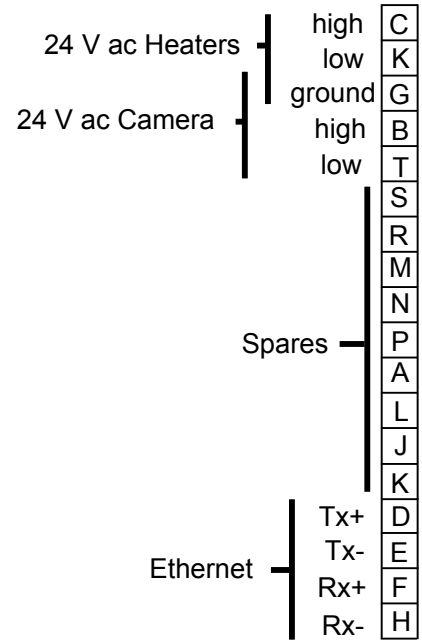
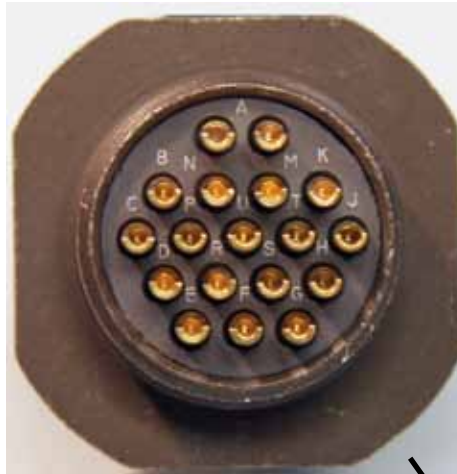
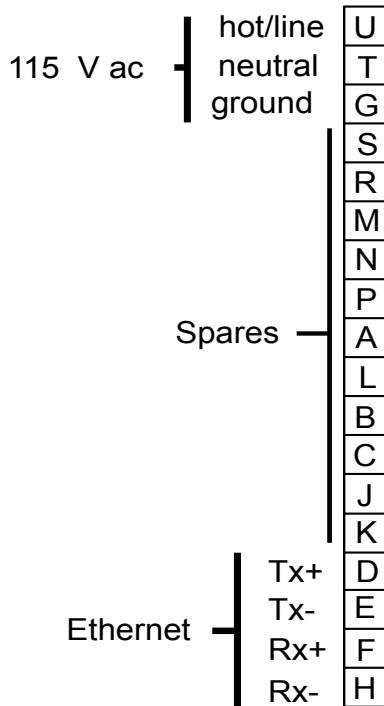
This product is available from a variety of commercial supply houses, consumer stores, and in the

**3940 IP i-Dome**

**INSTALLATION**

**MODEL 3945 (115 VAC)**

**MODEL 3944 (24 VAC)**



**Connector Kit (1310230-011)**

**Figure 11. Camera Cable Plug**

U.S. Government supply channels as GSA Schedule GS-07F-5739R

This product is a plastic tape-like material separated by a paper divider in its roll to prevent bonding to itself before use. After this material is wrapped around a connector, it forms a permanent weather-tight seal.

The cable and connectors should be clean and dry before wrapping with Coax-Seal.

Use a full wrap of this tape on the cable at the beginning. Then continue with a diagonal half over-

lap wrap up to the iDome housing. Then add a full wrap at the end of the coverage.

Squeeze together the wrapping so that it forms a tight bond both to itself and the mating connectors.

The web site for Coax-Seal has complete information about this product.

**2.4.4 IP Control and Viewing of Camera**

Installation and testing of the camera should be performed with the Cohu WinMPC.NET software. This is available at no cost from the Cohu website.

**Table 4. Cable CA-252 Cable Connectors**

CABLE	VOLT AC	MAIN CONNECTOR	IP VIDEO CONNECTION	POWER CONNECTION
CA-252A	115	Cohu Type 1310230-011 <i>Note 1 and Note 2</i>	stripped leads	stripped leads
CA-252B	115		RJ-45	115 V ac Plug
CA-252G	24		RJ-45	stripped leads

*Note 1. Equivalent types: MS3116F-14-18S and Amphenol/Bendix PT06E-14-18S(SR)*  
*Note 2. Main Connector mates with connector on top of iDome.*  
*Note 3. Maximum length of CA-252G is 80 feet. All others are maximum of 250 feet.*

**3.0 OPERATION**

All functions of this Dome are controlled by the viewer/GUI software.

Operating software for the camera can be developed using the Cohu Software Development Kit (SDK).

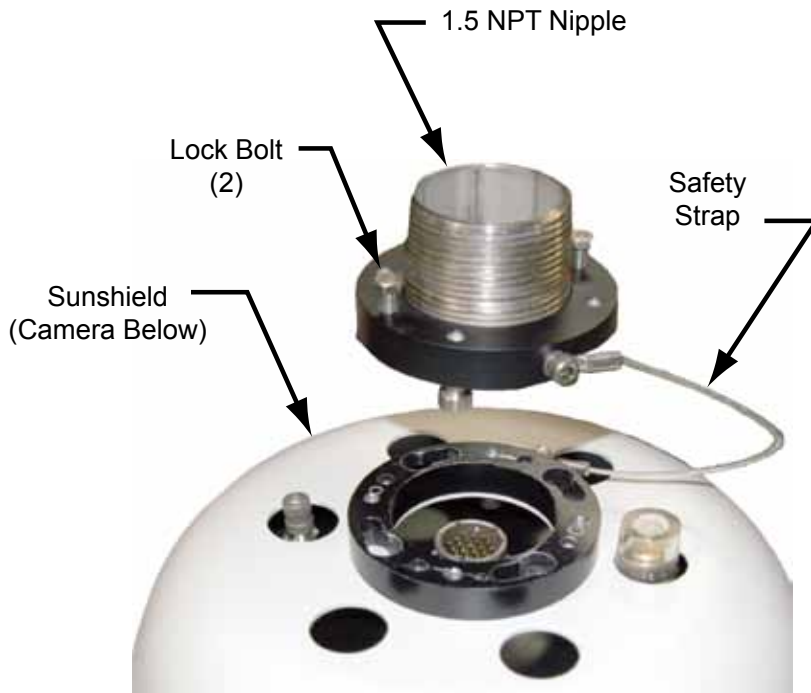
**4.0 MAINTENANCE**

This maintenance section consists of three parts: firm-ware uploading, troubleshooting, and preventive maintenance.

Figure 16 is a top view of the iDome showing various items related to maintenance operations.

The quick-disconnect assembly can be rotated 1/4 turn to separate the two halves.

Note that a safety strap connects the two halves so that the dome cannot accidentally fall. When installing the top (nipple) half of this assembly the safety strap is temporarily removed so that it can be threaded into the female threads of the supporting device. Always be sure to immediately reattach this strap after the dome half of the assembly is attached. Also snug down the two locking bolts that secures the two halves of the assembly from turning.



**Figure 12. Quick Disconnect Assembly**

**4.1 FIRMWARE UPGRADES**

Firmware upgrades to the iDome uses the Ethernet interface since this is the only method of exchanging data communications. See sections 1.2 through 1.2.4 for additional information about firmware downloads and the updating process.

**4.2 PREVENTIVE MAINTENANCE**

The iDome System contains no user serviceable components. If there is a problem with your system, it must be returned to Cohu for authorized servicing.

As well, there are some periodic maintenance routines that may be neces-

**Table 5. Cable Wiring to a Hub, Switch, or Router**

Ethernet Function	Camera Connector Ethernet Pins	Corresponding RJ-45 Ethernet Pins
Tx+	D	1
Tx-	E	2
Rx+	F	3
Rx-	H	6

*This Ethernet wiring is intended to connect directly to a hub, switch, or router. For connection directly to a PC it will be necessary to use either a crossover cable or a crossover adapter See table 6.*

**Table 6. Cable Wiring to a PC (Crossover Wiring)**

Ethernet Function	Camera Connector Ethernet Pins	Corresponding RJ-45 Ethernet Pins
Tx+	D	3
Tx-	E	6
Rx+	F	1
Rx-	H	2

*This Ethernet wiring is intended to connect an iDome to the NIC card in a PC..*

sary, in order to provide optimum operation and product performance. These procedures will generally only need to be performed on an as needed basis. However, it is recommended that a regular checkup (once every year or two) be performed to insure the following items are maintained.

**4.2.1 Acrylic Dome Window**

The iDome acrylic window may need to be cleaned of any grime that may accumulate over time, as would be expected of an outdoor device. If the picture quality of the iDome becomes affected by excessive grime on the acrylic window, clean with a mild, nonabrasive detergent and water with a soft cloth.

Do not use high pressure water on the camera seals.

**4.2.3 Dry Nitrogen Pressure**

The iDome is a sealed and pressurized device that over time, may need to be repressurized with dry nitrogen.

Low pressure can be suspected when the iDome low pressure message is displayed on the video signal (assuming the iDome alarm message is set to be enabled), and when internal moisture condensation is noticed on the interior of the iDome units acrylic window.

If either one of these conditions is present, Cohu offers a lifetime “pressurization” warranty (Refer to Cohu’s Warranty Statement).

You may elect to send the unit into Cohu for repressurization of the dry nitrogen or elect to do so yourself.

The iDome uses a standard Schrader valve to repressurize. Use only dry nitrogen for this purpose. Pressurize to 5 psig. A pressure relief valve releases pressure at 5 psig.

**4.2.3 Sunshield Vent Holes**

A visual check of the iDome units outer sunshield to insure the vent holes are not obstructed from allowing free air passage.

**5.0 SHIPPING AND HANDLING**

This section covers both receiving inspection and shipping the Camera back to the factory if necessary.

**5.1 UNPACKING AND RECEIVING INSPECTION**

This iDome was thoroughly tested and carefully packed in the factory. Upon acceptance by the carrier, they assume responsibility for its safe arrival.

Should you receive this item in a damaged condition, apparent or concealed, a claim for damage must be made to the carrier. To return an iDome or related product to the factory for service, please contact the Customer Service Department for a Return Authorization Number.“

**Table 7. 24 V ac iDome Connector Functions**

<b>PIN</b>	<b>FUNCTION</b>
A	no connection
B	24 V ac high (camera)
C	24 V ac high (heaters)
D	Ethernet Tx+
E	Ethernet Tx-
F	Ethernet Rx+
G	24 V ac Ground (camera & heaters)
H	Ethernet Rx-
J	no connection
K	24 V ac low (heaters)
L	no connection
M	no connection
N	no connection
P	no connection
R	no connection
S	no connection
T	24 V ac low (camera)
U	no connection
<i>The Ethernet connections on this iDome are intended to connect to a hub , switch. or router if it is to be connected directly to a PC a crossover cable or adapter will have to be used.</i>	

**Table 8. 115 V ac iDome Connector Functions**

<b>PIN</b>	<b>FUNCTION</b>
A	no connection
B	no connection
C	no connection
D	Ethernet Tx+
E	Ethernet Tx-
F	Ethernet Rx+
G	115 V ac Ground
H	Ethernet Rx-
J	no connection
K	no connection
L	no connection
M	no connection
N	no connection
P	no connection
R	no connection
S	no connection
T	115 V ac neutral (low)
U	115 V ac line (hot/high)
<i>The Ethernet connections on this iDome are intended to connect to a hub , switch. or router if it is to be connected directly to a PC a crossover cable or adapter will have to be used.</i>	

If a visual inspection shows damage upon receipt of this shipment, it must be noted on the freight bill or express receipt and the notation signed by the carrier’s agent. Failure to do this can result in the carrier refusing to honor the claim.

When the damage is not apparent until the unit is unpacked, a claim for concealed damage must be made. Make a mail or phone request to the carrier for inspection immediately upon discovery of the concealed damage. Keep all cartons and packing materials. Since shipping damage is the carrier’s responsibility, the carrier will furnish you with an inspection report and the necessary forms for filing the concealed-damage claim

**5.2 PREPARATION FOR SHIPMENT AND STORAGE**

For storage periods exceeding about one month, seal the unit in a vapor-proof bag containing a fresh desiccant pack.

Maintain the iDome storage environment within a range of -40 to 85 °C (-40 to 185 °F).

For shipment, package with enough foam padding or other packing material to prevent damage that can occur during shipping. The original shipping carton is a good container if it has not been damaged or subjected to excessive moisture.



Please contact the Customer Service Department for a Return Authorization (RA) number before sending any shipments to the factory:

Prominently display the RA number on the outside of the shipping container(s) and on paperwork contained inside. Give a brief description of why the equipment is being returned and list the symptoms of any problems being experienced with the equipment.

## **6.0 STATIC DISCHARGE PROTECTION**

Procedures in this manual do not require entry into the housing of the iDome. However in the event that an open unit were available, the following precautions should be followed:

### **CAUTION**

This iDome contains sensitive devices that can be damaged by static discharge. Use appropriate static control methods when working inside the iDome.

Components used in modern electronic equipment, especially solid state devices, are susceptible to damage from static discharge. The relative susceptibility to damage for semiconductors varies from low with TTL to high with CMOS. Most other semiconductors fall between TTL and CMOS in susceptibility to static discharge. As a minimum, therefore, observe the following practices when working inside this or any other electronic equipment:

1. Use conductive sheet stock on the work bench surface.
2. Connect the sheet stock to ground through an 1 megohm or greater value resistor.
3. Use a wrist strap connected to ground through an 1 megohm or greater value resistor when working at the bench.
4. Maintain relative humidity of the room above 30 percent. This may require a room humidifier. Working on circuits with relative

humidity below 30 percent requires extraordinary procedures not listed here.

5. Use antistatic bags to store and transport an exposes chassis, circuit boards, and components. Use new antistatic bags. Old, used bags lose their static protection properties.

This list serves as a reminder of the minimum acceptable practices. Be sure that all static discharge devices at the work bench are properly installed and maintained. Standard grounding mats and wrist straps purchased for use at work benches are supplied with leads having current limiting resistors for safety. Never substitute with a grounding lead not having the resistor.

## **7.0 MOUNTING METHODS**

This section provides a brief introduction to the various methods of mounting an iDome. The installation methods described in this manual are a general overview of typical installations. Since the particular conditions at various installation sites can vary widely, it is best if the actual installation is performed only by a professional installer familiar with all local codes and other requirements.

### **7.1 BASIC MOUNTING CONFIGURATIONS**

An iDome can typically be mounted in any one of three mechanical configurations (figure 4):

#### **7.1.1. Pendant Mount**

The basic configuration. The iDome hangs directly from a supplied 1.5-inch female NPT (national pipe thread) support. This support must provide for the connector of two multiconductor cables to pass down through the 1.5-inch pipe nipple for mating with the iDome. These two cables connect to a single plug for mating with the iDome connector.

#### **7.1.2. Wall Mount**

This mounting arrangement requires an arm that bolts to the wall. The iDome hangs from the end of this arm.

**7.1.3. Pole Mount**

This mounting arrangement is similar to the Wall Mount — except that the mounting arm attaches to a bracket fastened to a pole instead of directly bolting to a wall.

Table 1 summarizes the major items supplied for each of these three installation methods. Each of these installations will be expanded upon in a later sections.

**7.2 INSTALLATION CHECKLIST**

Before starting the installation of an iDome the following check lists should be read for an overview of the process.

**7.2.1 IP Dome Test Bench Checkout**

Checking out the Dome requires a PC running WinMPC.Net. This software can be used both to control the camera and to view its video.

Connecting a PC directly to an IP iDome requires an Ethernet crossover cable or adapter. When using one of the Cohu supplied cables that already has a RJ-45 plug, an adapter will have to be used so that another cable can make the connection to the PC. In this case, either a crossover adapter or a crossover cable can be used for the extension to the PC. But both should not be of the crossover type. See figure 7.

**7.2.2. Field Installation Procedure -**

Use the following outline to become familiar with the steps required to install an iDome at its field location:

1. Route the cable to the mounting location of the iDome.
2. Route the cable through any mounting arms or brackets.
3. Remove the safety strap from the iDome quick disconnect fastener
4. Thread the nipple portion of the quick disconnect into the mounting bracket or arm.

5. Route the cable down through this nipple and attach it to the iDome connector
6. Wrap the connector with self sealing waterproofing tape to ensure a long-term trouble free installation.
7. Attach the dome half of the quick disconnect to the half mounted to the arm or other bracket. (If a particular orientation is required be sure to mount it correctly positioned.)
8. Attach the safety strap back to the other half of the quick disconnect.
9. Connect the laptop to the iDome at the junction box or equipment cabinet.
10. Verify (or set) the address and check all operations.
11. Release the iDome for service.

**7.3 MOUNTING EQUIPMENT SUPPLIED**

Depending on the mounting configuration, several variations of equipment can be supplied. Refer to table 1 for a list of the basic differences between models as they relate to mounting arrangements. A mating connector is supplied with each camera.

**7.3.1 PEDD (Pendant Mount). See figure 12.**

Pendant mounting is the most basic of the three mounting arrangements. The top half of a quick-disconnect assembly is threaded into a site supplied 1.5-inch NPT mount.

**7.3.2 WALL (Wall Mount). See figure 14.**

With a wall mount the iDome hangs from the end of an arm which is attached to a wall. Figure 14 gives dimensions of the arm and adapter plate. This wall must not only have four mounting bolts but also a hole centered between these bolts through which the cable must pass. A weather-tight gasket should be used between the arm and wall.

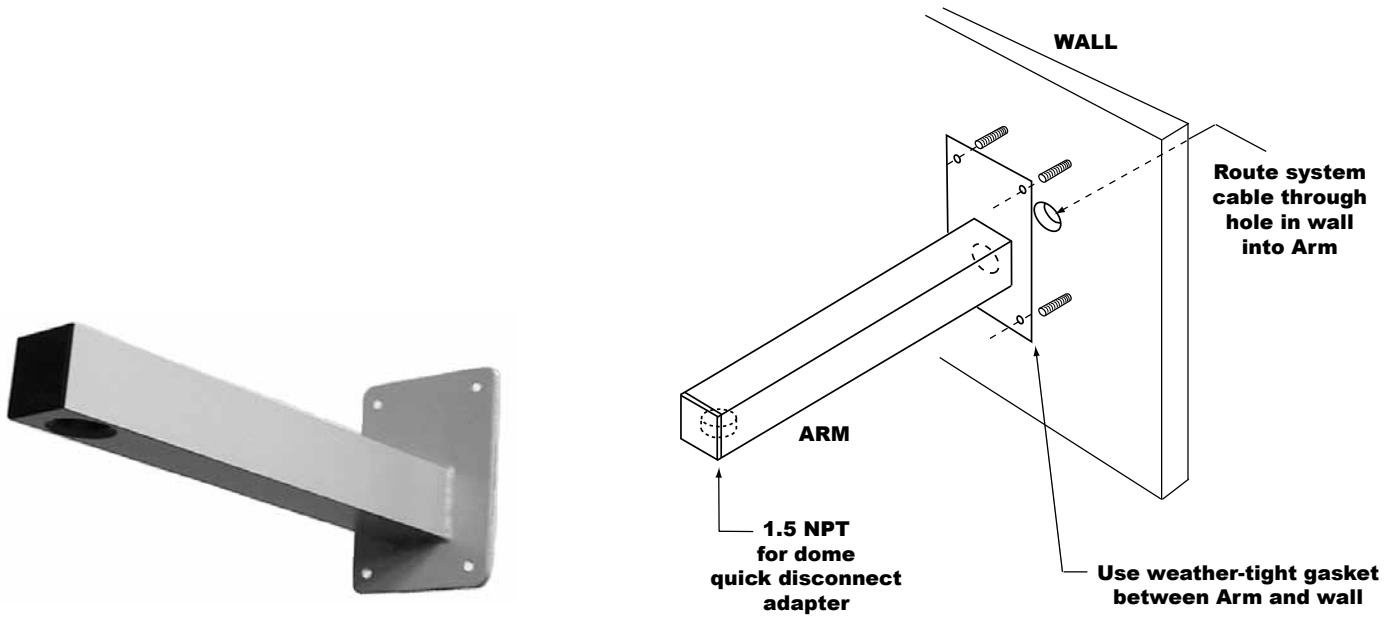


Figure 13. Wall Mount Arm

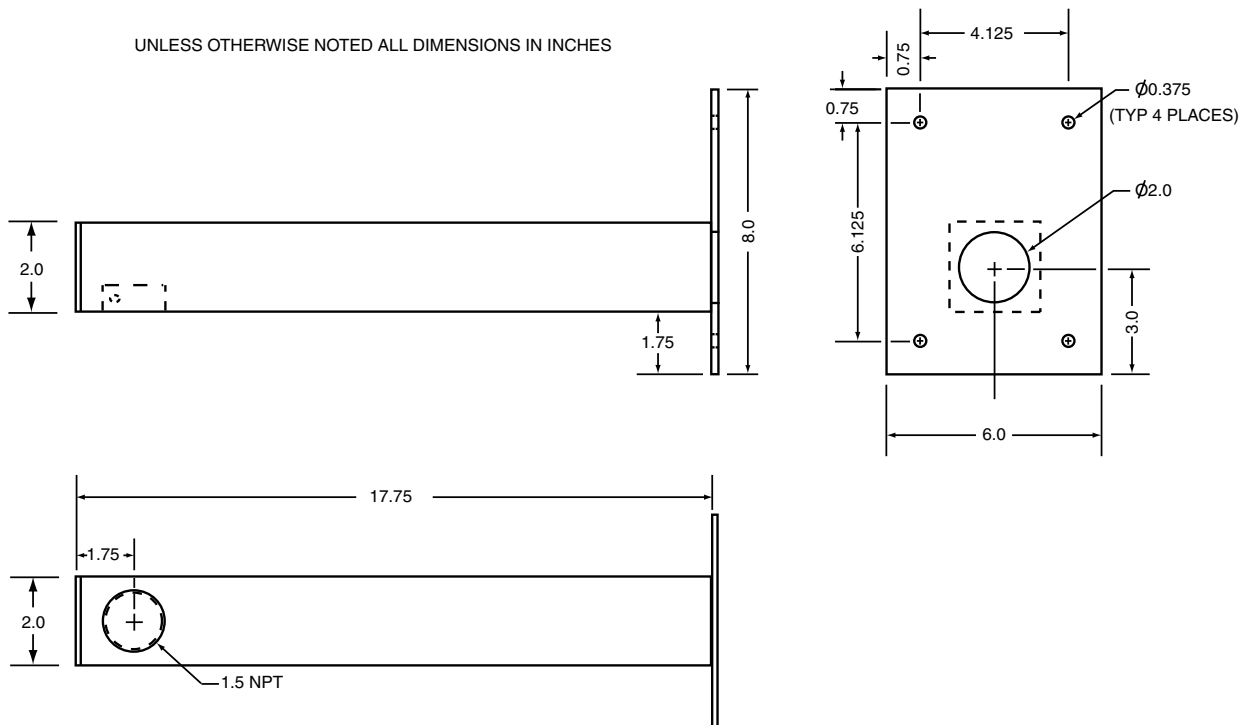


Figure 15. Arm Dimensions

**7.3.3 POLE (Pole Mount). See figure 15.**

Mounting to a pole is similar to mounting to a wall. For mounting to a pole, the four mounting bolts are provided by a bracket. This bracket is attached to the pole by stainless steel straps.

Cable routing when using a pole mount depends upon the situation encountered. It can either be directed down behind the pole bracket or, if arrangements have been made for this, into the pole. Junction boxes, drip loops, and weather proof integrity of the connectors must be considered before starting the installation.

**7.4 PENDENT MOUNT INSTALLATION**

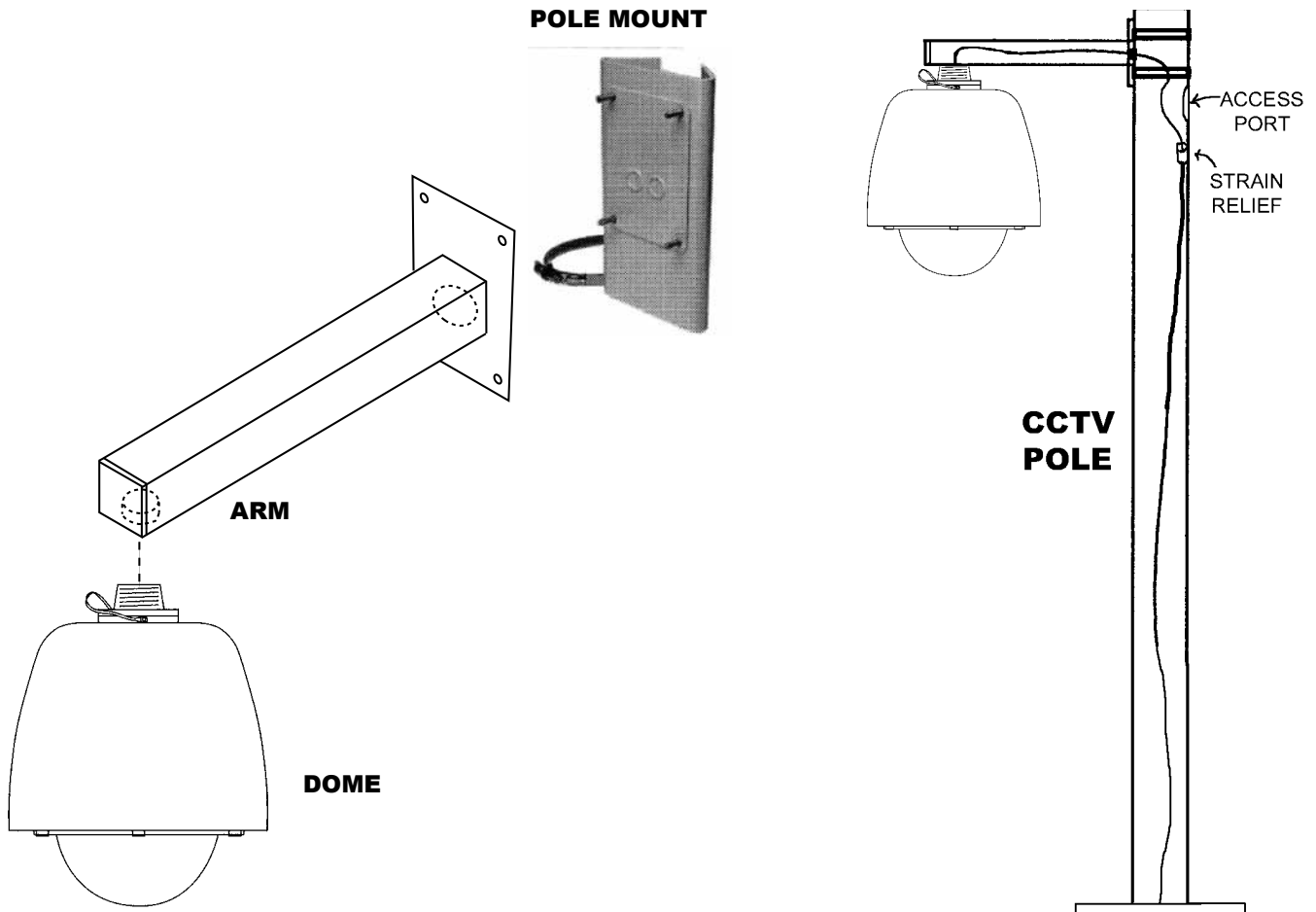
An iDome in the pendent configuration is its most basic form. No mounting arms or adapters

are provided. The 1.5 inch NPT pipe thread on top the dome (figure 12) is attached to an appropriate mount supplied by the installer. Provisions must be made for the cable to pass through this mount down through the quick disconnect mount (figure 17) and onto the connector on top the iDome.

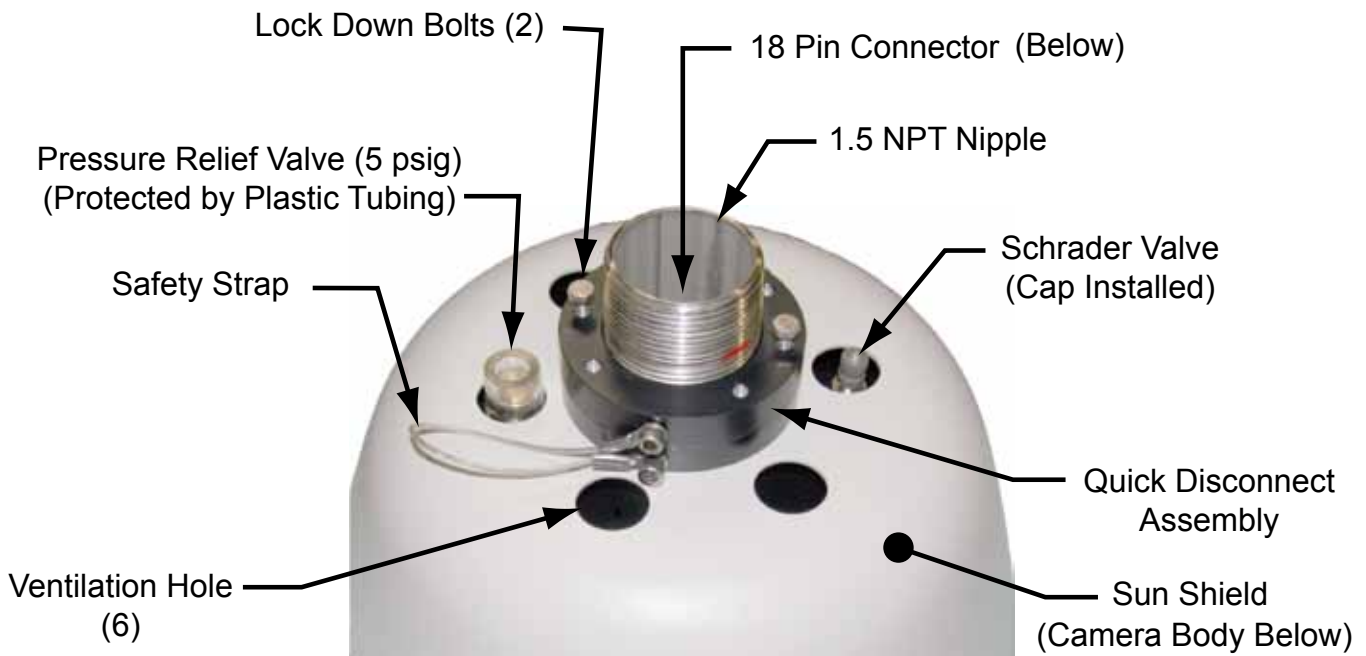
**7.5 WALL MOUNT INSTALLATION**

With a wall-mount installation, a support arm bolts to a wall and the iDome then hangs from the end of that arm.

1. Remove the safety strap from the top half of the quick disconnect (the half with the threaded nipple attached).



**Figure 15. Typical Pole Mount**



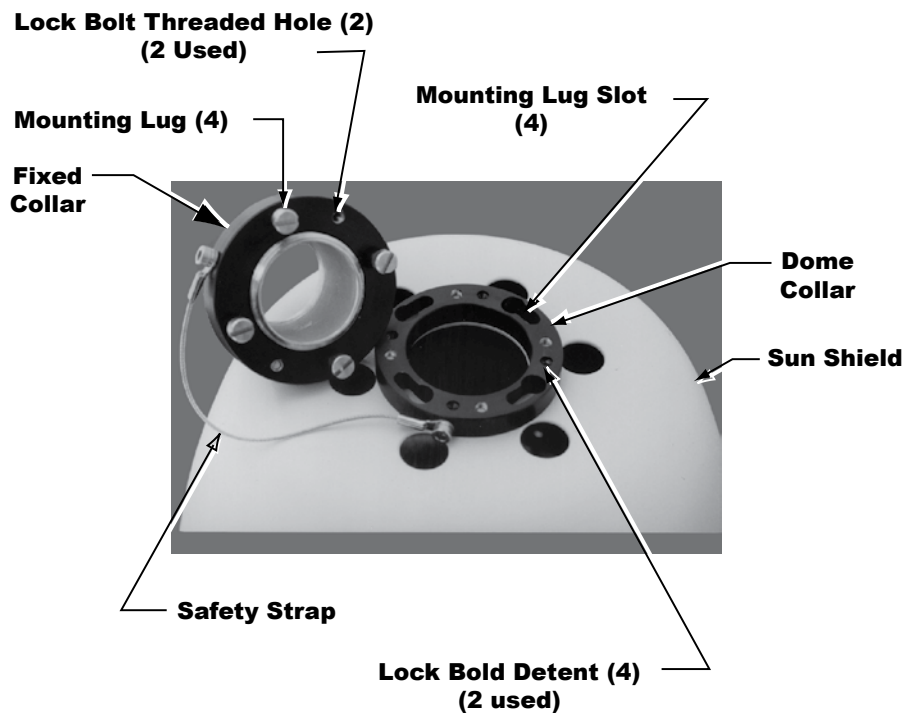
**Figure 16. iDome Maintenance Features**

2. Thread the quick disconnect nipple into the mounting arm and tighten with a strap wrench (figure 18).
3. Verify that the system cable is accessible for connection to the iDome connector at the end of the arm. This cable typically must pass through the wall and into the arm.
4. Route the system cable out of the wall and into the back of the wall mount arm. Continue the cable through the arm and out the hole at the iDome mounting location.
5. Install a weather tight gasket between the arm and the surface of the wall.
6. Bolt the Arm to the wall.
7. Attach the cable plug to the iDome connector.
8. Orient the iDome properly and attach it to the other half of the quick disconnect mounted to the arm.
9. Reattach the safety strap.
10. Snug down the two locking bolts
11. Verify that all operating modes work and that video is obtained from the camera. Then release the camera for use.

## 7.6 POLE MOUNT INSTALLATION

A pole mount installation is similar to the wall mount installation except that the arm fastens to a bracket (figure 19) attached to the pole instead of directly to a wall.

1. Remove the safety strap from the top half of the quick disconnect (the half with the threaded nipple attached).
2. Thread the quick disconnect nipple into the mounting arm and tighten with a strap wrench (figure 18).
3. Verify that the system cable is accessible for connection to the iDome connector at the end of the arm. This cable typically



**NOTE:**

**Dome can be mounted to fixed collar at any of four positions - in 90° increments**

**Position the Dome between 90° increments by rotating the Fixed Collar ±45° with a strap wrench**

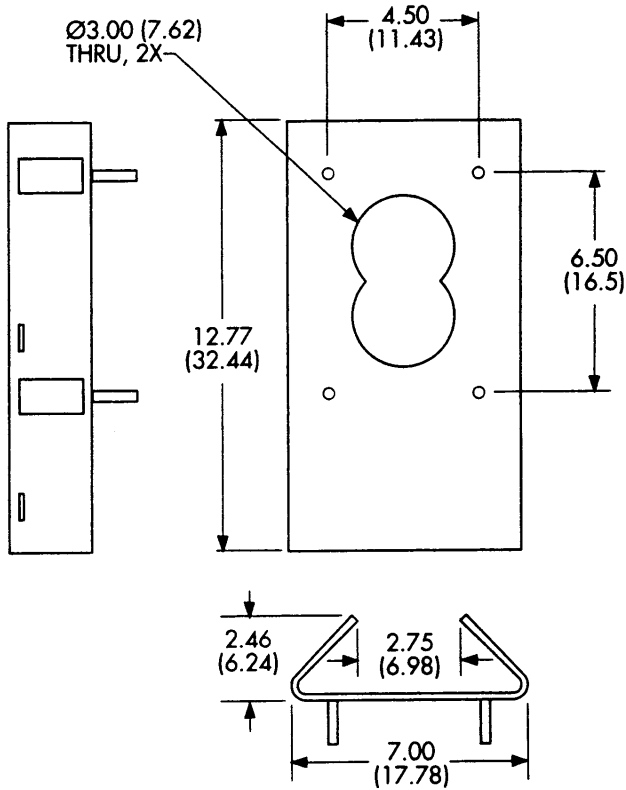
**Figure 17. iDome Quick Disconnect Mounting**

must pass into the back of the pole mount and then into the arm — although various other cable routing configurations are possible.

4. Route the system cable through the mounting and out the hole at the iDome quick disconnect.
5. Provide for weather tight mounting at the pole mount bracket.
6. Bolt the Arm to the bracket.
7. Attach the cable plug to the iDome connector.
9. Orient the iDome properly and attach it to the other half of the quick disconnect mounted to the arm.



**Figure 18. Strap Wrench**



DIMENSIONS IN INCHES (CM)

**Figure 19. Pole Mount Dimensions**

10. Reattach the safety strap.
11. Snug down the two locking bolts)
12. Verify that all operating modes work and that video is obtained from the camera. Then release it for use

**7.7 ALTERNATE MOUNTING METHODS**

Other mounting configurations are possible.



**Figure 20. Mast Arm Mount**

For example, figure 20 shows a mount suitable for attaching to an arm suspended over a roadway or other location. This mount straps to the arm and is threaded for 1.5 inch NPT mounting. Installing some of these alternate mounts may requires the use of special tensioning tools.

-end text-

**Table 9. Specifications**

<b>SYSTEM SPECIFICATIONS</b>	
PAN/TILT DRIVE	
Angular Travel	360° continuous pan range -90° to +5° tilt range
Pan Speed (preset)	250°/second
Pan Speed (manual)	0.1° to >80°/sec
Tilt Speed (preset)	80°/sec
Tilt Speed (manual)	0.1° to >40°/sec
Preset Accuracy	>0.1°
Presets	64 preset positions (pan, tilt, zoom, focus coordinates, & 24 character ID label)
Video Tours	8 tours, each consisting of 32 presets with dwell time per pre-set per tour
Sector Zones	Up to 16 programmable zones in the horizontal plane
Privacy Zones	8 zones can be set by drawing polygons on the scene
Compass Direction	8 or 16 direction points (i.e., north, NE, east, SE, south, SW, west, & NW) can be displayed. Function can be on/off, 3 sec, or permanent.
Absolute Position	Displayed in 0 to 359° azimuth & +14° to -95° elevation. Function can be on/off, 3 sec, or permanent.
Cloning	Positioner settings (presets, title, etc) can be saved to a file for easy duplication
TITLE GENERATION	
Camera ID	2 lines of 24 characters
Preset ID	1 line of 24 characters
Sector Zone	1 line of 24 characters per zone
Privacy Zone	1 line of 24 characters per zone
Alarm Label	2 lines of 24 characters
Compass/Position	1 line. Includes compass direction and absolute position

<b>CAMERA SPECIFICATIONS</b>	
Imager	1/4 inch interline transfer color CCD
Resolution 35X lens & EIS:	520 horizontal tv lines
Pixels 35X lens & EIS:	768 X 494
Progressive Scan 35X lens & EIS	Yes
Lens Zoom 35X lens & EIS	3.4 to 119 mm, f1.4 (w) f4.2(t)
Lens Hor. Angle of View 35X lens & EIS	55.8° (w) 1.7° (t)
Iris/Focus/Shutter Operation	Auto/Manual
Wide Dynamic Range 35X lens & EIS	On/off
EIS at 5 Hz Suppression 35X lens & EIS	20 dB suppression 7 to 17 Hz
EIS at 16Hz Suppression 35X lens & EIS	20 dB suppression 3 to 13 Hz
Digital Zoom	Auto/manual (12X)
White Balance	Auto/manual
Sync	Crystal / phase adjust line lock
S/N	>50 dB
Sensitivity (scene) 35X lens & EIS	1 lux at 1/60 sec (color day) 0.1 lux at 1/4 sec (color day) 0.01 lux at 1/4 sec (mono night)



**Table 9. Specifications (continued)**

<b>VIDEO SPECIFICATIONS</b>	
VLIW/DSP	TI TMS320DM642-600
Video Encoding	MPEG4 ISO/IEC 14496-2 ASP; RTP/UDP stack
Resolution	720 X 480 (D1) 640 x 480 (VGA) 640 X 240 (2 CIF) 320 X 240 (1 CIF)
Frame Rates	30, 15, 8, 4, 2, 1
Bit Rates	64 k to 3 MB
Data Encoding	RTSP/TCP/IP stack
Network	100Base T fast Ethernet connection
Logo Insertion	Supports bmp image insertion for logo
Privacy / Masking Zones	Supports 64 polygon mask areas (0.8° per side, with 0.1° resolution). Each polygon mask can be turned on/off at a user defined zoom position. All video below & above user-defined tilt angle can be masked. Masking areas adjust in size relative to zoom level.

<b>COMMUNICATIONS SPECIFICATIONS</b>	
Data Format	IEEE 802.3U
PTZ Latency	<200 ms (typical)
Protocol	Cohu
Firmware	Stored in flash memory, uploaded via Ethernet port

<b>MECHANICAL SPECIFICATIONS</b>	
Weight	14 lb
Dimensions	See figure 3
Connector	18 pin MS type

<b>ENVIRONMENTAL SPECIFICATIONS</b>	
Protection Rating	IP67 & NEMA 4X; sealed & pressurized to 5 psi with dry nitrogen
Ambient Temp. Limits Operating: Storage:	-34 to 50 °C (-27 to 122 °F) -40 to 85 °C (-40 to 185 °F)
Humidity	Up to 100 percent relative humidity
Vibration	Conforms to NEMA TS2, paragraph 2.1.9
Shock	Conforms to NEMA TS2 paragraph 2.1.10
Altitude	Sea level to equivalent of 3,000 meters / 10, 000 feet (508 mm/20 inches of mercury)
Air Contaminants	Withstands exposure to sand, dust, fungus, & salt atmosphere, per MIL-STD-5400T, paragraph 3.2.24.7, 3.2.24.8, & 3.2.24.9
Acoustics	Can withstand environments greater than 150 dB continuously for 30 minutes
EMI	FCC rules, part 15, subpart J, for class A devices

<b>POWERS SPECIFICATIONS</b>	
Power Input	120 V ac (89 V ac to 135 V ac), 60 Hz or 24 V ac (17.8 - 27 V ac), 60 Hz
Power Consumption	Basic power consumption is 37 W. P/T stepper motors add 23. Heaters add 54 W. Total maximum draw is 114 W with heaters on and pan/tilt both operating.
Power Interruption	Conforms to NEMA TS2 paragraph 2.1.4
Power Transients/ Interruptions	Conforms to NEMA TS2 paragraph 2.1.6

**8.0 Warranty**

Please refer to the Cohu website for product warranty information:

<http://www.cohu-cameras.com/warranty/WarrantyStatement.pdf>.

<b>Revision History</b>		
<b>Revision</b>	<b>Date</b>	<b>Comments</b>
Rev D	06/28/12	<ul style="list-style-type: none"><li>the manual is revised to replace contact information with a link to the web page.</li></ul>