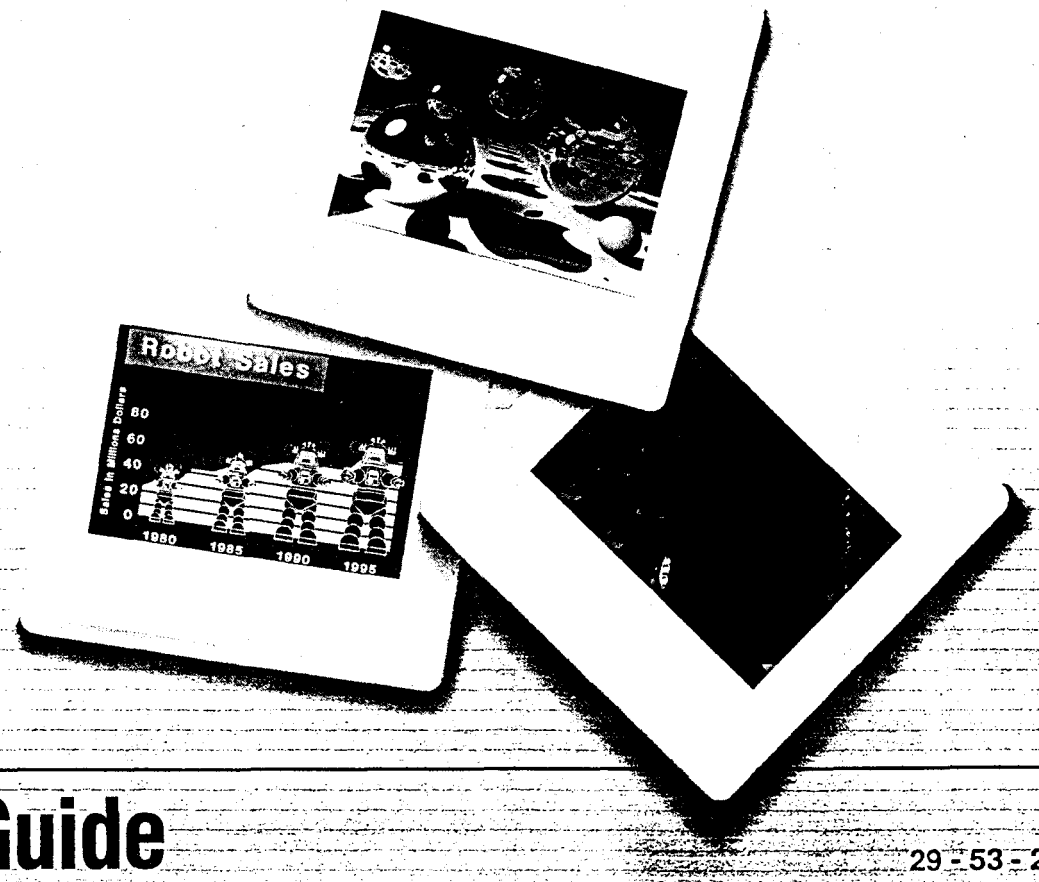
AGFA AGFA MATRIX DIVISION

SLIDEWRITER™
Film Recorder



Owner's Guide

29 - 53 - 2001

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SlideWriter OWNER'S GUIDE

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PREFACE

About This Manual

This manual provides the steps needed to install, operate, and maintain optimum performance of the SlideWriter. The first four chapters provide the information needed to produce slides. The fifth chapter will provide the basics of how the SlideWriter works. The following is an overview of each chapter in this manual:

Chapter 1: Unpacking and Preparation - introduces the machine, its controls, and connectors. This chapter also contains information on choosing a place to put your SlideWriter.

Chapter 2: Installation - Connecting your SlideWriter to a Macintosh™ computer.

Chapter 3: Operator Instructions - includes procedures on loading and unloading film and taking an exposure on the SlideWriter.

Chapter 4: SlideWriter Maintenance - Contains information on keeping your film recorder in proper working order and procedures for testing SlideWriter.

Chapter 5: Reference - Contains a system overview, a glossary, and a description of function numbers and error codes.

Additional information regarding the software is contained in a separate booklet, *SlideWriter Utility Software User's Guide.*

As with any standard office equipment, a service contract is recommended for the Matrix SlideWriter. Contact your authorized Matrix representative for details.

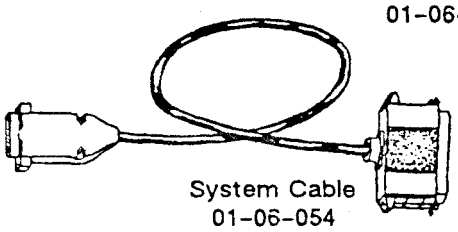
Introduction

The Matrix SlideWriter produces full color 35mm slides of outstanding quality with both 2048 x 1366 (2k) and 4096 x 2732 (4k) resolutions (software selectable).

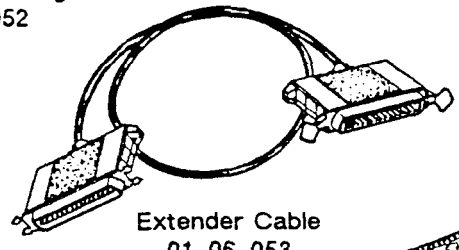
The SlideWriter is designed to be used with any computer that uses a SCSI (Small Computer System Interface) interface. The SlideWriter's functions may be controlled from the host computer.

SCSI CABLES

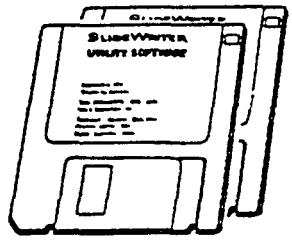
Termination Plug
01-06-052



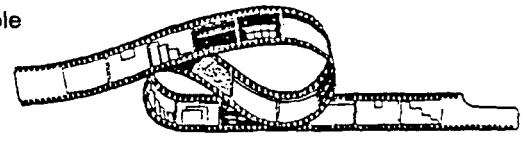
System Cable
01-06-054



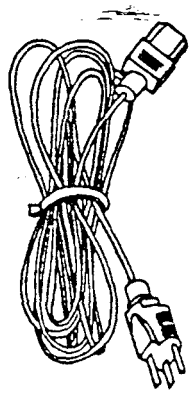
Extender Cable
01-06-053



Software (Two 3.5" Disks)
21-01-013



Factory Test
Patterns
(Final Test Films)



Power Cord
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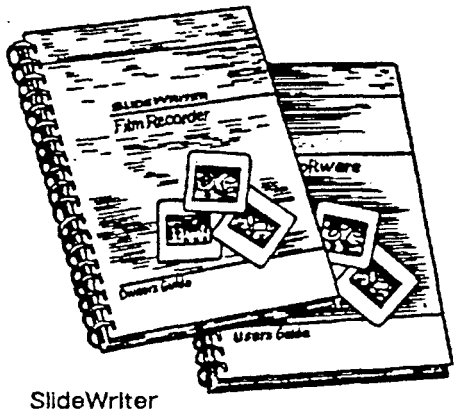

SlideWriter
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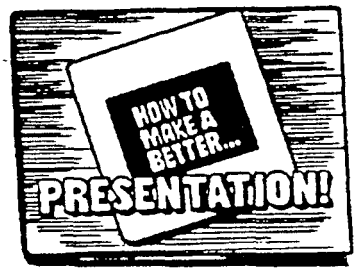
29-53-2001

Conductor Utility
Software User's Guide
29-55-5001



How to Make a Better
Presentation
26-02-008

Power Requirements

The SlideWriter requires either 110 VAC, 60 Hz or 220 VAC, 50 Hz depending on individual power specifications. The SlideWriter's power requirements are on the serial number identification label located on the rear of the unit.

The SlideWriter draws approximately 1.5 Amps. Before installing it, ensure that adequate power is available. Because the SlideWriter is a precision electro-optical device, it is important that the voltage specifications and power requirements are specifically adhered to.

If the power system has other large electrical machinery connected to it, or it is subject to variations such as transients, voltage sags and surges, or brownouts, use a use a power line conditioner such as the Elgar Power Line Conditioner (PLC) Model PLC 250.

EMI/RFI

This equipment has been tested and complies with the limits for a computing device in accordance with the specifications in Subpart J, Part 15, Class A, of FCC rules.

Space Requirements

The SlideWriter film recorder measures 17.7 (length) x 11.5 (width) x 35.8 (height with wheels) inches (450 x 292 x 910 mm). It weighs 42 lbs. (19 kg). Because the SlideWriter stands vertically, 17.7 x 11.5 inches constitutes the required floor space. Keep the space above the unit clear to facilitate film loading.

CAUTION *The internal CRT uses magnetic coils to position an electronic imaging beam. Although the SlideWriter contains shields from external magnetic fields, it should be located as far as possible from computer tape drives, disk drives, fans, or any other device with magnetic switching. This will minimize interference from these devices during imaging.*

Environmental Requirements

Storage Temperature: 32° to 158° F (0° to 70° C)
Operating Temperature: 59° to 86° F (15° to 30° C)
Relative Humidity: 35% to 65% non-condensing

Film Types

The SlideWriter supports Kodak Ektachrome ASA 100 35mm film and Polacolor HC 35mm instant slide film.

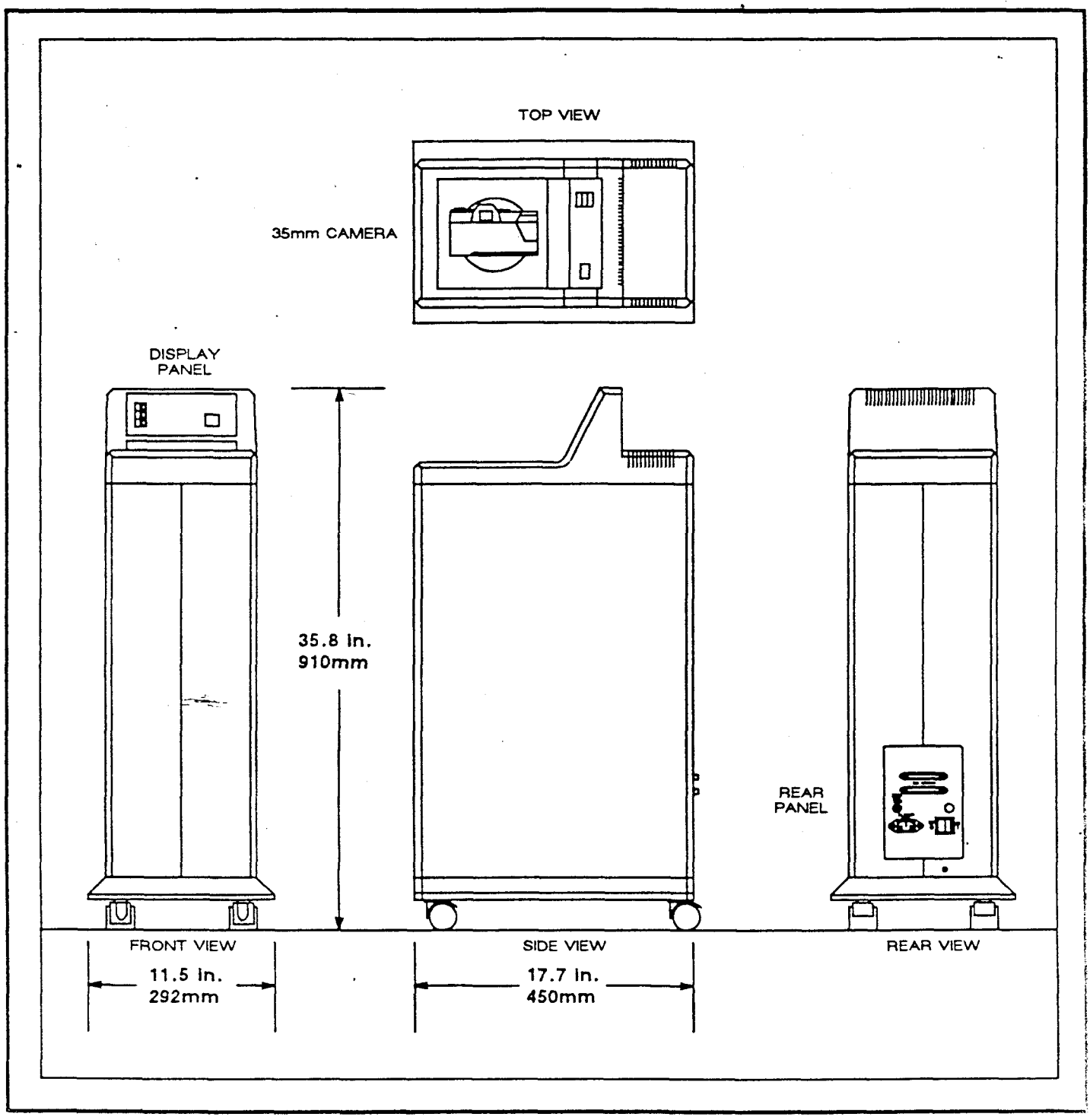
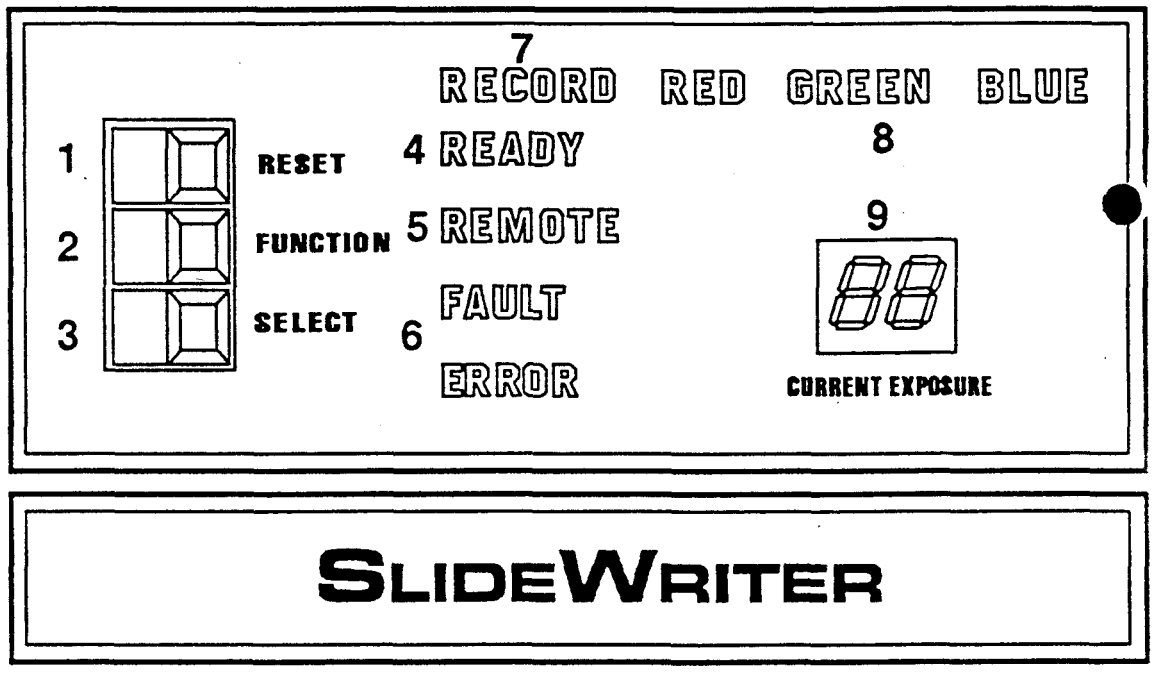


Figure 1-2. SlideWriter Dimensions and External Features

Controls and Connectors

The following describes the functions of the SlideWriter's controls, display and connectors.

Display Panel



1. RESET SWITCH
2. FUNCTION SWITCH
3. SELECT SWITCH
4. READY LIGHT
5. REMOTE LIGHT
6. FAULT & ERROR LIGHTS
7. RECORD LIGHT
8. RED, GREEN, BLUE LIGHTS
9. CURRENT EXPOSURE DISPLAY

Figure 1-3. Switch and Light Identification

1. Reset

This switch initiates a system reset and moves the filter wheel (three colored glass lenses) to the neutral position.

2. Function

This allows selection of an internal function when the SlideWriter ready light (4) is on. Pressing this switch displays the number of the function on the Current Exposure Display. Press it repeatedly or hold it down to increase the displayed number to the function number desired. If the desired number is passed, the SlideWriter will repeat the numbers 1 to 11. A complete description of these functions can be found in section 5.

3. Select — **Press this switch to initiate the function displayed on the Current Exposure Display.**

4. Ready — This signal light announces that the SlideWriter is ready to accept commands.

5. Remote — This signal light indicates that the SlideWriter is processing a command from the host computer.

6. Fault and Error — These lights indicate either a fault or an error condition. The SlideWriter will issue a two-second-long warning alarm every fifteen second until a system reset occurs. When either light is on, the Current Exposure Display exhibits a primary hexadecimal error code. (See page 34 for an explanation of each error code.)

7. Record — This signal light indicates that the SlideWriter is recording an image.

8. Red, Green, and Blue — These lights indicate which color is being recorded when the Record light is on. When all three are off, the wheel is in the neutral position. When all three are on, the wheel is changing from one color to another.

When the three signal lights flicker randomly, the SlideWriter is performing an automatic intensity calibration.

9. Current Exposure Display — This operates under three conditions:

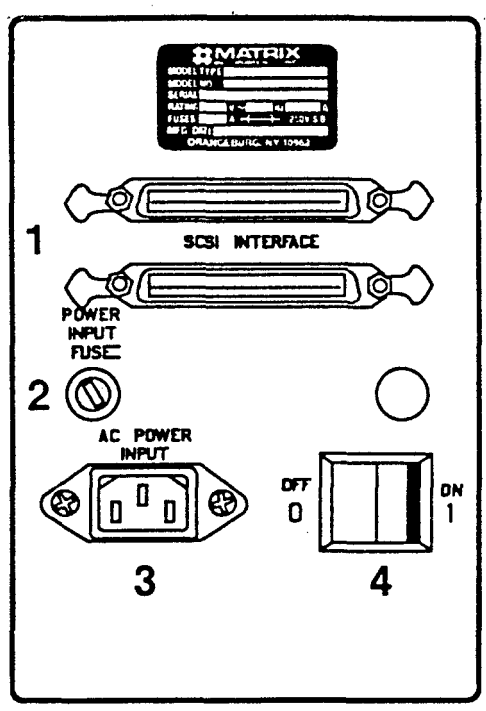
- During normal operation, the displayed digits indicate the film frame the SlideWriter is currently exposing. A double dash (--) means that the film has run out, that no film is present, or that the "film load" function has not been set.

- A numerical display concurrent with an illuminated Fault or Error light indicates the error code. (See page 34 for a detailed explanation of error codes.)

- If the Function switch is pressed, the Current Exposure Display shows the function number currently selected.

NOTE *The display will flash continuously while in the function mode. This is part of normal operation.*

Rear Panel



1. **SCSI CONNECTORS**
2. **FUSE**
3. **SOCKET**
4. **POWER SWITCH**

Figure 1-4. Switch and Connector Identification

1. SCSI Connectors — Connectors which accept the SCSI interface cable allowing the transmission of data and commands to the SlideWriter. Two connectors are provided to permit looping through from the SlideWriter to another device on the SCSI bus. The SCSI interface cable can be connected to either connector on the SlideWriter's Rear Panel.

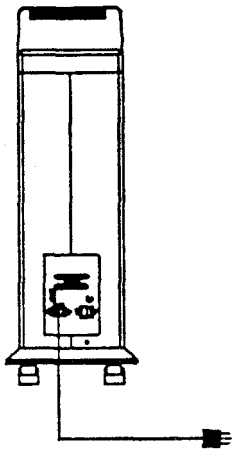
2. Fuse — Protects the electrical system of the unit. It breaks the circuit when the current exceeds the rated value. The fuse value is stamped in the serial number tag.

3. Socket — Input connector for line power.

4. Power Switch — Pressing this switch to the right turns on the SlideWriter.

INSTALLATION

Connecting the Power Line



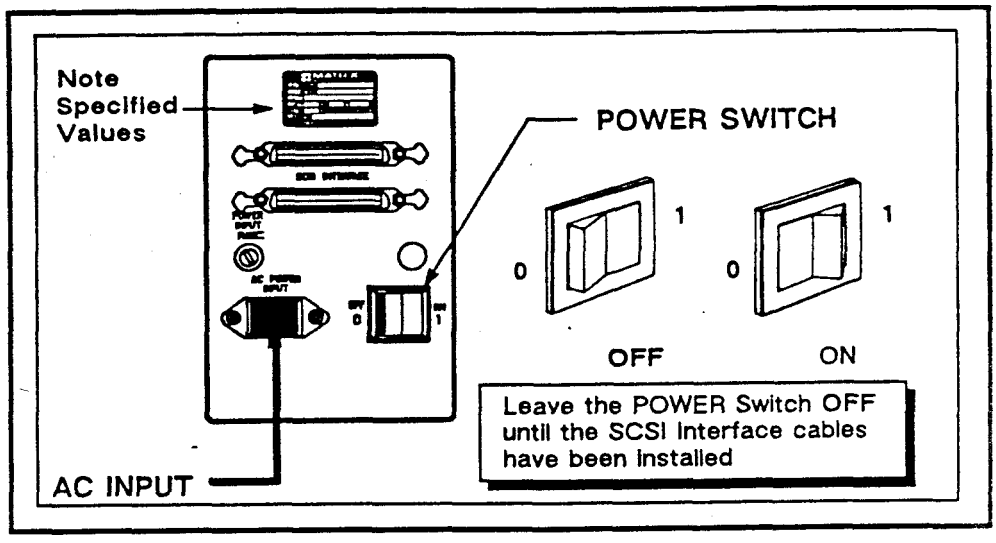


Figure 2-1. POWER Switch and Connector Location

Read all the installation instructions carefully before you plug in your SlideWriter. Follow all the instructions and warnings dealing with your system. Keep this manual handy for reference by you and others.

To connect the SlideWriter's power line:

• Ensure that the SlideWriter's POWER Switch is in the OFF position.

• Connect the female end of the AC power cord supplied with the SlideWriter to the three-pronged socket on the rear panel.

» Ensure that the AC current provided matches the specification given on the SlideWriter's serial number tag. Plug the three-pronged male end into a standard AC power socket.

WARNING *The SlideWriter is intended to be electrically grounded. The SlideWriter's AC connector will fit only a grounding-type AC outlet. This is a safety feature.*

If you are unable to insert the plug into the outlet, contact a licensed electrician to replace the outlet with a properly grounded outlet.

Do not defeat the purpose of the grounding plug!

NOTE You should use a power line conditioner if your AC is subject to variants such as voltage drops, surges or brownouts.

Connecting the SCSI Interface Cable

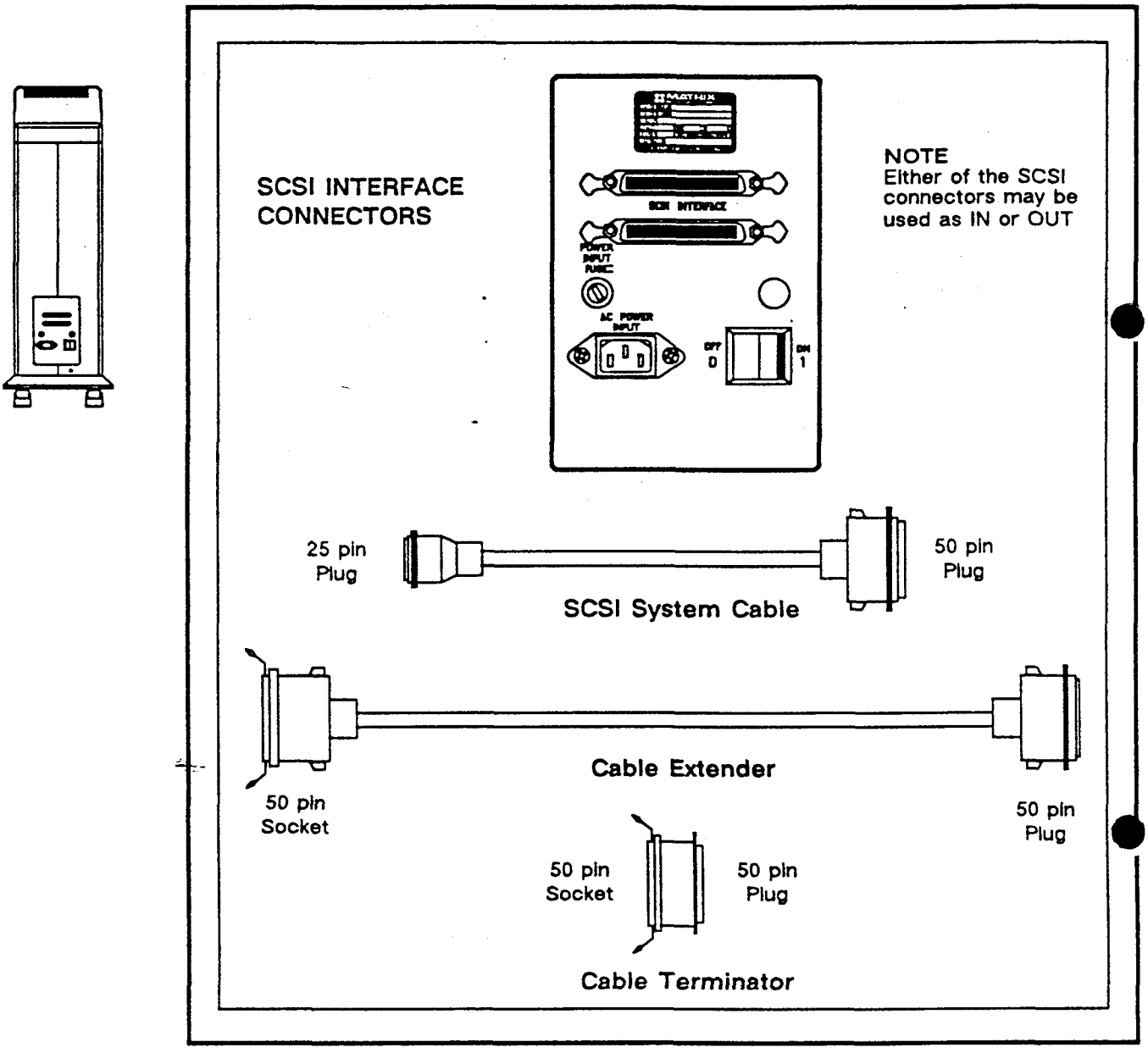


Figure 2-2. SCSI Interface Connectors and Cables

This section provides you with instructions for connecting the SlideWriter onto the SCSI computer bus. Two cables and an in-line cable terminator are included in the SlideWriter accessory kit.

SCSI System Cable	The SCSI system cable (part number 01-06-054) is included for Apple Macintosh users. This short cable connects between the SCSI port on the Macintosh and the first device in the chain.
Cable Extender	The cable extender (part number 01-06-053) has a 50 pin plug connector at on end and a 50 pin socket connector at the other end. This cable will receive a cable terminator or peripheral interface cable, and plug into the next device in the chain.
Cable Terminator	The cable terminator (part number 01-06-052) connects to the 50 pin end of the SCSI system cable when you are using a Macintosh Plus. The external terminator is required for SlideWriters which do not have internal termination for the SCSI bus. The terminator is not a SCSI device. Its purpose is simply to minimize signal reflections and noise in the interconnecting cables.

Some Rules to Follow When You. Connect the SlideWriter

• Be certain the host computer and SlideWriter's AC power is off before connecting or disconnecting the SCSI cables.

• Do not exceed a total of 6 meters (19.7 feet) in combined cable length among all devices on the SCSI bus.

• A number of suggested device layouts are provided on the following page. Ensure that you terminate both ends of the SCSI bus for whichever arrangement you decide upon.

• Check to see if the host computer has internal SCSI bus termination. Some systems such as the Macintosh Plus do not, and require an external terminator plug as described above. Never double terminate either end of the SCSI bus.

• The SlideWriter has internal SCSI bus termination. If you decide to install the SlideWriter in the middle of the device chain, as in Figure 2-6, then its terminators must be removed. Refer to page 39 of this manual for complete instructions.

» In order to guarantee secure cable connections between devices you should fasten the interlocking wire clips or screws on the connector ends, and ensure that adequate strain relief is provided wherever cables connect into the devices.

SlideWriter
Installation Configurations

• Connect the SlideWriter on the SCSI Bus using one of the configurations shown in the following illustrations.

Single
Device
Setups

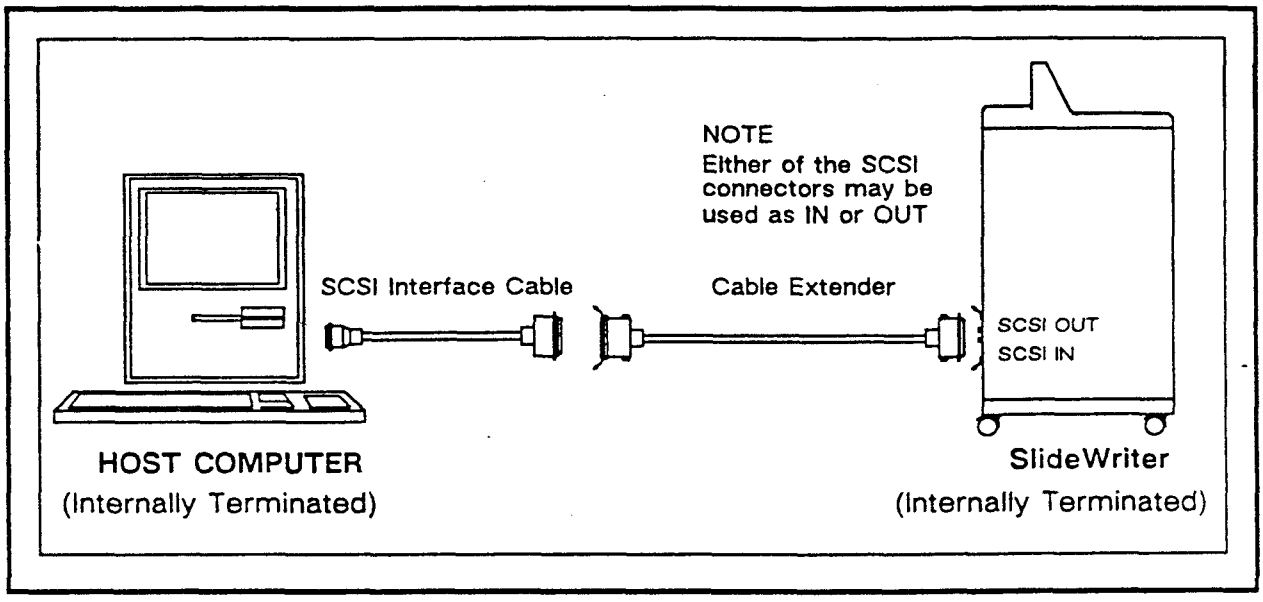


Figure 2-4. Single Device Setup, Both Host and SlideWriter Terminated Internally

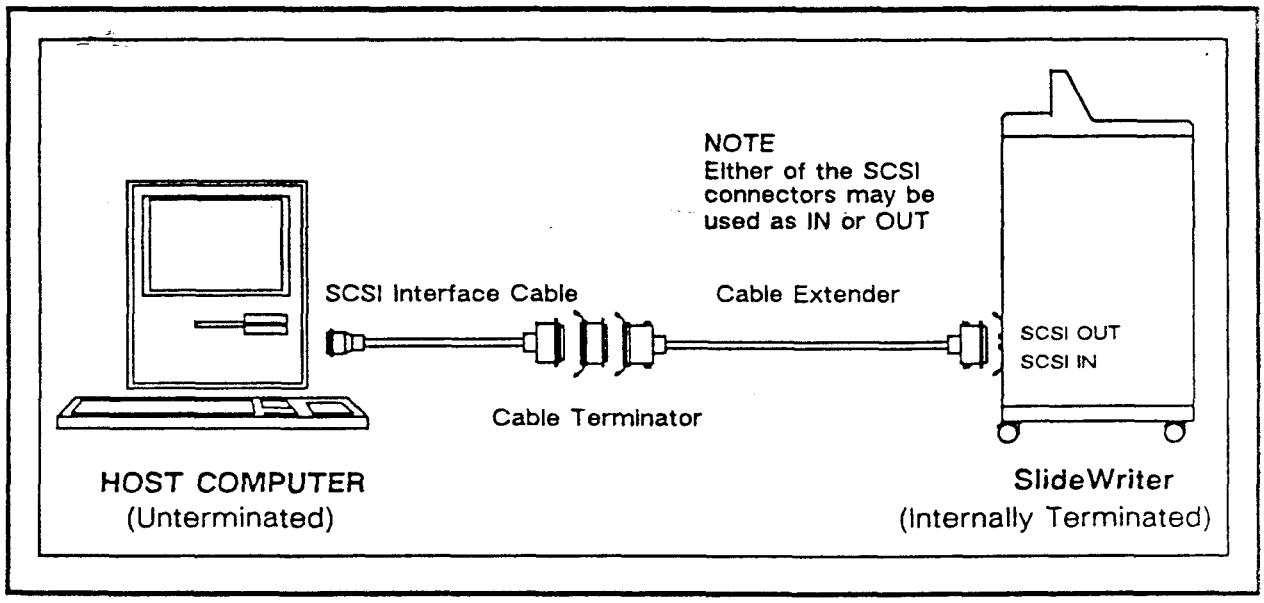


Figure 2-3. Single Device Setup, Unterminated Macintosh Plus with Cable Extender

Multiple Device Setups

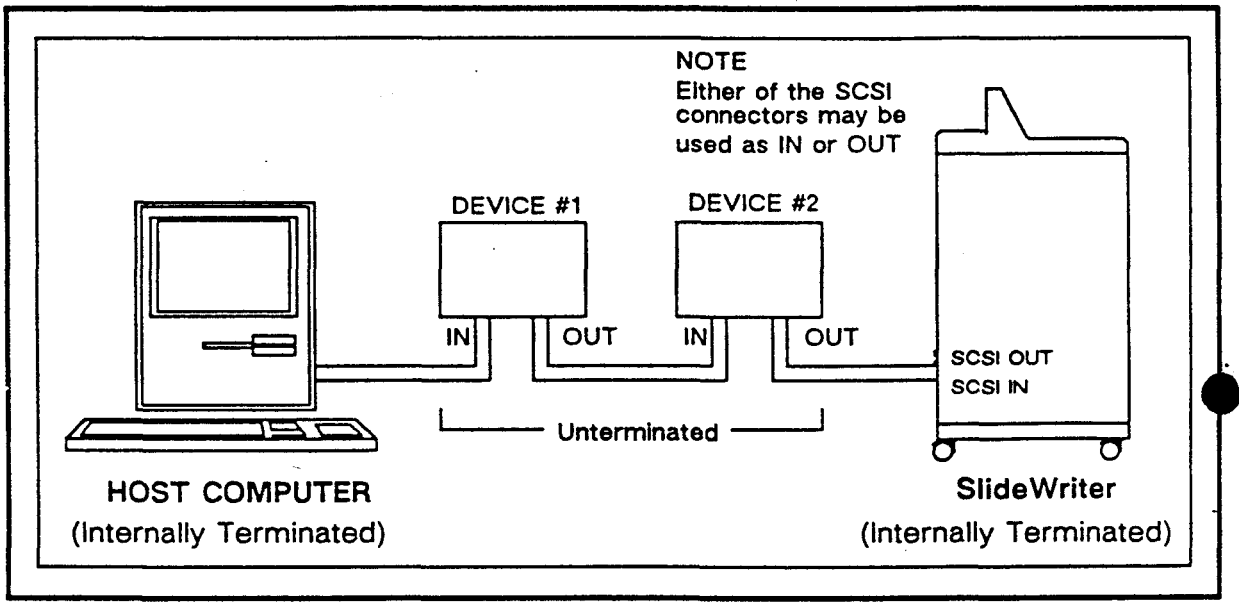


Figure 2-5. Recommended Multiple Device Setup, Both Host and SlideWriter Terminated Internally

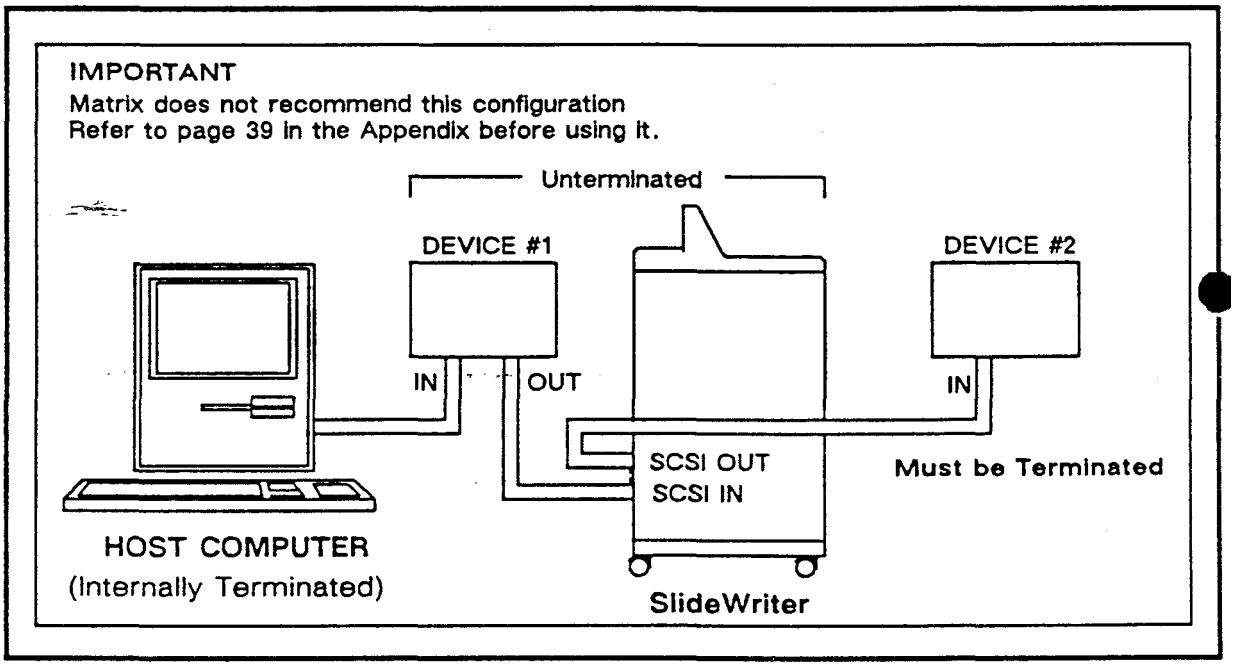


Figure 2-6. Alternate Multiple Device Setup with SlideWriter Unterminated and in the Middle of the Device Chain

OPERATOR INSTRUCTIONS

Power-Up Sequence

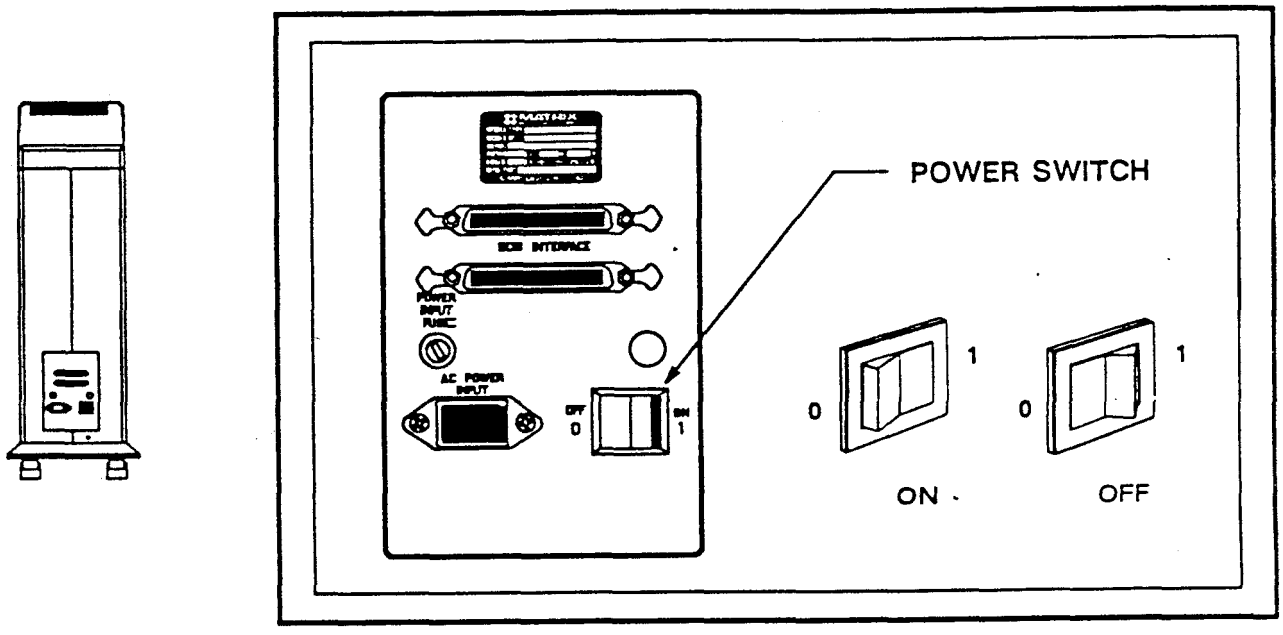


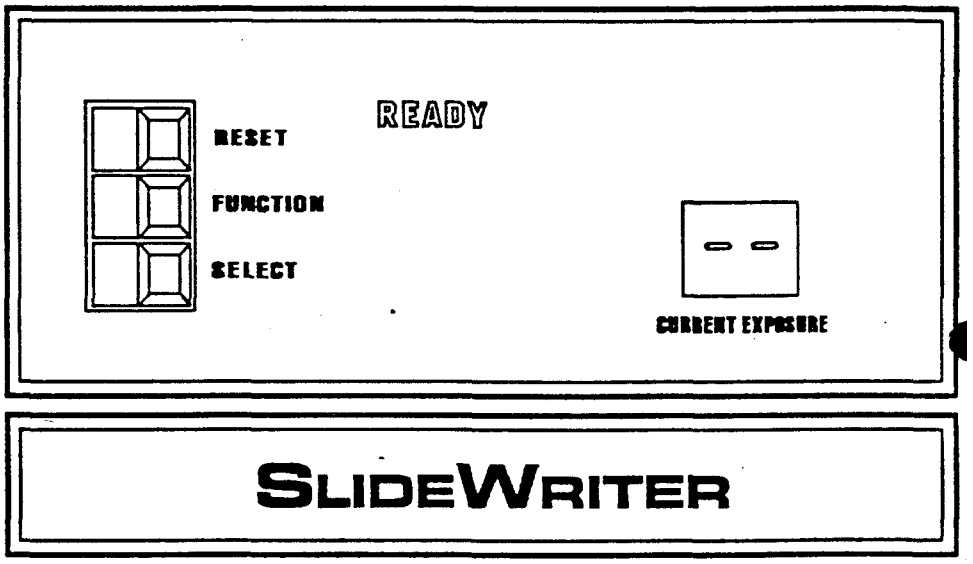
Figure 3-1. POWER Switch Location

- Locate the POWER Switch on the rear panel.

- Turn on the SlideWriter by pressing the right half of the POWER Switch

The Display Panel is located on top of the SlideWriter. The Display Panel consists of eight indicator lights, three switches, and a two-digit LED display. After turning on the POWER Switch the SlideWriter will begin a warm-up process during which the Display Panel lights will flash rapidly in various combinations for about two minutes. During this time the SlideWriter performs internal tests and calibrates the brightness of the CRT to ensure consistent color balance. When the self-test and calibration are complete, the SlideWriter will beep, then run a calibration routine again. The RED, GREEN, and BLUE Lights will flash.

NOTE *The SlideWriter will periodically perform a calibration routine. This is* a *normal operation which ensures the proper functioning of the SlideWriter. It will not interfere with the imaging process.*



When only the READY light is on, the self-test and calibration routine is complete. Two dashes will appear in the CURRENT EXPOSURE Display provided that no film was loaded or advanced since power-up.

If the ERROR or FAULT lights flash and the SlideWriter beeps, locate the error code displayed in the CURRENT EXPOSURE Display and refer to page 30 for an error explanation. Although the SlideWriter is ready for use upon warm-up completion (approximately two to four minutes), an hour wait is recommended before imaging in order to assure the most consistent colors.

NOTE: *It is not necessary nor recommended that the SlideWriter be turned off overnight. However, it should be turned off if it is not used for more extended periods of time.*

Loading Film

The Pentax Camera is the film receptacle for the SlideWriter. It allows you to take up to 36 high resolution images per roll.

The SlideWriter is optimized for Kodak Ektachrome ASA 100 35mm film. However, other types with similar ASA settings may provide acceptable results.

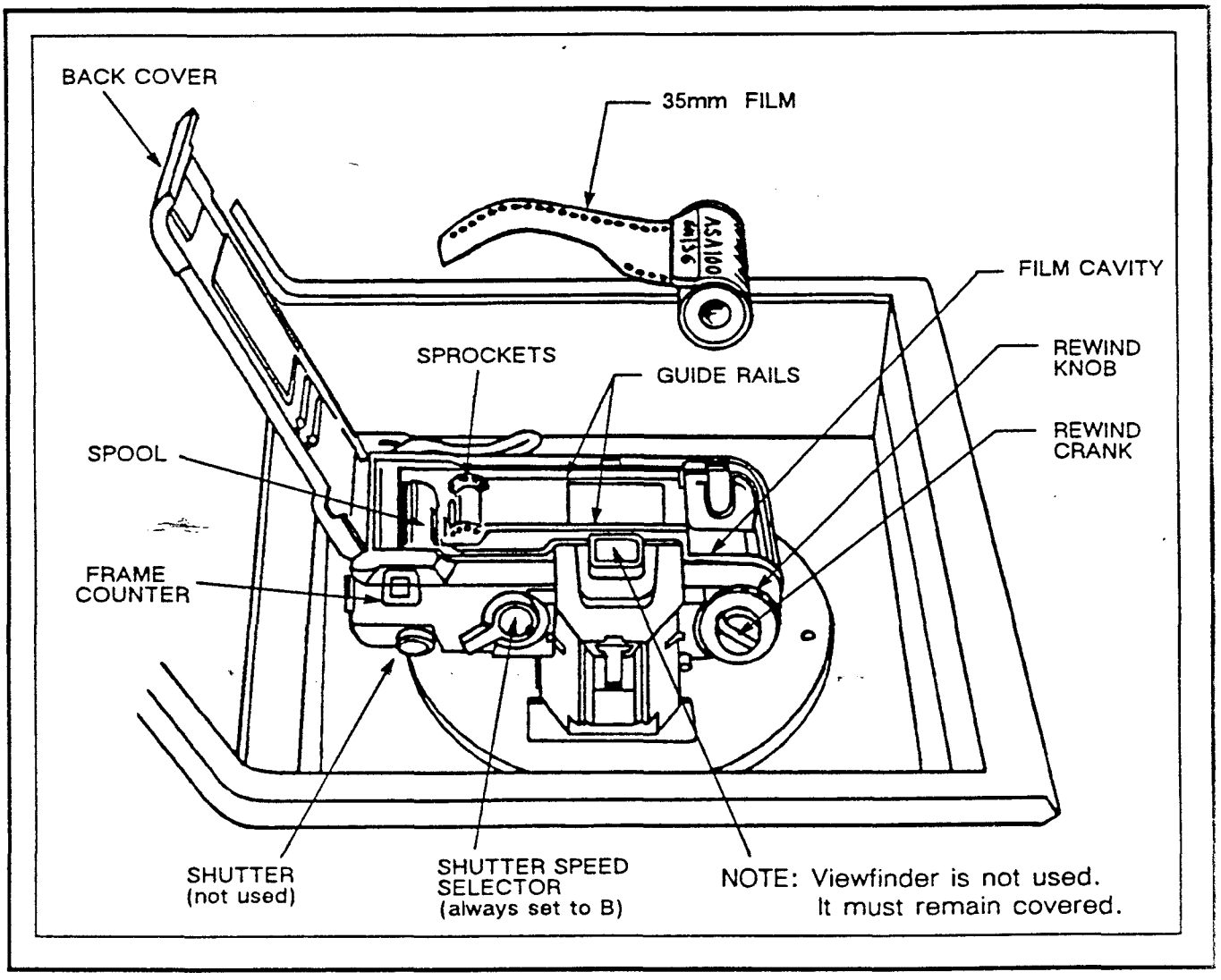


Figure 3-2. Major Components of the Pentax A3000 35mm Camera Back

The SlideWriter supports Polacolor HC 35mm instant slide film. Refer to the *SlideWriter Utility Software User's Guide* for instructions on loading the LUT and brightness tables for this film type.

To load the film (Refer to Figure 3-3.)

- Ensure that the SlideWriter is on.
- Ensure that the Shutter Speed Selector 1 is set to 'B'.
- Locate the film rewind knob 2 at the top left of the camera.
- Unfold the rewind crank 3 by pushing it in with your fingernail. Pull the rewind knob, but do not push it back to its original position. Open the camera back.
- Place a roll of film into the cavity 4 at the left of the camera - back with the flat side up.
- Lock the cartridge in place by pushing the rewind knob down and rotating it slightly so that it grips the spool.
- Pull the film leader out so it aligns with the film leader end mark (dashed line) 5 .
- Lay the leading end of film flat along the back of the camera so that the holes in the film fit over the sprocket teeth 6 and the spool teeth 7 .
- Check that the film is properly placed and lays flat between the two guide rails 8 .
- Take up any slack by rewinding the film into the cartridge.
- Close the camera back using light pressure until it clicks shut.
- Press the FUNCTION Switch on the SlideWriter until a '1' appears in the Current Exposure Display.
- Press the SELECT Switch. This activates the SlideWriter's load film function. The camera will advance the film until a '1' appears in the frame counter 9 .
- If the rewind knob turns in the direction of the arrow 10 while the film is being transported, it means the film is advancing properly. If it does not, the film has not caught and you should reattempt the loading procedure.

Unloading Film

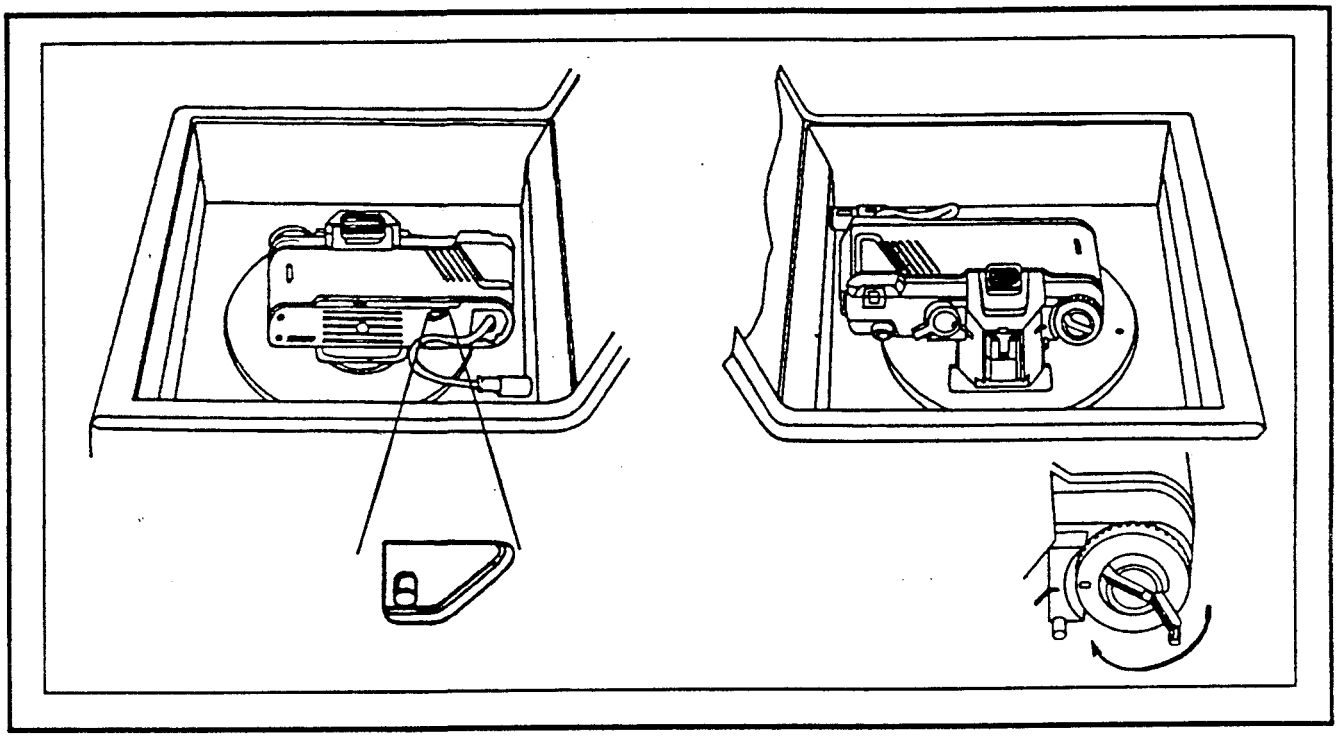


Figure 3-4. Unloading Film from the Pentax A3000 Camera

When the film advances past the last frame, two dashes (--) appear in the Current Exposure Display and the beeper sounds. You should now unload the film in the following way:

- Depress the film rewind button located on the underside of the Pentax Camera. If the button does not stay depressed, keep it depressed until the next step is complete.
- Unfold the rewind crank and turn it in the direction of the arrow indicated in Figure 3-4 until the exposure counter returns to 'S'.
- Open the camera back by pulling up on the rewind knob;
- Remove the film;
- Press the FUNCTION Switch on the SlideWriter until a '2' appears;
- Press the SELECT Switch to execute the unload film sequence.

SLIDEWRITER MAINTENANCE

General Maintenance

The SlideWriter is a relatively maintenance-free device. It should be kept as clean, dry, and free from dust as possible.

A non-abrasive household cleaner may be used to remove dust and scuff marks from the outside panels. Avoid getting any foreign substances near the Pentax Camera.

Test Operations

The SlideWriter operation can be tested at any time by running a test pattern without film (Functions 6 and 7) or with film (Functions 8 and 9) to test the unit's brightness calibration, focus, and other imaging characteristics. The following text provides directions for running these tests.

NOTE: *Do not attempt to run test patterns while the SlideWriter is actively controlled by the host computer. Local test patterns will interfere with the SlideWriter remote activities. Neither the FAULT light nor the ERROR light should be on.*

Running a Test Pattern Without Film (No Exposure)

A test pattern can be run without exposing an image on film. Open the back of the Pentax Camera and observe the filter wheel. It should rotate to position each colored filter in front of the Pentax Camera for exposure. (Refer to Figure 5-1.)

- Press the FUNCTION Switch on the Display Panel, holding it down until the function number desired, either 6 or 7, appears in the Current Exposure Display. (The CRT will display test pattern A when Function 6 is selected, test pattern B when Function 7 is selected.)

- Press the SELECT Switch. This executes the chosen function. The process takes approximately 3 to 4 minutes for 2k patterns, and up to 15 minutes for 4k patterns depending on the SlideWriter setting (2k is the default test pattern mode unless the host sends a prior resolution setting command).

If the pattern finishes without the ERROR or FAULT lights turning on, the SlideWriter is working properly.

WARNING Do not press the FUNCTION and SELECT Switches simultaneously. This causes the SlideWriter to activate a diagnostics routine At this time "dr" will appear in the Current Exposure Display. Press the RESET Switch to return the SlideWriter to normal operation.

Diagnostic routines are to be performed only by trained, qualified service personnel. Initiating a diagnostics routine risks potential damage to the SlideWriter and voids warranties made by Matrix.

NOTE: *If an ERROR or FAULT light remains on, check the error code in the Current Exposure Display and refer to page 34 to identify the problem. Then reset the SlideWriter and try the test image again. If this problem persists, contact your authorized Matrix service representative.*

Running a Test Pattern With Film (With Exposure)

Load film according to the instructions in Chapter 3.

Press the FUNCTION Switch on the Display Panel, holding it down until the desired function, either 8 or 9, appears in the Current Exposure Display.

Press the SELECT Switch to execute the function chosen. The process takes approximately 3 to 4 minutes for 2k patterns, and up to 15 minutes for 4k patterns depending on the SlideWriter setting (2k default or software specified).

- Compare the test pattern with the equivalent factory test pattern received with the SlideWriter.

Test Pattern 0 (Function 8) Verifies focus, proper geometric and radiometric registration, color registration, and color balance. In each colored or neutral section, three subsections contain patterns of exposed and unexposed pixels (pixel-on/pixel/off patterns).

Test Pattern 1 (Function 9) Verifies linearity, focus, and color registration. It appears as a uniform field of neutral 16-pixel squares on a dark background. The neutral squares in this image are produced from three passes, that is, from light passed through all three color filters.

Upon pattern completion, the READY light will come on and a beeping tone will sound.

REFERENCE

System Description

Components of SlideWriter

To produce a slide, the SlideWriter uses digitized image data from the computer to create a high resolution 35mm slides.

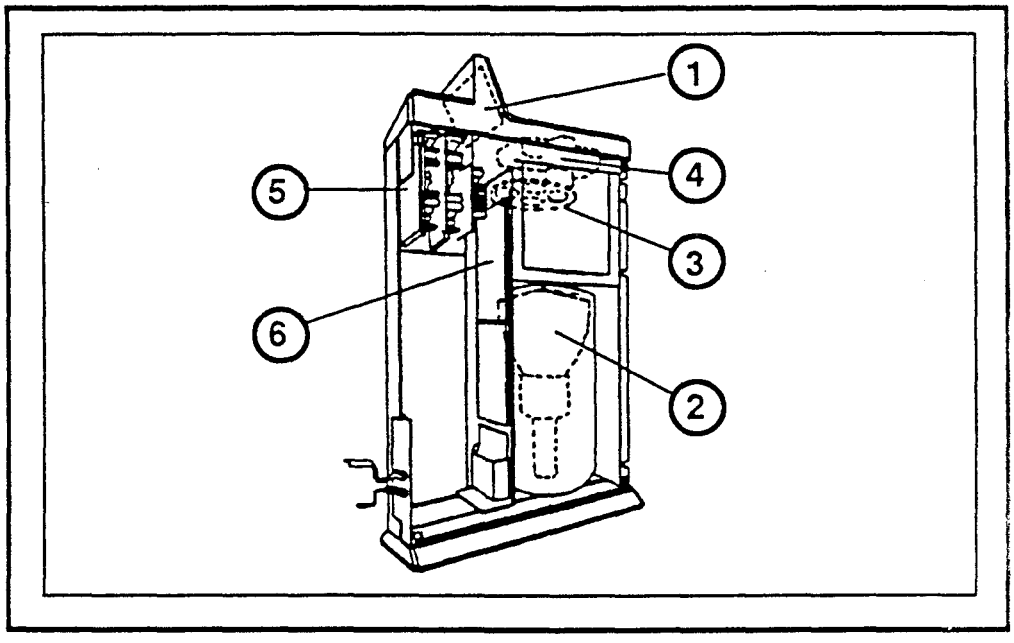


Figure 5-1. SlideWriter Major Components

The SlideWriter film recorder consists of the following components:

1. A Display Panel with Input Switches;
2. A monochrome Cathode Ray Tube (CRT) which acts as the light source for film exposure;
3. A color filter wheel which positions one of four filters (red, green, blue, or neutral) across the optical path;
4. A 35mm camera which exposes the film to the CRT image and automatically advances the film;
5. A power supply; and
6. A microprocessor, memory, and associated circuitry.

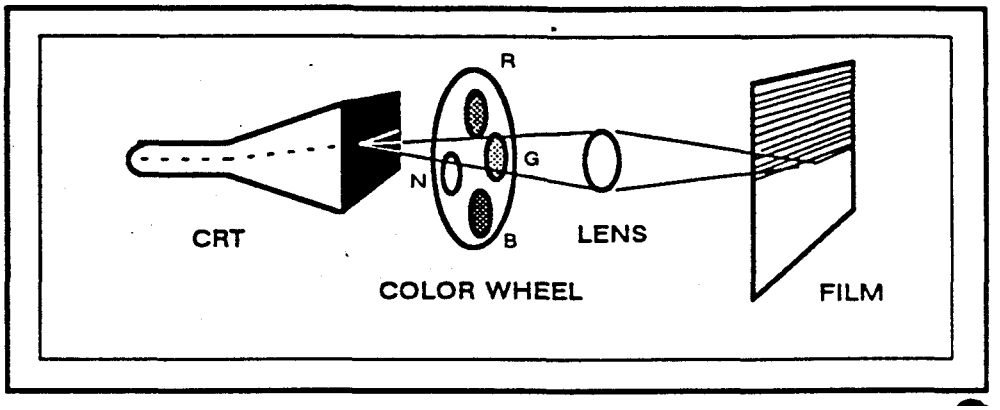


Figure 5-2. SlideWriter Imaging Process

The SlideWriter's microprocessor decodes input data received from the host through an SCSI interface cable and controls the CRT beam path and intensity. The CRT produces up to 256 different shades of gray which, when combined after the three color passes, can produce a maximum of 16.7 million colors.

The microprocessor rotates the filter wheel, controls the camera shutter, and advances the film. The display control indicates information on the Display Panel and accepts operator input via its panel switches.

The CRT images the computer-generated data in the form of a traveling spot of light. The filter wheel electronically selects the color filter that the light will pass through and a lens focuses the light on the film. The shutter in the film back opens to allow film exposure.

Images are created by exposing the film to each resolvable location along the scan line for the amount of time per color as specified by the incoming data.

After completing a color pass, the filter wheel rotates and the process repeats until each of the three primary colors (red, green, and blue) has been recorded.

The SlideWriter digital film recorder utilizes a time-modulated film recording process. This means that the light intensity of the CRT's electron beam remains constant for each pixel exposure while the amount of time spent on recording each pixel varies. The result is very consistent spot size and color balance.

Power-up and System Reset

Upon power-up, the SlideWriter:

Power Up

- Executes a warm-up;
- Diagnosis the system memory;
- Executes a system reset;
- Performs a calibration of assigned brightness levels; and
- Programs the two consecutive addresses specified by the display board DIP Switch, into the SCSI controller.

System Reset

As well as during power-up, a system reset occurs in the following circumstances:

- Pressing the SlideWriter RESET Switch;
- The SlideWriter receives a BUS RESET signal from the host computer via the SCSI interface;
- After the SlideWriter receives a REQUEST SENSE command to clear a fault or an error condition;
- After the SlideWriter receives a Select Resolution with Reset command.

Upon a system reset the SlideWriter will perform the following:

- Turns off all display lights;
- Loads the delay time constant with zero;

» Turns off and centers the CRT beam;

- Rotates the filter wheel to the neutral filter position;
- Sounds the alarm beeps for 1/2 second;
- Turns the READY light on to indicate that the SlideWriter is operational;
- Loads default image dimensions (2048 pixels/line x 1366 scan lines for 2k, 4096 pixels/ line x 2732 scan lines for 4k);

(continued)

- Enables automatic calibration (if disabled);
- Enables automatic camera control (if disabled);
- Enables automatic filter wheel control (if disabled);
- Enables end of image warble signal (if disabled);
- Enables black jumping (if disabled);
- Disables 90 degree rotation (if enabled);
- Disables exchange of coordinates (if enabled);
- Disables mirror imaging (if enabled);
- Disables 180 degree rotation (if enabled);
- Interrupts current command in progress;

The SlideWriter requires several seconds to complete a system reset, due to the time it takes to rotate the filter wheel. Do not issue any commands until a reset has had time to complete. The READY light will go on after a reset is complete.

Function Numbers

Pressing the FUNCTION Switch accesses a number of functions which the SlideWriter performs in order to execute pre-set instructions.

To choose a function

- Press the FUNCTION Switch while in the ready state.
- Hold the FUNCTION Switch. Notice that the two-digit reading in the Current Exposure Display will increase.
- When the function number desired appears, release the FUNCTION Switch and press the SELECT Switch to indicate the choice. The SlideWriter will then execute the function.

WARNING Do not press the FUNCTION and SELECT Switches simultaneously. This causes the SlideWriter to activate a diagnostics routine. At this time "dr" will appear in the Current Exposure Display. Press the RESET Switch to return the SlideWriter to normal operation.

D i a g n o s t i c routines are to be performed only by trained, qualified service personnel. Initiating a diagnostics routine risks potential damage to the SlideWriter and voids warranties made by Matrix.

For most functions, the SlideWriter will execute the desired function sequence then return to normal operation. However, some functions, such as 5 and 10, require that another choice (an SCSI address or a frame count) to be made. In these cases, perform the above steps again. Remember that the task is not completed until the READY light comes back on.

Function Numbers	Function Description
1	Load film
2	Unload film
3	Disable automatic calibration
4	Calibrate to assigned intensities
5	Set SCSI addresses
6	Test pattern 0, no exposure
7	Test pattern 1 , no exposure
8	Test pattern 0 with exposure
9	Test pattern 1 with exposure
10	Set frame counter
11	Enable automatic calibration

Table 5-1. Numbered SlideWriter functions

Choose the function number that corresponds to the function desired.

The SlideWriter can perform the following functions:

1 - Load Film

Select this function after loading film into the camera. It causes the SlideWriter to;

- Clear the "end-of-film" and "no film" flags;
- Set the "film present" flag;
- Move the film ahead to the first frame, and
- Set the frame counter to one.

2 - Unload Film

This function causes the SlideWriter to ;

- Reset the end-of-film condition;
- Reset the "film present" flag;
- Set the frame counter to zero. (The Display Window will show two dashes.)

3 - Disable Automatic Calibration

This function causes the SlideWriter to turn off automatic calibration between exposures.

Automatic calibration mode causes the SlideWriter to re-calibrate the CRT's brightness levels automatically between images. This ensures a high standard of accuracy in image brightness, but takes time that this function can save.

4 - Calibrate to Assigned Intensities

This function causes the RED, GREEN, and BLUE lights to flash for a few seconds while the SlideWriter calibrates. The SlideWriter will calibrate only certain assigned levels in order to reduce the amount of time consumed by the process.

5 - Set the SCSI Device Addresses:

The function lets the operator set up the SlideWriter device address on the SCSI interface to the host computer. On power up, the SlideWriter reads a default address from the DIP Switches inside the Display Panel. Upon selecting this function, the current device address will appear in the Current Exposure Display. To leave this as the active address, press the SELECT Switch. Press the FUNCTION Switch to increase the current address in steps of one up to "6" (after "6" the display goes to zero and repeats the process). Press SELECT to indicate the address desired.

CAUTION

The SlideWriter will not operate remotely from the host computer unless it's SCSI address corresponds to the address programmed by the host (refer to page 32 for additional information.)

6, 7, 8, 9 - Test Patterns: The SlideWriter comes with copies of two test patterns which it stores internally and can output on request. (There is more information on test patterns in Chapter 4.) Either pattern will take approximately three minutes to image in 2k mode, longer in 4k mode., The SlideWriter will beep four times when it is finished. The functions are as follows;

6 The CRT will display test pattern 0 but the shutter will remain closed during imaging.

7 The CRT will display test pattern 1 but the shutter will remain closed during imaging.

8 The SlideWriter will expose test pattern 0 on film.

9 The SlideWriter will expose test pattern 1 on film.

10 - Set Frame Counter: After selecting function 10, press FUNCTION again to increase the frame count in steps of one. Press SELECT to:

- Set the frame count to the displayed value, and Reset the end-of-film condition.

11 - Enable Automatic Calibration This function activates automatic calibration.

Beeper

The SlideWriter contains a beeper that alerts the operator to various conditions with different kinds of beeps. The following is a list of the type (solid or warbled) and length of beeps, and why they occur:

- A solid one-half second beep indicates the completion of a hardware reset and power-up ready.

- A solid one-half second beep indicates an increase in function selection.

- Four short beeps indicate that the SlideWriter has successfully recorded an image.

- A continuous repeating beep approximately once per second, the Current Exposure display flashing once per second, and a rod LED on the camera indicate that the SlideWriter is out of film. Refer to page 19 of this manual to unload the film.

» A warbled beep for two seconds indicates an error. The beeper will emit a warbled sound approximately every fifteen seconds. The alarm will stop when the RESET Switch is pressed or send a REQUEST SENSE command from the initiator or host.

Programming the SCSI Device Address

The Small Computer Systems Interface (SCSI)

The Small Computer Systems Interface (SCSI) Device Address designates a specific location or destination of information. During manufacturing, the SlideWriter's Device Address is preset (default settings) using DIP switches as part of the SlideWriter's communication protocol with the host processor.

The SCSI default address is set to 2 (See Table 5-2.)

Verify the SCSI address setting by selecting Function 5 (described on the following page). The current address will appear in the Current Exposure Display.

The default settings may be altered in the following way:

- Turn off the SlideWriter. Re-setting the DIP switches does not affect the SlideWriter until the next power-up, so the unit should be off when the settings are changed.

- Lift up the left edge of the black plastic strip just beneath the Display Panel by carefully using a small screwdriver. This strip is the same width as the Display Panel by about one inch high and adheres with velcro.

- Pull the left edge of the strip outward far enough to locate the DIP Switch underneath. When received, it is set to "00010". ("0" is off, or down, and "1" is on, or up.) Switches 1, 2, and 3 are used to set the Device Address.

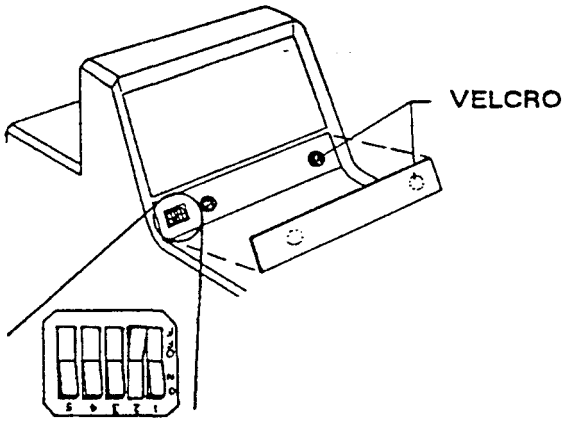


Figure 5-3. Location of the SCSI DIP Switch

• Set the switches to represent the desired address in binary by pressing the appropriate bit until it clicks. Use the tip of a pen or a small flat tip screwdriver. The switch is off (0, zero) when the top of the switch is pushed in. The switch is on (1, one) when the bottom of the switch is pushed in.

NOTE: SCSI address 7 is reserved for the host. Do not set the SCSI DIP Switch to 00111 (7). This will cause Error Code "86" to appear. Refer to page 34 for Error Code explanations.

• Replace the plastic strip and turn on the SlideWriter. The microprocessor will read the DIP Switch and program the SlideWriter addresses.

To select addresses other than the DIP-determined defaults, select function number 5 while the SlideWriter is running.

To do this:

• Press the FUNCTION Switch on the Display Panel, holding it down until the number "5" appears in the Current Exposure Display.

• Press the SELECT Switch. An even number between 0 and 6 will appear, representing the current SCSI address. After "6" the display goes to zero and repeats the process.

• Press the FUNCTION Switch again. The number displayed will increase by one. Press the FUNCTION Switch as many times as necessary to reach the desired value.

• Press the SELECT Switch to set this value.

SCSI DIP Switch				SCSI ID
5,4	3	2	1	
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	*

SCSI Address 7 Is reserved for the host, and may not be used by the SlideWriter
On the Device Address DIP Switch, 0 is the OFF position and 1 Is the ON position

Table 5-2. Device Address Settings

SlideWriter Error Codes

Error codes are intended as a guide to the operator or programmer. Even though the SlideWriter has an extensive set of error codes, do not attempt a form of automatic error recovery. In most instances, and error code means that the SlideWriter has exposed incorrect information on film.

When the SlideWriter detects an error, it reports the error by illuminating the ERROR or FAULT lights and displays an error code in hexadecimal on the current Exposure Display referred to as a "primary error code". The following table explains the primary error codes:

Primary Code	Problem
83	Illegal Command
84	Illegal Data Byte
86	Illegal SCSI Address
91	Memory Fault
92	SCSI Interface Fault
93	CRT Beam Calibration Fault
A2	Filter Wheel Fault

Table 5-3. Primary Error and Fault Code Interpretations

When an error or fault occurs, the SlideWriter emits a warbled beep every 15 seconds. During the 15 second interval between warbled beeps, and before the host processor sends a REQUEST SENSE command, press the FUNCTION Switch to display a secondary error code on the Current Exposure Display.

After having displayed the secondary error code, display the contents of the SlideWriter's internal registers to obtain even more information This is accomplished by pressing the SELECT Switch. The SlideWriter displays the registers in the following order: H, L, D, E, B, C. After the SlideWriter displays register C, press the FUNCTION Switch to return the SlideWriter to the primary error display.

Explanation of Error Codes

Incorrect camera operation, incorrect data from the computer, or malfunctions of the SlideWriter can result in errors and faults. If there is an error or fault due to SlideWriter malfunctioning, note the primary and secondary error codes and the values of all registers. Then call your Matrix service representative.

The following explanation describes the problems which cause an error message and the primary and secondary codes.

Primary Code: 83

Problem: Illegal Command

Secondary Code: 00, 01

Reason for Error: While the SlideWriter was in the idle state, it received an unrecognized command. The illegal command byte is contained in register "H".

Secondary Code: 02

Reason for Error: The SlideWriter received a command with an illegal parameter. The command byte is contained in register "H", and the illegal parameter is contained in register "L".

Problem: Illegal Data Byte

Primary Code: 84

Secondary Code: 01

Reason for Error: The SlideWriter received and illegal run-length code (a length of zero). This code is contained in register "E", and indicates a special function. The function code (INTENSITY) does not correspond to any of the allowed codes. Function codes are contained in register "C".

Secondary *Codes:* 02, 03, 04

- 02 indicates that the initial horizontal address was greater than the allowed minimum.
- 03 indicates that the calculated end address was greater than the allowed maximum.
- 04 indicates that the calculated end address was less than the start address.

For all three errors

- H and L contain the horizontal start address,
- D and E contain the end address, and
- B and C contain the pixel count.

Primary Code: 84
(Continued)

Secondary Codes: 05, 06, 07

Reason for Error: The SlideWriter used the image parameter information it received and calculated an illegal vertical video address.

- 05 indicates that the initial vertical address is greater than the allowed maximum.
- 06 indicates that the calculated end address is less than the allowed minimum.
- 07 indicates that the calculated end address is greater than the start address.

For all three errors:

- Register pair H and L contain the vertical start address,
- D and E contain the end address, and
- B and C contain the number of lines per scan.

Secondary Code: 08

Reason for error: A non-existent internal lookup table was requested.

Secondary Code: 09

Reason for Error: The SlideWriter received an illegal intensity assignment.

Secondary Code: 0A

Reason for Error: The calculated horizontal endpoint was no longer within the digital image map when the image rotated by 90 degrees.

- Register HL contains the horizontal start address,
- DE contains the horizontal end address, and
- BC contains the horizontal line length.

Secondary Code: OB

Reason for Error: The calculated vertical endpoint was no longer within the digital image map after the image rotated 90 degrees.

- HL contains the vertical start address,
- DE contains the vertical end address, and
- BC contains the number of lines per scan.

Primary Code: 86

Problem: Illegal SCSI Address

Solution: Reset the DIP Switches so that the SCSI address switches do not specify "7". Refer to page 32.

Secondary Code: 00

Reason for error: The SCSI address switches inside the Display Panel are set for address "7". Address "7" is reserved for the initiator or host. The SlideWriter's Device Address may be set from "0" to "6" only.

Primary Code: 91

Problem: Memory Fault.

Solution: Turn off the SlideWriter and wait 30 seconds. Turn the SlideWriter back on and retry the image. If the error persists, there is a RAM failure.

Secondary Code: 00, 01

Reason for Error: Prior to imaging, the SlideWriter verifies the checksums of various RAM data areas such as the color look-up tables (LUTs). This code indicates corruption of one of these RAM data areas.

Secondary *Code:* 02 to 07

Reason for Error: On a power-up or reset sequence, the SlideWriter has detected a memory failure during its memory diagnostics tests. Code "02" indicates an EPROM check sum failure; the remaining codes indicate RAM failures. Errors of this nature should be brought to the attention of a qualified service technician.

Primary Code: 92

Problem: SCSI Interface Fault

Secondary Code: 00

Reason for Error: The SlideWriter has detected a parity error during data transfer from the host.

Secondary Code: 01

Reason for Error: SCSI Controller fault.

Primary Code: 93

Problem: CRT Beam Calibration Fault

Secondary Code: 00, 01

Reason *for Error:* Code "00" the CRT beam is too bright. Code "01" the CRT beam is too dim. If the SlideWriter is unable to maintain proper CRT intensity, contact your Matrix service representative.

Primary Code: A2

Problem: Filter Wheel Fault

Secondary Code: 00 to 05

Reason for Error: The SlideWriter is experiencing problems in reliably moving the filter wheel.

Setting the SlideWriter as an Unterminated SCSI Device.

CAUTION *This procedure is intended for qualified service personnel only. There are no user servicable parts or adjustments in the SlideWriter.*

If you intend to locate the SlideWriter in the middle of the SCSI bus as indicated in Chapter 2, Figure 2-6, then you must remove the SlideWriter's internal SCSI terminators. The terminators are resistor packs U1 and U2 on the SlideWriter's Processor Board. The objective of the following procedure is to carefully remove U1 and U2 from their respective DIP sockets on the Processor Board.

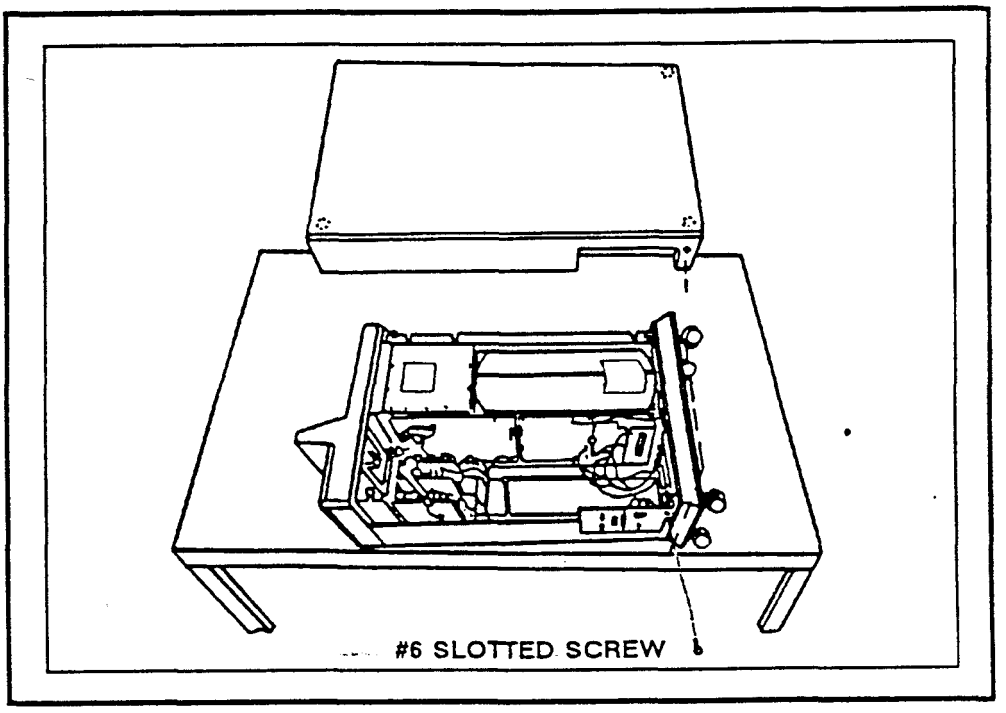


Figure 5-4. Side Cover Removal

Side Cover Removal

Remove the side cover by performing the following procedure.

- Turn the SlideWriter off and disconnect the line cord and SCSI cable(s). Lay the unit on its side so that the camera back is on the left side and faces away form you. Ensure that you lay the unit on a flat, level surface. See the above illustration for correct positioning.
- Remove the slotted screw near the Power and Signal Input Panel.
- Carefully pull the side cover off and store it in a safe place. This gives you general access to all interior PC boards, power supplies and the CRT assembly.

Terminator Chip
Removal Procedure

In order to gain access to the Processor Board you must remove the Low Voltage Power Supply. You do not need to disconnect the AC or DC power connectors because you will only move the Power Supply module to another spot. You will not remove it entirely from the unit.

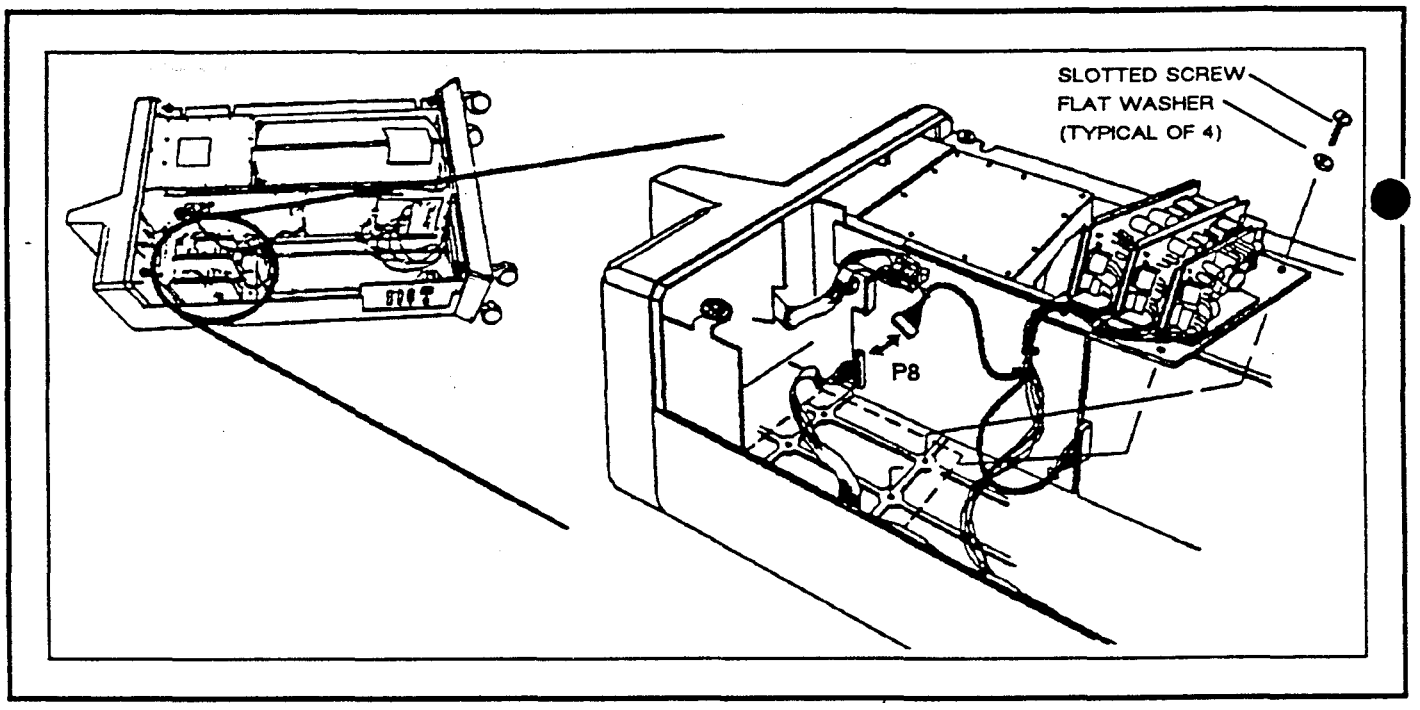


Figure 5-5. Low Voltage Power Supply Removal

Remove the Low Voltage Power Supply by performing the following procedure.

• Remove the four flat-head screws and flat washers that secure the Low Voltage Power Supply to the unit. Save all hardware.

• Remove the P8 Connector from the Processor Board.

» Slide the low voltage power supply partially out of the unit and rest it on the CRT plate. You now have service access to the Processor Board.

• Terminator Chips U1 and U2 are located next to the 50 pin SCSI ribbon cable J1 on the Processor Board. Carefully remove both U1 and U2 using an IC extractor or a small flat tip screwdriver.

• Save both terminator chips in case you decide to place the SlideWriter at the end of the device chain at some later date.

Replace the low voltage power supply by performing the following procedure.

- Position the Power Supply module in the unit and connect ribbon cable P8 on the Processor Board.

- Secure the Power Supply module by replacing the four flat-head screws and flat washers that you removed previously.

Replace the Side Cover as follows:

- Position the cover, matching the velcro-like fasteners, and replace the slotted screw.

- Turn the SlideWriter upright and connect the line cord and SCSI cables. Refer to page 12 for instructions on connecting the SlideWriter to the SCSI bus.

GLOSSARY OF TERMS

This glossary provides the meanings of terms for the purposes of using and programming the SlideWriter. These meanings may not coincide with other uses or with formal definitions.

Black-jumping -	An imaging mode in which the CRT Beam skips over black pixels.
Brightness Level -	One of nine CRT intensities (0 through 8). The user or the internal system assigns a subset of intensities to red, green, and blue colors in a given mode.
Bus-	A circuit over which information passes.
Cathode Ray Tube (CRT) -	A vacuum tube in which an electron beam, directed at a phosphor-coated glass screen, causes a point on the screen to glow. As magnetic coils deflect the beam, the point of light moves across the screen. Variations in the intensity of the beam create a visible display on the screen.
Checksum -	During a check, a sum of bits or bytes in a quantity of data ensuring that the data is accurate.
DIP Switch -	A set of 5 switches in a plastic box (a "Dual In-line Package" or DIP) which can be set by hand.
DRAM - (Dynamic Random Access Memory)	A form of memory, continually refreshed, possessing both read and write capability. Memory contents are lost when the power is turned off.
Error -	An operator-induced fault, a programming fault, or a data discrepancy.
Fault -	A hardware-induced failure.
Filter Wheel -	A movable wheel containing three color filters and one neutral filter which reside in the optical path and which color the imaging beam.

Hexadecimal - The representation of numbers in the base-16 number system, using the ten digits 0 - 9 and the six letters A through F.

Host Computer - A computer from which the SlideWriter receives image data and commands via the SCSI Bus.

Initiator - An SCSI device (usually a host System) that requests an operation to be performed by another SCSI device.

Intensity Calibration - Checking the CRT hardware to ensure it matches the intensity value for each of the levels in the brightness table. The SlideWriter automatically adjusts this intensity value. Calibration may be performed either automatically or manually. Refer to page 29.

Least Significant Bit - In a binary number, the bit representing the lowest exponent of 2.

Look-up Table (LUT) - A table translating one set of values into another based on a known relationship. SlideWriter LUT's compensate for non-linear film sensitivity. Different LUTs are required to produce similar results on different film types.

Microprocessor - The component of the SlideWriter (and of microcomputers) which performs logic, computational and control functions.

Optical Path - The path that the light emitted by the CRT follows through the filter wheel and lens to the film.

Peripheral Device - A peripheral that can be attached to an SCSI device (e.g., Magnetic disk, printer, optical-disk, or magnetic-tape).

Pixel - Abbreviation for Picture Element. The smallest position into which an image resolves. The term refers to both the smallest defined segment of a scan line (a unit of width) and to a two-dimensional screen area one pixel wide and one line high.

Power-up Sequence - A sequence of operations the SlideWriter goes through when the user turns the power switch on. The SlideWriter:

- Sets all SCSI functions to the idle state;
- Performs memory diagnostics, causing a random flashing of the display lights;
- Loads default LUT values, brightness tables, brightness levels; and
- Resets the system.

Reset Sequence - A sequence of operations the SlideWriter goes through when the user presses the RESET Switch (Refer to page 25 for details).

SCSI - (Small Computer System Interface) A standard data communication interface which allows high speed transmission of data from one device to another.

SCSI Device - A host computer adapter or a peripheral controller or an intelligent peripheral that can be attached to the SCSI bus.

Target - An SCSI device that performs an operation requested by a host or initiator.

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