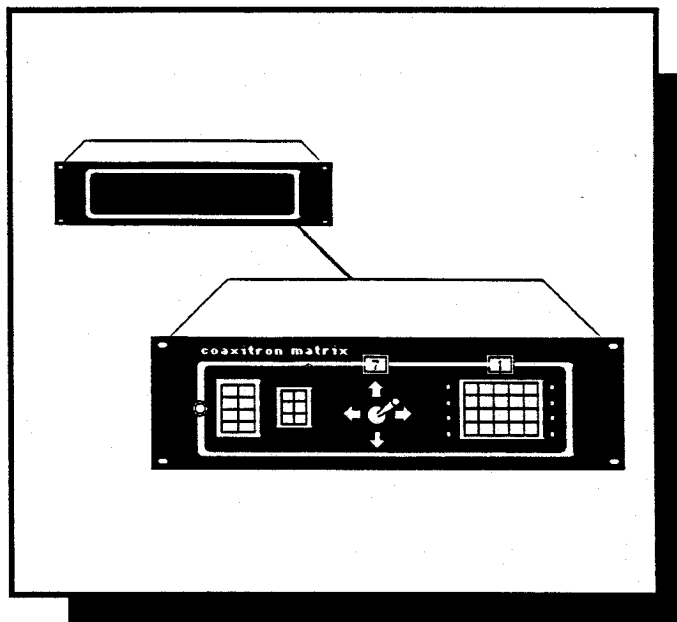




**Installation/Operation Manual  
Coaxitron® Matrix  
System 7500 Series**



*-Important Instructions-  
Please Read Before Attempting  
Installation and Operation*

**C584M  
Revision C  
(with incorporated  
addendum)**

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# INSTALLATION/OPERATION MANUAL COAXITRON® MATRIX SYSTEM 7500

## 1.0 SCOPE

The information contained within this manual covers the Coaxitron Matrix Transmitter/CPU and Remote Control units.

Installation should be in accordance with all applicable local and national electric codes, utilizing only conforming materials.

Please thoroughly familiarize yourself with the information in this manual prior to installation and operation.

## 2.0 GENERAL DESCRIPTION

The Coaxitron Matrix, System 7500 is a microprocessor based cross-point video switcher capable of handling up to 64 camera inputs and up to 4 independent monitor outputs. It is completely compatible with the Coaxitron System 2000 receiver/driver for control of pan/tilts, motorized zoom lenses and auxiliary functions.

The system is comprised of a 5.25"H x 19"W (10.5"H for 64-channel matrix unit) card cage/CPU, in which there are 16 camera input card slots and 4 monitor output card slots. The card cage/CPU can be purchased with an integral keypad control and/or remote keypad controls, in a desk top or rack mount version. The system comes equipped with four (4) RS-422 control ports which may be connected from 1 to 4 remote keypad controls.

Additional features include independent sequence rates per group, quick forward or reverse viewing, enabling or disabling of camera inputs, and ease of operation.

This is a bi-functional system. An RS-422 communications port links the switcher with the CPU. Control of the pan/tilt, camera and lens is accom-

plished by transmitting the control information over the coax cable. The CPU controls all video switching.

Although the CPU may be purchased with a self-contained control panel, video switching is designed to be remotely controlled by up to 4 remote control stations. Communication between the CPU and each remote station is accomplished by RS-422 communication links. This allows the CPU to be centrally located in order to minimize cable requirements, or meet the individual user's needs for control and CPU placement.

The CPU has no operating controls aside from a power switch on the power supply and a push-button reset switch. The power switch should be used when a configuration change is made, and the reset switch is normally used for convenience in testing or programming.

## 2.1 MODELS AND ASSOCIATED EQUIPMENT

### TRANSMITTER/CPU

CM7501	Coaxitron Matrix card cage with CPU and power supply. Accepts up to 8 input cards (CM7508). Controls and switches up to 32 cameras and up to 4 monitors. Rack mounted in a 5.25" x 19" frame. Use with CM750D or CM750R remote control panels.
CM7501/220	Same as CM7501 except 230 VAC operation
CM7501/64	Same as CM7501, except controls up to 64 cameras. Rack mounted in a 10.5" x 19" frame.
CM7501-RS422	Same as CM7501 except with RS-422 computer interface
CM7502	Same features as CM7501 Coaxitron Matrix card cage except has a full feature integral keyboard for control of pan/tilt, lens, switcher and auxiliary functions. Rack mounted in a 5.25" x 19" frame.

CM7502/220	Same as CM7502 except 230 VAC operation	CX9024RX-12V	Same as CX9024RX except 12 VDC camera power
CM7502/64	Same as CM7501/64 except 230 VAC operation	CX9024RXI	Coaxitron indoor receiver for 24 VAC pan/tilts, zoom lens, 24 VAC camera power and accessory functions

**VIDEO INPUT CARDS**

CM7508	Video and control input switch card assembly. Provides input for 4 cameras with control	CX9024RXI/220	Same as CX9024RXI except 230 VAC input
CM7508L	Same as CM7508 except with looping inputs	CX9024RXI-12V	Same as CX9024RXI except supplied with 12 VDC camera power (115 VAC input)

**MONITOR OUTPUT CARDS**

CM7504	Video and control output switch card assembly. Provides output for 1 monitor with camera and control selection	CX9024RXI-PP	Coaxitron indoor receiver with PT/Z preset drive (24 VAC) (115 VAC input)
		CX9024RXI-PP/22	Same as CX9024RXI-PP except 230 VAC input

**MATRIX INTERFACE CARD**

CM750C	Matrix interface card required for use with CSF704DT, CSA764 and CS716AFDT	CX9115RX	Coaxitron outdoor receiver for 115 VAC pan/tilts, zoom lens, 115 VAC camera power and accessory functions
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**REMOTE CONTROL PANELS**

CM750D	Desk top remote Coaxitron Matrix control. Provides pan/tilt joystick, lens control, auxiliary function control and keypad selection of any video input to any monitor output	CX9115RX-PP	Same as CX9115RX except with PT/Z preset drive
CM750D/220	Same as CM750D except 230 VAC operation	CX9115RXI	Same as CX9115RX except for indoor use
CM750R	Same features as CM750D remote control, except rack mounted, 5.25" x 19"	CX9115RXI-PP	Same as CX9115RX-PP except indoor unit
		CX9224RX	Same as CX9024RX, except 24 VAC input
		CX9224RX-PP	Same as CX9224RX except with PT/Z preset drive
		CX9224RXI	Same as CX9024RXI, except 24 VAC input

**RECEIVERS/DRIVERS**

CX9024RX	Coaxitron outdoor receiver for 24 VAC pan/tilts, zoom lens, 24 VAC camera power and accessory functions	CX9224RXI-12V	Same as CX9224RXI except 12 VDC camera power
CX9024RX/220	Same as CX9024RX except 230 VAC input	CX9224RXI-PP	Same as CX9224RXI except with PT/Z preset drive

### 3.0 SPECIFICATIONS

Input voltage:	
Card cage	120 VAC $\pm$ 10%, 50/60 Hz (230 VAC switchable)
Remote keypad	16 VAC supplied with U.L. Listed plug-in wall trans- former
Power consumption:	
	40 vA maximum (Models CM7501, CM7502)
	80 vA maximum (Model CM7501/64 only)
	12 vA (Remote keypad)
Inputs:	75 ohm internal termination
Video input level:	1 volt p-p nominal
	1.5 volts p-p maximum at 90% APL
	2 volts p-p maximum at 75% APL
Outputs:	75 ohm source terminated
Frequency response:	Less than 2 dB down at 10 MHz
Crosstalk:	Better than -50 dB to 8 MHz (any input to any output)

Keypad control method:	RS-422, 600 baud, 4 wires
Video connectors:	
Input cards	4 BNC
Output cards	1 BNC
Keypad control connectors:	Four standard, 6-conductor, modular phone jacks
Operating distance:	
Switcher control	Greater than 8,000 ft on two twisted pairs of #20 Awg wire from controller to switcher
Switcher with Coaxitron control	Up to 1,500 ft from card cage to remote keypad control on two (2) twisted pairs, plus coaxial cable
Card cage power cord:	3-wire, grounded #18 Awg
Ambient temperature:	32°F to 100°F (0°C to 37.8°C)
Dimensions:	See Figure 1

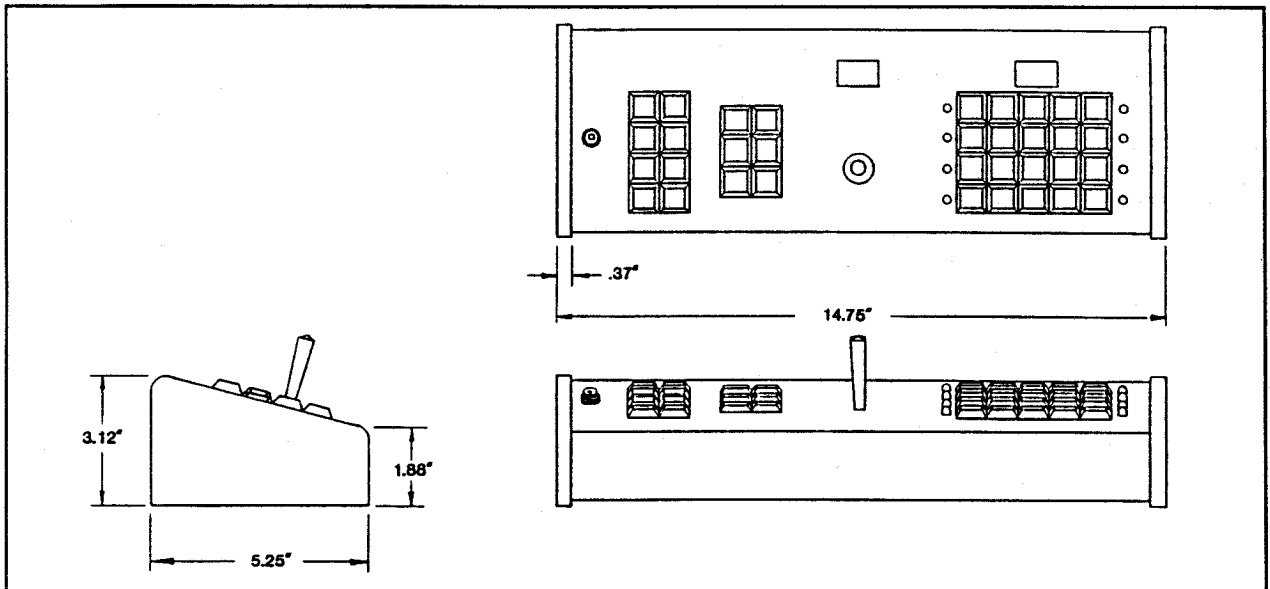


Figure 1. CM750D Dimension Drawing

## 4.0 INSTALLATION

The Coaxitron Matrix card cage is shipped without the video input cards and the monitor output cards installed. Install the cards by sliding them into their appropriate rack slots and securing them with the two screws provided with each card. The 32 channel card cage occupies 5-1/4" x 19" (64 channel unit occupies 10.5" x 19") of vertical rack height and should have proper ventilation for cooling.

Camera inputs and monitor outputs should be connected as specified in Figures 2 through 5.

All unused monitor outputs must be connected to a 75 ohm terminating cap BNC connector, PELCO part number CON4700-75 or equivalent.

Once the input and output cards have been installed, proceed with system setup as outlined in Sections 5.0 through 8.0 (where applicable to your configuration).

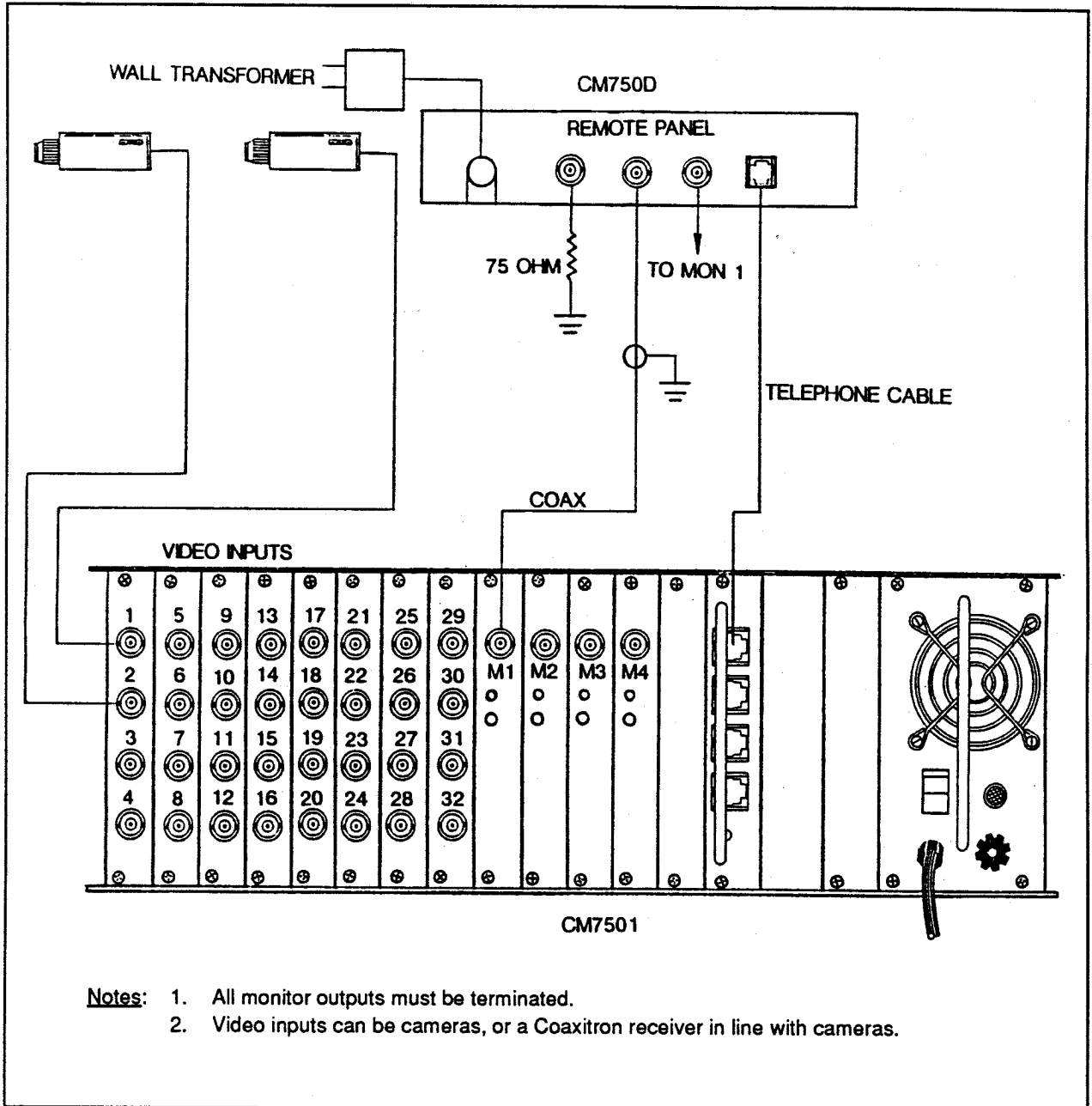
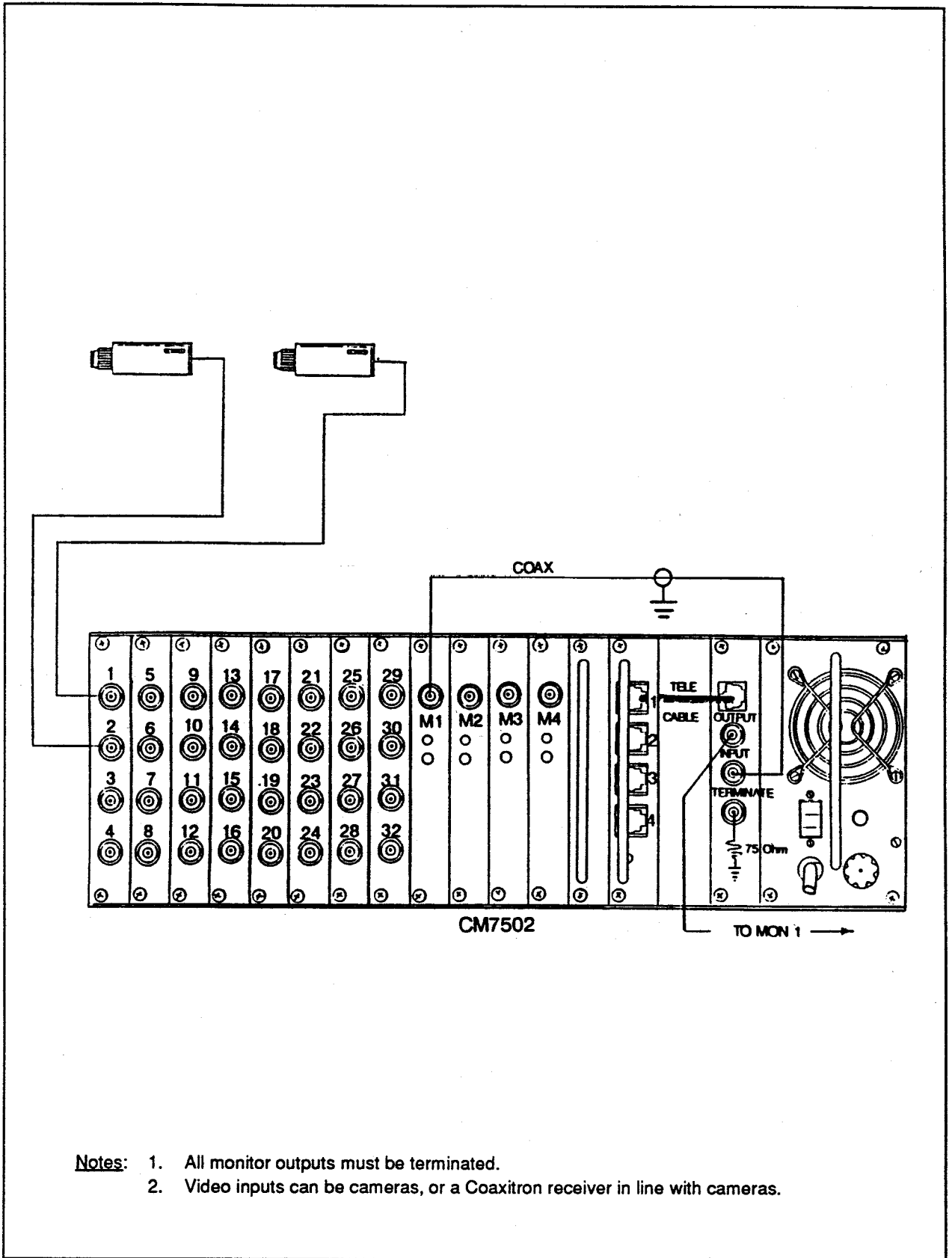


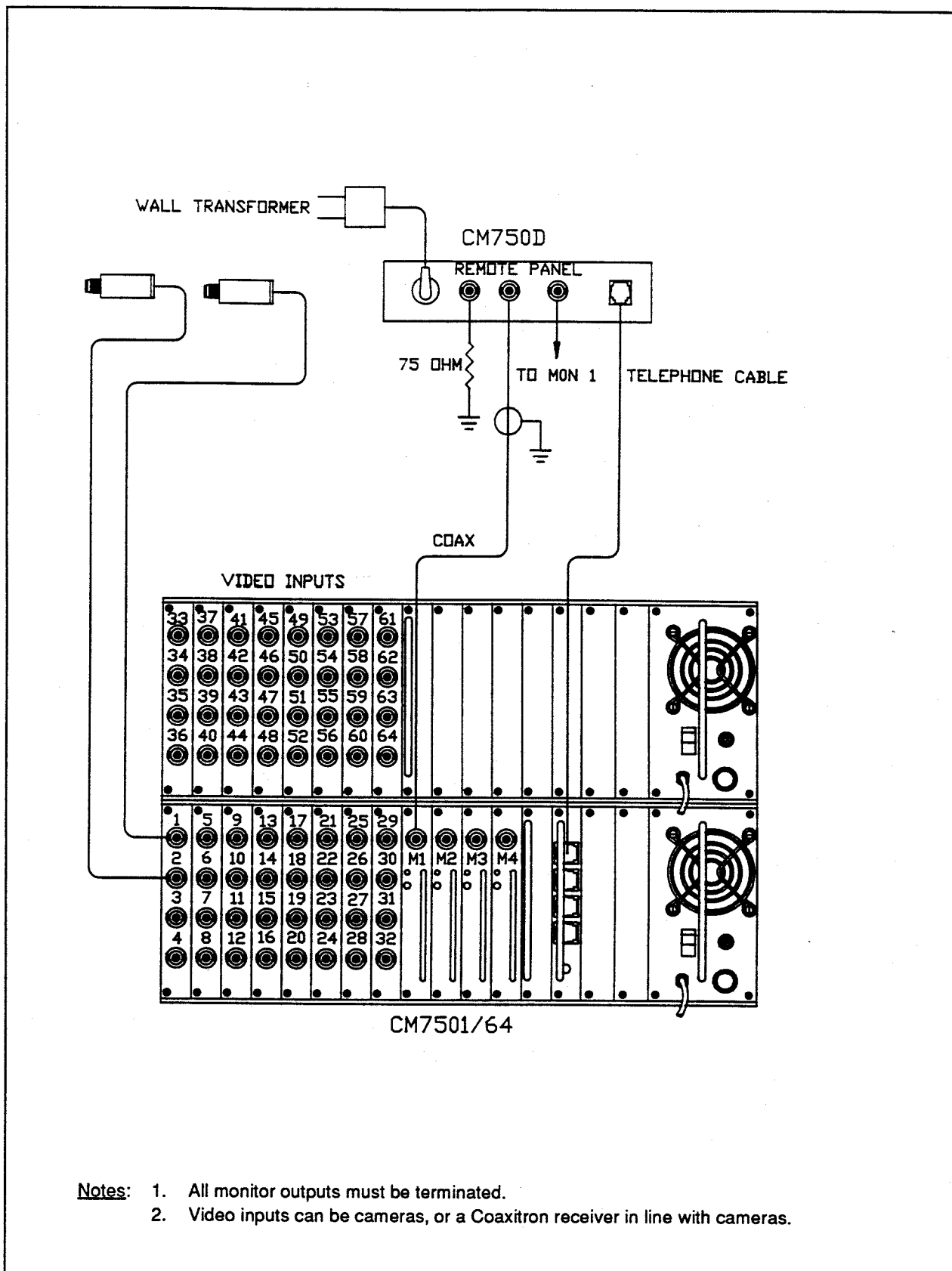
Figure 2. CM750D/CM750R with CM7501 Basic Interconnect Diagram





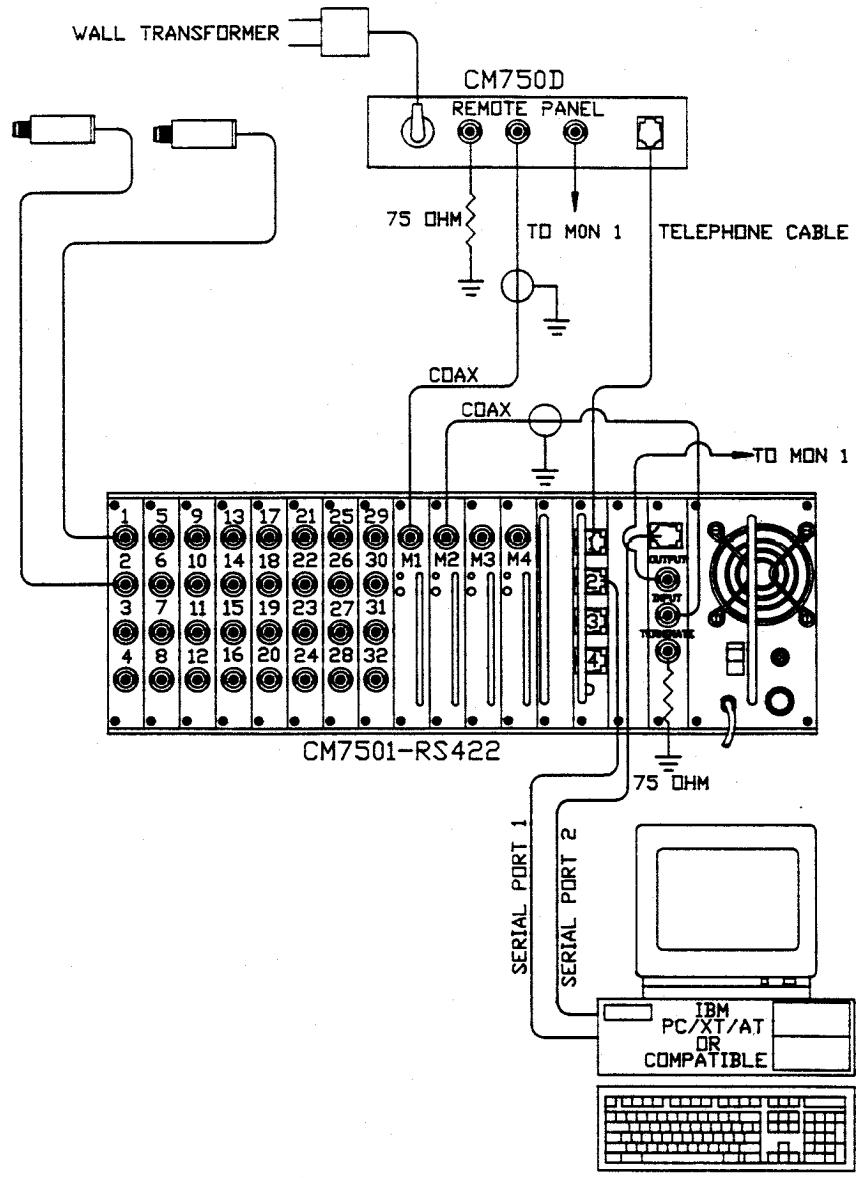
- Notes:**
1. All monitor outputs must be terminated.
  2. Video inputs can be cameras, or a Coaxitron receiver in line with cameras.

Figure 3. CM7502 Basic Interconnect Diagram



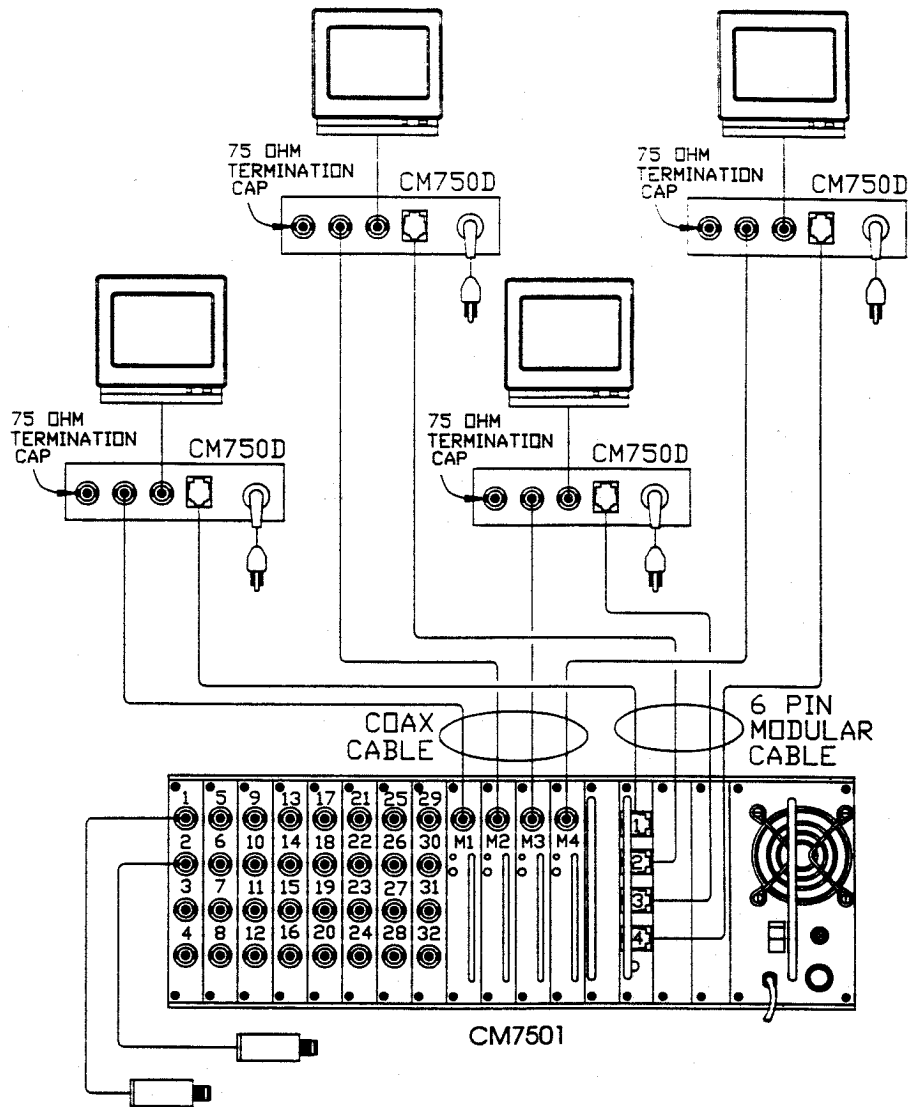
- Notes:**
1. All monitor outputs must be terminated.
  2. Video inputs can be cameras, or a Coaxitron receiver in line with cameras.

Figure 4. CM7501/64 Basic Interconnect Diagram



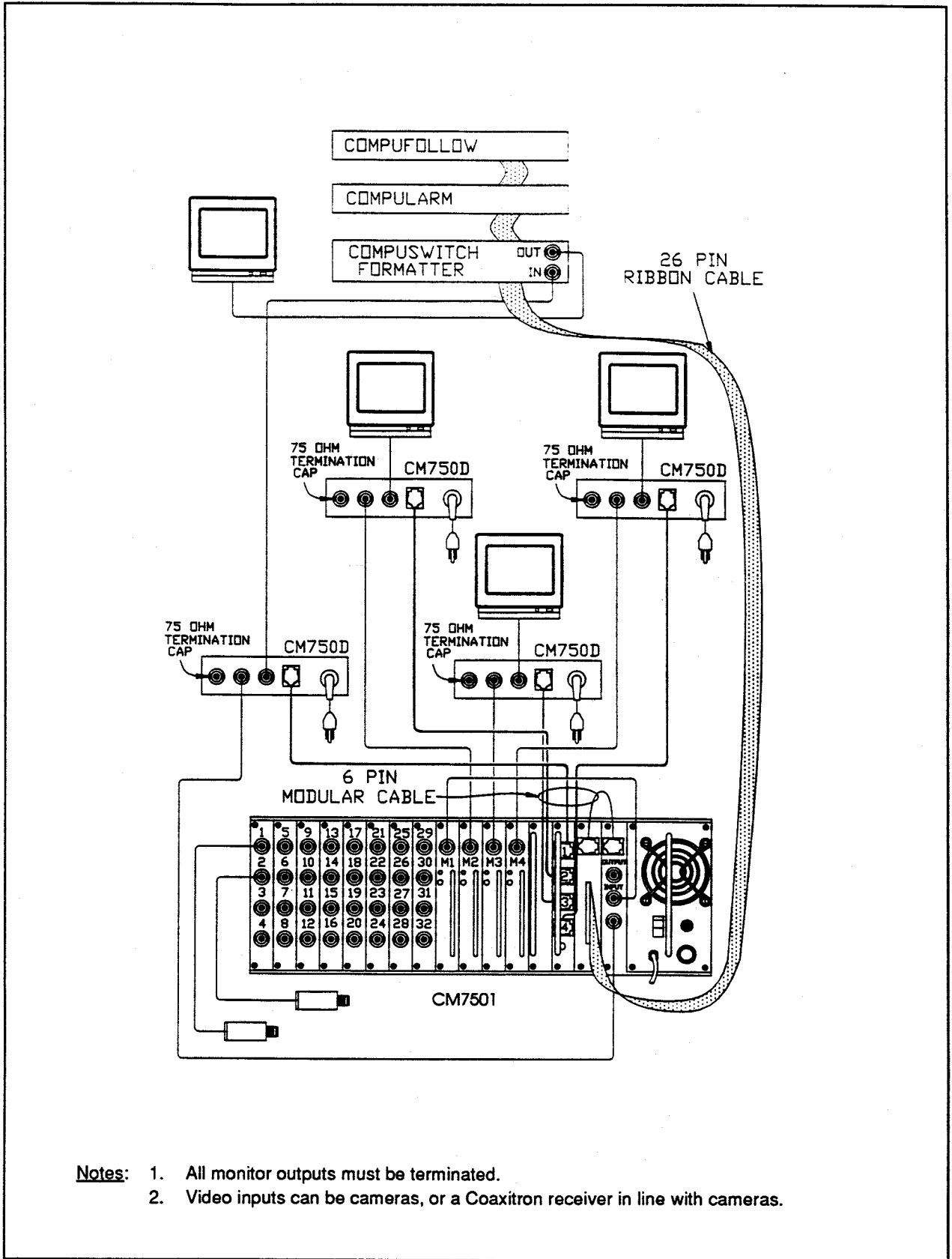
- Notes:**
1. All monitor outputs must be terminated.
  2. Video inputs can be cameras, or a Coaxitron receiver in line with cameras.

Figure 5. CM7501-RS422 Basic Interconnect Diagram



- Notes:**
1. All monitor outputs must be terminated.
  2. Video inputs can be cameras, or a Coaxitron receiver in line with cameras.

Figure 6. Typical System Using Four (4) CM750D Controllers



- Notes:**
1. All monitor outputs must be terminated.
  2. Video inputs can be cameras, or a Coaxitron receiver in line with cameras.

Figure 7. Typical System Using CM750C Interface Card

## 5.0 OPERATION

### PLEASE READ FIRST!

A change was made to the CM7504 output card. As a result, new software was written to allow a system to operate with all new CM7504 output cards or any combination of old and new cards.

CM7501/CM7502 card cages identified as "2F" (or subsequent) in the serial number will have the new CM7504 output cards factory installed. If you are uncertain whether your output cards are of the new or old design, refer to Section 5.2.2 for additional instructions.

After determining whether your system has new, old, or a combination of both new and old output cards, proceed to Sections 5.1, 5.2, or 5.3 for correct operating procedures.

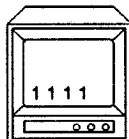
### 5.1 CM7500 SYSTEM CONFIGURED WITH NEW CM7504 OUTPUT CARDS

Follow the procedure below for **initial** operation.

1. Turn the system ON; then reset the system by momentarily depressing the **reset** switch on the CPU card (see Figure 8). clear any old programming that might be stored in the memory on battery backup. Make sure the keyboard controller is connected to port 1 of the CPU card and the key switch is turned to the **PGM** position.

If there is a video source connected, you should see the video from camera input 1 on the monitor, along with four numbers (all ones) in the bottom left-hand corner of the monitor screen (see example below).

Example:



2. Wait approximately 5 seconds (or until the system has reset) and then press the **STOP** key on the controller keyboard. This will clear the four number ones from the monitor screen.

3. Refer to Sections 5.4 through 8.3 for additional operating and programming instructions.

### IMPORTANT NOTE:

Any time the **reset** switch is pressed the system memory will be cleared. If this occurs, you must repeat the procedures previously outlined.

Turning the power off and on will not clear the system memory.

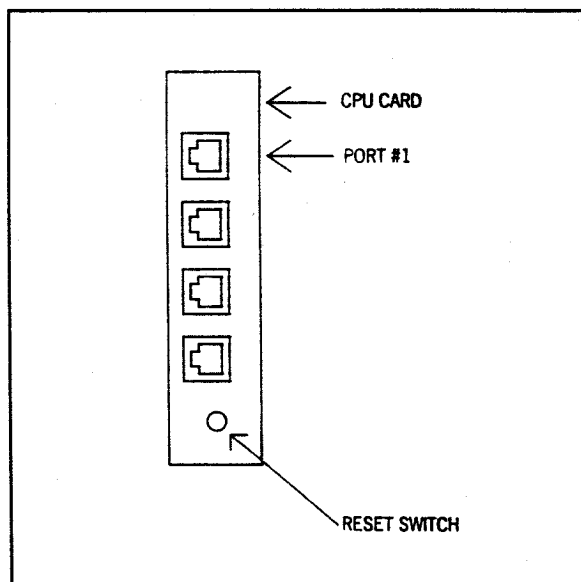


Figure 8. Reset Switch Location

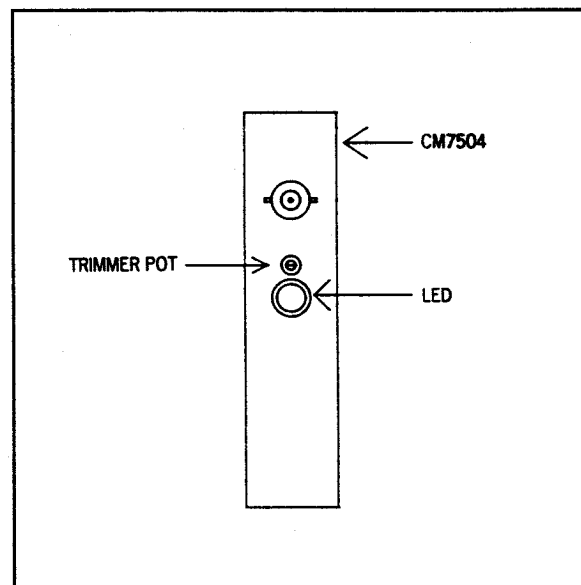


Figure 9. Trimmer Pot Location

## 5.2 CM7500 SYSTEM CONFIGURED WITH ANY COMBINATION OF NEW AND OLD CM7504 OUTPUT CARDS

If you are installing new CM7504 output cards into a system with existing output cards, you will need to install a new EPROM chip on the CM7501/CM7502 CPU card.

The software EPROM chip will allow the new CM7504 output card(s) to work in conjunction with any previously manufactured output cards in your system configuration.

If for some reason you did not receive the new EPROM chip, consult the factory **before** installing the new output card(s).

Install the EPROM according to the instructions in Section 5.2.1 and then proceed to Section 5.2.2 for CM7504 output card installation and setup procedures.

### 5.2.1 EPROM Installation

To install the new EPROM chip on the CM7501 or CM7502 series CPU card, perform the following steps.

1. Turn the system OFF. Remove the CPU card from the card cage. (This is the card with the four modular phone jacks.)

2. Locate the EPROM at location U18 (see Figure 10) and remove by placing a slot screwdriver under the chip at either end and gently lifting up and away from the board.
3. Each chip on the board has a small notch on one end. Determine the orientation of these notches (either left or right, depending on the position of the CPU card).

#### **CAUTION:**

The new EPROM chip **must be inserted** with the notch oriented in the same direction as the other chips. **Failure to do so will result in damage to the chip.**

After determining correct orientation, insert the new EPROM by aligning the pins with the holes in the board; gently press the chip into the board. (You may need to slightly bend the pins towards the center of the chip to align them with the pin holes on the board.)

4. Insert the CPU card back into the card cage.
5. Proceed with CM7504 output card installation and setup procedures outlined in the following section.

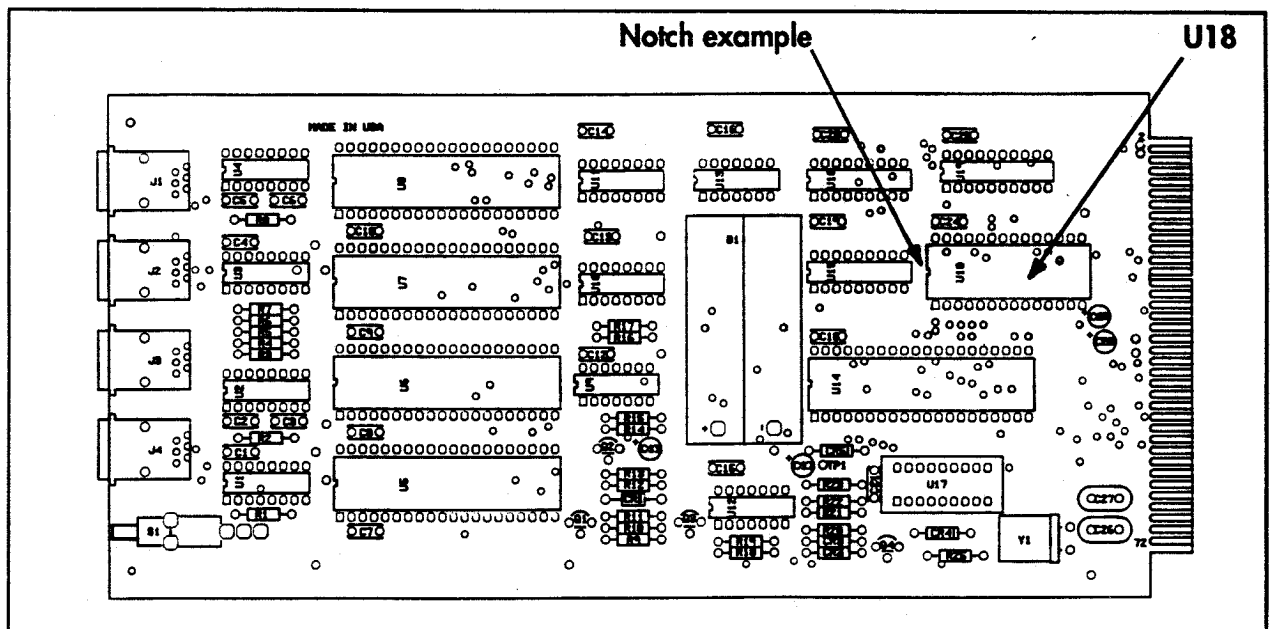


Figure 10. CM7501/CM7502 CPU Printed Circuit Board Layout

## 5.2.2 CM7504 Output Card Installation and Setup

When combining new and old CM7504 output cards in your system, follow the instructions provided below to ensure proper operation of your matrix system.

### CARD IDENTIFICATION

To identify old versus new, look for the largest integrated circuit (IC) on the output card. The part number for this IC on the **old board** will be **MM58146N**; the part number for the **new board** will be **MB88323A**.

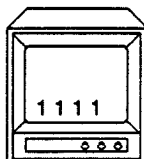
Plug all cards into the appropriate slots in the card cage, making note of which output card slots have new cards and which ones have old cards.

The leftmost slot for output cards is slot #1, while the rightmost slot is slot #4 (refer to Figures 2 through 7, if necessary).

Once all cards have been installed, perform the following steps:

1. Locate the switch beneath the fan on the back of the CPU/card cage, turn the system ON; then momentarily depress the **reset** switch on the CPU card (see Figure 8.)
2. Attach a video source to camera input 1 (upper left-hand corner) and a monitor to any one of the **new** output cards. (Note: If a video source is not available, or if all output cards are old style, connect the monitor as previously mentioned and proceed directly to step 4. However, if this procedure is done in this manner there will be no visual indication that programming has taken place.
3. You should see the video from camera input 1 on the monitor, along with four (4) numbers (all ones) in the bottom left-hand corner of the monitor screen.

Example:



4. Attach the CM750D keyboard controller to port 1 of the CPU card (see Figure 2) and turn the key switch to the **PGM** position.

**Note:** *The following procedure is time dependent. Please read instructions before proceeding.*

Referring to your list of slot locations of the **new** and **old** output cards, press "9 0 MONx" where "x" is the number of any slot where an **old** output card is inserted (i.e., if Monitor 4, slot #4, has an old output card you would enter "9 0" on the numeric keypad and press the MON4 key). If the time between entering "9 0" and "MONx" exceeds five (5) seconds, the system will default and "CC" will reappear in the Group/Preview window requiring re-entry.

If there is a video source connected, you should see the "1" on the screen change to a "0". If you need to change a "0" to a "1", press "9 1 MONx".

5. When you are finished, press **STOP** on the controller keypad and return the key switch to the **RUN** position.

Refer to Sections 5.4 through 8.3 for additional operating and programming instructions.

**Notes:** (1) If you do not perform the steps listed above, the system will work fine except that some monitor outputs may have no ID number present or the ID number displayed may be incorrect.

- (2) The ID number displayed on the monitor by the new output card is smaller than the ID number displayed by the old output card. This is because of the different IC used to generate the channel ID number.

### IMPORTANT NOTE:

Any time the **reset** switch is pressed the system memory will be cleared. You must perform steps 1 through 5 to restore the settings in the memory.

Turning the power off and on will not clear the system memory.



### 5.3 CM7500 SYSTEM CONFIGURED WITH OLD CM7504 OUTPUT CARDS

If you have a system manufactured prior to June 1992 (identified 2E, or earlier, in the serial number on the card cage), **continue** to operate your system as you did in the past. Refer to Sections 5.4 through 8.3 for additional operating and programming instructions.

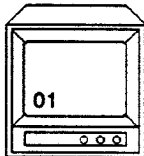
Follow the procedures outlined below for **clearing** the system memory only.

1. Turn the system ON; then reset the system by momentarily depressing the **reset** switch on the CPU card (see Figure 8). This action will clear all the information stored in the system memory.

**Note:** Turning the power on and off **will not** clear the system memory.

2. The system will begin sequencing (at 5 second intervals) through all camera inputs. As it sequences through the inputs, the corresponding camera input number will be displayed in the lower left-hand corner of the monitor screen (for each monitor output).

**Example:**



where 01 indicates camera input #1

Sequencing will continue indefinitely until one of the features outlined in Sections 5.4 through 8.3 is selected.

### 5.4 VIDEO PRE-DISTORTION ADJUSTMENT

This adjustment is initially done at the factory, however, a field adjustment may be required to compensate for the cable distance between the CM750D (controller) and the CM7501 (card cage).

To accomplish this adjustment the system must be operating and have a camera hooked up to one of the video inputs, as the light is a result of the video signal. At this point rotate the trimmer pot located on each CM7504 (output card) until the light is brightest and then from that point slowly rotate the trimmer pot just to the point that the light dims to minimum brightness (this is a fine adjustment). Refer to Figure 9 for trimmer pot location.

**Note:** The LED will light up brightly whenever a Coaxitron control signal is transmitted through the CM7504 (output card).

### 5.5 CAMERA SELECTION

To view a specific camera on MON1, press the key number that corresponds to the camera (the GROUP/PREVIEW display will show this number) and press the MON1 key. The selected camera's picture will appear on MON1 while the camera number is shown on the CAMERA display. Once the camera is selected to MON1 it will stop sequencing (verification of this command is identified by the LED moving from GO to STOP). This indicates that MON1 will not continue to sequence. Since all the monitor outputs operate independently they will not be affected by the STOP status of MON1. To select a camera to MON2, press the key number that corresponds to the camera and press the MON2 key, etc. To make the Matrix begin to sequence (change the status from STOP to GO) simply press the GO key. The LED next to the GO key will light to indicate the state of the monitor. To stop the sequence, press the STOP key and the indicator LED will light. Coaxitron control is directly related to which output card (CM7504) and 6-pin modular port that the desk top controller (CM750D) is connected to. For example, if the CM750D is connected to MON1 and to the 6-pin modular port 1, then control can only be attained when the camera is selected to MON1. Thus, in the configuration of Figure 6 each CM750D can have independent Coaxitron control of each camera.

## 5.6 RAPID SEQUENCE

To rapidly sequence through the cameras on a particular monitor, press the ENABLE key and hold it down. It is also possible to single step through the sequence by momentarily keying the ENABLE key.

To rapidly sequence in the reverse direction, press the BACK/DWELL key and hold it down. It is also possible to single step in the reverse direction by momentarily keying the BACK/DWELL key.

## 5.7 PROGRAMMING CAMERA GROUPS

To program a select sequence of cameras or group it is necessary to turn the key operated switch clockwise from the RUN to the Program (PGM) position. The LED lights will indicate the state of the key switch as either **RUN** or **PGM**. Once in the Program (PGM) mode, select the monitor that the group is to be programmed on by pressing the desired monitor (MON1-MON4) key. To remove a camera from the group sequence, key the number of the camera, then key the DISABLE key. The status of the camera is shown by the LED next to the ENABLE and DISABLE keys. In the case above, the lit LED would have moved from ENABLE to DISABLE.

### 5.7.1 Rapid Camera Removal From The Group

To rapidly remove several cameras in sequence, key the number of the first camera then hold the DISABLE key down. The CAMERA display will show the number of the cameras that are being removed from the group. (One will note that the CAMERA display shows the numbers of cameras that have input cards inserted in the Matrix. The GROUP/PREVIEW display shows the possible number of cameras that the Matrix can accommodate. It is normal for the displays not to count synchronized.) Return to the **RUN** mode by use of the key switch. You will note that the cameras that were disabled do not appear in the normal sequence of the Matrix. It is still possible to view the disabled cameras by selecting them as normal. The disabling just removes them from the normal sequence.

## 5.7.2 Adding Cameras To The Group

To add cameras back to the normal sequence group, return the key switch to the Program (PGM) mode. Make certain that the Matrix is at the correct monitor (MON1-MON4) that contains the group you are adding cameras to. Add a camera by keying the number of the camera, then pressing the ENABLE key. The LED next to the switch lights, indicating the status.

To rapidly add cameras to the group, press the key of the starting camera and hold the GROUP switch down. The Matrix will add the cameras the CAMERA display indicates. This operates identical to the camera removal procedures previously mentioned.

### 5.7.3 Camera Group Status Check

While in the Program mode it is possible to check the ENABLE or DISABLE status of each camera in the group. To do this, press the number of the camera, then press the monitor (MON1-MON4) key of the group that you want to check. The LED next to the ENABLE or DISABLE switch will light indicating the status of that camera.

## 5.8 MOVING CAMERA GROUPS

After a system reset the Matrix assumes that the sequence of cameras on MON1 is GROUP 1, the sequence on MON2 is GROUP 2, etc. The moving of camera groups can be done in the RUN mode. The group sequence of one monitor may be placed into another monitor. For example, to put the group sequence of MON1 into MON2, press the MON2 key. This will light the LED next to the MON2 key. Next press the "1" key and press the GROUP key. The GROUP/PREVIEW display will now show a "1" indicating that the monitor will now sequence the camera pattern programmed for group 1.

## 5.9 CAMERA DWELL TIME ADJUSTMENT

The Matrix has the option of four different camera groups with the possibility of each group sequencing at a user defined rate for viewing the video picture from each camera, commonly referred to as the "dwell" time. The span of dwell times range from 1 to 99 seconds.

**Note:** The dwell times apply to independent groups, not individual cameras.

To set the dwell time, turn the key switch to **PGM**. Next, press the monitor key for the camera group that you want to adjust the dwell on (for this example use MON1). Now press the number "1" key and press the BACK/DWELL key. This has assigned a one second dwell time between the cameras for the group on MON1. Return the key switch to the **RUN** mode and press the GO key.

The cameras will now sequence with a one second dwell between cameras.

## 5.10 CAMERA LOCKOUT

**Note:** "Lockout" Programming can only be done from the CM750D connected to CPU port number 1.

The Matrix has the ability to keep user assigned cameras from being selected by the CM750D (referred to as LOCKOUT). Once a camera is locked out it will not only be kept from being viewed by the monitor connected to the CM750D, but will also not respond to an alarm activation. Independent lockouts may be assigned to each CM750D. To lock out a camera, rotate the key switch clockwise to the third position (in this position both LEDs to indicate RUN or PGM will be off). Next, press the number "1" key and press the GROUP key. The LEDs next to the GO and STOP keys will alternately flash on and off. At this point merely press the key number that corresponds to the camera and then press the DISABLE key. For example, to lock out camera number 1 on MON1, press the MON1 key (this sets the Matrix to LOCKOUT on the group assigned to MON1) and the LED will light next to it. Next, press the number "1" key and press the DISABLE key. The LED next to the DISABLE key will light indicating that the camera is locked out. Return the key switch to the **RUN** mode and press the MON1 key to stop the flashing LEDs. Camera number 1 will not respond to any commands to select it on MON1.

## 5.11 RESTORE CAMERA FROM LOCKOUT

To restore a camera from lockout, turn the key operated switch clockwise to the third position. Next, press the number "1" key and press the

GROUP key. The LEDs next to the GO and STOP keys will alternately flash on and off. At this point, press the number key of the camera and press the ENABLE key. The LED next to ENABLE key will light indicating that the camera is no longer locked out. Return to the **RUN** mode and press the MON1 key to stop the flashing LEDs.

## 5.12 LOCKOUT STATUS CHECK

To check whether a camera is in LOCKOUT, first turn the key operated switch clockwise to the third position. Next, press key number "1", then press the GROUP key. The GO and STOP LEDs will flash on and off to indicate the third program mode of the Matrix. To check the camera status, press the number key of the camera and press the appropriate monitor (MON1-MON4) key for the camera group that is to be checked. The LEDs next to the ENABLE and DISABLE keys will light to indicate the status of the camera. ENABLE = operating ; DISABLE = locked out.

### 5.12.1 Controller Lockout

The CM7500 in normal operating conditions (such as after a reset) will allow all controllers to change cameras on all monitor outputs. This may be an undesirable case if a monitor output(s) is to be dedicated to a particular group of cameras and not to be interrupted by an operator. The CM7500 can be programmed to prevent such a situation. When the MON key is preceded by numeric entry between 65 and 79 this will enable switcher control of that controller to a particular monitor (or monitors). The proper numeric entry is equal to the sum of the binary number associated with each of the CPU card's control ports.

The binary values are:

Output number 1 = 1  
Output number 2 = 2  
Output number 3 = 4  
Output number 4 = 8

For example, if the system was a 4 controller system and each controller was only to operate their particular monitor output then the programming sequence would be as follows. Any controller can perform this programming, for this example controller 1 is used.

Turn the key operated switch to the **PGM** mode.

- To enable control of MON4 to controller 4 only, enter 72 ( $64+8=72$ ) and press the MON4 key.
- To enable control of MON3 to controller 3 only, enter 68 ( $64+4=68$ ) and press the MON3 key.
- To enable control of MON2 to controller 2 only, enter 66 ( $64+2=66$ ) and press the MON2 key.
- To enable control of MON1 to controller 1 only, enter 65 ( $64+1=65$ ) and press the MON1 key.

**Note:** Care must be taken in this case for if the MON1 were entered first, then it would have been locked out and not able to complete the programming.

If more than one monitor is to be enabled to a controller, simply enter the sum of the binary numbers for the monitors. For example, to allow controller 1 switcher control of monitors 1 and 2, enter 67 ( $64+1+2=67$ ) and press the MON1 key.

Another example would be to allow controller 4 switcher control of monitors 2, 3 and 4. Again enter the binary sum of 2, 3 and 4 which is 78 ( $64+2+4+8=78$ ) and press the MON4 key.

**Note:** This programming is lost when the CPU card is reset.

### 5.13 ALARM FUNCTIONS

**Note:** Alarm Programming can only be done from the CM750D connected to CPU port number 1.

When the Matrix is connected to the Compularm CSA764 by use of the interface card (CM750C), see Figure 7, it will act as an alarmed triggered video switcher. When an alarm is activated, the MON1 of the Matrix will automatically switch to the camera that corresponds to the alarm number input. The camera display shows the alarmed camera number while the MON1, STOP and ENABLE LEDs flash.

Provided the CSA764 is in the attended mode, one can acknowledge the alarm state by pressing the MON1 key. To ARM or DISARM the alarm inputs, turn the RUN/PGM key switch clockwise to the third position in which both LEDs are off. Press the number "2" key and press the GROUP key. This key sequence will cause the GO and STOP LEDs to alternately flash and the PREVIEW/GROUP display to show number "2".

The Matrix is now in the correct mode to ARM or DISARM alarm inputs. To disarm input 1, press "1" and press the DISABLE key. Notice that the LED next to the DISABLE key is now on. This indicates the status of the input DISABLE = DISARM. Activating this input now will not trigger the alarm. To ARM this input simply press "1" and press the ENABLE key. Again, notice that the LED next to the ENABLE key is on indicating the status of ARMED = ENABLED. This input will now trigger an alarm. To read the status of each alarm input, key the number for the input and press the GO key. The status is indicated by the LED next to the ENABLE or DISABLE key.

### 5.14 ALARM ENHANCE FEATURES

**Note:** This software feature is available on CM7500 matrix systems released during or after October 1991. (Serial number XXXX 1J)

The alarm enhance features increase the flexibility of the CM7500 matrix by providing the following options:

- Programming any camera inputs to any monitor outputs when the CSA764 receives an alarm condition.
- Programming preposition commands to respond to alarm activations (available only on the CM7501/RS422).

#### 5.14.1 Clear All Alarm Program Memory

After the reset switch is pressed, the CM7500 matrix will default to the normal alarm described in Section 5.13. Since it is not desirable to lose all alarm programming when a system reset is pressed, additional steps must be taken to clear the alarm enhanced memory.

**Note:** All key entries are single key entries; there are no simultaneous entries.

To clear the alarm memory, turn the key operated switch to the third position. Press the number 2 key and then press the GROUP key. The MON1 LED will light while the GO and STOP LEDs will alternately flash on and off. Press the number 22 and press the GROUP key. The GO, STOP, ENABLE and DISABLE LEDs will flash on and off. At this time, press the reset switch located on the CPU card (see Figure 8). This action has cleared all alarm memory and will allow you a "clean slate" to begin programming on.

Return the key switch to the **RUN** position and press the MON1 key. This action returns the matrix from a disallowed reset state to the run mode.

#### 5.14.2 Programming Enhanced Alarms

Before beginning to program the alarm enhance features, one must have a good idea of the conditions to be performed when each alarm activation of the CSA764 occurs. A chart as in Figure 11 is helpful, but not necessary. The chart indicates alarm input verses monitor output (camera and preset). To program, turn the key operated switch to the third program position.

Press the number 2 key, then press the GROUP key (alarm programming mode). The MON1 LED will light while the GO and STOP LEDs will alternately flash on and off.

Press the number 22 and press the GROUP key (this will activate the alarm enhance features). The MON1, MON2, GO and STOP LEDs will flash on and off.

Press the number 33 and the GROUP key (alarm enhance programming mode). The GO, STOP, ENABLE and the DISABLE LEDs will flash on and off while the MON4 LED remains lit. The camera display indicates the alarm input number 1 (refer to Figure 12). The MON keys are for assigning a camera input to the monitor output. The GO, STOP, ENABLE and DISABLE keys are for assigning presets to the monitor output (the unit must be a CM7501/RS422 for preset option).

Press the MON1 key (no number entry before). The CAMERA display will indicate a "1". This is

because the system default is that all alarm inputs will be displayed on monitor 1. Press the MON2, MON3 and MON4, GO, STOP, ENABLE and DISABLE keys (with no numeric entry before); a "99" will be displayed in the CAMERA window. The "99" being displayed indicates no entry at that location. To assign camera 1 to MON2, MON3 and MON4, press the number 1 and press the corresponding monitor key (i.e., press the number 1 and press the MON2 key; press the number 1 and press the MON3 key; press the number 1 and press the MON4 key).

If presets are desired on the alarm activation (model CM7501/RS422 only) then the keys directly opposite of the monitor keys are used (see Figure 12). To assign preset 1 to MON1, press the number 1 and press the GO key. Since all the monitors in this program will display the same camera, only one preset can be assigned. If, however, each monitor had been assigned a different camera, then it would be possible to assign each monitor a different preset number.

Advance to alarm input 2 by pressing the GROUP key. The CAMERA window will display the number 2. Press the MON1 key (no number entry before). The CAMERA display will indicate a "2". This is because the system default is that all alarm inputs will be displayed on monitor 1. Press the MON2, MON3, MON4, GO, STOP, ENABLE and DISABLE keys (with no numeric entry before); a "99" will be displayed in the camera window. The "99" being displayed indicates no entry at that location. In this case, one may want to assign camera 3 to monitor 2, camera 4 to monitor 3, and camera 5 to monitor 4 when alarm input 2 is triggered. To assign camera 3 to MON2, press the number 3 and press the MON2 key. To assign camera 4 to MON3, press the number 4 and press the MON3 key. To assign camera 5 to MON4, press the number 5 and press the MON4 key. Assign the desired preset to each camera monitor combination using the GO, STOP, ENABLE, and DISABLE keys.

To check if the entries are correct, press MON1, MON2, MON3, MON4, GO, STOP, ENABLE and DISABLE keys (with no numeric entry before). The number assigned should appear in the camera window. Advance to the next alarm input by pressing the GROUP key and continue to program in the same manner all the enhanced alarm inputs appropriate.

		ALARM INPUT NUMBER																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	ETC.
MON1																				
CAMERA #																				
PRESET #																				
MON2																				
CAMERA #																				
PRESET #																				
MON3																				
CAMERA #																				
PRESET #																				
MON4																				
CAMERA #																				
PRESET #																				

ENHANCED ALARM PRESETS  
AVAILABLE ON CM7501/RS422 ONLY

Figure 11. Charting Enhanced Alarm Presets

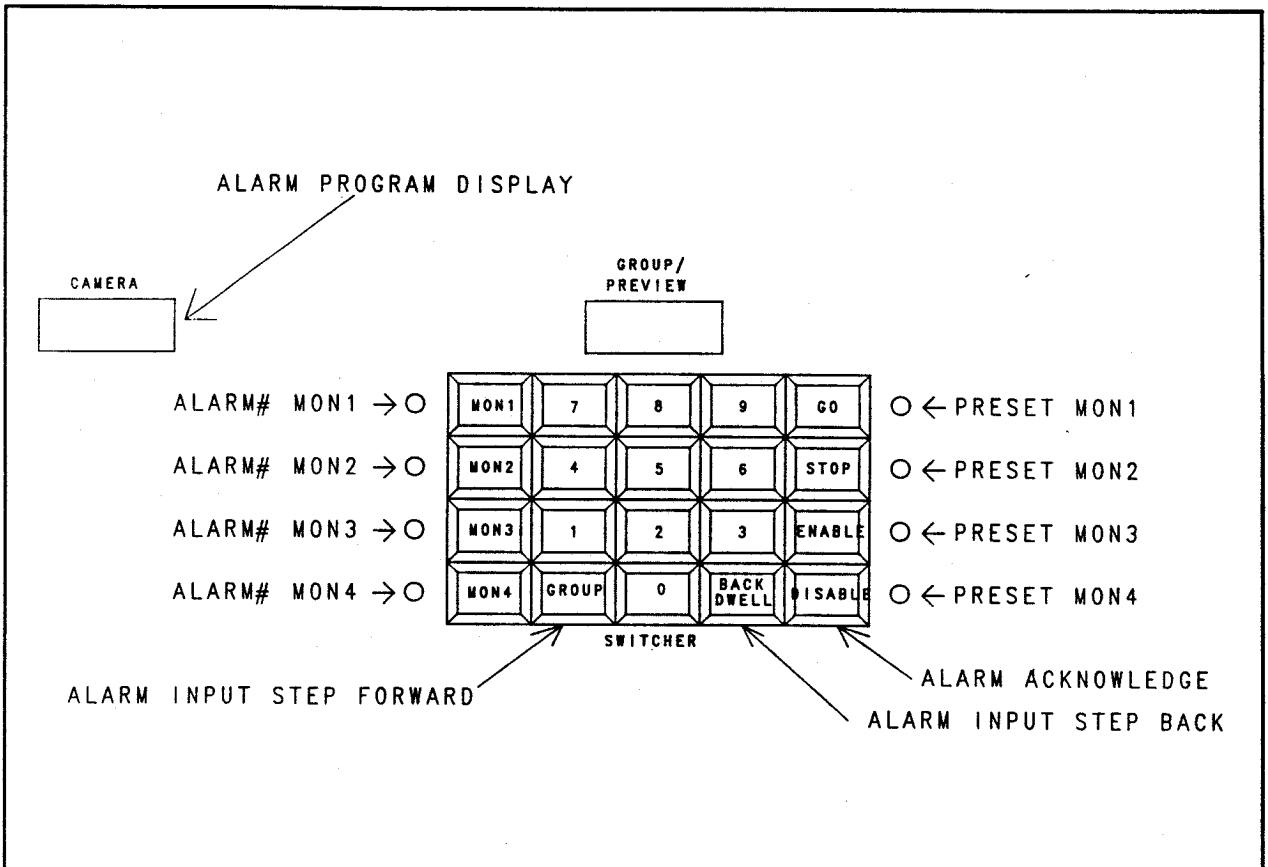


Figure 12. Programming Enhanced Alarms

## Stepping Back

To step back to the previous alarm input, press the BACK/DWELL key. The camera window will show the current alarm input.

## Run Operation

To operate the alarm enhance features, turn the key switch to the **RUN** mode and press the MON1 key.

**Note:** Because of the multiple programming modes all monitors are operating as camera group 2. This can easily be returned to previous camera groups as described in Section 5.8, Moving Camera Groups.

## 6.0 COAXITRON CONTROL

The Coaxitron control panel (CM750D) must be connected to one of the four control ports via a 6-pin modular telephone type cord. The control port defines which monitor key is used for control of the pan/tilt, camera, lens and auxiliary (AUX) functions.

**Example:** A control panel connected to port 1 has control of pan/tilt, camera, lens and AUX functions only when the camera is addressed on MON1. Trying to control the pan/tilt, camera, lens and AUX functions on MON2-4 will not work.

## 6.1 COAXITRON PRESETS

Presets are positions of the pan/tilt and lens which the user has pre-programmed and wants to view again. The Coaxitron preset system requires special preset equipment at the receiver. The connection to the Matrix is identical to a conventional Coaxitron system. It is possible to create up to 32 different presets at each receiver. Once a preset is created it cannot be erased by power out conditions. Presets may be created and selected from any CM750D triggered at the receiver (consult Coaxitron receiver manual for more information).

### 6.1.1 Setting Presets

First select the camera. Next, position the pan/tilt and adjust the lens to where the preset is to be. Turn the key switch to the **PGM** position. The keys used have dual functions for presets (see Figure 13). Press a number key (1-32) and press the SET PRESET (AUX 3) key. The GROUP/PREVIEW display will show "cc" while the Matrix sends the preset signal. At this point, it is best to make copies of the chart provided in Figure 14 to record the presets, since the numbers become too cumbersome to remember.

### 6.1.2 Accessing Presets

It is possible to access a preset (GO TO PRESET) with the key switch in either the RUN or PGM position. To GO TO PRESET, press the number key assigned to the preset and press the "GO TO PRESET" (AUX 4) key. The pan/tilt and lens will return to the preset.

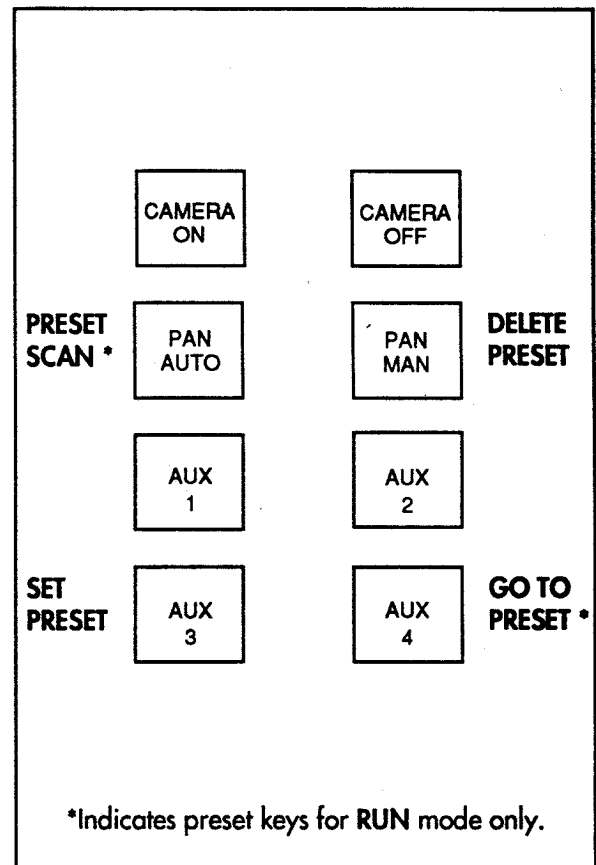


Figure 13. RUN and Program (PGM) Mode Preset Keys

PRESETS FOR CAMERA #\_\_\_\_

PRST#	PRESET VIEW
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	
31	
32	

Figure 14. Presets For Camera



### 6.1.3 Preset Scan

The PRESET SCAN function will scan between presets at a user designated dwell time of 5 to 64 seconds. To PRESET SCAN, press a number key (5-64) to designate the scan dwell time and press the PRESET SCAN (PAN/AUTO) key. To stop the scan, activate any Coaxitron function.

### 6.1.4 Delete Preset

Since the presets are held in a non-volatile memory by the receiver they must be deleted manually. First, turn the key switch to the **PGM** position. Next, press the number key for the preset and press the DELETE PRESET (PAN/MAN) key. To delete all presets, see Section 6.1.5, Receiver Reset.

**Note:** It is possible to write over an existing preset without deleting it first.

### 6.1.5 Receiver Reset

Provided the Coaxitron receiver has the latest software, it can be reset remotely. The reset goes through a routine to check for the presence of a preset lens and the presence of limit stops on the pan/tilt.

The receiver will cause the pan/tilt to nod "yes" if a preset lens is properly connected and if the pan/tilt has limit stops. This reset routine will clear all the presets in the receiver and take approximately 45 seconds to complete. To remotely reset the receiver, turn the key switch to the **PGM** mode, key in the number "55" and press the PAN/MAN key.

**Note:** A power off and on condition at the receiver will also begin the routine, but the presets will be retained.

## 7.0 CM750C TIME CARD PROGRAMMING

The CM750C interface card identified as PCB9000213 and manufactured after February, 1990, is for use with Compuswitch Formatter, Compularm, and Compufollow modules, and provides automatic clock control matrix functions. The information in this section applies only to models manufactured after February, 1990, utilizing the PCB9000213 board.

**Note:** CM750X cards identified as PCB9000207 are not capable of performing automatic clock control matrix functions.

The following procedures should be performed by an experienced operator who is familiar with the matrix functions as previously described in Sections 5 and 6. For system configuration of the CM750C, refer to Figure 7.

## 7.1 LIST OF TERMS

### Step

A numerical location in the program.

### Setup #

The number assigned to a particular camera and preset on any of the four monitor outputs.

### Day Type

A sequence of different channels and presets at designated times over a 24-hour period. There are 9 possible day types.

### Group Sequencing Setup

A select group of cameras and dwell times assigned to a monitor output.

## 7.2 TIME PROGRAM PROCEDURE (EXAMPLE PROGRAM)

To program at this point, one must be familiar with the basic Matrix and preset commands.

The first thing to do is to set the desired presets in the Coaxitron receiver locations.

In this example program, create six different presets at one Coaxitron receiver. Record these presets on a copy of the preset chart for reference ease. (See Figure 14.)

Now place the key switch in the third position (in this position, both the RUN and PROGRAM LEDs will be off). Push the number "4" key and then push the GROUP key. The LEDs next to the GO and STOP keys will begin to alternately flash on and off. The GROUP/PREVIEW display will show a number "4" indicating program mode 4. The CAMERA display shows a number "1" which indicates program step 101.

Refer to the chart on preset setups. (See Figure 16.) This chart is to assist in recording setups, since the numbers may become too cumbersome to remember. One can see from the chart that it is possible to put up to 30 clock controlled presets for each monitor output.

For the example program, we will record all the clock controlled preset setups in the MON1 column.

Make certain that the Coaxitron receiver in this example is connected to input channel 1 of the matrix.

Refer to the SETUP keyboard (Figure 15).

To create the first setup:

- Press key "1" (for camera 1) and press the MON1 key. This assigns the camera number. (Record this at step 101 under the camera # column.)
- Next, press the key "1" and press the GO key. This assigns the first preset to MON1. (Record this at step 101 under the camera # column.)

- Next, advance to step 102 by pressing key number "2" and pressing the GROUP key. The CAMERA display shows 2, indicating step 102.

Create the second setup by:

- Pressing key "1" and pressing the MON1 key. (Record this at step 102 under the MON1 camera # column.)
- Now, assign the second preset by pressing key "2" and pressing the GO key. (Record this at step 102 under the MON1 camera # column.)
- Advance to step 103 by pressing key "3" and pressing the GROUP key.

Now assign the third setup to camera 1 by:

- Keying "1" then pressing the MON1 key.
- The third preset can now be assigned by keying "3" then pressing the GO key. (Record these in the appropriate column.)

Advance to the next step by repeating these procedures for setups 4, 5, and 6.

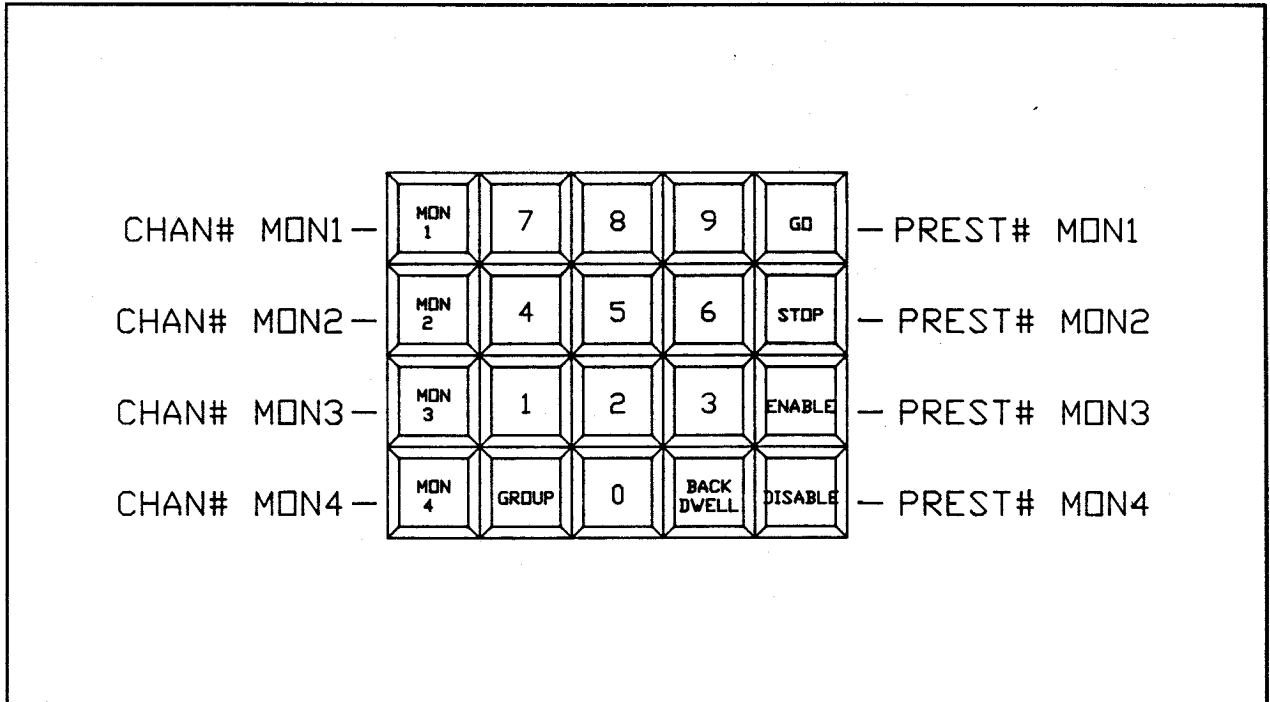


Figure 15. Setup Keyboard

# PRESET SETUPS

STEP#	SETUP#	MONITOR 1		MONITOR 2		MONITOR 3		MONITOR 4	
		CAMERA #	PRESET #1-32	CAMERA #	PRESET #1-32	CAMERA #	PRESET #1-32	CAMERA #	PRESET #1-32
101	1								
102	2								
103	3								
104	4								
105	5								
106	6								
107	7								
108	8								
109	9								
110	10								
111	11								
112	12								
113	13								
114	14								
115	15								
116	16								
117	17								
118	18								
119	19								
120	20								
121	21								
122	22								
123	23								
124	24								
125	25								
126	26								
127	27								
128	28								
129	29								
130	30								

Figure 16. Preset Setups

### 7.3 DAY TYPES

With the completion of the setups we are ready to program one of nine possible DAY TYPES. See charts in Figures 18 through 22. In this example program we will assign the first setup to go on at 6:06 a.m.

- First advance to step 141 by keying "41" and pressing the GROUP KEY. (Refer to the DAY TYPE keyboard, Figure 17.)
- Now, key "6" and press the MON1 key to set the hour.
- Next, key "5" and press MON2 to set the minute.
- Last, key "1" and press MON3 to set the data for the setup.

Record these on the DAY TYPE charts for ease of reference.

We can now assign the second preset on step 141 by using the opposite side of the keyboard.

- First, key "6" and press the GO key; this sets the hour.
- Next, key "7" and press the STOP key to set the minute.
- Now, key "2" and press the ENABLE key to set the data for the setup.

The second setup will now occur one minute after the first setup.

To program the third setup, advance to step 142 by keying "42" and pressing the GROUP key. The number 42 will be shown in the camera display to indicate this.

- Again, key "6" and press the MON1 key to set the hour.
- Next, key "8" and press the MON2 key to set the minute.
- Now, key "3" and press the MON3 key to set the data for the third setup.

We will now set the fourth setup by keying "6" and pressing the GO key to set the hour.

- Next, set the minute by keying "9" and pressing the STOP key.
- Last, key "4" and press the ENABLE key to set the data for the fourth setup.

One can now advance to step 143 by keying "43" and pressing the GROUP key.

Assign setups 5 and 6 in the same manner as the previous setups, making certain to assign the minutes as 10 and 11 respectively. To advance to step 200, 300, 400, etc. (for other day types), key "2" and press the BACK/DWELL key to arrive at step 201. To arrive at step 301, key "3" and then press the BACK/DWELL key; etc.

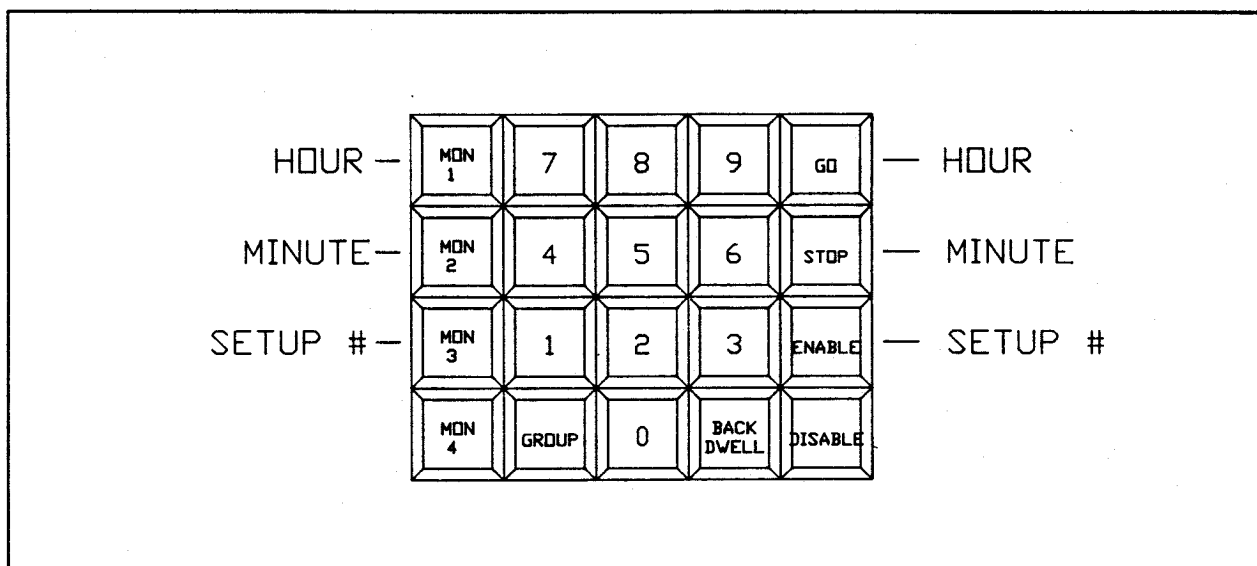


Figure 17. Day Type Keyboard



### DAY TYPE 3

STEP# 221-240	HOUR 0-23 MON1 KEY	MINUTE 0-5 MON2 KEY	SETUP# 1-30 MON3 KEY
221			
222			
223			
224			
225			
226			
227			
228			
229			
230			
231			
232			
233			
234			
235			
236			
237			
238			
239			
240			

HOUR 0-23 RUN KEY	MINUTE 0-59 STOP KEY	SETUP# 1-30 ENABLE KEY

### DAY TYPE 4

STEP# 241-260	HOUR 0-23 MON1 KEY	MINUTE 0-5 MON2 KEY	SETUP# 1-30 MON3 KEY
241			
242			
243			
244			
245			
246			
247			
248			
249			
250			
251			
252			
253			
254			
255			
256			
257			
258			
259			
260			

HOUR 0-23 RUN KEY	MINUTE 0-59 STOP KEY	SETUP# 1-30 ENABLE KEY

Figure 19. Day Type 3 and Day-Type 4 Charts

### DAY TYPE 5

STEP# 301-320	HOUR 0-23 MON1 KEY	MINUTE 0-5 MON2 KEY	SETUP# 1-30 MON3 KEY
301			
302			
303			
304			
305			
306			
307			
308			
309			
310			
311			
312			
313			
314			
315			
316			
317			
318			
319			
320			

HOUR 0-23 RUN KEY	MINUTE 0-59 STOP KEY	SETUP# 1-30 ENABLE KEY

### DAY TYPE 6

STEP# 321-340	HOUR 0-23 MON1 KEY	MINUTE 0-5 MON2 KEY	SETUP# 1-30 MON3 KEY
321			
322			
323			
324			
325			
326			
327			
328			
329			
330			
331			
332			
333			
334			
335			
336			
337			
338			
339			
340			

HOUR 0-23 RUN KEY	MINUTE 0-59 STOP KEY	SETUP# 1-30 ENABLE KEY

Figure 20. Day Type 5 and Day Type 6 Charts





## DAY TYPE 9

STEP# 421-440	HOUR 0-23 MON1 KEY	MINUTE 0-5 MON2 KEY	SETUP# 1-30 MON3 KEY	HOUR 0-23 RUN KEY	MINUTE 0-59 STOP KEY	SETUP# 1-30 ENABLE KEY
421						
422						
423						
424						
425						
426						
427						
428						
429						
430						
431						
432						
433						
434						
435						
436						
437						
438						
439						
440						

## SPECIAL DAYS

STEP# 441-450	HOUR 0-23 MON1 KEY	MINUTE 0-5 MON2 KEY	SETUP# 1-30 MON3 KEY	HOUR 0-23 RUN KEY	MINUTE 0-59 STOP KEY	SETUP# 1-30 ENABLE KEY
441						
442						
443						
444						
445						
446						
447						
448						
449						
450						

Figure 22. Day Type 9 and Special Days Charts

## 7.4 CLOCK/CALENDAR

In this example program we are ready to set the clock/calendar. For this example, we will set the time just prior to the DAY TYPE setups in order to observe it operates in a reasonable amount of time. Refer to the CLOCK/CALENDAR keyboard (Figure 23). Return to normal operation mode by turning the program key switch counterclockwise to the **RUN** position and press the MON1 key (this gets the unit out of the Program 4 mode).

To set the clock, one must get into Program 3 mode. To do this:

- Turn the program key switch clockwise to the third position; both RUN and PROGRAM LEDs will be off.
- Now key "3" and press the GROUP key. The GO and STOP LEDs will flash on and off alternately while the GROUP/PREVIEW display shows the number "3".
- Set the month by keying "8" (or the current number for the month) and pressing the GO key.
- Set the year by keying "89" (or the current number for the year) and pressing the STOP key.
- To set the day of the month, key "1" (or the current number for the day) and press the ENABLE key.

## 7.5 SETTING DAY OF WEEK

The BACK/DWELL key is used to assign the day of week the routines are to begin on (this requires a number setting of 1 to 7).

**Note:** The programming assumes that four consecutive days in the week will have the same clock programmed preset routines. Therefore, the day of week should be set so that the following four days will perform the same routines.

**Example:** If Tuesday were set as the first day of the week, then Wednesday, Thursday and Friday would perform the same routine. Then, Saturday would be day 2 and require a second type routine; Sunday would be day 3 and require a third day type routine; Monday would be day 4 and require a fourth day type routine; and then the week would repeat.

For this example program, set the day of week to "1" by keying "1" then pressing the BACK/DWELL key.

Before we set the clock, disable it from running by pressing the MON4 key. Next, set the hours by keying "6" and pressing the MON1 key. Set the minutes by keying "5" and pressing the MON2 key. Last, set the seconds by keying "1" and pressing the MON3 key.

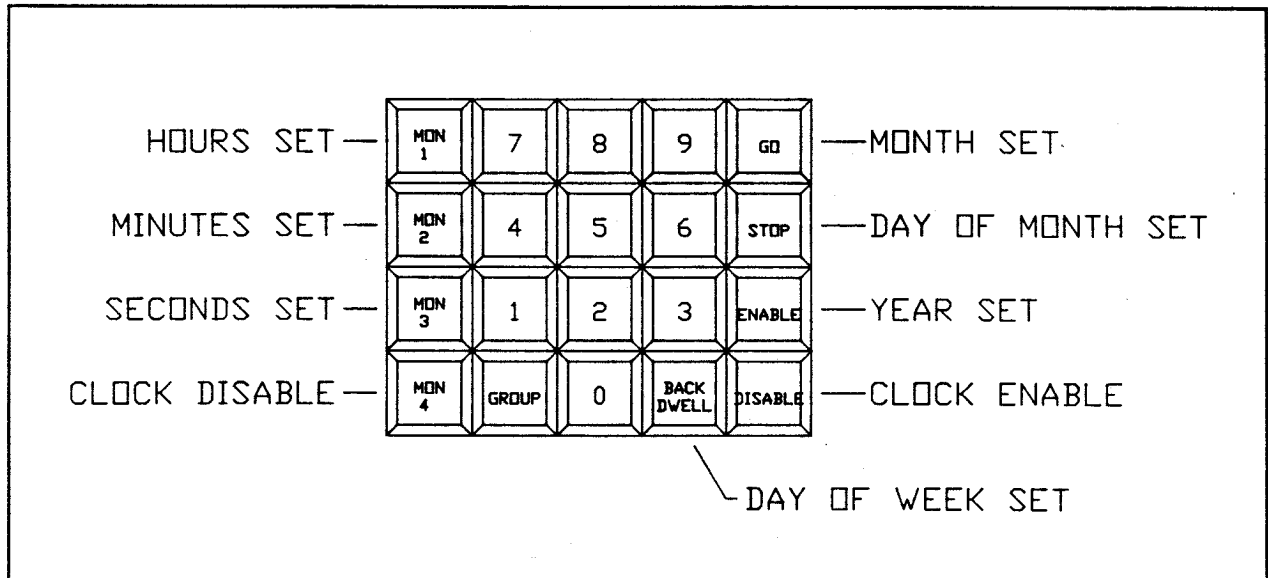


Figure 23. Clock/Calendar Keyboard

## 7.6 PROGRAM CHECK

At this point it is a good idea to check your work. Since we are still in the third program mode, check the clock/calendar settings by pressing the MON1 key for hours set. The setting entered previously (6) will appear on the camera display. If the wrong number appears, key the correct number and press the MON1 key. This will correct the entry. If the default number 99 appears, this means that no entry was made.

Press the month set key (GO), the year set key (STOP), etc. The number setting will appear on the CAMERA display. Check the SETUP and DAY TYPES in the same manner by returning to the fourth program mode and appropriate step number.

Return to the third program mode. Now start the clock by pressing the DISABLE key and quickly return the Matrix to the run mode by turning the key switch counterclockwise to the **RUN** position and pressing the MON1 key.

To begin the auto clock operated presets, key "99" and press the BACK/DWELL key. The first preset will occur 1 minute after the clock was enabled. The second preset will occur 1 minute after the first, etc. To stop automatic operation, key any number, except 99, and press the BACK/DWELL key.

## 7.7 GROUP SEQUENCING SETUP

Once the Matrix has completed its last preset, it will stay there until the beginning time of the presets for the following day. At this point, it is possible to program a group of sequencing cameras until the presets time the next day.

To create a group, refer to Section 5.7.

To program a group type:

- Return to the fourth program mode. Refer to the chart on GROUP SEQUENCING SETUPS (Figure 24).
- Next, key "31" and press the GROUP key. This will place the Matrix in step 131.
- Key the desired group number and press the MON1 key. This assigns the group to setup 31.

Observing the chart, one can see that it is possible to assign a different or the same GROUP to each of the monitors, all with the same setup number. It is also possible to program up to 10 different setups.

Now place setup 31 in the day type you just programmed.

STEP#	SETUP#	MON 1 GROUP#	MON 2 GROUP#	MON 3 GROUP#	MON 4 GROUP#
131	31				
132	32				
133	33				
134	34				
135	35				
136	36				
137	37				
138	38				
139	39				
140	40				

Figure 24. Group Sequencing Setups

Since you are still in the fourth program mode, key "44" and press the GROUP key. This will put you in step 144.

- Now key "6" and press the hour key (MON1).
- Key "12" and press the minute key (MON2).
- Key "31" and press the setup key (MON3).

The group has now been placed in the day type and will begin after the last preset setup.

Return to the third program. Set the clock to 6:05 a.m. and return to the **RUN** mode.

Begin the auto clock functions by keying "99" and pressing the BACK/DWELL key.

After the last preset, the Matrix will sequence through the assigned group until the presets are activated the next day.

### 7.8 COPYING DAY TYPE PROGRAMS (PROGRAM SHORT CUT)

In the event that more than four days will require the same DAY TYPE, the program from one day may be automatically copied into another.

Suppose you want to copy the example program located in day type 1 into day type 2.

- First return to the fourth program mode.
- Next, key "12" (where "1" indicates day type 1 and "2" indicates day type 2) and press the GROUP key.
- Now, key "99" and press the GROUP key (this executes the copy). Check to see if the copy was made by going to step 201. Do this by keying "2" and pressing the BACK/DWELL key.

Look for the correct numbers to be displayed in the camera display while pressing the corresponding hours, minutes, and setup keys.

### 7.9 SPECIAL DAYS

A special day is a different DAY TYPE routine assigned to a particular day of the year. It is possible to have up to 20 special days during the year. These special days require one of the nine day types to be programmed for it, since as the name indicates, the routine will be outside the ordinary routine.

Complete the programming for the new DAY TYPE. (For instance, we will call it the third DAY TYPE). Refer to the chart on SPECIAL DAYS (Figure 22), and to the SPECIAL DAY keyboard (Figure 25). Get to step 400 by keying "4" and pressing the BACK/DWELL key. Get to step 441 by keying "41" and pressing the GROUP key.

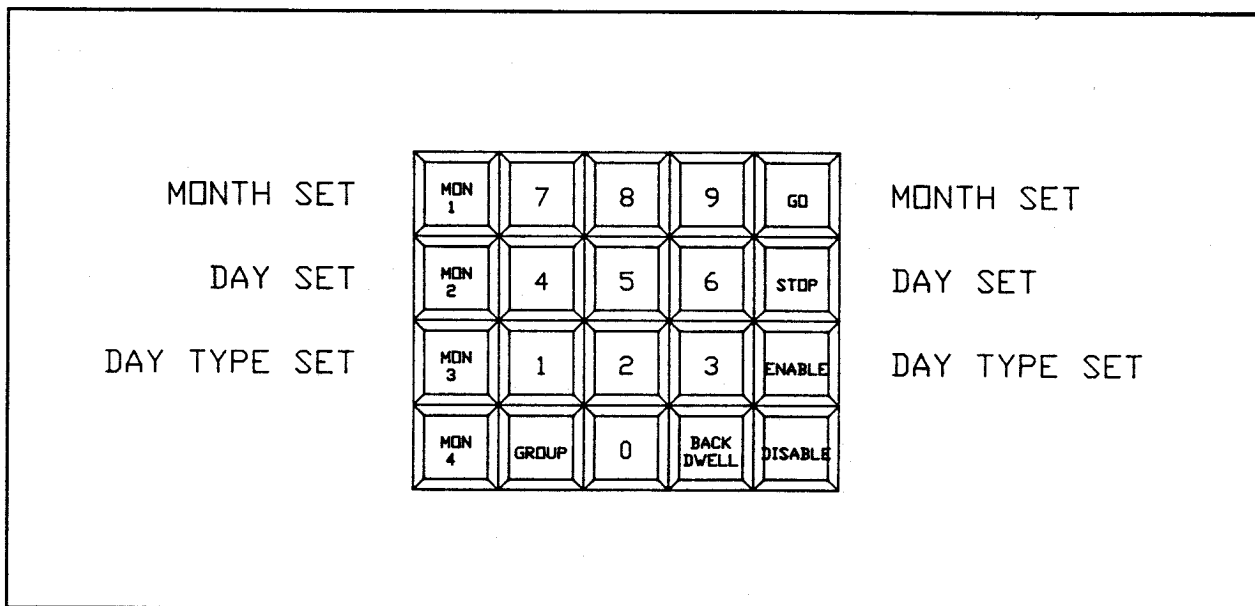


Figure 25. Special Days Keyboard

Suppose you want a special routine on December 25th:

- First, assign a special day type number. In this example, the number "3" has been chosen as the special DAY TYPE number.
- Key "12" and press MON1 to set the month.
- Key "25" and press MON2 to set the day.
- Key "3" and press MON3 to set the DAY TYPE.

Use the opposite side of the keyboard to program another special days on the same step number.

Continue to the next program step for more special days.

Exit to the **RUN** mode by use of the key switch.

To activate automatic clock programs, key "99" and press the BACK/DWELL key.

## **8.0 TECHNICAL INFORMATION REGARDING OPTIONAL COMPUTER CONTROL OF MATRIX**

The PRESETTER card is used to provide bi-directional communication capabilities between the Matrix and a computer, via a RS-422 or RS-232 port ( $\pm 5$  volts).

### **8.1 COMPUTER CONTROL OF MATRIX**

The Matrix system employs an RS-422 (RS-232 compatible) communication system running at 600 bps. All control of the Matrix is over two twisted pairs, to one or more of its four communication ports. Commands from the controller to the Matrix, or responses from the Matrix to the controllers, are made up of two-byte words which are transmitted serially, LSB first, with start, even parity, and stop bit added.

All PELCO controllers are designed to go into high impedance state when not active. Any number of controllers can be "daisy chained" to a single communications port, with more than one controller there is the possibility of contention, and the Matrix does not employ any form of arbitration.

The Matrix does check for errors, therefore, contention will cause an error, causing the Matrix to ignore both commands.

The Matrix is compatible with standard Coaxitron control equipment, in that a standard Coaxitron transmitted signal, driven into an output, is reconstructed and retransmitted to the selected Coaxitron receiver. The Matrix controllers contain a built-in Coaxitron transmitter.

The Matrix can be compatible with a computer. PELCO has available an interface accessory to the Matrix which provides for computer control of Coaxitron presets, via two (2) communication cables. By adding a second computer serial port, provisions for "handshaking" between the computer and the Matrix can occur.

The handshaking or two-way communication between computer and preset controller (PRESETTER) is only beneficial if the user wants to take advantage of the Matrix's error detection and correction capabilities.

The handshake protocol is as follows:

1. The computer sends a preset command to the PRESETTER card in the Matrix.
2. The PRESETTER card stores the command and immediately echoes the unaltered command back to the computer to check for errors.
3. If acceptable, the computer repeats the command with an added "execute" bit.
4. The PRESETTER card receives the "execute" bit and sends the properly coded command to the Coaxitron receiver. The PRESETTER card also compares the second command to the first and echoes it back to the computer (after approximately a one-second delay), with bit 6 of the first byte set indicating that the preset command was sent. If the last two commands are not identical, except for the execute bit, the execute bit is echoed as a zero to indicate that an error has been detected.

If the user does not wish to use the above protocol, simply delete steps 1 and 2 above.

Coaxitron signal contention occurs when the controllers attempt to transmit Coaxitron commands at the same time. When this occurs, Coaxitron ignores the signals. Operators can visually see that the desired command has not been executed, and can simply repeat the command. With computer control, the above contention can occur with no one's knowledge.

If the user feels that his application might cause such contention, he can use a slight variation of the "normal" command code, whereby all other Coaxitron signals from controllers are inhibited for one second. The "cost" of using this command, other than the above, is that normal sequencing will be delayed on all sequencing outputs by 1 second.

### COMPUTER TO PRESETTER MESSAGE FORMAT

#### First Byte

- Bit 0: Is a one for EXECUTE, a zero (0) for full use of protocol.
- Bit 1: Is a one (1) for AUTO, a zero (0) for GO-TO.
- Bits 2 through 5: Forms the command character; must be E or F (hexadecimal). Use F to inhibit Coaxitron transmission for 1 second.
- Bits 6 & 7: Always zero (0), indicating this is the first byte.

The command word from the computer to the PRESETTER is constructed as follows:

#### Second Byte

- Bits 0 through 4: Form a number indicating the requested Preset number.
- Bits 5 & 6: Always zero (0)
- Bit 7: Always one (1), indicating this is the second byte.

### PRESETTER TO COMPUTER MESSAGE FORMAT

#### First Byte

- Bits 0 through 5: Are an echo of the command from the computer. Bit 0 is deleted if an error is detected.
- Bit 6: Is a one (1) if the Coaxitron Preset command was sent. Is a zero (0) if not set.
- Bit 7: Always a zero (0), indicating this is the first byte.

#### Second Byte

Always an echo of the second byte from computer.

The command word from the computer to the PRESETTER is constructed as follows:

#### First Byte:

	Without Coaxitron <u>Inhibit</u>	With Coaxitron <u>Inhibit</u>
GO-TO w/protocol	#38h	N/A
Execute GO-TO	#39h	#3Dh
AUTO w/protocol	#3Ah	N/A
Execute AUTO	#3Bh	#3Fh

#### Second Byte:

- Range = 80h through 9Fh
- 80 = PRESET 1
- 9F = PRESET 32

### CONTROLLER (OR COMPUTER) TO MATRIX MESSAGE FORMAT

#### First Byte

- Bits 0 & 1: Forms a number which represents the number of the video output port whose status is, or is to be, under the control of a given COM port.

Bits 2 through 5: Forms the command character 0 through Fh

Command List:

- 0 Monitor Select
- 1 Group Select
- 2 Set Dwell
- 3 Start Sequencing
- 4 Stop Sequencing
- 5 Home to Channel
- 6 Step (Enable)
- 7 Step (Disable)
- 8 Step Back
- 9 Monitor Selected and Home
- A Home and Sequence
- B Enable Number in a Data Field
- C Disable Number in a Data Field
- D Lockout
- E Presetter without Disable
- F Presetter with Disable

Bit 6: Is normally a zero (0), except when programming.

Bit 7: Is always a zero (0) indicating that this is the first byte of the command word.

**Second Byte**

Bits 0 through 5: Forms a number: (This is the data byte for the corresponding command.)

0-3 when selecting group number

0-63 when selecting channel number

Bit 6: Normally a zero, except when programming dwell time; 0-99 seconds.

Bit 7: Always a one (1) indicating that this is the second byte of the command word.

**MATRIX TO CONTROLLER  
(OR COMPUTER) MESSAGE FORMAT**

**First Byte**

Bits 0 & 1: Form a number representing the video output port whose status is being given.

Bit 2: A one (1) when sequencing; a zero (0) when stopped.

Bit 3: A one (1) when this channel is included in the sequence table of the indicated group (enabled); a zero (0) when not enabled (disabled).

Bit 4: A one (1) when the controller is logged on to its assigned video port.

Bits 5 & 6: Forms a number indicating the selected sequence group number.

Bit 7: Always a zero (0), indicating that this is the first byte of the status word.

**Second Byte**

Bits 0 through 5: Forms a number from 0 to 63, indicating the number of the input channel presently available at the indicated video output port.

Bit 6: Normally, a zero (0) except in the event of an alarm.

Bit 7: Always a one (1), indicating that this is the second byte of the status word.

## 8.2 SYSTEM CONNECTIONS

The following describes the interconnecting requirements when the computer has two COM ports (COM1 and COM2). COM1 is connected to PORT2 on the Matrix CPU card and COM2 is connected to the PRESETTER card (located adjacent to the Matrix power supply). Note that PORT1 must be used when programming I/O Lockout, etc., from a controller unit.

A short video cable connects the video output of output card #2 to one of the looping inputs to the PRESETTER card (the middle or lower of the three BNC connectors). The second looping input can be terminated or fed to a terminated monitor (it must be terminated with 75 ohms). The video output from the PRESETTER card can be used if desired (there is no need to terminate this output).

Standard controllers can be connected to ports 1, 3 and/or 4, and to outputs 1, 3, and/or 4, as the user desires. See Figures 26, 27, and 28.

## 8.3 SYSTEM OPERATION (COMPUTER CONTROLLED)

**Example:** The computer needs to send CAMERA #5 to PRESET #4 and switch the camera output to OUTPUT #3. It must first switch CAMERA #5 to output #2 in order to send a Coaxitron PRESET command to the camera location.

1. COM1 sends 25h, 84h, this places CAMERA #5 on MON2 output.
2. The computer should then wait for confirmation of the requested status.
3. COM2 sends 39h, 83h; this sends camera number 5 to PRESET #4 and waits for confirmation.

**Note:** The computer must wait until the Coaxitron Preset signal has been completed (approximately one second) before executing the following step.

4. Now, COM1 sends 26h, 84h; this places CAMERA #5 on MON3 output.

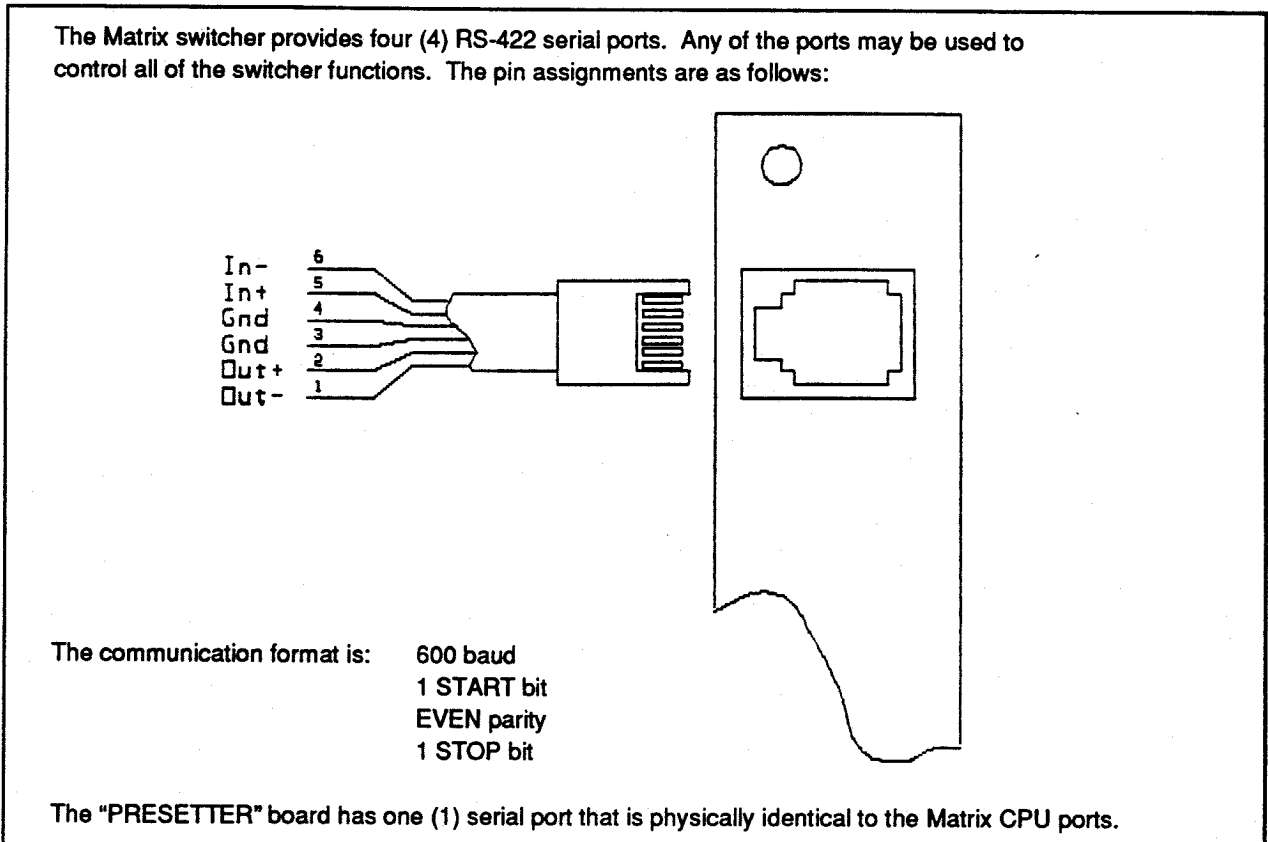
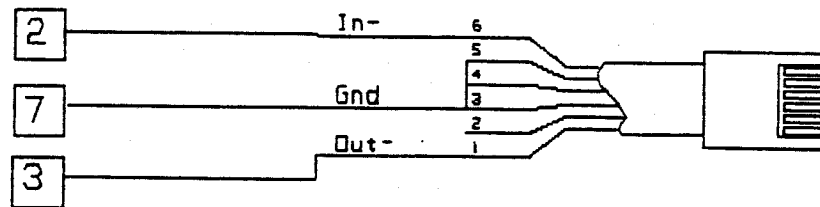


Figure 26. Matrix Serial Ports



The following diagram shows the connections required to communicate with an RS-232 port.

PC  
Serial Port



**Note:** This is the minimum interface required by the switcher. The switcher neither provides nor requires hardware handshaking. That may not be true of the computer's serial port.

Figure 27. RS-232 Pin Outs

The "PRESETTER" board allows preset commands to be sent to the switcher from any RS-232 port. The PRESETTER may be controlled from the same port used to control the switcher if the PRESETTER is wired as a "listen only" device. The following diagrams the test cable that should be used in conjunction with "Mtest.exe" to demonstrate an IBM PC controlling Matrix switcher and preset functions.

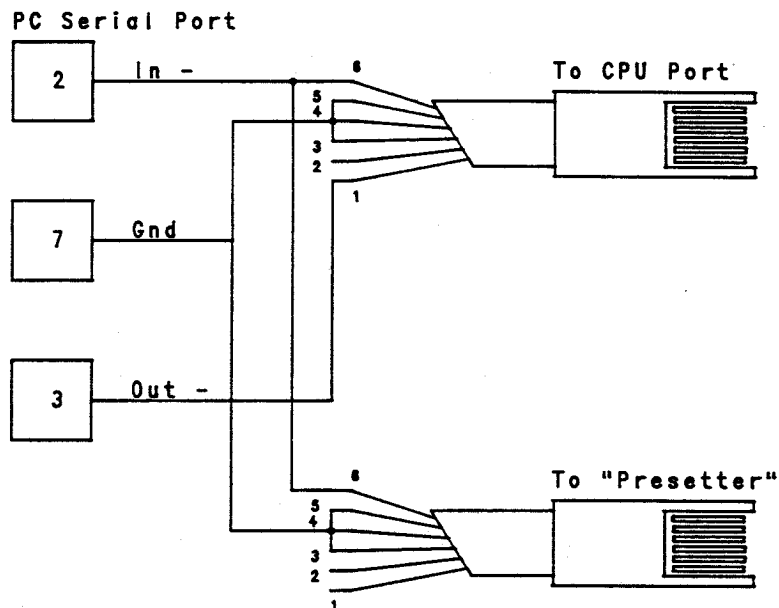


Figure 28. Presetter Communication

## **9.0 WARRANTY AND RETURN INFORMATION**

### **WARRANTY**

PELCO will repair or replace, without charge, any merchandise proved defective in material or workmanship for a period of one year after the date of shipment (six months on all pan and tilts with auto scan and medium duty scanners). PELCO will warranty all replacement parts and repairs for 90 days from the date of shipment. All goods for warranty work shall be sent freight prepaid to our Clovis, California facility. Repairs made necessary by reason of misuse, alteration, normal wear, or accident are not covered under this warranty. PELCO is not liable for any incidental or consequential expenses or liability incurred by the customer as a result of field repair, installation, or any other reason.

The above warranty is in lieu of any other expressed or implied warranty, condition, or guarantee by PELCO of the equipment listed herein. PELCO makes no warranties except for intended use and will not be liable for any loss, damage, or costs arising, whether consequential or incidental, from the use of said merchandise.

This warranty gives you specific legal rights. You may also have additional rights, which are subject to variation from state to state.

If a warranty repair is required, contact PELCO at **1-800-289-9100** for a Repair Authorization number (RA), and provide the following information:

1. Model and serial number
2. Date of shipment, P.O. number, Sales Order number, or PELCO invoice number
3. Details of the defect or problem

If there is a dispute regarding the warranty of a product which does not fall under the warranty conditions stated above, please include a written explanation with the product when returned.

Ship freight prepaid to: PELCO  
300 West Pontiac Way  
Clovis, CA 93612-5699

### **RETURNS**

No unauthorized returns will be accepted. All returns must be accompanied by an authorization number issued by the factory (CA number if returned for credit and RA number if returned for repair). Contact PELCO at **1-800-289-9100** for a CA/RA number. Goods returned for repair or credit will be rejected if no authorization number has been issued or freight has not been prepaid. All merchandise returned for credit will be subject to a 20% restocking and refurbishing charge.

Ship freight prepaid to: PELCO  
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