



Kramer Electronics Ltd.

USER MANUAL

ACCESSORIES

Model: PIP-200

**IMPORTANT: Before proceeding, please read paragraph entitled
"Unpacking and Contents"**

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1 INTRODUCTION

Congratulations on your purchase of this Kramer Electronics - **Picture-in-Picture Inserter**. Since 1981 Kramer has been dedicated to the development and manufacture of high quality video/audio equipment. The Kramer line has become an integral part of many of the best production and presentation facilities around the world. In recent years, Kramer has redesigned and upgraded most of the line, making the best even better. Kramer's line of professional video/audio electronics is one of the most versatile and complete available, and is a true leader in terms of quality, workmanship, price/performance ratio and innovation. In addition to the Kramer **PIP-200** such as the one you have just purchased, Kramer also offers a full line of high quality switchers, distribution amplifiers, processors, interfaces, controllers and computer-related products.

1.1 Factors Affecting Quality of Results

There are many factors affecting the quality of results when signals are transmitted from a source to an acceptor which are described in Table 1:

Table 1: Factors Affecting Quality of Results

FACTOR	EFFECT
Connection cables	Low quality cables are susceptible to interference; they degrade signal quality due to poor matching and cause elevated noise levels. They should therefore be of the best quality.
Sockets and connectors on the sources and acceptors	So often ignored, they should be of highest quality, since "Zero Ohm" connection resistance is the objective. Sockets and connectors also must match the required impedance (75ohm in video). Cheap, low quality connectors tend to rust, thus causing breaks in the signal path
Amplifying circuitry	Must have quality performance when the desired end result is high linearity, low distortion and low noise operation
Distance between sources and acceptors	Plays a major role in the final result. For long distances between sources and acceptors, special measures should be taken in order to avoid cable losses. These include using higher quality cables or adding line amplifiers.
Interference from neighboring electrical appliances	These can have an adverse effect on signal quality. Balanced audio lines are less prone to interference, but unbalanced audio should be installed far from any mains power cables, electric motors, transmitters, etc., even when the cables are shielded



2 SPECIFICATIONS

PIP-200	
Function	Picture in Picture Inserter
Input Type/Standards	2 video, each composite or Y/C PAL, NTSC (both), SECAM
Input Connections	Composite: BNC connector; YC: 4P connector
Input Level	Composite: 1Vpp/75ohm, YC: 1Vpp/75ohm (Y), 0.3Vpp/75ohm (C)
Inserted Picture Size	1/4, 1/9, 1/16, 1/36th.
Inserted Resolution	6 bits
Output Type	1 composite video + Y/C PAL, NTSC (both)
Output Connector	Composite: BNC connector; YC: 4P connector
Output Level	Composite: 1Vpp/75ohm, YC: 1Vpp/75ohm (Y), 0.3Vpp/75ohm (C)
Video Crosstalk	-62dB (Sync), -37dB (C)
Standard Detection	Automatic
Dimensions (W, D, H)	48cm x 17cm x 1U; 19 " x 7 " x 1U
Weight (net)	2.8kg. (6.2lbs.) Approx.
Power Consumption	18.4VA
Power Source	230VAC, 50/60 Hz, (115VAC, U.S.A.)

3 HOW DO I GET STARTED?

The fastest way to get started is to take your time and do everything right the first time. Taking 15 minutes to read the manual may save you a few hours later. You don't even have to read the whole manual. If a certain section doesn't apply to you, you don't have to spend your time reading it.

4 UNPACKING AND CONTENTS

The items contained in your Kramer **PIP-200** package are listed below. Please save the original box and packaging materials for possible future shipment.

PIP-200 - Picture-in-Picture Inserter

Software

AC Power Cable

KRAMER Null Modem Adapter Connector

User Manual

4 Rubber Feet

Kramer Concise Product Catalog

4.1 Optional Accessories

The following accessories, which are available from Kramer, can enhance implementation of your machine. For information regarding cables and additional accessories, contact your Kramer dealer.

- **VS-5x4** - (5x4 Video/ Stereo Audio Matrix Switcher) can be serially connected between sources and the PIP-200 for video and audio input switching. The VS-5x4 may also be used as one 1:4 or two 2:2 Y/C-video/audio DAs or any other combination as well. The VS-5x4 switches during the vertical interval for smooth transitions between genlocked sources. It is microprocessor and RS-232 controlled (software included), and is operated by touching a keypad on the front panel. Front switches control the audio level of each output. Large illuminated seven segment LED displays show the connection status of the machine at any given moment.
- **VS-4x4YC**- (4x4 Composite/YC/Audio matrix) can be serially connected between the PIP-200 and its sources or between the PIP-200 and the acceptor. The Kramer **VS-4x4YC** is a high performance 4x4 vertical interval matrix switcher for composite and/or s-Video and stereo audio signals. It is a true matrix, allowing the user to route any input to any or all outputs simultaneously. Since the **VS-4x4YC** switches during the vertical interval, transitions are glitch-free when sources share common reference sync. The **VS-4x4YC** provides composite video and s-Video connectors allowing it to be used for either format. Mixing formats is possible but composite video sources need to be routed to composite video outputs and s-Video sources must be routed to s-Video outputs. It is important to note that the **VS-4x4YC** does not perform signal format conversion. Like most Kramer switchers, the **VS-4x4YC** can be controlled by front panel buttons or RS-232 serial commands. For applications requiring remote control via a Windows-based personal computer, K-Switch software is provided at no additional cost. It is easy to use, dependable, rugged, and fits in one vertical space of a standard 19" rack.
- **VM-1411** (Video/Balanced Stereo Audio Distribution Amplifier) can be serially connected between the PIP-200 processor and the acceptors for video and audio distribution. It is a full broadcast, state-of-the-art machine, designed for studio and other applications. The VM-1411 has two inputs, video and audio, each splitting to 5 outputs. The user may select 2 x 1:5 or 1:10 operation via front panel control switches. Several VM-1411 units may be chained through the looping inputs. Output signals are (user selectable) DC or AC coupled for maximum flexibility. Audio outputs are buffered and isolated from each other, allowing Hi-Fi Balanced audio distribution.
- **SP-11** - (Video/Audio Processor) can be serially connected between the video/audio source and the PIP-200 processor for video and audio control/correction. The machine provides camera control and luminance/white balance correction. The SP-11 is also capable of performing composite to Y/C conversion and bi-directional transcoding. The machine allows full control over the video signal: video gain down to full fade, log or linear definition control, log or linear contrast control, color saturation control, black level control, red, green and blue controls and a screen splitter control for "before-after" comparison.
- **VIDEO TESTER** - A unique, patented, indispensable tool for the video professional, the video Tester is used to test a video path leading to/from an amplifier, switcher or processor. By pressing only one touch switch it can trace missing signals, distinguish between good and jittery (VCR sourced) signals, and identify the presence of good signals. Whenever a video signal is missing, because of bad connections, cable breaks or faulty sources, the video Tester is all you need.

5 GETTING TO KNOW YOUR PIP-200

The KRAMER **PIP-200** is a Multi-Standard Picture in Picture Video Inserter designed for studio and other applications for monitoring and special effects generation. Front panel switches control the size of the inserted picture (1/4, 1/9, 1/16 or 1/36th of the screen), its position, its border color and matte color and they can also be used to freeze the inserted picture. The user can flip between the inserted and background image, with a key or wipe effect. A single color can be displayed instead of the background video source and the user can flip between the inserted picture and the background image, using a front panel switch. Additional features of the **PIP-200** include the ability to insert an NTSC image into a PAL background and vice versa. When turned off, the machine saves its settings in an internal EEPROM, recalling them when it is turned on again. The encoder's power up settings (PAL, NTSC, NTSC4.43) can be selected via internal jumpers inside the machine. Control of the machine is also possible via its RS-232 port with the software which is provided with the machine. Front/rear panel features of the **PIP-200** are described in Figure 1, Table 2 and Table 3.

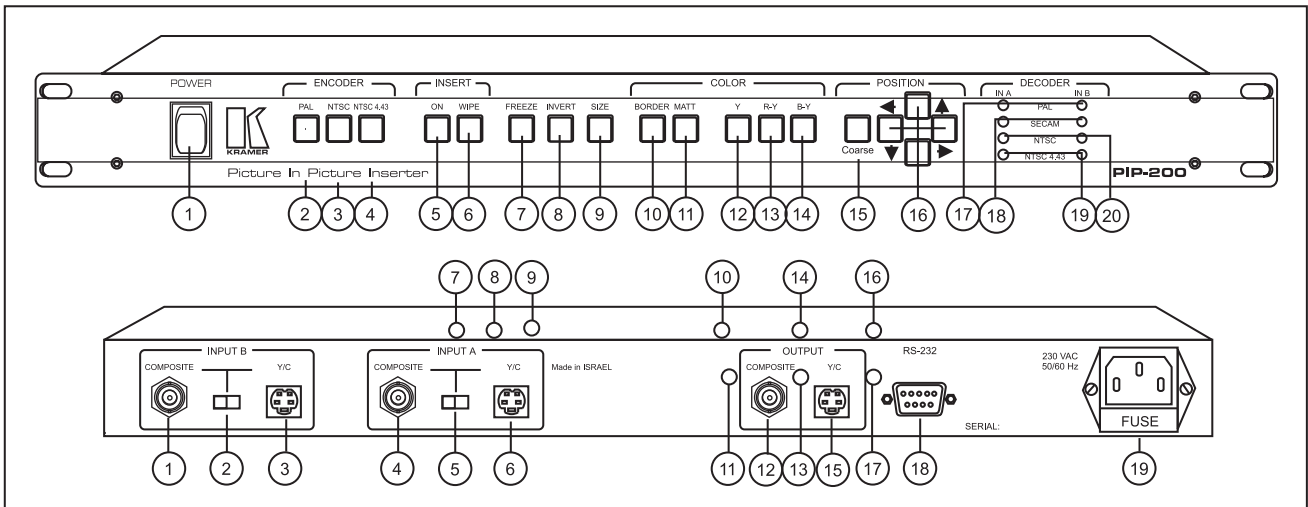


Figure 1: PIP-200 Front/Rear Panel Features

Table 2: PIP-200 Front Panel Features

No.	Feature	Function
1.	Power Switch	Illuminated switch supplies power to the unit.
2.	PAL pushbutton	When pressed, illuminates and selects PAL encoding for the output.
3.	NTSC pushbutton	When pressed, illuminates and selects NTSC encoding for the output.
4.	NTSC 4.43 pushbutton	When pressed, illuminates and selects NTSC 4.43 encoding for the output.
5.	ON pushbutton	Toggles the PIP insert function on and off. Illuminated when on is selected.
6.	WIPE pushbutton	Wipes the inserted picture in and out.
7.	FREEZE pushbutton	Toggles the freezing of the inserted picture. Illuminates when frozen.
8.	INVERT pushbutton	Toggles the swapping of the inserted and background picture. Illuminates when swapped.
9.	SIZE pushbutton	Selects the inserted picture size (1/4,1/9,1/16 or 1/36th of the screen).
10.	BORDER pushbutton	Toggles the border around the inserted picture. Illuminates when a border is selected.
11.	MATT pushbutton	Toggles a Matte (single color) background. Illuminates when Matte is selected.
12.	Y pushbutton	Press to set the color of the border or the Matte. (Y component).
13.	R-Y pushbutton	Press to set the color of the border or the Matte. (V component).
14.	B-Y pushbutton	Press to set the color of the border or the Matte. (U component).

Table 2: PIP-200 Front Panel Features (Continued)

No.	Feature	Function
15.	COARSE pushbutton	Toggles from fine position control to coarse control. Illuminates when coarse control is selected.
16.	POSITION pushbuttons	Move the inserted picture along the X, Y-axis.
17.	PAL LEDs	Illuminate when IN A and/or IN B receive a PAL system signal.
18.	SECAM LEDs	Illuminate when IN A and/or IN B receive a SECAM system signal.
19.	NTSC LEDs	Illuminate when IN A and/or IN B receive a NTSC system signal.
20.	NTSC 4.43 LEDs	Illuminate when IN A and/or IN B receive a NTSC 4.43 system signal.

Table 3: PIP-200 Rear Panel Features and Rear Panel Trimmers

WARNING!

Adjustments of the trimmers described in Table 3 may only be done by qualified and authorized personnel. Failure to comply with this warning may damage the machine.

No.	Feature	Function
1.	COMPOSITE BNC connector	Composite input signal (A).
2.	INPUT B COMPOSITE/YC selector	Selects the input signal format: (Composite or Y/C)
3.	YC 4P connector	YC input signal (A).
4.	COMPOSITE BNC connector	Composite input signal (B).
5.	INPUT A COMPOSITE/YC selector	Selects the input signal format: (Composite or Y/C)
6.	YC 4P connector	YC input signal (B).
7.	R-Y trimmer	Adjusts R-Y colors of the inserted picture.
8.	B-Y trimmer	Adjusts B-Y colors of the inserted picture.
9.	YINS trimmer	Adjusts inserted picture size.
10.	Chroma trimmer	Adjusts the burst level of the Chroma signal.
11.	Burst trimmer	Adjusts the burst signal timing.
12.	OUTPUT COMPOSITE BNC connector	Composite output signal.
13.	PAL level trimmer	Adjusts PAL level of output signal.
14.	PAL DC trimmer	Adjusts DC level of PAL output signal.
15.	OUTPUT YC 4P connector	YC output signal.
16.	NTSC DC trimmer	Adjusts DC level of NTSC output signal.
17.	NTSC LEVEL trimmer	Adjusts level of NTSC output signal.
18.	RS-232 connector	Used for bi-directional control of the machine from a PC through RS-232 interface.
19.	Power Connector	A 3-prong AC connector allows power to be supplied to the unit, Directly underneath this connector, a fuse holder houses the appropriate fuse.

6 TYPICAL APPLICATIONS

6.1 Picture in Picture

Figure 2 illustrates a typical set-up of the PIP-200: Two incoming video signals from video sources are connected to the PIP-200 video inputs. The PIP-200 outputs the incoming signals to an acceptor in a "PIP" (Picture in Picture) mode and the operator uses the programming keys to control the inserted pictures.

Perform the following steps (as necessary):

1. Connect two video sources to the PIP-200 input sockets and select **Composite** or **YC** format.
2. Connect Composite and/or YC acceptors to the PIP-200 output sockets (both outputs are available).
3. Activate the PIP function (**INSERT**), either immediately (**ON**), or via the **WIPE** function (see section 4.3 for details).
4. Select the status of the **FREEZE** (inserted picture only), **INVERT** and **SIZE** (inserted picture only) functions, using the front panel controls (see Table 1 for details).
5. Select if a **BORDER** is required around the inserted picture, or a **MATTE** (single color) background, using the front panel controls. The border or matte color can be set using the **Y**, **R-Y** and **B-Y** front panel controls (see Table 1 for details).
6. Use the **COARSE** and **POSITION** controls to locate the picture (see Table 1 for details).
7. For RS-232 control, connect an RS-232 cable from your PC to the RS-232 connector of the PIP-200 (see section 9.3).
8. Operate sources, acceptor, PC, and the PIP-200. The system is automatically detected, however full standard conversion takes place only in the inserted picture.

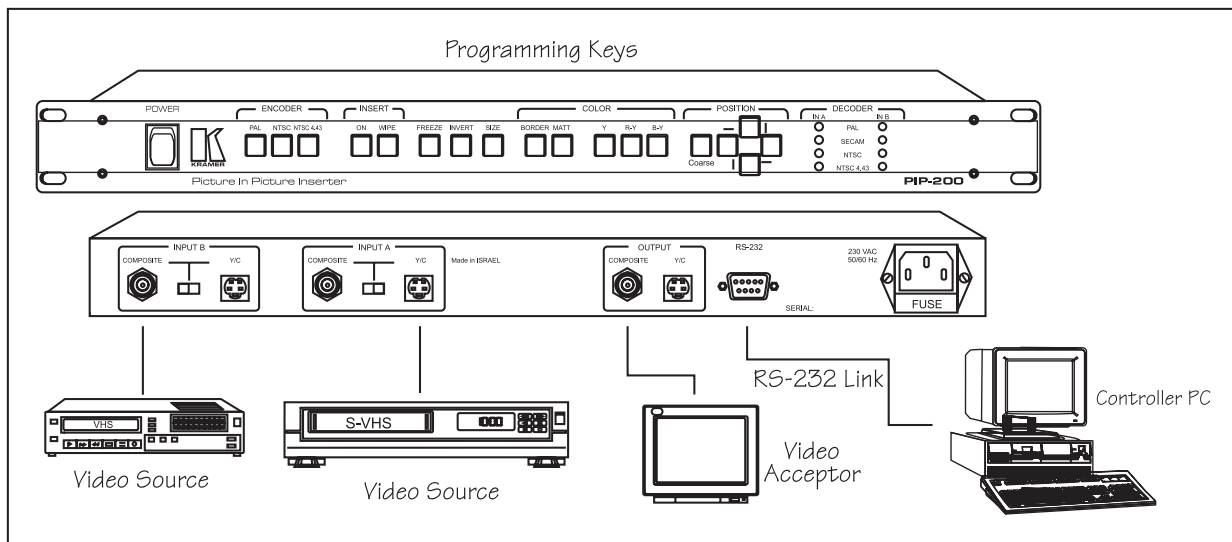


Figure 2: Picture in Picture

7 INSTALLATION

7.1 Rack Mounting

The PIP-200 can be rackmounted in a standard 19" (1U) EIA rack. The machine does not require any specific spacing for ventilation above or below the unit. To mount the machine, simply place the unit's ears against the rack rails of your rack and insert standard screws through each of the four corner holes.

8 CONNECTING TO VIDEO DEVICES

Video sources and output devices (such as monitors, projectors or recorders) may be connected to the PIP-200 through the BNC or 4P type connectors located on the back of the unit. Please keep in mind that the output signal format of the parent picture matches that of the input signal format.

9 USING THE PIP-200

9.1 Turning on the Machine

NOTES

1. The machine should only be powered on after all connections are completed and all source devices have been powered on. Do not attempt to connect or disconnect any video or control signals to the machine while it is powered on!
2. The socket-outlet should be near the equipment and should be easily accessible. To fully disconnect equipment, remove power cord from socket.

1. Press the toggle switch on the far-left front panel to the up position. The toggle switch will illuminate.
2. Operate the sources and acceptors.

9.2 Setting the Internal Jumpers

The encoder's initial settings (**PAL**, **NTSC**, **NTSC4.43**) can be selected via internal jumpers (**JMP1-JMP3**) inside the machine. Only one jumper is inserted to determine which of the three **ENCODER** pushbuttons illuminates when the machine is turned on. If the **NTSC** jumper is inserted, for example, the **NTSC** pushbutton illuminates whenever the machine is turned on. The internal jumper locations are presented in Figure 3.

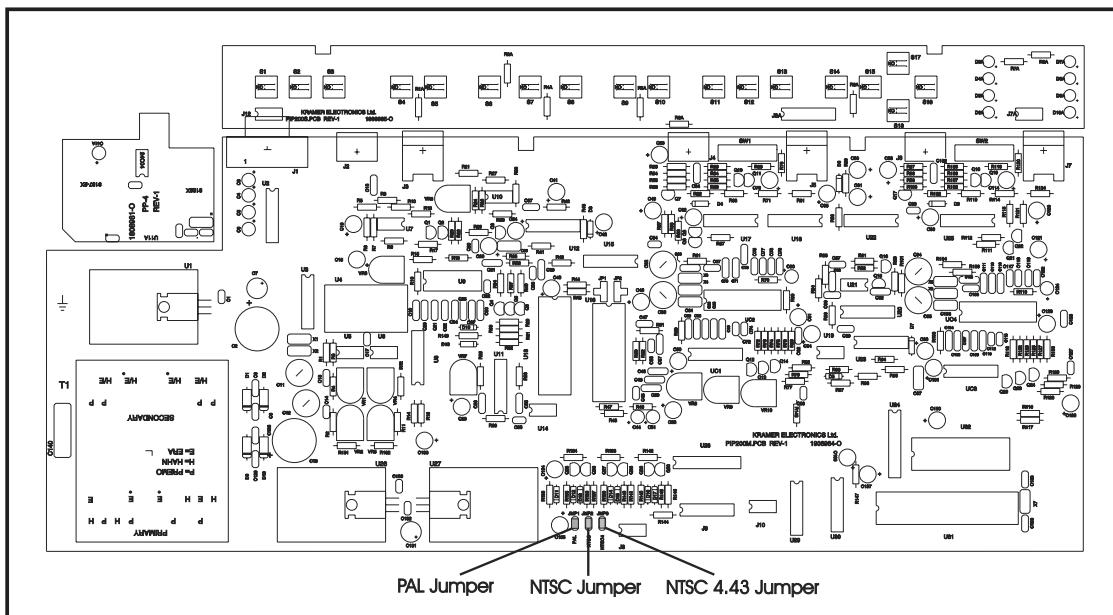


Figure 3: PIP-200 Internal Jumper locations

9.3 Connecting to a PC

Connections between your PIP-200 and a PC are made using your computer's RS-232 communication port. This port is either a DB-9 9-pin port or DB-25 25-pin port. The cable connecting your PIP-200 to a PC should be wired as shown in Figure 4. Please keep in mind that it is not recommended to extend an RS-232 signal beyond a length of 25 feet, without use of an RS-232 to RS-422 protocol converter at both the PC and the machine. An adapter is provided with the machine. The adapter is wired according to one of the diagrams in Figure 4. If you choose to use the adapter (recommended), then simply plug the adapter into the PC's RS-232 port and connect the other end to the PIP-200 via a flat cable.

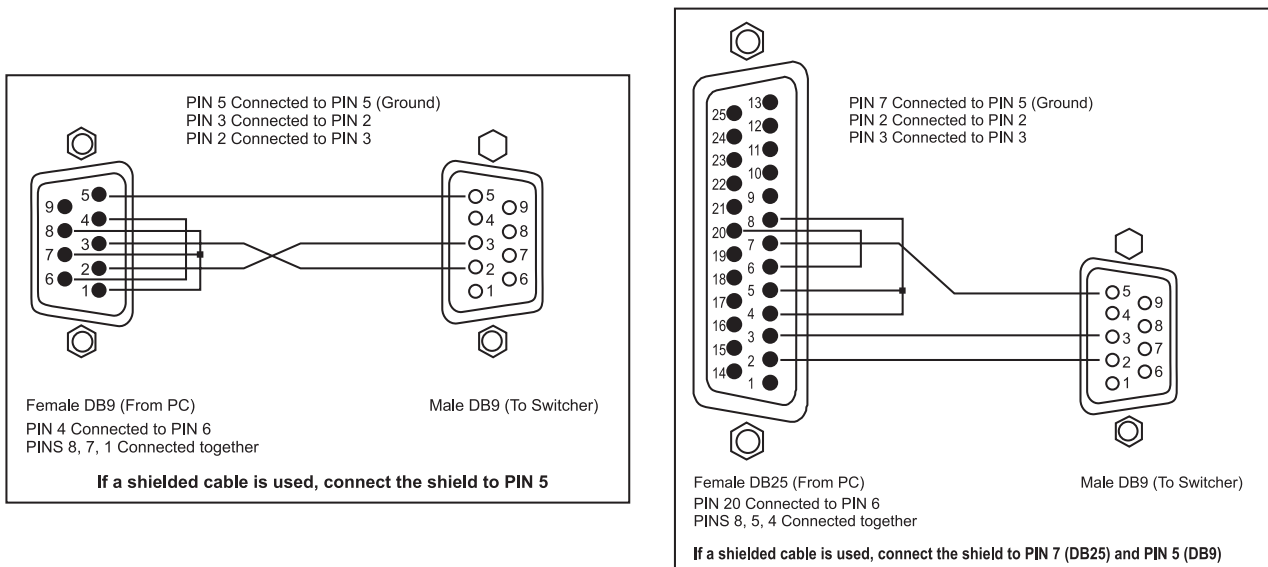


Figure 4: RS-232 Control Connector Wiring

9.4 Installing the "Pip" Control software

Included with your machine are diskettes (or a CD) with software drivers for the PIP-200's operation. Drivers and updates may also be downloaded from our web site: www.kramerelectronics.com. To install the Control Software perform the following steps:

1. Insert the program diskette #1 into the floppy drive of your PC.
2. Run from within Windows 95™ or Windows 98™ the Setup.exe file on the first diskette. Follow the instructions.
3. The "Pip" software & icon are automatically installed in a specific destination folder on the hard disk.
4. Once the "Pip" program installation is completed, it is ready to use.

9.5 Using the PC Control Software

After installing the program perform the following steps:

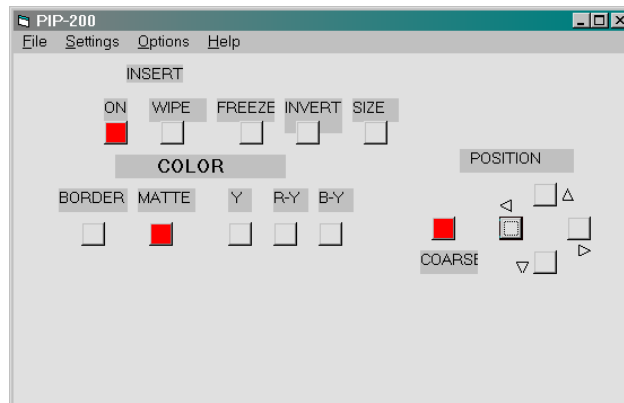
1. Connect your PIP-200 to a PC serial port.
2. Turn on the sources and acceptors and the PIP-200,.
3. Open the folder where the program was installed (the default folder is named "Pip") and double click on the **Pip** icon. You may create a shortcut to the program and locate it in a convenient location.
4. When the program is launched for the first time, the **Port** screen appears. Select the active serial port (**COM1-COM4**) to which the PIP-200 is connected and then click **Ok**. The Port screen disappears and the PIP-200 main screen remains.
5. If the COM is not properly selected, or the PIP-200 is not properly connected, "**Communication Error**" message appears:

COMMUNICATION
ERROR

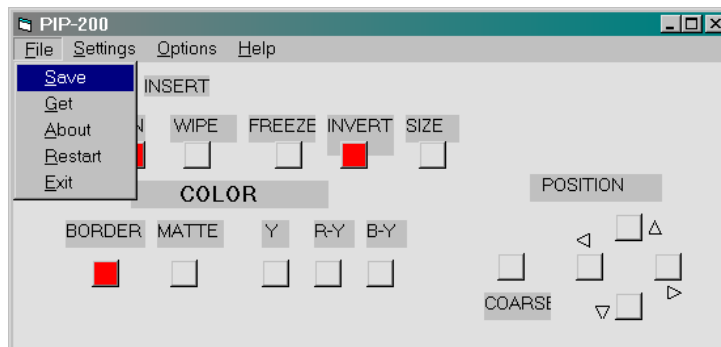
NOTE

The PIP-200 main operation screen buttons function similarly to those located on the machine's front panel. Refer to Table 2: "PIP-200 Front Panel Features" for more details.

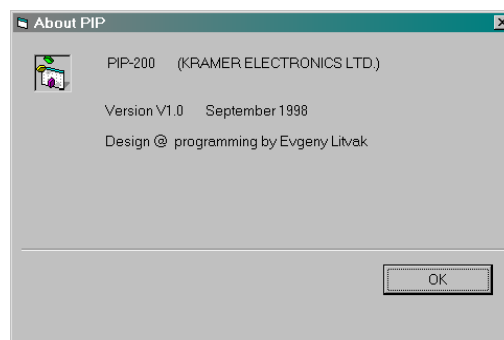
The software main menu controls include **File**, **Settings**, **Options** and **Help** as shown below:



- ❖ **File Sub Menu** - Click on **File**. The **File** sub menu appears:



- **Save** - When clicked, saves the current configuration of the screen. To save the configuration: click on **Save** and then select the file location of the saved configuration.
- **Get** - When clicked, recalls and displays on the screen a saved configuration. To recall a configuration, click on **Get** and then select the desired configuration.
- **About** - When clicked, describes the current software version. Click **Ok** after the selection is complete.

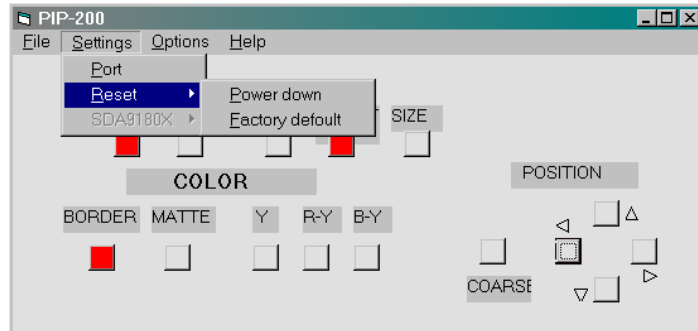


- **Restart** - Displays the current configuration of the PIP-200 on the screen.
- **Exit** - When clicked, allows you to exit the program. To exit the program, select "**Exit**" from the File sub menu.

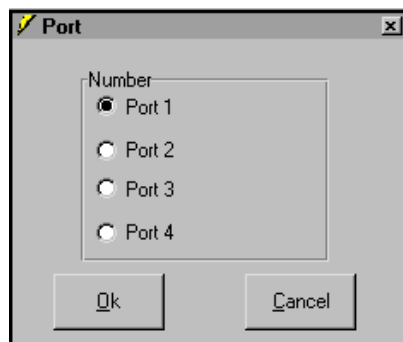
NOTE

When clicking "**Exit**", the program automatically stores the active port number. When the program is run again, this port number automatically appears.

- ❖ **Settings Sub Menu** - Click on **S**ettings. The **S**ettings sub menu appears:

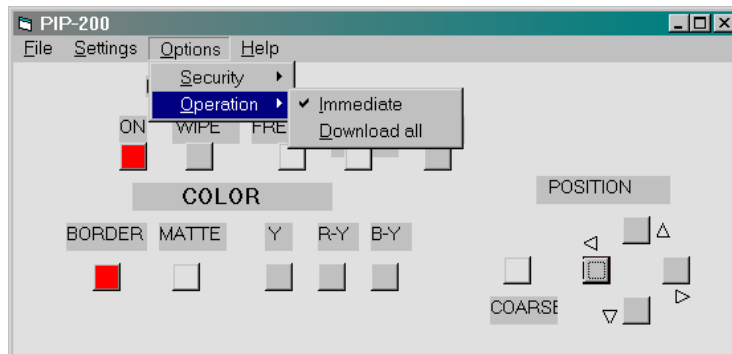


- **Port** - Defines the active serial port (**COM1-COM4**) to which the PIP-200 is connected. To select a port, click on the **P**ort button. When the **P**ort screen appears, select the desired port and then click **O**k.



- **Reset** - Enables selection of two types of configurations: **P**ower down, or **F**actory default:
- Clicking on **P**ower down resets the machine and as a result the last saved settings appear on both the screen and the front panel.
- Clicking on **F**actory default resets the machine and as a result the Factory default settings appear on both the screen and the front panel.

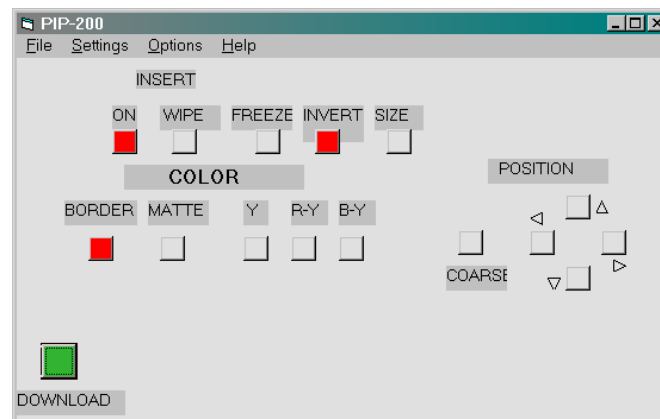
- ❖ **Options Sub Menu** - Click on **Options**. **Options** sub menu appears:



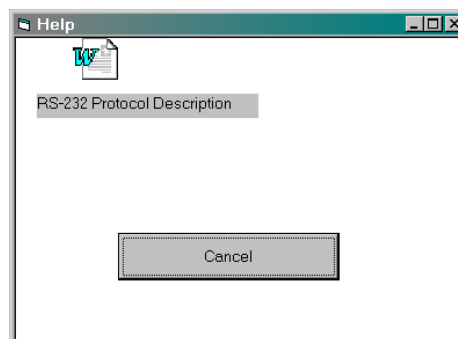
- **Security** – For use by authorized personnel only for firmware configuration.
- **Operation** - Enables selection of two types of operation: **Immediate** or **Download**:

Clicking on **Immediate** enables immediate control of the PIP-200: Each time a button is clicked, the front panel of the PIP-200 is affected immediately.

When clicking on **Download** a green **DOWNLOAD** button is displayed at the lower left corner of the screen: Only when this button is clicked the PIP-200's front panel is affected, thus enabling delayed control of the PIP-200.



- ❖ **Help Sub Menu** - When **Help** Sub Menu is clicked, a **Help** screen appears allowing you to view the Communication protocol (by clicking the RS-232 protocol Description icon), or **Cancel** to cancel your selection.



10 TAKING CARE OF YOUR MACHINE

Do not locate your machine in an environment where it is susceptible to dust or moisture. Both of these may damage the electronics, and cause erratic operation or failure. Do not locate your machine where temperature and humidity may be excessive. Doing so may also damage the electronics, and cause erratic operation or failure of your machine. Do not clean your machine with abrasives or strong cleaners. Doing so may remove or damage the finish, or may allow moisture to build up. Take care not to allow dust or particles to build up inside unused or open connectors.

11 TROUBLESHOOTING

NOTES

1. *Please note that if the output signal is disturbed or interrupted by very strong external electromagnetic interference, it should return and stabilize when such interference ends. If not, turn the power switch off and on again to reset the machine.*
2. *If the following recommended actions still do not result in satisfactory operation, please consult your KRAMER Dealer.*

11.1 Power and Indicators

Problem	Remedy
No Power	<ol style="list-style-type: none"> 1. Confirm that the rocker switch is in the "ON" position, and that the switch is illuminated. 2. Confirm that power connections are secured at the machine and at the receptacle. Make sure the mains receptacle is active. If still there is no power, remove power cord from AC outlet and then, using a flat head screwdriver, remove the fuse holder located directly below the power connector on your machine. 3. Confirm that the fuse is good by looking for the wire connected between the ends of the fuse. If the wire is broken, replace the fuse with another, with the same rating.

11.2 Video Signal

Problem	Remedy
No video at the output device	<ol style="list-style-type: none"> 1. Confirm that your source and output devices are powered on and connected properly. The input of your machine (parent picture) should be of an identical signal format at the output of your source. Signals at the output of your machine should be of an identical signal format as at the input of your display. 2. Confirm that any other device in the signal path has the proper input and/or output selected. 3. Use the Video Tester to test the video path leading to/from your machine (see section 4.1 " Video Tester").
Video level is too high or too dim.	<ol style="list-style-type: none"> 1. Verify that the lines are well matched through 75ohm impedances, otherwise the video level will be too high or too dim. 2. Confirm that the connecting cables are of high quality and properly inserted.

<p>Noise bars are "rolling" up or down in the output image</p> <p>or:</p> <p>Low Frequency Hum in the output signal</p>	<p>Hum bars (ground loop) are caused by a difference in the ground potential of any two or more devices connected to your signal path.</p> <p style="text-align: center;">WARNING!</p> <p style="text-align: center;"><i>Do not disconnect the ground from any piece of video equipment in your signal path!</i></p> <p>Check the following to remove hum bars:</p> <ol style="list-style-type: none"> 1. Confirm that all interconnected equipment is connected to the same phase of power, if possible. 2. Remove equipment connected to that phase that may introduce noise, such as motors, generators, etc. 3. Disconnect all interconnect cables and reconnect them one at a time until ground loop reappears. Disconnect the affected cable and replace, or insert an isolation transformer in the signal path.
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12 RS-232 COMMUNICATION PROTOCOL

RS-232 communication with the PIP-200 is defined using a two byte protocol as defined below. Data is transferred at 9600 baud, with no parity, 8 data bits and 1 stop bit. The physical interface with the controller should be via a null-modem connection. The protocol gives the user direct access to the SDA-9189X chip within the PIP-200, and also to the front-panel switches which control the picture-in-picture functions. Resetting internal memories is also possible.

	MSB							LSB
1 st byte	0	D7	S	A4	A3	A2	A1	A0
	7	6	5	4	3	2	1	0
2 nd byte	1	D6	D5	D4	D3	D2	D1	D0

1st BYTE: Bit 7 – defined as 0.

D7 – MSB of data (D0...D6 described in 2nd byte).

S – Send bit - "1" when PC sends information to address A4...A0.

- "0" when PC requests PIP-200 to download data of A4...A0.

A4...A0 – address (sub address) of data in SDA-9189; or set to 1F (hex) for access to a front-panel switch.

2nd BYTE: Bit 7 – defined as 1.

D6...D0 – Data to be sent to, or retrieved from SDA-9189X (D7 in first byte); or D3...D0 is the front-panel switch number (if A4...A0 is set to 1F (hex)).

12.1 Using the Protocol

- ❖ To download data from the PC to the SDA-9189X set S=1, and send the data (D7...D0) to address (A4...A0) in the machine. The machine will reply by echoing back the two bytes sent to it. For example, to send 2D (hex) to address 14 (hex), set 1st byte as 00110100 (34 hex), and second byte as 10101101 (AD hex).
- ❖ To request the value of data in the SDA-9189X set S=0, and set the A4...A0 with the address of the requested data in the SDA-9189X. The machine will reply by sending the requested data (D7...D0) to the PC.
- ❖ To "press" (via RS-232) a front-panel switch on the PIP-200 set S=1; A4...A0 = 1F (hex); and D3...D0 with the value of the switch to be "pressed" (switch numbers are defined below).
- ❖ To request the status of a front-panel led set S=0; A4...A0 = 1F (hex); and D3...D0 with the value of the switch whose led status is required (switch numbers are defined below). The PIP-200 replies by setting D6 high if the led is on, or low if the led is off.
- ❖ To reset the PIP-200 to its factory-settings set 1st byte = 3F (hex), and 2nd byte = FF (hex).

NOTE

If a switch which causes a front-panel led to change status is pressed, the PIP-200 sends S=0; A4...A0=1F (hex); D6=led status; and D3...D0=switch number. On initialization (eg. on power-up), the PIP-200 sends 1F (hex), 80 (hex).



12.2 Front Panel Switch Numbering

The switches on the front-panel of the machine, (as well as their internal LEDs, where applicable), are defined by the hexadecimal numbering system below:

ON	WIPE	FREEZE	INVERT	SIZE	BORDER	MATTE	Y
1	2	3	4	5	6	7	8

R-Y	B-Y	COARSE	LEFT	UP	RIGHT	DOWN
9	A	B	C	D	E	F

LIMITED WARRANTY

Kramer Electronics (hereafter Kramer) warrants this product free from defects in material and workmanship under the following terms.

HOW LONG IS THE WARRANTY

Labor and parts are warranted for three years from the date of the first customer purchase.

WHO IS PROTECTED

Only the first purchase customer may enforce this warranty.

WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1. Any product which is not distributed by Kramer or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the web site www.kramerelectronics.com.
2. Any product, on which the serial number has been defaced, modified or removed.
3. Damage, deterioration or malfunction resulting from:
 - a) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature.
 - b) Unauthorized product modification, or failure to follow instructions supplied with the product.
 - c) Repair or attempted repair by anyone not authorized by Kramer.
 - d) Any shipment of the product (claims must be presented to the carrier).
 - e) Removal or installation of the product.
 - f) Any other cause, which does not relate to a product defect.
 - g) Cartons, equipment enclosures, cables or accessories used in conjunction with the product.

WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

We will pay labor and material expenses for covered items. We will not pay for the following:

1. Removal or installations charges.
2. Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
3. Shipping charges.



HOW YOU CAN GET WARRANTY SERVICE

4. To obtain service on you product, you must take or ship it prepaid to any authorized Kramer service center.
5. Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
6. For the name of the nearest Kramer authorized service center, consult your authorized dealer.

LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

EXCLUSION OF DAMAGES

Kramer's liability for any defective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1. Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or:
2. Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place. **NOTE:** All products returned to Kramer for service must have prior approval. This may be obtained from your dealer.

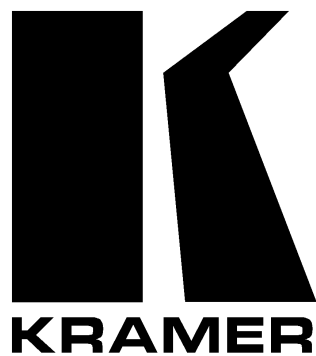
NOTICE

This equipment has been tested to determine compliance with the requirements of:

- EN-50081:** "Electromagnetic compatibility (EMC);
generic emission standard.
Part 1: Residential, commercial and light industry"
- EN-50082:** "Electromagnetic compatibility (EMC) generic immunity standard. Part 1:
Residential, commercial and light industry environment".
- CFR-47** FCC Rules and Regulations:
Part 15- "Radio frequency devices:
Subpart B- Unintentional radiators

CAUTION

- Any user who makes changes or modifications to the unit without the express approval of the manufacturer will void user authority to operate the equipment. The machine should be serviced by Kramer's authorized personnel only.
- Use the DC power supply (provided) to supply power to the machine and controllers.
- Please use recommended interconnect cables to connect the machine to controllers and other components.



**The list of Kramer distributors appears on our web site:
www.kramerelectronics.com
From the web site it is also possible to e-mail factory headquarters.
We welcome your questions, comments and feedback.**

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