

User's Manual



DAGE-MTI

CCD-100

Camera System

Purchaser's Record

Model Name: *DAGE-MTI CCD-100*

Serial Number:

Dealer's Name:

Dealer's Address:

Dealer's Phone Number:

Date Purchased:

P.O. Number:

Introduction

The **CCD-100** camera system is a fiscally responsible approach to any imaging situation. The camera automatically adjusts to any light situation to provide clear, crisp images for even the most demanding application. In those times when control is a necessity, the camera's automatics can be switched off, allowing control of those parameters that are important to you. Camera adjustments can also be remote controlled using the optional **RC100** remote. (P/N 207672-01).

The **CCD-100** uses the latest in circuitry and design to provide images that will dazzle in even the toughest light situations. The camera's automatic controls provide exceptional performance from high light levels to the dimmest environments. And if additional sensitivity is needed, no problem. Just attach the **CCD-100** to the Dage *InvestiGater* and extend the camera's exposure time to whatever is required. The combination of the **CCD-100** and *InvestiGater* allow a low cost alternative to those expensive cameras and frame grabbers that deliver only a fraction of the capability at a great premium. And with our Dage-MTI series of products, you won't be spending a lot of time setting up your system. That leaves time for what you purchased the camera for in the first place; to get the images needed to perform your job.

***DAGE-MTI** offers our customers state-of-the-art video technology... with an eye on your image.*

Installation

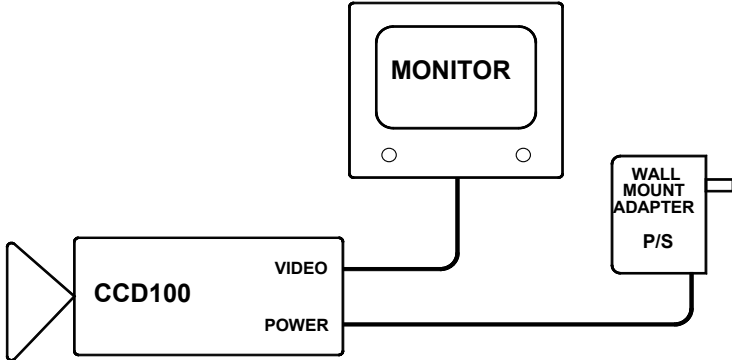


Figure 1: CCD-100 Standalone Configuration

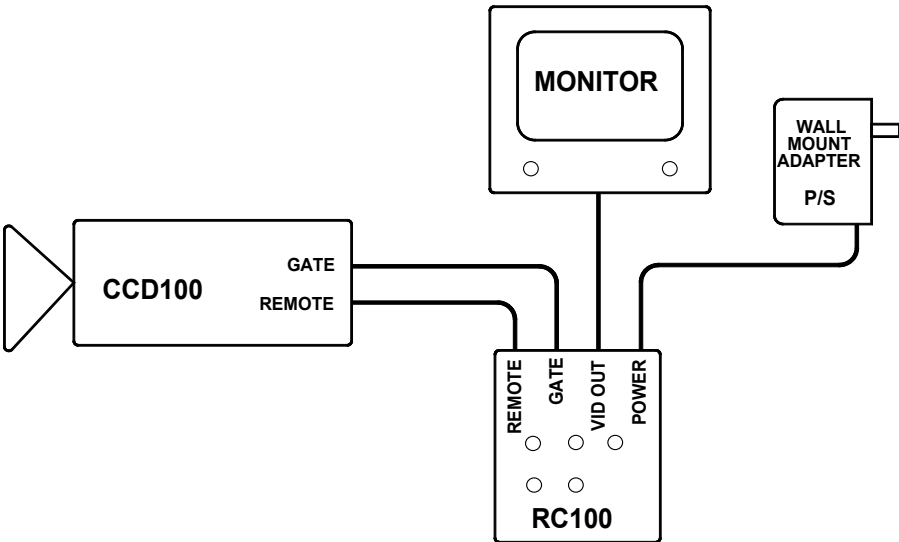


Figure 2: CCD-100/RC-100 Configuration

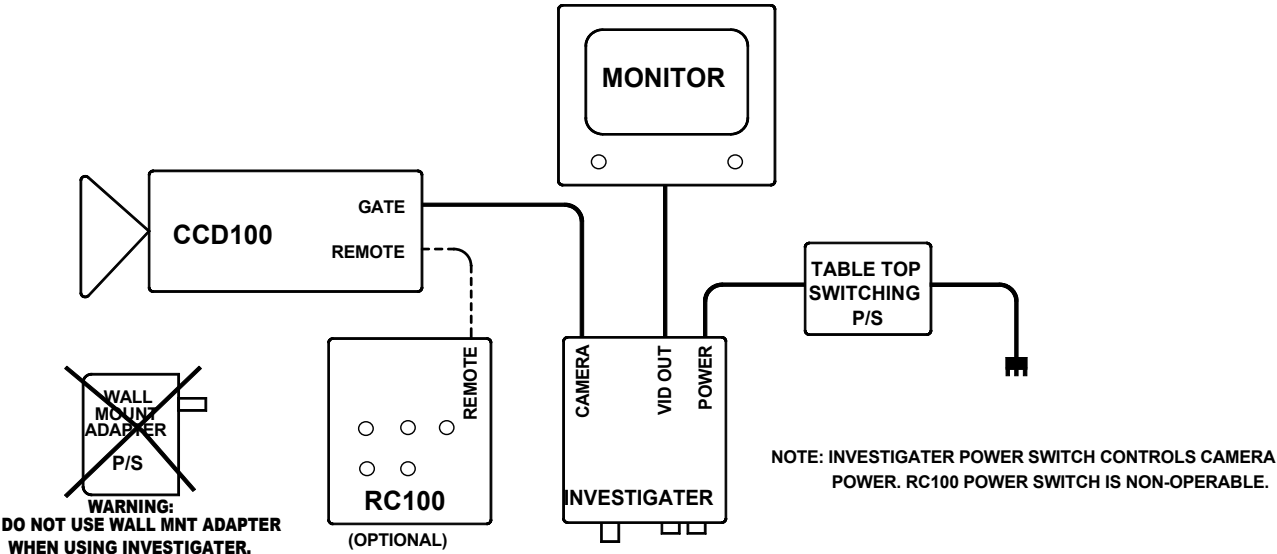


Figure 3: CCD-100/Investigator Configuration

The **CCD-100** can function in tandem with the Dage *InvestiGater* or independently. Figure 1 shows the **CCD-100** independently. Attach the power supply to the **POWER** connector on the **CCD-100**. Video output from the **VIDEO** BNC is available for viewing with a monitor.

Figure 2 shows the **CCD-100** with the optional **RC-100** remote control. The **POWER** and **VIDEO** interconnects are now made at the **RC-100** and two cables, **REMOTE** and **GATE**, connect the **RC-100** to the **CCD-100**.

Figure 3 shows the **CCD-100** connected with the Dage *InvestiGater*. A standard S-video cable, Dage P/N 737980-01, provides video and the gate pulse between the *InvestiGater* and the **CCD-100**. The *InvestiGater's* power supply provides power for both the **CCD-100L** and the *InvestiGater*, therefore do not use the **CCD-100's** power supply. The output video of the Dage *InvestiGater* is available for viewing with a monitor or for digitization by a computer.

A lens or microscope can be attached to the front of the **CCD-100**. The camera is supplied with a removable C-mount adapter. If a CS lens is to be used, the C-mount adapter should be removed. Be sure not to remove the C-mount adapter when unscrewing a lens or microscope from the camera. The camera has an adjustable back focus that can be changed through the use of a flat bladed screwdriver. The adjustment is located on the top of the camera at the front. Simply use the screwdriver to provide the correct back focus.

To achieve a picture, place the camera in the **AUTO BLACK** and **AUTO GAIN** positions. This will ensure that the camera will be able to provide an acceptable image regardless of light level.

Operation

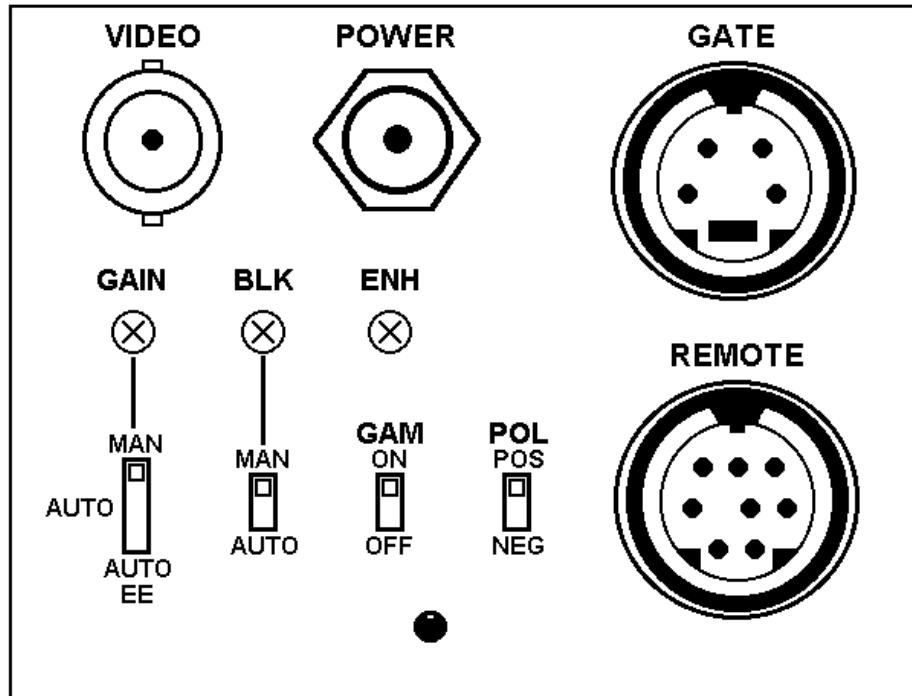


Figure 4: CCD-100 Rear Panel

POWER

The green LED located at the bottom of the rear panel between the **GAM** switch and the **POL** switch lights when power is supplied to the camera either through the **POWER**, **GATE**, or **REMOTE** connectors. The camera requires approximately 200mA with a voltage of +10.5VDC to +18VDC. The external power supply, Dage P/N 738044-02, provides the correct power to the camera.

VIDEO

The BNC video connector provides a 1Vp-p composite video signal into a 75 Ω termination. The output video of the camera is also available at the **GATE** connector. If the **GATE** connector is being utilized, be sure not to double terminate the video by also using the **VIDEO** connector.

GAIN

The output level of the camera is determined by the **GAIN** controls. The gain can be in one of three modes: **MAN**, **AUTO**, or **AUTO EE**.

MAN GAIN

When the **GAIN** switch is in the **MAN** position, the output level of the camera is determined by the rear panel **GAIN** pot located above the **GAIN** switch. This pot has a range of about 20db.

AUTO GAIN

The camera senses the output video level and adjusts the gain to maintain a full level signal when the **GAIN** switch is in the **AUTO** position. This position ensures that the camera is providing a nominal output, but it is not useful in applications where quantitative measurements are needed. In those instances, the camera should be in the **MAN** gain position.

AUTO EE

This gain position allows the camera to use the full range of its automatics in the quest of providing a standard output signal level. In addition to the use of the automatic gain controls, the **AUTO EE** mode uses the Electronic Exposure capabilities of the camera to increase the dynamic range of the CCD. By shuttering the CCD off for a portion of the video period, the camera is capable of providing images under enormous light differences. The camera can shutter down to 1/50,000 sec.

Note: When using the camera in the *AUTO EE* mode under certain types of lighting such as fluorescent, the camera's output signal may seem as though it is changing in level. This is due to the cyclical nature of the fluorescent light. While the human eye is not capable of viewing the light difference cycle of fluorescent lighting, the shuttered CCD is able to see it.

BLACK LEVEL

The black level determines the output level of the darkest portions of the image. The *BLK* switch allows either a manual or automatic mode to set the output video's blacks.

MANUAL

In the *MAN* black position, the video black level is determined by the *BLACK* pot located above the *BLACK* switch. This control allows the user to set the black level to the desired position. Note that the detail below the black set point will be lost, so the black level should be set such that all of the useful information is visible.

AUTO

In the *AUTO* black position, the darkest portions of the video signal are determined by the camera. This position is useful in applications where the contrast level of the incoming light is low and it is necessary for the camera to expand that contrast. The camera will take the darkest portion of the signal, which may not be close to black in reality, and pull it down to black. This has the effect of actually "stretching" the contrast of the signal. Care should be taken to realize that the output signal may not truly represent the input light level when the camera is in this position.

ENHANCE

This pot determines the sharpness of the output picture. To sharpen the picture, rotate the pot to the right. In low light situations where the gain of the camera is high, it may be better to not use as much enhancement since it also increases the amount of noise in the output picture.

GAMMA

Gamma is a non-linear process added to the output video to compensate for the characteristics of a monitor. When **GAMMA** is **ON**, the blacks will tend to be stretched in contrast, while the whites will be compressed. If the camera is being used for measurement purposes, the **GAMMA** should be in the **OFF** position.

POLARITY

In certain situations, it may be convenient to reverse the output video image. When the **POL** switch is set to **POS**, the output video is normal. In the **NEG** position, the video is inverted, with blacks being white and whites being black.

REMOTE



This 8 pin connector allows the rear panel functions to be remoted. Care should be taken to insure the placement of the rear panel controls to the **REMOTE SET** positions as indicated in the table when remoting the functions. The mating connector to the **REMOTE** port is a male 8-pin mini-DIN connector such as Dage P/N 738129-02.

<u>PIN #</u>	<u>FUNCTION</u>	<u>REMOTE SET POS</u>
1	Man Gain Pot (+5V=Max; GND=Min)	Center
2	Man Black Pot (+5V=Dark; GND=Light)	Center
3	Gain Switch (+5V=AUTO; GND=MAN)	AUTO
4	AUTO EE (+5V=ON; GND=OFF)	
5	Gamma Switch (+5V=ON; GND=OFF)	ON
6	Power IN (+12V @ 200mA)	
7	Black Switch (+5V=AUTO; GND=MAN)	AUTO
8	Enhance Pot (+5V=MAX; GND=MIN)	Center

Shield GND

GATE



The gating pulse that the camera uses to inhibit the readout of the CCD is brought in through this connector. Gating cable 207663-01 provides the interface. If a different interface is required, a 4-pin male mini-DIN connector, such as Dage P/N 737129-01 can be used. This connector also allows the Dage *InvestiGater* to be used with the CCD-100L to provide a complete system for long-term gating. The camera mates to the *InvestiGater* through a standard S-video cable such as Dage P/N 737980-01. The pin-out and interface is as follows:

<u>PIN #</u>	<u>FUNCTION</u>
1	GND
2	Power In (+12V @ 200mA)
3	Video Out
4	External Gate In (+5V=Readout; GND=GATE)

GATING

The CCD-100L can be externally gated in order to provide additional sensitivity by inhibiting the readout of the

CCD for extended periods of time. The external gate pulse is placed on the **GATE** connector pin as shown in the timing diagram below. The camera has an internal pull-up resistor, so only a ground closure is necessary. Figure 5 shows the exact relationship between CCD readout and composite video. The gate pulse transitions *must* occur before the CCD transfer for gating or readout to occur. Figure 6 shows the gate pulse relationship to video output.

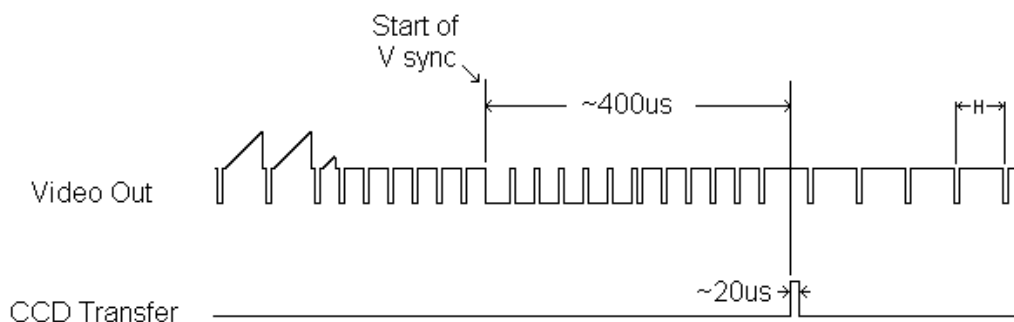


Figure 5: Timing between CCD readout and Video

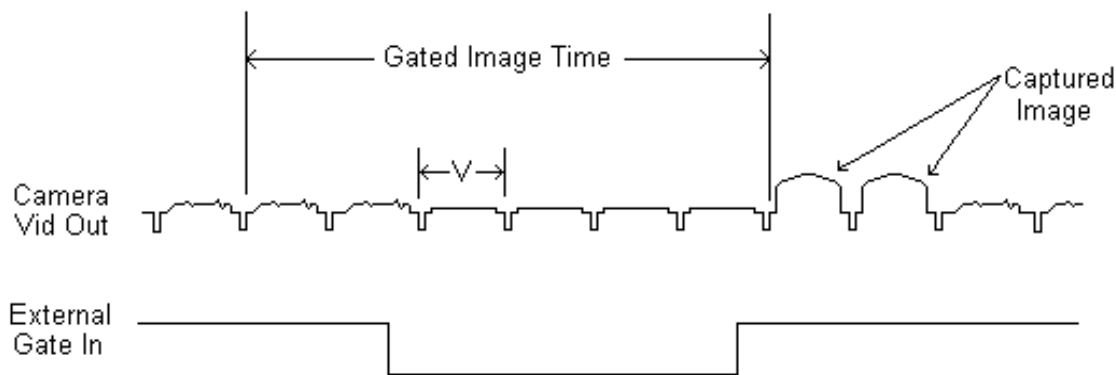


Figure 6: External Gate Timing and Video Readout

Specifications:

Sensor:	1/3" IT CCD, 768(H) x 494(V)
Resolution:	Horizontal: 570 TVL Vertical: 350 TVL
Signal to Noise:	57 db
Gain Range:	>18db
Enhancement:	0db to +8db @ 5MHz.
Electronic Exposure Range:	1/60 to 1/50,000 sec.
Minimum Illumination: (w/ f/1.2 lens)	0.007 lux for 20% video out (No IR Filter)
Back Focus Adjustment:	± 1.9mm
Lens Mount:	"CS" or "C" (with adapter)
Input Power:	+12VDC @ 200mA
Dimensions:	2¼"(W) x 2½"(H) x 5"(L)
Weight:	1 lb.
Operating Temperature:	0°C to +40°C

Troubleshooting

No Picture (Check or try the following):

1. Camera Power On?

- a. External Power Supply Attached?
- b. AC Power On?
- c. LED on Camera Rear On?

2. Monitor Connected to Camera Video Output?

- a. Monitor Power On?

3. Light Level Too Low?

- a. Open Camera Lens.
- b. Set Camera into Auto.

Picture Saturated: (Check or try the following):

1. Video Output Cable Terminated Into 75Ω?

2. Light Level Too High?

- a. Reduce Lens Setting.
- b. Set Camera in Auto.

Warranty

The ***DAGE-MTI CCD-100*** is warranted to be free of defects in material and workmanship in normal use for a period of one year from the original date of purchase from *DAGE-MTI*.

This warranty does not apply to units which have been subject to abuse, neglect, accident, improper installation, or on which the serial number has been removed or damaged. Units that have been altered without the prior permission of *DAGE-MTI* are not covered by this warranty.

This warranty does not apply to other equipment furnished by *DAGE-MTI*, which is listed or otherwise identified as manufactured by another and therefore shall be covered by the other manufactures' applicable warranty.

Limitations

1. This warranty is valid only if the malfunctioning unit is returned to *DAGE-MTI* service depot. This warranty does not cover on-location service. If warranty work is needed, the following should be contacted:

DAGE-MTI, INC.

Customer Service

701 N. Roeske Ave.

Michigan City, IN 46360

(219) 872-5514

Fax: (219) 872-5559

service@dagemti.com

2. This warranty does not cover:
 - a. Problems caused by or inflicted upon associated equipment such as digitizing systems, video tape recorders, cameras, microscopes, etc.
 - b. Damage caused by accident, misuse, improper power source, fire, flood, lightning, other acts of God, war, and repair or alteration by other than a *DAGE-MTI* authorized service organization.
 - c. Labor or incurred charges required in removing or installing the Product, down time, failure of the Product to perform properly, and any consequential damages.
 - d. Transit damage.
3. Unit must be properly packaged (in original packing, if possible) when being returned under warranty.

DAGE-MTI Inc.

701 N. Roeske Ave.

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(219) 872-5514

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