

RapidEye[™] PLUS

Remote Video Unit

***Installation and Setup
Guide***

RapidEye[™] **PLUS**

Remote Video Unit

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The JSC232/485 (RS-232 to 485) converter is a product of Javelin Systems.

Changes or modifications not expressly approved by Ademco could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction guide, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Guide Revision

| Date | Remote Unit Part Number |
|-------------------|--------------------------------|
| November 26, 1999 | JRRP4 |

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About This Guide

This guide is intended for people who will be responsible for the installation of the Rapid Eye PLUS remote video Unit.

Related Documents

- [1] *Rapid Eye Remote Video System Operator Software User Guide*
- [2] *Rapid Eye Remote Video System MANAGER Software User Guide*

About the Rapid Eye Remote Video System

Rapid Eye is an information management, quick-response video telesurveillance system. It is designed to display visual information from distant sites, and has been specifically designed to assist in:

- alarm verification and identification
- remote Guard Tour
- crisis intervention
- remote business management
- remote monitoring and surveillance

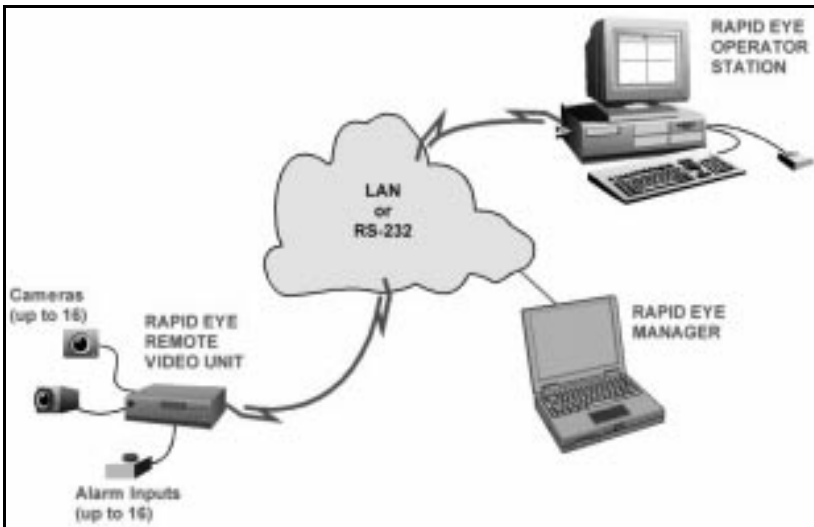


Figure 1: Typical System Interconnect

The Rapid Eye Video Telesurveillance system consists of the following two major components, that communicate via a communication link such as Public Switched Telephone Network (PSTN), Integrated Services Digital Network (ISDN), or Frame Relay:

1. **Rapid Eye PLUS remote video Unit:** This component connects directly into standard Closed Circuit TV (CCTV) systems. It provides the ability to view video images from cameras from distant sites, to process and transmit alarm information, and to store video images before, during, and after an alarm event has occurred. It may be connected to a central monitoring site using PSTN, ISDN, or Frame Relay. This guide describes how to install this unit.
2. **Rapid Eye OS Operator Software:** This is a Windows-based software product that allows alarm and video information to be retrieved from the Remote Video Unit. (Refer to the *Rapid Eye Remote Video System Operator Software User Guide* for installation and operating instructions).

The system can handle up to 16 dry contact alarm inputs, up to 16 camera inputs, and can deliver 8 control outputs.

Using the Operator Software, the Rapid Eye Remote Video Unit can be configured to operate in a variety of different modes:

- Capture video images before, during, and after an event (alarm)
- Process and transmit stored or live video images
- Process and transmit alarm information
- Control external devices

1.0 Unpacking the Remote Video Unit

Package Contents

The packing container has the following items:

- This installation guide
- Rapid Eye Remote Video Unit
- Power cord
- Warranty and software license

Please check the package for all of the above items. If any items are missing, contact Ademco.

1. Open the packing container and remove the Rapid Eye PLUS remote video Unit.
2. Remove the packing styrofoam ends from the unit and place the unit on a working surface that is clear of obstacles.
3. Inspect the unit for obvious damage.
 - a. If you see damage to the unit, call your designated Ademco representative and describe the problem. Please have your Serial Number available (the serial number for the Remote Video Unit is located on the underside of the unit). If necessary, your sales representative will supply a Return Authorization Number (RAN) that must be prominently displayed on the shipping container should the equipment be returned.
 - b. Re-pack the unit, along with the other contents in the original shipping container and return to Ademco. Refer to *Appendix A: Getting Help* for the shipping address.



Important: Do not return equipment to Ademco without first contacting Ademco Customer Support. Equipment returned without prior authorization will be returned to the sender.

Your Rapid Eye equipment is covered by the terms of your ownership agreement.



Note: Do not remove the factory seals on the Rapid Eye PLUS remote video Unit chassis. The Remote Video Unit has no customer serviceable items inside and must be returned to Ademco for repair. Breaking the factory seals will void your warranty.

The registration process ensures prompt service of your equipment should you require it, whether the system is under warranty or not.

2.0 Rear Panel Connectors

Locate the rear panel of the unit (refer to Figure 2). There are several different types of connectors available for video and alarm equipment attachments. Refer to *Section 3.0 Installing the Remote Video Unit* on page 8 for additional installation details.

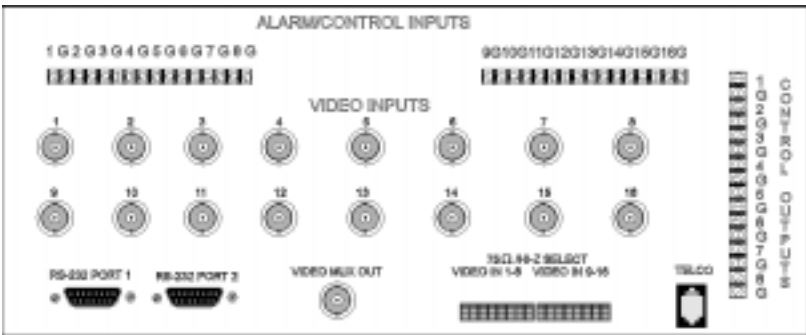




Figure 2: Rear Panel

| Connector | Description |
|--|---|
| Video Inputs | These BNC connectors are used to accept video signals from your CCTV system (cameras). Depending on the option(s) ordered, the unit might have 4, 8, or 16 video input connections. |
| Video Mux Out | This connector allows you to connect an NTSC monitor or VCR to view the cameras attached to your Remote Video Unit. |
| DIP Switches 1 to 8 and 9 to 16  ON OFF | Setting the DIP switches determine if the 75 ohm video input termination are on or off. <ul style="list-style-type: none"> • DIP switch in ON (top pushed in) position: (75 ohm termination) • DIP switch in OFF (bottom pushed in) position: (no termination - high impedance) <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">  Note: Refer to <i>Setting DIP Switches</i> on page 9 for more information. </div> |

(cont'd on next page)

| (cont'd) Connector | Description |
|------------------------------|---|
| Alarm/Control Inputs | <p>These screw terminal connectors are used for alarm inputs and ground connections. Alarm inputs are factory configured as either NO (normally open), NC (normally closed), or 2.2K EOL (end of line) resistor. They are labeled as follows (refer to Figure 2):</p> <p style="text-align: center;">1 G 2 G 3 G 4 G 5 G 6 G 7 G 8 G 9 G 10 G 11 G 12 G 13 G 14 G 15 G 16 G</p> <p>The alarm control inputs are TTL type (having a minimum high level of +2.4 volts and maximum low level of +0.4 volts).</p> <p>The numbers refer to the alarm signal inputs, and the 'G's refer to the associated ground connection. All alarm inputs must be referenced to the ground connection(s) of the Remote Video Unit.</p> |
| Control Outputs | <p>These outputs provide the means to control external devices such as lights, sirens, or locks. They are labeled as follows (refer to Figure 2):</p> <p style="text-align: center;">1 G 2 G 3 G 4 G 5 G 6 G 7 G 8 G</p> <p>The numbers refer to the control outputs, and the 'G's refer to the associated ground connection. All control outputs must be referenced to the ground connection(s) of the Remote Video Unit.</p> <p>The outputs are at TTL logic levels that do not drive devices directly, but control relays that activate these devices. These devices can be purchased separately from a number of security-related OEMs that serve these extended functions.</p> <p style="text-align: right;">(cont'd on next page)</p> |

| (cont'd) Connector | Description | | | | | | | | | | |
|--------------------------------|---|---------------|----------------|----------------|-------------------------|-----|---------------|--------------------------------|---------------|---------------------|---------------|
| RS-232 Serial Ports 1 and 2 | <p>These ports may be used as follows:</p> <table border="0"> <thead> <tr> <th data-bbox="421 362 671 386">Device</th> <th data-bbox="694 362 777 386">Default</th> </tr> </thead> <tbody> <tr> <td data-bbox="421 386 671 410">External modem</td> <td data-bbox="694 386 960 410">Typically Serial Port 1</td> </tr> <tr> <td data-bbox="421 410 671 435">PTZ</td> <td data-bbox="694 410 960 435">Serial Port 2</td> </tr> <tr> <td data-bbox="421 435 671 459">RUI for setting LAN parameters</td> <td data-bbox="694 435 960 459">Serial Port 1</td> </tr> <tr> <td data-bbox="421 459 671 483">Passthrough devices</td> <td data-bbox="694 459 960 483">Serial Port 2</td> </tr> </tbody> </table> <p>Note: The defaults listed above can be changed by using the RDI feature in the Operator Software. Refer to the <i>Rapid Eye Remote Video System Operator Software User Guide</i> for more information.</p> | Device | Default | External modem | Typically Serial Port 1 | PTZ | Serial Port 2 | RUI for setting LAN parameters | Serial Port 1 | Passthrough devices | Serial Port 2 |
| Device | Default | | | | | | | | | | |
| External modem | Typically Serial Port 1 | | | | | | | | | | |
| PTZ | Serial Port 2 | | | | | | | | | | |
| RUI for setting LAN parameters | Serial Port 1 | | | | | | | | | | |
| Passthrough devices | Serial Port 2 | | | | | | | | | | |
| Telco (or LAN) | This connector is used for the Telco or LAN connection. | | | | | | | | | | |

3.0 Installing the Remote Video Unit

Installation of Rapid Eye equipment must comply with industry standard CCTV configuration and installation practices (refer to *Appendix C: Common CCTV Practices*).

You must have:

- A serial terminal or a computer running a terminal emulation program (e.g., HyperTerminal) for configuring the Remote Video Unit.
- A null modem cable (refer to connecting instructions on page 13).

As well, you may require:

- a telephone handset for testing the phone line
- an 1/8 inch wide slot screwdriver
- a wire stripper



Caution: We recommend that a line conditioning uninterruptible power supply (UPS) unit be a part of your security system to ensure that images will continue to be captured and stored should power blackouts or brownouts occur. The capacity (at 300 watts) of the UPS should be at least 30 to 60 minutes to allow time for corrective action.

If a UPS is not used, the Remote Video Unit should be connected to a dedicated ground circuit. The outlet and breaker box should be marked as such. Nothing else should be plugged into this circuit.

1. Place the Rapid Eye PLUS Remote Video Unit in a secure, clean, well-ventilated area. Do not place other equipment on top of the Remote Video Unit.



Caution: To comply with the FCC rules for Class A equipment, the unit must be installed in a location that is at least 10 meters (approx. 32 feet) from any other radio frequency devices such as television and radio receivers, and fixed location radio transmission devices. Failure to comply with this requirement may cause interference to those devices or to the Remote Video Unit itself, and thus may adversely affect the operation of this equipment.

2. Plug the supplied power cord from the rear of the Remote Video Unit to a grounded power supply.

3.1 Connecting Cameras

Cameras must be connected to Rapid Eye equipment in compliance with normal CCTV installation and configuration practices (refer to *Appendix C: Common CCTV Practices* on page 25).

Connect each video signal source to a BNC type connector in the VIDEO INPUTS section. Each camera (1 through 16) is associated with the same numbered connector (for example, camera 1 is associated with connector 1, and so on).

Each camera connected must use an RG-59U 75-ohm coaxial video cable with a continuous shield, and a BNC solder or crimp type connector. The maximum cable length between each camera and the Remote Video Unit is 750 feet. When installing coaxial cable, there must be no loops, kinks, or wraparounds. Avoid running video cables near fluorescent lights, RF receivers or transmitters, or through elevator shafts.

The coaxial cable (RG-59U) to be used with Rapid Eye equipment is constructed as shown in *Appendix C.2 Coaxial Cable* on page 26.




Note: It is not recommended to use BNC screw-on type connectors. If the connectors are not properly installed, the entire system performance will be compromised.

Setting DIP Switches

The DIP switches, located on the rear panel of the Remote Video Unit, allow you to select whether each video signal is terminated. Setting the DIP switch to ON terminates the signal (75 •). Setting the DIP switch to OFF sets the input to high impedance (Hi-Z).

If the signal is shared by another CCTV device (e.g., monitor, VCR, multiplexer, amplifier), one, and only one, of the devices (usually the last device in the series) must terminate the signal.

 **Note:** Only terminate the video signal once, regardless of the number of CCTV devices that are connected. Failure to do so will cause poor image quality.

To set the DIP switches, do one of the following:

- Set the video signal's DIP switch to ON (top of button pushed in) if the Remote Video Unit is the last (or only) CCTV device in the series and no other devices are terminating the signal.
- Set the DIP switch to OFF (bottom of button pushed in) if another CCTV device is already terminating the signal (usually the last device in the series). This step ensures that the Remote Video Unit's input is in high-impedance (Hi-Z). Refer to related equipment documentation to find out how to terminate the signal at the specific device.

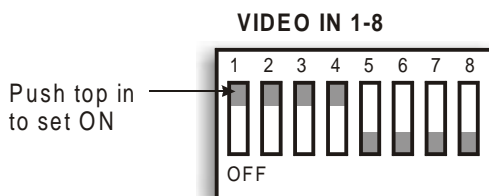


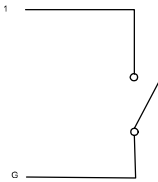
Figure 3: Example of terminating a 4-camera (video 1-4) signal

3.2 Alarm Connections

Use normal hookup wire (approximately 20 gauge) to connect alarm sensor equipment to the Remote Video Unit. Remote Video Unit alarm inputs are usually configured as normally open (NO). If required, they can be factory configured as normally closed (NC) or End Of Line (EOL). Refer to *Appendix D: Configuring Alarm Inputs*.

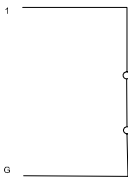
Most alarm sensor units have a dry contact for outputs, usually providing type 'C' outputs (both Normal Open and Normal Closed contacts). Note which type you have and select the Normally Open or Normally Closed option. Figure 4 shows the NO, NC, and EOL (End of Line) alarm configurations.

Normally Open



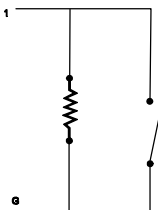
Alarm is active when switch goes ON.

Normally Closed



Alarm is active when switch goes OFF.

End of Line (EOL)



Alarm is active when switch goes ON, or when wires to the resistor are opened.

This provides circuit integrity confidence.

Figure 4: NO, NC, and EOL Alarm Configurations

1. Strip approximately 1/4 inch of insulation from the alarm wire to be connected to the Remote Video Unit.
2. Connect each alarm wire to the screw type terminal connector on the ALARM terminal strip: one wire to the numbered terminal connection you choose and the other wire to ground. There must be no bare wire visible at the rear panel when the alarm wire is connected to the Remote Video Unit.

3.3 Control Output Connections

The operator activates these outputs. Examples of this are turning on lights, warning bells, or power locks. Relays to control these devices may be connected as follows:

1. Strip approximately 1/4 inch of insulation from the wire to be connected to the connector.
2. Connect each relay control wire to the screw type terminal connector on the CONTROL OUTPUTS terminal strip: one wire to ground and the other wire to the numbered connection you choose. There must be no bare wire showing at the rear panel when the output control wire is connected to the Remote Video Unit.

Each output device can draw up to 24 mA.

3.4 Communication via LAN

If your system is configured for a Local Area Network (LAN) your Remote Video Unit contains a Network Interconnect Card (NIC) as well as TCP/IP drivers that allow you to connect to the LAN. You must first select an IP address, then program it in your Remote Video Unit as follows:

Selecting an IP Address


The IP address is the unique address permanently assigned to your Remote Video Unit. In addition to supplying an IP address, you may also have to configure a router and subnet mask.

Entering the IP Address

Use the Rapid Eye Remote User Interface (RUI) software to enter the IP address into your Remote Video Unit. The RUI is text-based software that allows a terminal operator to view and change configuration parameters in the Remote Video Unit.

To configure the IP address:

1. Connect a null modem cable (9-pin or 25-pin female) from either COM1 or COM2 of your workstation to the RS-232 Port 2 connector (9-pin female) at the rear of the Remote Video Unit.

 **Note:** For a null modem wiring diagram, refer to *Appendix D: Full Duplex Null Modem Wiring Diagram*.

Workstation

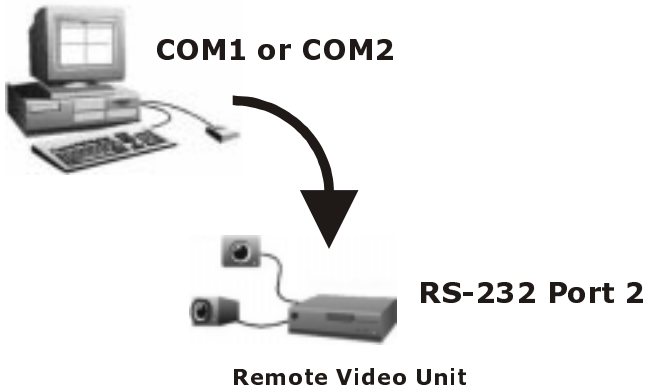


Figure 5: Null Modem Cable Connection

2. Start a Terminal program such as Windows Hyper Terminal:
 - In Windows 95, select [Start], [Programs], [Accessories], [HyperTerminal]. Click the **Hyperterm.exe** icon.
 - In Windows 98, select select [Start], [Programs], [Accessories], [Communications], [HyperTerminal]. Click the **Hyperterm.exe** icon.
 - In Windows NT, select [Start], [Programs], [Accessories], [Hyperterminal], [HyperTerminal].
3. In the Connection Description dialog box, enter **Rapid Eye** (or similar) in the Name box and click [OK].

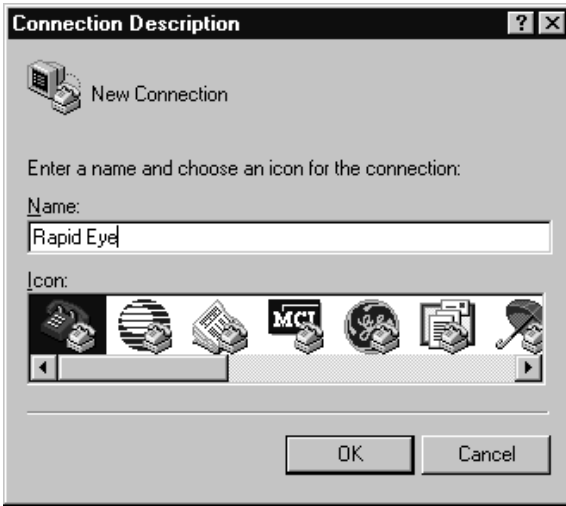


Figure 6: Connection Description dialog box


4. In the Connect To dialog box, select the Workstation's COM port number to which the null modem cable is attached in the Connect using box. Click [OK].




Figure 7: Connect To dialog box

5. In the COM Properties dialog box, set up the Terminal program as follows:
 - **9600** Bits per second, **8** Data bits, **None** Parity, **1** Stop bits, **Hardware** Flow controlClick [OK].
6. Make sure the Remote Video Unit is powered on and press [Enter] to display the `userid:` prompt.
7. Enter **customer** at the prompt.

You will see a `prompt :>` displayed in the Terminal program.
8. Type **?** and press [Enter] to display a list of available commands.

 **Note:** The following IP address, sub-net mask, and router values are examples only.

9. Enter an IP address, for example **set ipaddr 172.16.2.38**.
10. Enter a sub-net mask, for example **set subnet 255.255.0.0**.
11. Enter a router address, for example **set router 172.16.1.1**.


 **Note:** To verify a parameter, type the command only (for example to verify an IP address type **set ipaddr** and press [Enter]).

12. Type **restart** and press [Enter].

This command reboots the Remote Video Unit. After the remote video system is started, the IP address, sub-net mask, and router address are recognized.

3.5 Connecting the Communication Line

Connect one end of the supplied cable to the connector labeled TELCO (or LAN). Connect the other end of the cable to the wall jack.

 **Notes:** Datagrade (fax) telephone lines are preferable to standard telco lines. Special features, such as call waiting, should not be used on the telephone line.

3.6 Connecting Rapid Eye to the Audio Panel


It is necessary to attach a cable from the Rapid Eye PLUS Remote Video Unit Alarm Inputs and Control Outputs to the Remote Audio Surveillance (RAS) panel as shown in Table 1.

| <i>Rapid Eye Connections to the Audio Panel Terminal Strip</i> | |
|--|--|
| (Rapid Eye) | (RAS) |
| Input 16 | TRIP |
| Input 16 Ground | GND (first from left of terminal strip) |
| Output 7 | DATA IN |
| Output 8 | CLK |
| Output 8 Ground | GND (second from left of terminal strip) |

Table 1: RAS Panel to Rapid Eye Cable Connections

Any type of telephone or data communication cable having the following characteristics may be used:

- Multi-conductor
- Twisted or untwisted pair
- 22 or 24 AWG
- Stranded

 **Notes:** The maximum allowed distance between the Remote Video Unit and the RAS panel is 20 feet.

If a cable must run adjacent to electrical equipment, use shielded cable and ground as follows:

- a. At the RAS panel, attach the shield to the ground stud.
- b. At the Remote Video Unit, leave the cable shield unconnected.

Connect the indicated ALARM INPUTS and CONTROL OUTPUTS of the Rapid Eye PLUS Remote Video Unit as follows:

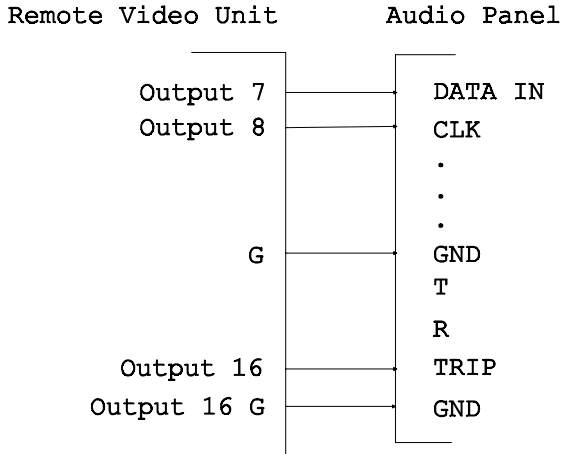


Figure 8: Rapid Eye to RAS Panel Cable Connections

Alarm Inputs

1. Attach alarm 16 input to the TRIP connection on the audio panel terminal strip.
2. Attach alarm input 16 ground to the first GND from the left connection on the audio panel terminal strip.

Control Outputs

1. Attach Output 7 to the DATA IN connection on the audio panel terminal strip.
2. Attach Output 8 to the CLK connection on the audio panel terminal strip.

Attach the ground connection to the second from the left GND connection on the audio panel terminal strip.

4.0 Connecting PTZ Domes

The Rapid Eye PLUS remote video System Operator Software supports Javelin, Pelco, and Kalatel PTZ (pan, tilt, and zoom) dome. The PTZ feature allows you to control and adjust a PTZ dome to pan, tilt, and zoom different views of your site(s). Refer to the *Rapid Eye Video System Operator Software User Guide* for instructions on adjusting the PTZ dome using the software controls.

Note: There is a support limit of one type of PTZ per Remote Video Unit.

The installation procedure consists of installing the PTZ units, followed by connection to the RS-232/485 Converter and the Rapid Eye PLUS remote video Unit. The domes are then designated with unique addresses via the Rapid Eye Operator software. Once enabled by the software, the units can be controlled for pan, tilt, and zoom operation.

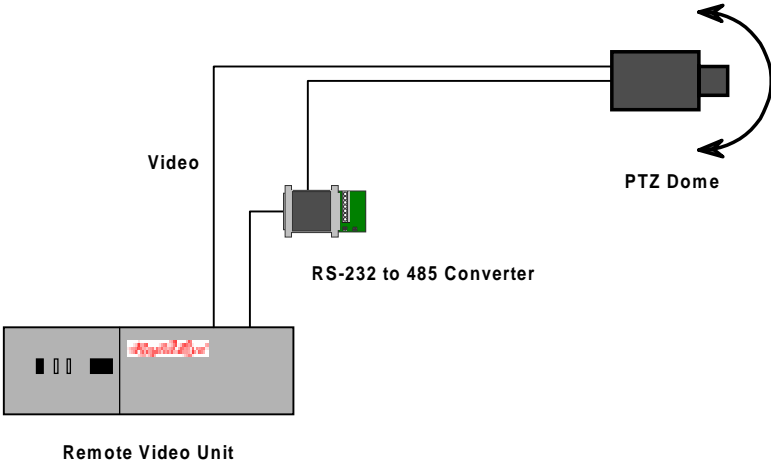


Figure 9: Javelin JSC232/485 Converter Connections

Note: Refer to the *Rapid Eye Video System Operator Software User Guide* for instructions on enabling the PTZ dome using the RDI (Remote Diagnostics Interface) feature.

4.1 RS-232 Converter

The RS-232 Converter is an RS-232 to RS485 interface converter that operates in a similar fashion as a modem. It allows an RS-232 device to transmit data over much longer distances than is normally possible. The maximum distance from the connection at the dome to the Converter is 4,000 feet.

| PTZ Dome Type | Converter required |
|---------------|----------------------------|
| Javelin/Pelco | Javelin JSC232/485 |
| Kalatel | KTD-312 computer interface |

The PTZ domes are generally connected to RS-232 Port 2 and must be configured using the Operator software.

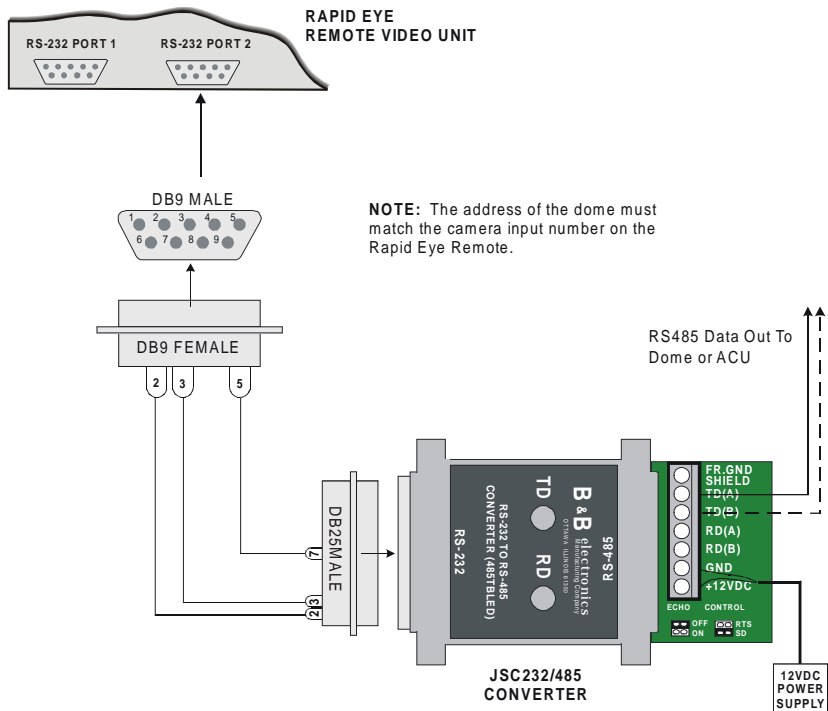


Figure 10: Javelin JSC232/485 Converter Connections

4.2 Required Cables

In order to complete the installation, you need proper cabling from the PTZ dome and the Converter as well as from the Converter to the Remote Video Unit.

| PTZ Dome Type | Cable from Dome to Converter | Cable from Converter to Remote Video Unit |
|---------------|------------------------------|---|
| Javelin/Pelco | RS-485 cable | 25-pin male to 9-pin female into RS-232 Port of Remote Video Unit (not included) |
| Kalatel | RS-485 cable | 9-pin female into RS-232 Port of Remote Video Unit (included with KTD-312 computer interface) |

Each PTZ unit must be configured to communicate at its default communication baud rate. Kalatel and Javelin units are set at 9600 bps. Pelco D Protocol units are set at 2400 bps and P Protocol units are set to 4800 bps.

Each dome must be set to the same addresses as the video input to which it is connected. This may require adjusting the dome's DIP switches. Refer to the dome manufacturer's documentation for more information.

4.3 Daisy-chaining Multiple Domes

You can connect up to 16 domes on one communication line connected to the Remote Video Unit. If you intend to do this, make sure that the cabling enters and exits each of the domes. Do not T-tap the cable. The last dome in the chain must have its communication input(s) terminated. All other domes in between must not be terminated. Refer to the dome manufacturer's documentation for more information.

5.0 Powering Up the Remote Unit

Before powering up, ensure that cameras are connected to the rear panel. To connect cameras, refer to *Section 3.1 Connecting Camera*.

1. Plug the supplied power cord into the rear of the Remote Video Unit.
2. On the front panel push the [Power] button located at the upper right hand corner of the unit.

It will take about 30 seconds for the unit to initialize upon power up. After initialization the Remote Video Unit plays a short tune indicating system readiness. (The tune can be disabled if you wish. Refer to the “Startup Sound” feature in the Rapid Eye Remote Video System Operator Software User Guide.)



Note: The [Reset] and [Turbo] buttons on the front of the Remote Video Unit are not used.

The unit is now ready to capture store and transmit fast response full-color images, to process and transmit alarm information, and to control external devices. An Operator System (refer to the *Rapid Eye Remote Video System Operator Software User Guide*) is used to configure and initiate these functions within the Remote Video Unit.

6.0 Powering Down the Remote Video Unit

To power down the Remote Video Unit, push the [Power] button located on the front panel of the unit.

6.1 Moving the Rapid Eye PLUS Remote Video Unit

Before moving Rapid Eye equipment from one site to another, refer to the *Rapid Eye Remote Video System Operator User Software Guide*. The *Administrative Functions* section of this document explains how to use the ‘Sleep’ button in the Remote Site Information window (you must do this from the Operator’s workstation and must be in ‘online’ mode). This will reset camera configurations to their default values, disarm all cameras, and delete all dialout locations from memory. It also prevents you from receiving

false alarms when you initially set up the Rapid Eye PLUS remote video Unit.

Appendix A: Getting Help

If you need help, first contact your sales representative for assistance. Should you need additional technical assistance, contact Ademco Group Video Products Division at the following location:

Address: 308 Palladium Drive
Kanata, Ontario
Canada
K2L 3H1

Telephone: 1-800-645-7492

Web site: <http://www.ademco.com>
<http://www.software.rapideye.ademco.com>

Please have the following information ready when you call your service center so that we may better assist you.

- Your name, company name, and address
- Contact telephone number
- Whether you are connecting to the Rapid Eye Remote Video System by LAN or dial-up
- If you are using dialup, the type of modem you have installed and the dial-in phone number of the Rapid Eye Remote Video Unit
- IP addresses for LAN and dial-up
- Operating system and version (e.g., Windows NT 4.0 SP3)
- Installed software on the host computer (e.g., fax, AOL, CompuServe)
- A description of the problem (for example, video has failed, cannot connect)

For ordering and parts information, please contact your dealer or distributor.

Appendix B: Remote Site Information

We suggest you create and maintain a record of remote site information similar to the form on this page. This form provides information useful to Rapid Eye system operators and Customer Support. This information is also useful for your own records when making changes to the camera type, description, or system configuration values.

| |
|--|
| Rapid Eye Remote Site Information |
|--|

Site Name: _____ Location: _____
 Emergency Contact: _____ Maintenance Contact: _____
 Dial-in Telephone #: _____ LAN IP Address: _____
 Remote ID Number: _____ PPP IP Address: _____

| Input Channel | Camera Type (color, B&W) | Camera Description |
|---------------|--------------------------|--------------------|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |
| 11 | | |
| 12 | | |
| 13 | | |
| 14 | | |
| 15 | | |
| 16 | | |

Appendix C: Common CCTV Practices

The purpose of Closed Circuit TV (CCTV) is to make visual information of a specific area available for viewing by a security operator. A CCTV system is thus a “visual assessment” tool. The lens and angle of the viewing determine the amount of information obtained, not by the camera. A CCTV system must also have a means to record events that can later be used for training or as evidence.

C.1 Lighting Characteristics

The lighting at the scene determines the amount of light reaching the camera lens. While light can be created from any source, factors affecting the quality of the image are:

- beam angle over which the source radiates
- light intensity, reflection, and contrast
- any lighting variations or obstruction at the light source
- location of the CCTV cameras
- complexity and motion at the scene

Recommended light levels are shown in Table 1.

| Type | Location | Light Level | |
|--|----------|-------------|-------------|
| | | FTCD | LUX |
| Parking Area | indoor | 5-50 | 50-500 |
| Loading docks | indoor | 20 | 200 |
| Garages - repair | indoor | 50-100 | 500-1,000 |
| Garages - active traffic | indoor | 10-20 | 100-200 |
| Production/assembly area rough machine shop/simple assembly | indoor | 20-50 | 200-500 |
| medium machine shop/moderate difficult assembly | indoor | 50-100 | 500-1,000 |
| Difficult machine work/ assembly | indoor | 100-200 | 1,000-2,000 |
| Fine bench/machine work assembly | indoor | 200-500 | 2,000-5,000 |
| Storage rooms/warehouses (active) | indoor | 15-30 | 150-300 |
| Storage rooms/warehouses (inactive) | indoor | 5 | 50 |
| Storage yards | outdoor | 1-20 | 10-200 |
| Parking, open, medium activity | outdoor | 1-2 | 10-20 |
| Parking, covered, medium activity | outdoor | 5 | 50 |
| Parking entrances (day, night) | outdoor | 5-50 | 50-500 |
| Lux: International unit of illumination where 1lux = 1lumen per meter. Lumen: A unit of light measurement: the light emitted per unit solid angle by a source of 1 candela. Candela: A unit of measurement of light intensity. | | | |

Table 1: Recommended Light Levels

C.2 Coaxial Cable

Coaxial cable is widely used for signal transmission in short to medium distances (several hundred to several thousand feet). The two types of coaxial cable used in video transmission systems are 75 ohm unbalanced indoor cable, and 75 ohm unbalanced outdoor cable. The cable construction is shown in Figure 11.

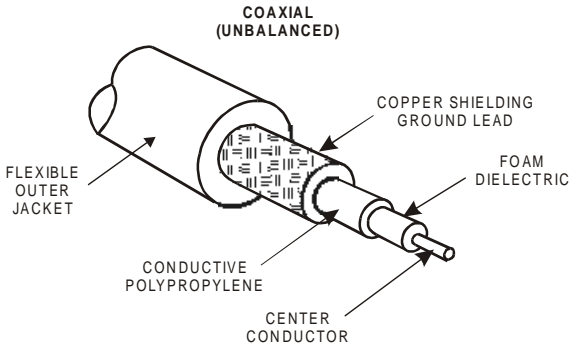


Figure 11: Coaxial Cable Construction

Choosing a cable depends on your environment and the electrical characteristics. Common types used are RG59/U and the RG11/U, each having 75 ohms impedance. For short camera-to-monitor distances (several hundred feet), preassembled or field-connected lengths of RG59/U coaxial cable, with BNC connector at each end are used.

C.2.1 Connectors

The BNC connector is commonly used for CCTV connections because of its small size, ease of twist-on installation, and low signal loss. The three types of BNC connectors are solder, crimp-on, and screw-on.

C.2.2 Amplifiers

Video amplifiers are required in applications where cameras and monitors are separated by several thousand feet. Amplifiers are located at the camera output or along the coaxial cable run, and increase camera-to-monitor distance to a maximum length of 3,400 feet for RG59/U cable.

The recommended cable lengths are shown in Table 2: Maximum Recommended Cable Lengths.

| Coaxial Type | Cable Only (feet) | Cable with Amplifier (feet) |
|--------------|-------------------|-----------------------------|
| RG59/U | 750 (230 meters) | 3,400 (1,035 meters) |

Table 2: Maximum Recommended Cable Lengths

C.2.3 Coaxial Cable Checklist

The following checklist indicates items that must be considered when designing and installing a CCTV system.

- Terminate all unused inputs and unused outputs in their correct impedance.
- When calculating coaxial cable attenuation, use the highest frequency you expect to transmit in the cable.
- In long cable runs, use the minimum possible number of connectors. (Each connector causes attenuation.)
- Do not splice coaxial cables without the use of proper connectors. (This can cause reflection of the signal, resulting in distortion.)
- For outdoor applications, ensure all connectors are weatherproof.
- If unbalanced coaxial cable runs exist between low power sources, use fiber optic cable to avoid ground loop problems.
- In long transmission systems, use balanced coaxial cable (or fiber optic cable).
- Do not run coaxial cable adjacent to high-power RF sources such as power lines.

C.3 Potential Problems

The following problems are most likely to occur in indoor or outdoor coaxial cable installations:

- Different ground potentials at the ends of the coaxial cable, or at different TV equipment locations in a building.
- Coaxial cable running through or close to electrical equipment. The EMI fields produced can distort the signal.
- Environmental conditions such as thunderstorms or lightning storms.

C.3.1 Ground Loops and Hum Bars

Electrical equipment is designed so that electronic circuitry is grounded at one or more points on the equipment chassis. The system must be designed so that these ground points are electrically connected together and connected to the chassis or earth ground (green wire).

Ground loops can be detected before connecting the cable. Measure the voltage difference before connecting the cable and chassis for a system with a long run, or between any two electrical supplies.

Hum bars appear as horizontal distortion across the monitor. The hum bar is caused by the effect of high voltage on the horizontal synchronization signal.



Caution: Do not attempt to solve any of the above problems by removing the third wire on a three-prong electrical plug. This is a violation of local electrical codes, and the Underwriters Laboratory (UL) recommendations.

C.3.2 Electrical Interference

To eliminate electrical interference (or EMI), conduct a facility site survey before installing any equipment. Cables can then be routed around noisy electronics equipment so that there will be no interference with the TV signal.

Use triaxial or fiber optic cable instead of coaxial cable when the cable must be routed through an area having EMI caused by large machinery, high voltage power lines, refrigerator units, microwaves, or other sources. Triaxial cable has a center conductor, insulator, and shield, followed by a second insulator and shield. The double shielding significantly reduces the amount of EMI radiation that is exposed to the center conductor.

C.3.3 Recommendations

The following recommendations should achieve noise-free CCTV performance:

- Make sure that the BNC connectors are firmly attached by using solder or crimp-on connections. Do not use BNC screw-on type connectors.
- Equipment chassis and cable shields should never be used for signal path returns (with the exception of coaxial cable).
- Signal circuits should use balanced cable (for example twisted pair, shielded, or balanced coaxial cable).
- Individual shields of balanced coaxial cable, when contained by a common shield, should be insulated from one another and insulated from the common shield.
- Do not bundle cables carrying high-level signals with cables carrying low-level signals.
- Each signal line should have its own independent return line running as close as possible to the signal line.

C.4 Backup Power

It is important to consider how possible AC or DC power failures will affect the CCTV system. Should the system fail due to electrical problems such as noise, electrical dips and surges, line spikes, power degradation, or brownout, there will be no security at all.

It is important to identify whether part or all of the CCTV system is to be protected from power interruptions.

To prevent the above electrical disturbances, sensitive devices such as computers, video equipment, or telecommunications equipment are never connected directly to raw power. An uninterruptible power source (UPS) is connected in the power line between the source power and the equipment. The UPS provides line conditioning and filtering, and delivers continuous uninterrupted power at all times, even during complete blackouts.

C.4.1 Line Conditioner UPS System

The ferro-resonant UPS system is commonly used as backup power in CCTV systems. This UPS system uses a constant-voltage ferro-resonant transformer and line-sensing circuitry to regulate power.

When the incoming power is stable, the UPS transformer cleans up the raw line power, eliminating spikes, dips, surges, noise, and minor brownouts. Should the power source fail to any extent, the ferro-resonant transformer initially provides energy from its magnetic field and capacitor circuits, then activates batteries to provide uninterrupted power.

Appendix D: Configuring Alarm Inputs

When delivered, Rapid Eye has the alarm inputs configured as Normally Open (NO). This configuration can be changed in the Operator Software by a System Administrator to Normally Closed (NC) or End of Line (EOL) by using the following procedure:

1. Start up Rapid Eye, and connect to a remote site.
2. Click [Configure] in the Main window, then click [RDI] in the Advanced Configuration window.

The Remote RDI window is displayed.

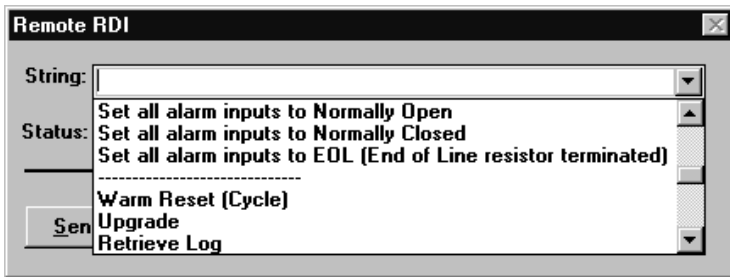


Figure 12: Remote RDI Window

3. Enter a command from one of the following sections.

Enabling the Alarm Input Type

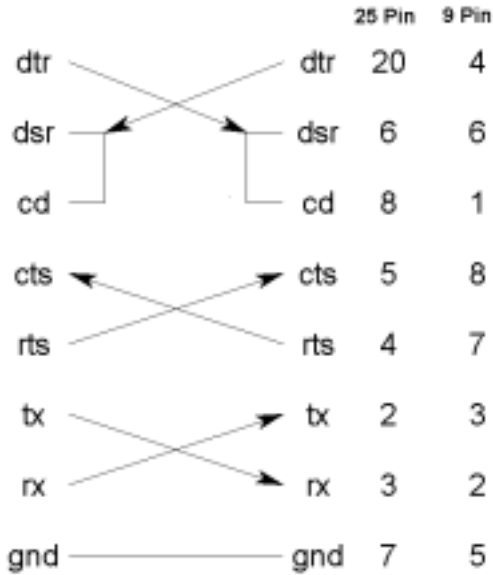
1. Click the down arrow to the right of the String box and select one of the following alarm input choices:
 - [Set all alarm inputs to Normally Open]
 - [Set all alarm inputs to Normally Closed]
 - [Set all alarm inputs to EOL (End of Line resistor terminated)]

The connection to the Remote Unit will be lost as the Remote Unit restarts to set the new configuration.

2. Acknowledge any alarms.
3. Click [Dial] or [Connect] to re-connect.

This sets all alarms to the appropriate input configuration setting.

Appendix D: Full Duplex Null Modem Wiring Diagram



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