

**Performance and  
Reliability!**

# HIGH PERFORMANCE MONOCHROME ENVIRONMENTAL CCD CAMERAS

## 4940 SERIES

**High Resolution  
1/2" On-Chip Microlens Sensor**

The 4940 Series high performance monochrome environmental CCD cameras from Cohu combine advanced video technology and rugged reliability for peak performance in harsh-environment security/surveillance applications.

The 4940 Series cameras feature a high-sensitivity on-chip microlens interline transfer imager, which reduces dark current, lag, and blooming while improving dynamic range and spectral characteristics. For video applications prone to streaking problems, a 1000:1 overload capability allows transmission of clear video signals even when bright incidental light is present in the scene.

The 4940 Series high performance monochrome CCD Cameras' 4.5" sealed and pressurized environmental housing provides maximum protection against rain, snow, dust, humidity, chemical pollutants, extreme temperatures, and other hazards.

Optional features include a fiber optic transmitter and a programmable source ID generator. An internal heater for low temperature operation is standard on all 115V models.

The 4940 Series is backed by a full two-year warranty. Cohu welcomes requests for special products and complete CCTV systems.



*Cohu 4940 Series High Performance Monochrome Environmental CCD Camera.*

### APPLICATIONS

- **ITS/Traffic Management**
- **Mass Transit Systems**
- **Security/Surveillance**
- **Military Installations**
- **Airports**
- **Industrial Process Monitoring**
- **Nuclear Power Plants**
- **Hazardous Waste Management**
- **Radar Tracking Systems**

### FEATURES AND BENEFITS

- **Sealed, Pressurized Environmental Housing** protects against harsh environmental conditions
- **On-Chip Microlens Interline Transfer Imager** improves sensitivity, virtually eliminates overload streaking, and improves dynamic range
- **High Resolution** — for better definition, error-free results
- **High Sensitivity** permits operation over a broad range of light levels
- **Choice of Synchronization Options** for greater versatility
- **High Signal-to-Noise Ratio** for clear, noise-free video
- **Optional Fiber Optic Transmitter and Source I.D. Generator**
- **Made in U.S.A.** — direct factory support
- **Two-Year Warranty**
- **Internal Heater** for low temperature operation
- **1000:1 Overload Capability** permits incidental light overloads up to ten times that of other CCD cameras
- **No Lag or Image Retention** — provides fast, clean, precise images
- **Zero Geometric Distortion** for consistent corner-to-corner linearity
- **26 dB AGC** for increased sensitivity at low light levels
- **Optional IR Filter**
- **"C" or "CS" Lens Mount** expands your choice of lenses
- **State-of-the-Art Design and Construction**

# 4940 HIGH PERFORMANCE MONOCHROME CCD CAMERA

## ELECTRICAL

### Image Area

6.4 x 4.8 mm (corresponding to 1/2" image tube)

### Active Picture Elements

RS-170: 768 H x 494 V  
CCIR: 752 H x 582 V

### Imager Type

On-chip microlens sensor interline transfer CCD

### Cell Size

RS-170: 8.4 x 9.8 microns  
CCIR: 8.6 x 8.3 microns

### Resolution

RS-170: 580 horizontal TVL, 350 vertical TVL  
CCIR: 560 horizontal TVL, 450 vertical TVL

### Sensitivity (faceplate) @ 2850 K

Please see Table 1

### Electronic Shutter\*

Eight steps from 1/50 or 1/60 to 1/10,000 second (1/50 or 1/60, 1/125, 1/250, 1/500, 1/1,000, 1/2,000, 1/4,000, 1/10,000 second)

### Video Output

1.0 V p-p @ 75 ohms, unbalanced

### Gamma

Variable 0.45 to 1.0

### AGC\*

26 dB, variable gain

### Signal-to-Noise Ratio

≥56 dB at gamma 1, gain 0 dB  
38 dB at gamma 1, AGC On

### Auto Lens

Separate lens video ration tracks AGC peak/average adjustment to eliminate AGC/auto lens interaction  
Power: +15V, 100 mA maximum

### Synchronization

Genlock, revert to variable phase adjustable line lock with zero crossing detector  
Genlock, revert to crystal  
Crystal Lock  
Internal Clock Speeds  
RS-170: 28.6363 MHz  
CCIR: 28.375 MHz

### Power Requirements

12V ac, 50/60 Hz  
24V ac, 50/60 Hz  
115V ac, 50/60 Hz  
230V ac, 50/60 Hz

### Power Consumption (by module)

4.2 watts camera  
40 watts heater  
1.5 watts lens

This model has been tested and found to comply within the FCC limits for Class "B".

\*Please see "Standard Features" box on back cover

## MECHANICAL

### Dimensions

Please see Figure 1.

### Weight (less lens)

10.8 pounds (4.9 kg)

### Lens Mount

"CS" mount, 16mm format  
"C" mount with adapter (furnished)

### Housing Mount

1/4 - 20 threaded holes

### Connectors

Please see Figure 1.

## ENVIRONMENTAL

### Ambient Temperature Limits

Operating: -20 to 60°C (-4 to 140°F)  
-40 to 60°C (-40 to 140°F) with heater  
Storage: -30 to 70°C (-22 to 157°F)

### Humidity

Up to 100% relative humidity

### Vibration (less lens)

Sine vibration from 5 to 60 Hz, with 0.082 inches total excursion (15 g's @ 60 Hz).  
Random vibration from 60 to 1,000 Hz, 5 g's rms (0.027g<sup>2</sup>/Hz without damage).

### Shock (less lens)

Up to 15 g's, 11ms, in any axis under nonoperating conditions, MIL-E 5400T, paragraph 3.2.24.6

### Altitude

Sea level to equivalent of 3,000m/10,000 feet (508mm/20 inches of mercury)

### Air Contaminants

Withstands exposure to sand, dust, fungus, and salt atmosphere, per MIL-E-5400T, paragraph 3.2.24.7, 3.2.24.8, and 3.2.24.9

### Explosion

MIL-E-5400T, paragraph 3.2.24.10

### Acoustic Noise

Can withstand environments greater than 150 dB continuously for 30 minutes

### EMI

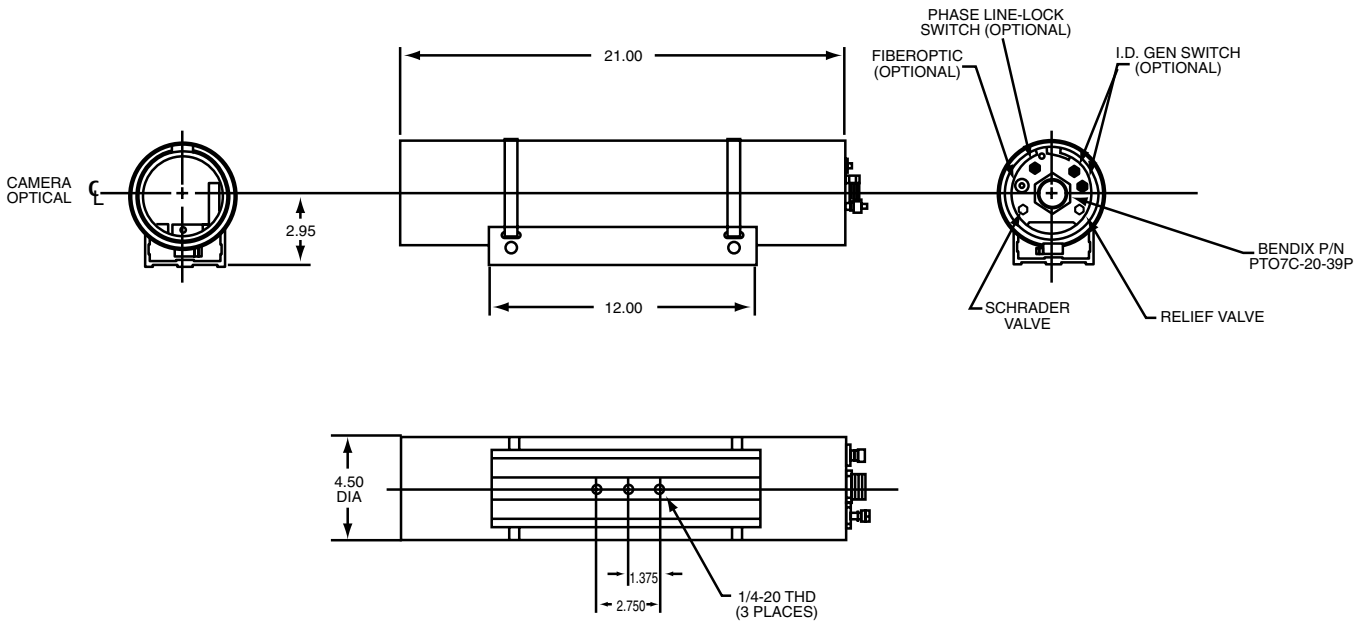
FCC rules, Part 15, Subpart J, for Class A devices

## SENSITIVITY

	Full Spectrum	With IR Filter
Full Video, No AGC	0.065 fc (0.65 lux)	0.25 fc (2.5 lux)
80% Video, AGC On	0.002 fc (0.02 lux)	0.01 fc (0.1 lux)
30% Video, AGC On	0.0004 fc (0.004 lux)	0.0015 fc (0.015 lux)

Table 1

## 4940 SERIES DIMENSIONS



NOTE: DIMENSIONS IN INCHES (MM)

Figure 1

### CONNECTOR CONFIGURATIONS

Pin	Function
A	12/24V ac in
B	Reserved for Position Reference Return
C	75 $\Omega$ Sync Termination
D	Reserved for Focus Position
J	Video Ground
K	Video Out
L	Ground (Overall Cable Shield)
M	External Sync In
N	Ground (Sync Coax Shield)
P	Ground (Lens Conductors Shield)
R	Zoom In
S	Focus In
T	Iris In
U	Ground (Zoom, Focus, Iris Common)
V	115V ac Camera Power, 60 Hz, Low
W	115V ac Camera Power, High
X	AC Ground
Y	Reserved for Zoom Position
Z	Ground
b	Reserved for Position Reference
c	Auto/Manual Iris Select
d	12/24V ac In
e	RXD (Programmable ID Generator)
f	Ground
h	TXD (Programmable ID Generator)
i	TXD (Programmable ID Generator)
k	Ground (Programmable ID Generator)
m	Heater Power, 115V ac Low
n	RXD (Programmable ID Generator)
r	Heater Power, 115V ac High

### PROGRAMMABLE SOURCE ID GENERATOR

The optional Programmable Source ID Generator is a built-in electronic circuit which allows written messages to be superimposed over images displayed on CCTV monitors. Using a computer and RS-422 serial communication, a user types messages that will then appear on the monitor. Text is made up of block letters 28 horizontal TV lines in height. The letters are white with a black outline for maximum legibility. There are two modes of operation, as follows:

1. ID Mode: Up to two lines of text (24 characters per line, including spaces) can be stored in non-volatile memory. Text can be placed at the top or bottom of the monitor screen, and can be updated from a computer or a dumb terminal, making this a real-time updatable programmable ID generator. Stored text, which typically provides information such as the location of individual cameras in multi-camera systems, will be continuously displayed until it is updated.

2. Menu Mode: In this mode, up to 12 lines of 24 characters can be entered into volatile memory without affecting data stored in the ID Mode. A computer is required to enter data in this mode.

Special cables or connectors are available for programming the Programmable Source ID Generator. Please consult factory for details.

# 4940 SERIES HIGH PERFORMANCE MONOCHROME CCD CAMERA

## ORDERING INFORMATION

**494X — X X X X / XXXX**

### Power Options\*

- 2 12V ac, 50/60 Hz
- 3 230V ac, 50/60 Hz\*\*
- 4 24V ac, 50/60 Hz
- 5 115V ac, 50/60 Hz

\*Heater for low temperature operation is standard on 115V models. Heater on 12V and 24V models is a special order feature. Please consult factory.

\*\*Please consult factory for availability.

### Sync Options & Video Format

- 2 RS-170 Genlock (revert to crystal)
- 3 RS-170 Genlock (revert to phase adjustable line lock)
- 5 CCIR Genlock (revert to crystal)
- 6 CCIR Genlock (revert to phase adjustable line lock)

### Option Filters

- 0 None
- 1 IR Filter (Non-removable)

### Camera Options

- 0 Standard TV Rate (Field Integration Mode)

### Module Options

- 0 None
- 1 Fiber Optic Transmitter
- 2 Programmable I.D. Generator
- 3 Programmable I.D. Generator and Fiber Optic Transmitter (See notes on page 3.)

### Lens Options

- Auto Iris, CS Mount**
- EH04 3.7mm, f/1.6, 1/2"
  - EH06 6mm, f/1.4, 1/2"
  - EH13 12mm, f/1.4, 1/2"

- Auto Iris, C Mount**
- ES04 4.2mm, f/1.8, 1/2"
  - ES05 4.8mm, f/1.8, 2/3"
  - ES07 8mm, f/1.4, 2/3"
  - ES08 8mm, f/1.4, 2/3"
  - ES12 12.5mm, f/1.4, 2/3"
  - ES13 12mm, f/1.2, 1/2"
  - ES16 16mm, f/1.4, 2/3"
  - ES25 25mm, f/1.4, 1"
  - EH35 35mm, f/1.4, 2/3"
  - ES50 50mm, f/1.4, 1"
  - EH75 75mm, f/1.8, 1"

### Zoom Lenses

- Z06R 6:1, f/1.0, 1/2"
- \*P06R 6:1, f/1.0, 1/2"
- Z10S 10:1, f/1.2, 1/2"
- \*P10S 10:1, f/1.2, 1/2"

\*Note: These lenses include follower pots.

Please consult factory for other lens selections.

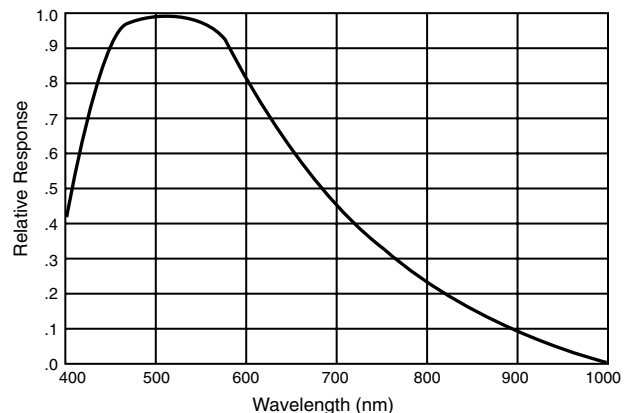
COHU RESERVES THE RIGHT TO CHANGE SPECIFICATIONS WITHOUT NOTICE.

## NOTES ON STANDARD FEATURES

**Electronic Shutter:** Internal switches select shutter speeds or the number of integration fields, and enable or disable the external ON/OFF control of the internally-selected shutter or integration mode. These switches are set at the factory prior to sealing and pressurizing the environmental housing. The standard factory settings disable the external ON/OFF control and provide 1/60 second shutter speed. The switches can be set differently at the factory to customer specifications, or in the field by removing the camera from the housing.

**AGC Peak/Average** adjustment is made via an internal control, which is set at 0.45 at the factory prior to sealing and pressurizing the environmental enclosure. Customer may specify different setting.

## SPECTRAL RESPONSE



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