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Color Quad Processor

Installation and Operation Manual

Model RVQ200C

Part Number 92-10090 REV B

Sensormatic
THE WORLD LEADER IN LOSS PREVENTION

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WARNING: TO REDUCE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.



WARNING!
RISK OF ELECTRICAL SHOCK
DO NOT OPEN!



WARNING: TO REDUCE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



The lightning flash with the arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of a shock hazard within the product's enclosure.



The exclamation point, within an equilateral triangle, is intended to alert the user to the presence of important and maintenance (servicing) instructions in the literature accompanying the appliance.

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You now own one of the many fine products manufactured by Sensormatic Electronics Corporation. This product has been carefully inspected to rigid quality standards before shipment. With reasonable care, it will provide years of reliable performance.

Considering the investment, we know that you will want to obtain the full performance capabilities engineered into your new Sensormatic product. We recommend that you read this installation and operation manual thoroughly before attempting to operate this product.

IMPORTANT INFORMATION

Before proceeding, please read and observe all instructions and warnings contained in this manual. Retain this manual with the original bill of sale for future reference and, if necessary, warranty service.

When unpacking your new Sensormatic product, check for missing or damaged items. If any item is missing, or if damage is evident, DO NOT INSTALL OR OPERATE THIS PRODUCT. Contact Sensormatic for assistance.

FOR YOUR PROTECTION

Complete the following product purchase information. The Factory requests this information when contacted for technical support. It is also valuable in case of loss or theft.

Serial Number: _____

Purchase Date: _____

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TABLE OF CONTENTS

FEATURES 1
TECHNICAL INTRODUCTION 2
FRONT PANEL DESCRIPTION 3
REAR PANEL DESCRIPTION 5
INSTALLATION INSTRUCTIONS 7
Alarm Connector Pin-Out 8
Remote Connector Pin-Out 8
INSTALLATION TIPS 9
Camera Specifications 9
Coax Cable Specifications 9
OPERATING INSTRUCTIONS 10
Power 10
Program 10
VCR 10
Sequence 10
Home 10
Alarm Response 10
Video Loss Alarm 11
SPECIAL FUNCTIONS 12
Quad Demo Operation with One Camera 12
Test Pattern Generator 12
Programming 12
Programming Tips 14
REMOTE OPERATION 14
Dry Contact Operation 14
RS-232 Operation 14
Command Code Table 15

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Table of Contents (continued)

APPENDIX A
TROUBLESHOOTING 16

APPENDIX B
SPECIFICATIONS 17
Video 17
Electrical 17
Physical 17
Alarm Command 17
Front Panel Controls 18
Connectors 18

PACKING LIST 19

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IMPORTANT INFORMATION

1. **READ INSTRUCTIONS** — Read all safety and operating instructions before operating the video product.

2. **RETAIN INSTRUCTIONS** — Retain the safety and operating instructions for future reference.

3. **HEED WARNINGS** — Pay attention to all warnings on the video product and in the Operating Instructions.

4. **FOLLOW INSTRUCTIONS** — Follow all of the instructions.

5. **ATTACHMENTS** — Do not use attachments other than those recommended by the video product manufacturer, as they may cause hazards.

6. **TO PREVENT SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.** If you spill liquid on this video product, consult authorized service personnel. Moisture can damage internal parts. Do not use this appliance near sources of water.

7. **ACCESSORIES** — Do not place this video product on an unstable cart, stand, tripod, bracket or table. The unit may fall, causing serious injury and serious damage to the appliance. Use only with a cart, stand, tripod, bracket or table recommended by the manufacturer. Any mounting of the video product should follow the manufacturer's instructions and should use a mounting accessory recommended by the manufacturer.

8. **POWER REQUIREMENTS** — This video product operates on 12 VDC and uses less than 12 Watts of power. Use only power transformers recommended by the manufacturer.

9. **POWER CORD PROTECTION** — The power transformer cord should be routed so that it is not likely to be walked on or pinched by items placed on or against it. Pay particular attention to cords at the plug, convenience receptacles, and the point where the cord exits the video product.

10. **POWER-LINE SURGES** — For added protection of this video product, when it is left unused for long periods of time, unplug the power transformer from the power outlet. This will reduce the danger of damage due to power line surges.

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11. **OVERLOADING** — Do not overload wall units and extension cords, as this can result in a risk of fire or electrical shock.

12. **OBJECT AND LIQUID ENTRY** — Never push objects or pour liquids of any kind into this video product through openings, as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock.

13. **SERVICING** — Do not attempt to service this video product yourself. Opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel. Warranty may be affected by unauthorized service.

14. **DAMAGE REQUIRING SERVICE** — Unplug this video product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

    - If power transformer, cord or plug is damaged.
    - If liquid has been spilled into the video product.
    - If the video product has been exposed to rain or water.
    - If the video product does not operate normally by the instructions contained in this manual.
    - If the video product has been dropped or the cabinet has been damaged.
    - When the video product exhibits a distinct change in performance.

15. **SAFETY CHECK** — Upon completion of any service or repairs to this video product, the service technician will perform safety checks to determine that the video product is in safe operating condition. Following service, ensure that the video product is reinstalled in accordance with the instructions included in this manual.

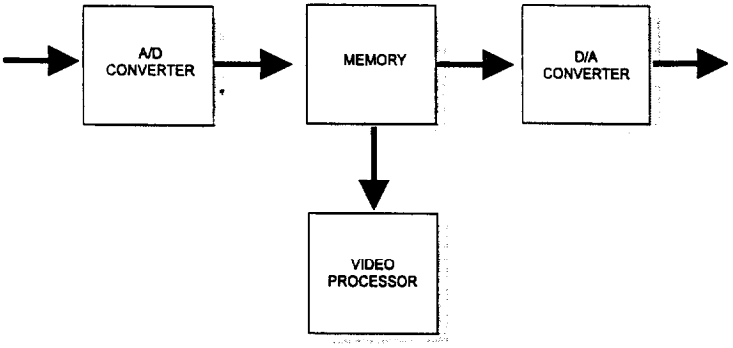
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FEATURES

- Four different camera locations on one monitor screen at one time.
- Real-time refresh rate.
- High-resolution display. 512 x 480 pixels.
- Four million colors on palette.
- VCR "ZOOM" playback. 256 x 240 pixels.
- Tape in quad mode while viewing full screen images from the built-in sequential switcher.
- Looping video inputs.
- Security lockout prevents unauthorized operation.
- Alarm output can trigger VCR alarm mode or an external device.
- External device or VCR can control duration of alarm.
- S-VHS compatible.
- Menu driven setup.
- Eight-character camera titles.
- NTSC and PAL versions available.
- Four camera vertical interval switcher with variable dwell.
- Quad display can be included into sequence.
- Single camera demonstration mode.
- Color bar test generator.
- Four alarm inputs (contact to ground).
- On-screen video loss alarm indication.
- On-screen contact alarm indication.
- Alarm output (normally open/normally closed).
- Compatible with most CCTV products.
- Low profile (1.75" height) rack mountable.
- DC powered — 12 VDC modular power supply included.
- Remote control via contact closure or RS-232.

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TECHNICAL INTRODUCTION



This unit uses digital technology to process and store the video information received from a camera. The incoming video image is transformed into a digital signal by an analog-to-digital (A/D) converter. This information is stored in memory and clocked out at a rate predetermined by the video processor.

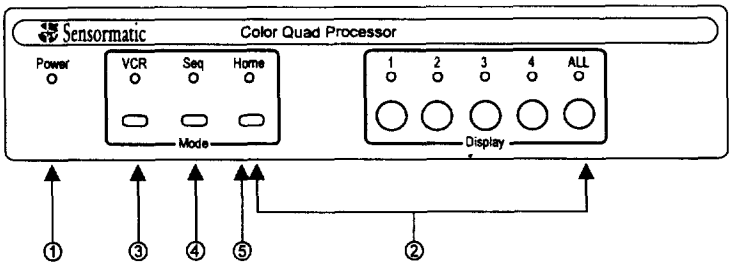
This clocking rate synchronizes the incoming video signals from the four cameras and enables them to be combined on a single video output in full screen or in quad format. As long as the camera signal contains the required sync signals to be displayed on a monitor, it can be mixed together with other camera inputs.

None of the four cameras need be synchronous, although using 2:1 interlaced cameras is recommended. After the digital signal is clocked out of memory, it is converted into an analog signal by a digital-to-analog (D/A) converter and channeled to the video outputs.

Each signal clocked into memory is held, sampled and clocked out at a rate of one video frame every 1/30 of a second. Once in memory, the video processor can display the video full screen, in quad format, or as a 4:1 zoomed quadrant in playback mode.

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FRONT PANEL DESCRIPTION



1. **Power** — Green power light indicates power is turned on and the unit is in the active (power on) mode.

2. **Program** — (Combination key, press **Home + ALL**). Allows selection of various operating modes through on-screen program menu selections.

   1 (up) — Moves forward through the alphanumerics

   2 (down) — Moves backward through the alphanumerics

   3 (left) — Moves the cursor left

   4 (right) — Moves the cursor right

   ALL (menu) — Selects next menu item

3. **VCR** — Controls VCR viewing format. VCR recording can be viewed as recorded in a quad format, or any quad image can be zoomed to full screen.

   1 — "Zooms" upper left hand quad to full screen.

   2 — "Zooms" upper right hand quad to full screen.

   3 — "Zooms" lower left hand quad to full screen.

   4 — "Zooms" lower right hand quad to full screen.

   ALL — Displays VCR video as recorded or live video through VCR for VCR setup.

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4. **Seq** — Displays cameras 1 – 4 and quad view sequentially at individually programmed dwell rates.

5. **Home** — Displays selected camera or quad view.

   1 — Displays camera 1 full screen.

   2 — Displays camera 2 full screen.

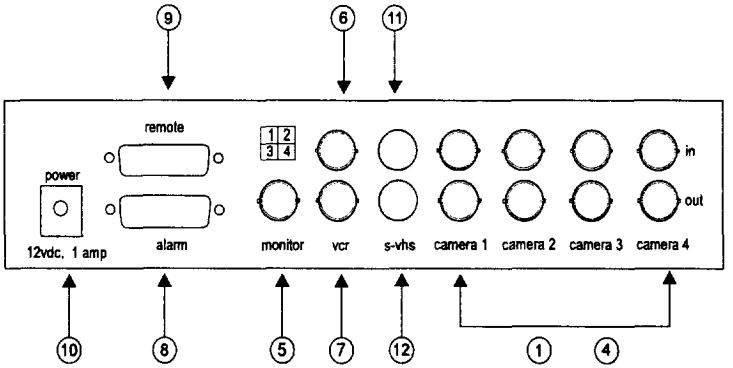
   3 — Displays camera 3 full screen.

   4 — Displays camera 4 full screen.

   ALL — Displays cameras 1 – 4 in quad view.

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REAR PANEL DESCRIPTION



1–4. camera inputs/outputs — BNC connectors (looping) for four camera input signals to the unit by means of coax cable. The drawing (above the monitor BNC connector) shows each camera number in the position it is displayed on the monitor.

5. monitor — BNC connector for output signal to monitor. When connected, monitor will display either quad screen or full screen as selected by the front panel or by an alarm condition.

6. vcr in — BNC connector for input from VCR. Allows for viewing of VCR recordings through the device in either normal or zoom mode.

7. vcr out — BNC connector for output signal to VCR. When connected, VCR will receive quad video or full screen video during an alarm condition.

8. alarm — DB15 connector for alarm inputs. A contact closure will command the unit to initiate the alarm mode.

- **first alarm** — If the unit is in the quad mode, the first alarm will signal the unit to go full screen, light the corresponding indicator and display the on-screen alarm message.

NOTE: **If full screen has been initiated manually and an alarm occurs, the unit will switch to the full screen picture of the camera associated with the alarm and light the corresponding indicator. The monitor will display the on-screen alarm message.**

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- **additional alarms** — In the presence of the first alarm, additional alarms will signal the unit to cycle through cameras with alarms at the programmed dwell rate.
- **alarm in** — This signal commands the unit to:
  a. Go into full screen mode for single or multiple alarms.
  b. Turn on the front panel indicator light for the camera with alarm.
  c. Indicate the alarm on the monitor screen.
- **alarm hold** — Connect to Alarm Out of VCR or external device. When an alarm occurs, unit will hold the alarm mode for the time programmed by the VCR or other device. Voltage range from +5V to +15V or CMOS/TTL compatible active high input will initiate the alarm mode.
- **alarm out** — Two alarm outputs to trigger an external source such as a VCR. Consists of normally open and normally closed contacts with a common return.

9. **remote** — DB15 connector for connection to dry contact or RS-232 remote.
10. **power** — Two conductor DIN jack. Accepts 12 VDC from power supply module (center positive only).
11. **s-vhs in** — Mini-DIN connector for S-video input from S-VHS or similarly equipped VCR. Allows for viewing of VCR recordings through the device either in normal or zoom mode.
12. **s-vhs out** — Mini-DIN connector for S-video output to S-VHS or similarly equipped VCR. When connected, the VCR will receive quad video or full screen video during an alarm condition.

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INSTALLATION INSTRUCTIONS

1. Connect cameras to unit by connecting video output of camera to camera input of unit.

   NOTE: Check the drawing above the monitor connector to note which quadrant on the monitor will exhibit the camera output.

2. Connect the unit to the monitor by connecting **monitor** of the unit to video in of the monitor.

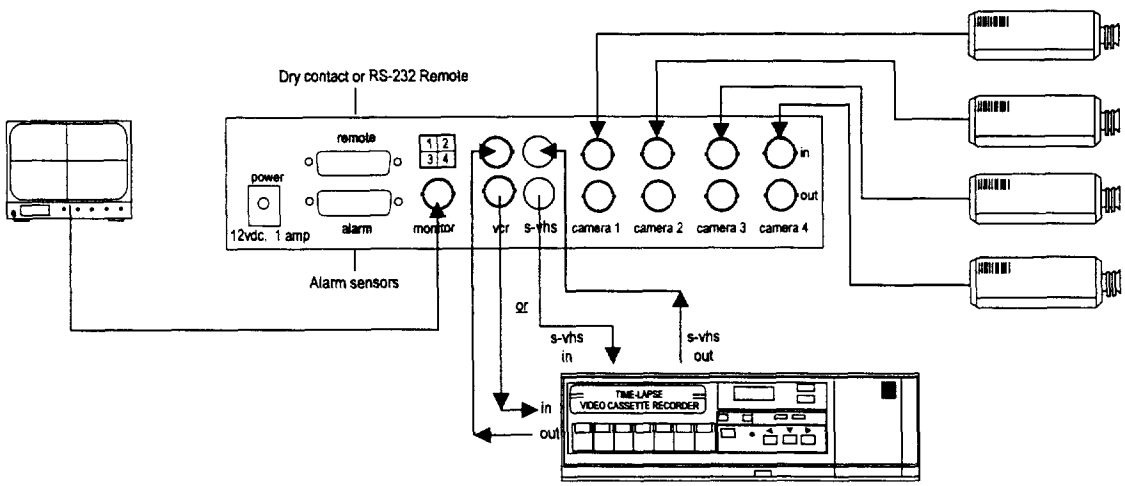
3. Connect the unit to the VCR by connecting **vcr out** or **s-vhs out** of the unit to video in or s-vhs in of the VCR for record operation.

4. Connect **vcr in** or **s-vhs in** of the unit to video out or s-vhs out of VCR for playback "zoom" operation.

   NOTE: Use s-video connectors for optimum zoom performance if available on your VCR. If s-connectors are used, DO NOT hook up cables to VCR IN or VCR OUT.

5. Connect alarm inputs (1 – 4) to DB15 **alarm** connector, as required.

6. Connect alarm output of VCR or external timer to alarm hold input pins of DB15 **alarm** connector.



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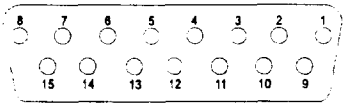
7. Connect alarm outputs.

   - normally open — When the unit goes into alarm, this contact will automatically close and will signal the VCR or external device to go into alarm mode. Connect to alarm in of VCR or external device.
   - common — Common return for VCR or external device, normally open, and normally closed.
   - normally closed — When the unit goes into alarm, this contact will automatically open and will signal the device to go into the alarm mode.

8. Supply power to unit with the power module provided.

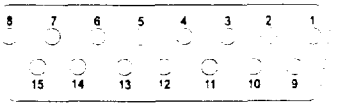
9. Select **75 OHMS** camera termination if not looping camera video to another device or **HI-Z** termination if looping. This is done by turning the unit on and entering the program mode by pressing **Home** and **ALL (menu)** buttons at the same time. Move through the program menu by repeatedly pressing the **ALL (menu)** button until the **IMPEDANCE:75 OHMS/HI-Z** menu is displayed. Pressing the **3 (left)** or **4 (right)** buttons will toggle between **75 OHMS** or **HI-Z** termination. When the desired termination is displayed, press the **ALL (menu)** button to complete your selection.

Alarm Connector Pin-Out



1.	alarm in 1	6.	common
2.	alarm in 2	7.	normally closed
3.	alarm in 3	8.	alarm hold
4.	alarm in 4	9-15.	ground
5.	normally open		

Remote Connector Pin-Out



1.	ALL	6.	home
2.	4	7.	sequence
3.	3	8.	vcr
4.	2	9-14.	ground
5.	1	15.	RS-232 in

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INSTALLATION TIPS

NOTE: While this unit will work with any properly installed camera system, the following information defines the requirements for optimum performance.

Camera Specifications

- This unit can accept signals from random interlaced cameras. However, some vertical jitter in the picture may result. A CCTV camera with 2:1 interlace is recommended. Camera phasing is not required for proper quad display operation, as this unit incorporates video timebase correction.
- This unit is a color device and will accept composite video from color and B&W cameras.
- This unit can loop-through camera signals originating from "over the coax" vertical interval type control systems.

Coax Cable Specifications

- It should be noted that long cable runs may cause signal deterioration and/or sync discrepancies. 1 volt peak-to-peak should be delivered to the unit.
- Use RG59/U (75 OHMS impedance) cable.

NOTE: Do NOT use RG58/U cable.

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OPERATING INSTRUCTIONS

NOTE: This unit has been designed for ease of operation. For maximum benefit, we recommend taking a few minutes to familiarize yourself with the operation of the unit. Sometimes when problems occur they can be easily solved by carefully checking obvious, but often overlooked, possibilities. For details, see the "Troubleshooting Chart."

Power When the power transformer is connected to the unit and plugged into the power receptacle, power is applied to the unit (the green power indicator light is on). The monitor will exhibit video in each quadrant which has camera input. If a camera is not connected, the corresponding quadrant will exhibit color bars.

Program See Special Functions for details on programming the unit.

VCR To playback a quad tape, press the play button on the VCR. Press the **VCR** button to view the tape as recorded in quad format or press **1**, **2**, **3** or **4** to selectively enlarge a quad to full screen. Press **Seq** or **Home** to resume normal operation.

Sequence Press the **Seq** button to sequentially switch, full screen, through all four cameras and quad view at individually programmed dwell times. To change dwell times, refer to the Programming section.

Home Press the **Home** button to place the unit in the manual switcher mode. Once in this mode, pressing **1**, **2**, **3**, **4**, or **ALL** will display the selected camera or quad view until another mode is selected.

Alarm Response **First Alarm** — If the unit is in the quad mode, the first alarm will signal the unit to go to full screen, light the alarm indicator light (above the camera button), and display the on-screen alarm indication. If the unit is in one of the full screen modes and an alarm occurs, the unit will switch to the full screen picture of the camera with alarm, light the indicator, and display the on-screen alarm message.

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Additional Alarms — In the presence of the first alarm, additional alarms will signal the unit to cycle through cameras with alarms at the programmed dwell time.

With each alarm, the following will occur:

- The unit displays the cameras with alarms.
- The **ALARM** message blinks on-screen.
- The rear panel alarm output contacts are asserted.
- This condition exists for a minimum of four seconds.

The above conditions remain in effect until all three of the following have occurred:

- All alarm inputs are removed from ground.
- The four second time-out has elapsed.
- The alarm hold input, if connected, is no longer active.

Video Loss Alarm

This unit is equipped with a video loss alarm feature. If **ON**, and video from any camera is lost, the unit will respond in the following manner:

- Cameras displayed in quad view on the monitor will automatically freeze the last image before video was lost.
- Cameras display color bars when called up full screen.
- If camera video does not return after one second, the **VID LOSS** message flashes on screen.
- The unit issues a four-second alarm pulse to the output contacts.

To reset a video loss alarm, re-establish video into the unit.

To clear an image frozen after video loss, press **ALL** twice. Color bars will appear on those quadrants that no longer have video present.

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SPECIAL FUNCTIONS

NOTE: This unit is equipped with special functions to provide maximum utility. Instructions to operate each special function follow.

Quad Demo Operation with One Camera

This is used for demonstrating quad operation with only one camera connected.

1. Connect a camera to the **camera 1** video input.
2. While holding the **Home** button down, press the **1** button. Release the buttons.
3. Check that the camera video is now displayed in all four quadrants.

Test Pattern Generator

This is used for monitor setup.

1. While holding the **Home** button down, press the **2** button. Release the buttons.
2. Check that the monitor displays color bars.

Programming

1. While holding the **Home** button down, press the **ALL** button. Release the buttons.

   NOTE: When the Program mode is active, all five display indicator lights are lit.

2. Check that the display shows camera 1 video (if connected) and the following message:

   CAM 1 = CAM 1 DWL = 01

3. To enter the title for camera 1 use the **1 (up)** and **2 (down)** buttons to move up or down through the alphabet and the **3 (left)** and **4 (right)** buttons to move the character cursor. The buttons can be held down for one second or more to automatically repeat the operation (to move through the characters quickly).

1	2	3	4	ALL
Up Cursor	Down Cursor	Left Cursor	Right Cursor	Next Menu

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4. To set a dwell time for the camera 1 display, press and hold the **4 (right)** button until the cursor moves to the **DWL = 01** display. Use the **1 (up)** and **2 (down)** buttons to select a dwell time in seconds from 00 (bypass the camera) to 99 seconds.

   NOTE: If DWL = 00 is set, the camera will NOT display in full screen sequence. The highest setting (99 seconds) is the longest a camera will display.

5. Press the **ALL** button to advance to the next camera.

6. Repeat steps 3, 4 and 5 for each of the cameras installed. If no programming change is desired for a particular camera, simply press the **ALL** button to advance to the next camera or to the next menu.

7. To set a dwell time for quad display, press and hold the **3 (right)** button until the cursor moves to the **QUAD DWELL = 01** display. Use the **1 (up)** and **2 (down)** buttons to select a dwell time in seconds from 00 to 99 seconds.

8. To set zoom mode, select **FIELD** or **FRAME** "zoom" operation using the **3 (left)** and **4 (right)** buttons. The default is **FRAME.** Highlight the selection compatible with your VCR and press the **ALL** button.

9. Select **75 OHMS** or **HI-Z** video termination. Normally this is set for **75 OHMS.** Select **HI-Z** if you are looping video in and out of the unit to other devices. Pressing the **3 (left)** or **4 (right)** button will toggle between the two modes. Choose the desired selection and press the **ALL** button.

10. Enable or disable video loss alarm mode. The **3 (left)** and **4 (right)** buttons toggle between **ON** and **OFF**. The default is **OFF**.

11. Enable or disable the security lock. To prevent unauthorized operation, the front panel controls can be locked in their last configuration prior to entering the program mode by choosing **ON**. If the unit is already security locked, you can release the lock by 1) pressing the **Home + ALL** buttons, choosing **OFF**, and pressing the **ALL** button, or 2) recycling power to the unit.

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Programming Tips

The program mode can be entered at any time to revise programmed information. Once in the program mode, use the **ALL (menu)** button to select the item to be revised. Once revised, use the **ALL** button to go on to other items. The program mode can be exited at any time by pressing any **Mode** (**VCR**, **Seq**, or **Home**) button.

To reset the unit programming to the factory pre-set values (defaults), simultaneously press the **Home** and **3** buttons. Release the buttons. The unit programming is now reset to the factory defaults.

REMOTE OPERATION

NOTE: This unit is equipped for remote operation through the rear panel remote connector.

Dry Contact Operation

To activate a remote command, momentarily connect the desired control pin to one of the ground pins 9 through 14 as referenced in the **remote** connector pin-out on page 8.

RS-232 Operation

This unit can be easily controlled by standard ASCII RS-232 control signals from a host terminal or computer. Simply connect pin 15 from the **remote** connector to the RS-232 transmit output pin on the host, and pin 14 from the **remote** connector to signal ground on the host with twisted pair wiring. Set the RS-232 host data format to 1200 baud, 7 data bits, even parity, and one stop bit. Set the host terminal or computer to half duplex mode (the Color Quad Processor does not echo received characters).

The unit uses a very simple command set. All commands are prefaced by a slash (/) character followed by a two character command. For example, if controlling the unit from an RS-232 terminal, you would type the following characters to select **camera 1**:

/C1

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A series of commands may be entered at once. For example, to manually sequence through **cameras 1–4**:

/C1/C2/C3/C4

Commands can also be entered one at a time. For example:

/C1

/C2

/C3

/C4

The unit will only look for slash (/) characters followed by a two character command. It will ignore all other characters. If you make a mistake entering a command, just type another slash (/) character and enter the correct two character code.

Command Code Table

The following is a table of command codes:

COMMAND	CODE
VCR	VR
Seq	SQ
Home	HM
1	C1
2	C2
3	C3
4	C4
ALL	QD

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APPENDIX A TROUBLESHOOTING

Sometimes problems can be easily solved by carefully checking seemingly obvious, but often overlooked, possibilities. Check this chart carefully if the unit is not responding properly.

PROBLEM	SUGGESTED ACTION
No power (power indicator does not light).	Check to see if power supply module is plugged in.
	Check power at supply outlet.
	Check to see if power supply cable is connected to the unit.
Unit fails to respond to user commands or operations.	Check programming for security mode status.
	Check for shorted alarm connection.
Video picture is blank, or picture motion is stopped, or no picture in one quad, or gray bars exhibited in one quad, or one quad shows black.	Check camera connections; verify camera signal is 1 Volt p-p.
	Check for video loss alarm.
	Check camera input.
	Check camera connection to the unit.
Dim or excessively bright picture.	Check camera connections; verify camera signal is 1 Volt p-p.
	Check for proper video termination programming.
	Check loop-through destination (if applicable).
Excessive "combing" during ZOOM.	Select FIELD ZOOM mode.

For a factory representative call:
Sensormatic Electronics Corporation
TEL: 1-800-241-6678
FAX: 561-989-7017

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APPENDIX B
SPECIFICATIONS

Video	Signal Format	NTSC or EIA
	Camera Input	1.0 V p-p 75 ohm or HI-Z, BNC
	Camera Output	1.0 V p-p 75 ohm termination
	VCR Input	1.0 V p-p 75 ohm termination
	VCR Output	1.0 V p-p 75 ohm termination
	Digital Memory	512 x 480 pixels full screen 256 x 240 pixels per quadrant 24 bit color pixels
	Refresh Rate	30 fields per second, each quadrant
Electrical	Power	12 VDC, less than 12 watts
Physical	Dimensions	8.5" x 12.25" x 1.75" (216mm x 311mm x 44mm)
	Ship Weight	7 lbs. (3.2 kg)
	Operating Temperature	40° – 104°F (5° – 40°C)
Alarm Command	Alarm Inputs	Four alarm inputs, one per camera, activated by contact closure
	Alarm Outputs	Normally open, normally closed contacts with shared common: • 1 amp @ 125 VAC resistive only • 2 amps @ 30 VDC resistive only
	Alarm Duration	Four second minimum duration pulse
	Alarm Hold Input	+5 to +15 VDC or CMOS/TTL logic compatible, active high

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Front Panel Controls

Soft touch, rubberized push buttons with indicator lights

Seq		Displays cameras 1-4 and quad view sequentially
Home	ALL	Display cameras 1-4 in quad view
	1	Displays camera 1 full screen
	2	Displays camera 2 full screen
	3	Displays camera 3 full screen
	4	Displays camera 4 full screen
VCR	ALL	Displays vcr output
	1	Enlarges quadrant 1 to full screen
	2	Enlarges quadrant 2 to full screen
	3	Enlarges quadrant 3 to full screen
	4	Enlarges quadrant 4 to full screen

Connectors

Camera In/Out	BNC, 2 per camera, includes loop-through (eight total)
S-VHS In	Mini-DIN connector
S-VHS Out	Mini-DIN connector
VCR Out	BNC, one only
VCR In	BNC, one only
Monitor Out	BNC, one only
Alarm	DB15, female receptacle
Remote	DB15, female receptacle
Power	2.1 mm pin-type power jack (center positive)

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PACKING LIST

Each package should contain the following:

- 1 Color Quad Processor
- 1 Power Transformer
- 1 Installation and Operation Manual

Please check your package for missing items upon receipt.

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