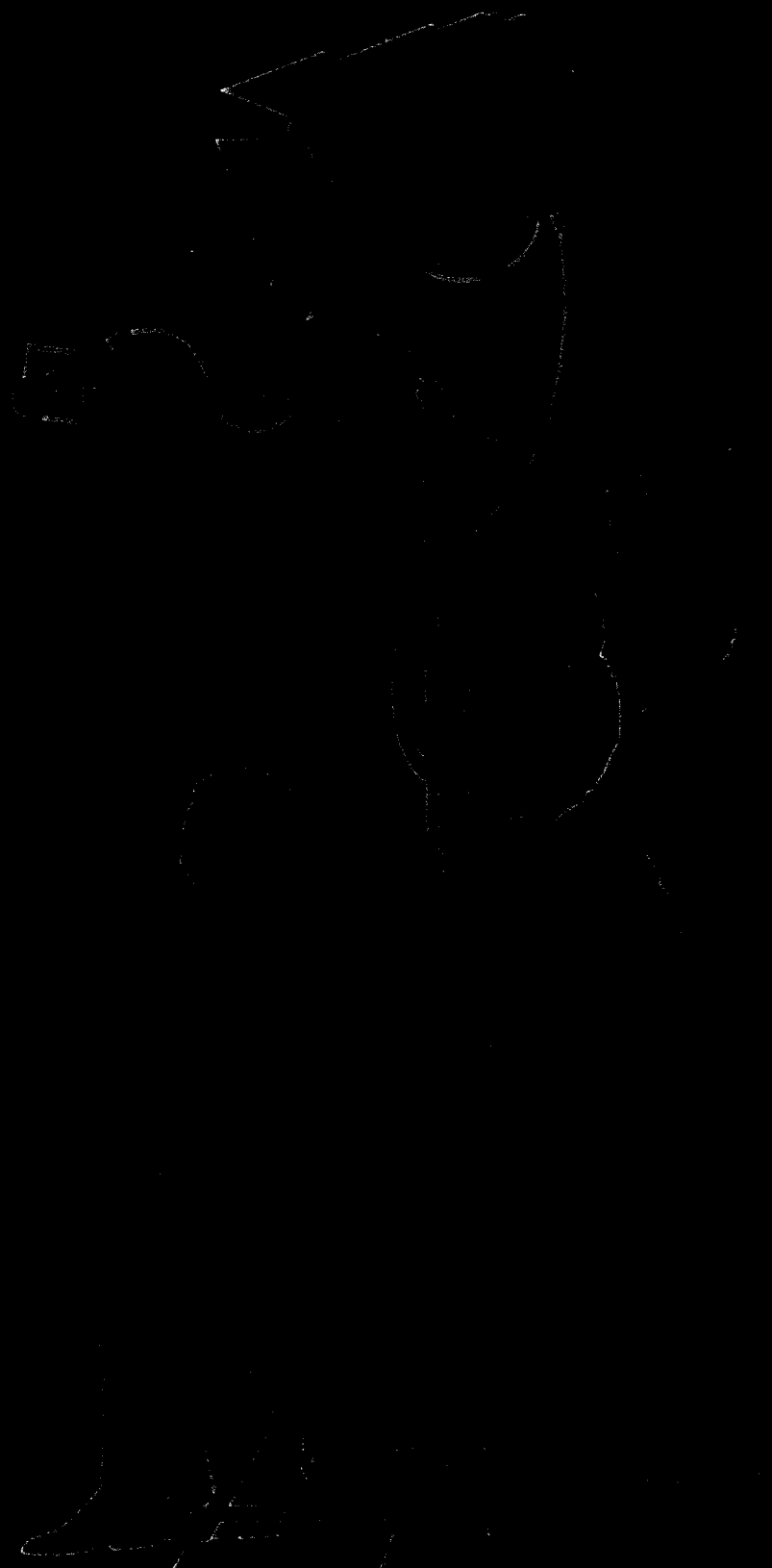
FILM NOTES FOR THE REEL PEOPLE

H-50-24

A TECHNICAL SERVICE FOR FILMHANDLERS FROM EASTMAN KODAK COMPANY



Film From Start To Finish

Platter Transport: An Overview

HDTV In The Era Of Film

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EDITOR'S MAILBOX

I am writing you relative to a problem in the theatre projection booth, a problem which in many cases detracts from the presentation of motion picture films.

In editing film, the film editors place fade-outs and fade-ins for the final prints. When these occur at the end of a reel, most are cut out when placing the film on platters. Projectionists do this in order to leave a visible frame of the film to match with the proper leaders in breaking down the film for shipment. The results often delete from the film the very thing the editor intended as effect.

We have tried various pieces of equipment to trace the film frame bar back to the black portion of the fade-out but the results have been far from desirable, resulting in misframes, etc.

A number of years ago prints received in the theatre had what was referred to as flash marks on the edges of the film which corresponded with the frame lines. If these marks could be returned to the print, I believe the theatres could improve picture presentation and come closer to achieving what the film editor initially intended. Can this be done? If so, I believe the results would be very worthwhile.

Dan Goodwin
Cinemark Corporation

Editor: Your letter has been forwarded to the director of engineering for motion picture film of the Society of Motion Picture and Television Engineers (SMPTE). Methods of marking film are being reviewed to determine which will best suit current and future needs.

If you have a ***Letter to the Editor*** please send to:

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MOVIES GENERATE ESTIMATED $9.9 BILLION REVENUE IN 1988:

VIDEO EXPECTED TO SUPPLY $6 BILLION BY 1991

(Reprinted with permission, MOTION PICTURE INVESTOR)

American movie distributors generated an estimated $9.9 billion in revenues from all sources in 1988 and are expected to reach the $15 billion mark by 1993, according to the latest forecast in MOTION PICTURE INVESTOR, an industry newsletter published by Carmel, CA-based Paul Kagan Associates, Inc.

Higher-than-anticipated revenue from all sources, including domestic and foreign theatrical, home video and television, maintained the distribution industry's double-digit percentage growth. A key factor in the 15% revenue growth in 1988 was strong video performance, highlighted by record-setting sales of "E.T." and "Cinderella."

At an estimated $4.6 billion in 1988, video has already become the largest single source of revenue for movie studios. Video revenues are estimated to grow at 10% a year, which would bring 1991 revenues to more than $6 billion.

Despite the impressive pattern, in percentage terms video growth is expected to take a back seat to pay-per-view and foreign TV over the next few years. Distributor rentals from foreign TV are projected to reach the $1 billion level in 1990, about the same level as domestic TV.

The following table shows 1983, 1988 and 1993 distributor revenue totals for feature films (in millions of dollars) and growth rates from the MOTION PICTURE INVESTOR study.

PROJECTED REVENUE AND GROWTH RATES

				Per-year Average Growth	
Exhibition Window	*1983*	*1988*	*1993*	*1983-1988*	*1988-1993*
Domestic Theater	$1,582	$1,875	$2,511	+3.5%	+6.0%
Foreign Theater	1,006	1,125	1,507	+2.3	+6.0
Domestic Video	370	2,905	4,479	+51.0	+9.0
Foreign Video	411	1,740	2,980	+33.5	+11.4
Pay TV	595	846	1,216	+7.3	+7.5
Pay-per-view	14	114	419	+52.1	+29.7
Network TV	125	100	122	-4.4	+4.0
Broadcast Syndication	250	431	717	+11.5	+10.7
Cable Syndication	40	149	297	+30.1	+14.8
Foreign TV	125	600	1,346	+36.9	+17.5
Total Revenue	$4,518	$9,885	$15,594		
Percent Growth	18%	15%	9%	17.6%	10.8%

IN THE ERA OF FILM

Featuring: **Joerg Agin**, Vice President and General Manager
Motion Picture and Audio Visual Products Division
Eastman Kodak Company

Q: What do you envision as the future of motion imaging?

A: Systems that give the industry the benefit of both disciplines, film and high-definition television, are where we believe the future lies. Turning first to film...we know its unique strength is its ability to capture visual information...and to do so under a wide variety of conditions. This is the result of the technology of film, the way it reproduces color and tone. Each frame is a sophisticated combination of solid-state physics and chemistry. As you know, actual dyes are used to create color and luminance in an array of random elements that end up forming a real picture. All of this results in a distinct image quality we call "the film look."

It differs greatly from the look created by electrons, phosphors and magnetic oxide—"the video look." Most motion picture films have an exposure latitude much greater than their video counterparts. Film speeds reach 500 and beyond, allowing production under conditions of near darkness. And, of course, there's the difference in resolution. None of the current proposed HDTV systems can match the resolution of today's 35 mm film. In fact, the inherent superiority of film as a technology for capturing visual information has always been recognized by the developers of HDTV systems.

We also know and appreciate that electronics has an unequaled ability to manipulate images and information. The integration of digital image technologies into new high-resolution image manipulation systems will give motion picture artists unequaled creative control in the production of theatrical special effects. We have a responsibility to the users of the technologies we develop—the responsibility of giving them systems that will improve the quality, and the cost-effectiveness—of their work.

Joerg Agin

Q: The developers of HDTV are doing extensive research and development. What is being done in the way of advancing film technology?

A: Today's films are neither archaic nor developed with static technology. Film manufacturers are spending millions of dollars every year on research to successfully expand and improve the capability of film. For example, Kodak recently introduced a new line of EASTMAN EXR Color Negative Films that are changing the art form and extending the dimension of high-definition imaging. Furthermore, we know we can advance photographic image structure by a factor of ten. That means we can expect to see even faster, sharper, finer-grained films over the next several years.

And there's still another important fact about film as a production tool—its remarkable flexibility.

Q: What properties make film a flexible production tool?

A: If we look only at 35 mm color film, we can see that the creators of modern movies, TV programs and commercials choose from a wide assortment of emulsions. They vary in speed, sharpness and other imaging characteristics, which enables filmmakers to get the exact mood, quality and emotional tone they need.

These films can be shot on four perf or three perf and at various camera speeds. They can be shot with normal or anamorphic lenses, and the final prints can be set up for projection in a variety of aspect ratios. But all this flexibility is contained within the film. And that film can be run through any 35 mm motion picture camera (or projector) anywhere in the world.

"...film is an ideal production tool because it encourages productivity but does NOT limit creativity."

In other words, film is an ideal production tool because it encourages productivity but does NOT limit creativity. Remember, too, that every advance in film technology is also incorporated within the film itself. There's no need to buy new equipment to keep up with these advances. It is difficult to say the same about electronic imaging because it is hardware intensive.

Q: What equipment requirements are necessary with high-definition video?

A: For HDTV the technological advances are contained within the cameras, recorders and other equipment. Every major advance requires a new generation of equipment. That means that current equipment becomes obsolete and must be replaced, modified or updated at enormous cost. We're already seeing that analog HDTV videotape recorders are being replaced by new digital recorders. This constant reinvestment in hardware is obviously very costly to producers.

Q: How compatible are these technologies?

A: Film, of course, has always been thought of as the "future-proof" production tool. Movies, TV programs and commercials originated on film will retain, if not increase, their value because they will be convertible to all future video formats currently being discussed. The compatibility question is one to ponder with video. What happens to programs produced on one video format when the next one comes along and is incompatible?

Q: We've talked about HDTV production. Some have argued that theatrical distribution of film will be replaced by high-definition video projection. What are the arguments for this?

A: The arguments center on cost. The notion is that if theatres converted to electronic projection systems, motion picture distributors would save the cost of making and distributing film prints. Two ways of converting to electronic projection have been suggested. One involves distributing high-definition video tapes to theatres. The other calls for satellite transmission to theatres. Both of these scenarios usually assume distributing narrow-band MUSE-encoded HDTV—not true wide band studio high-definition video.

We know that estimates for the cost of equipping a theatre for high-definition videotape display *start at* $250,000 per screen. These estimates involve fairly small-size, low-brightness screens, such as those found in some industrial situations. To even approach the image size, brightness and resolution of projected 35 mm film requires very high-performance—and very expensive—video recorders and projectors. Estimated costs for these two items alone are closer to $300,000 per screen.

And no one can guess what satellite time will cost to distribute these signals. In addition to the cost for satellite distribution you have external situations to consider such as inclement weather and transmission malfunctions. Furthermore, none of these estimates includes a penny for equipment maintenance and repair, or for labor.

Q: How does this compare with the current cost of distribution?

A: If you amortize the cost of an average 35 mm film print over the length of an average first-run engagement, it

comes to about $5 to $6 per showing. One more fact to be considered: the average annual gross revenue per screen in the U.S. is about $220,000. So it would literally take decades for theatre operators to recover their investment in converting to electronic display.

It is hard to see where the cost benefits of converting theatres would come from. It is even harder to see any quality or visual experience benefits. But quality experiences are exactly what theatre audiences are now looking for. Audiences want theatrical motion picture experiences that surpass anything they could see at home. Film-originated productions are the answer to that need. For example, we are seeing growing interest in what, for want of a better term, we can call "special format productions"—such as those created for IMAX and Showscan equipment. Productions in these formats underscore an interest in the rebirth of 65 mm production.

Q: Why do we see this renewed interest in 65 mm production after such a long hiatus?

A: It has been a long time since the last theatrical feature was originated on 65 mm negative—"Ryan's Daughter" in 1970. The problems that hampered shooting in the past— big, cumbersome cameras, less advanced lenses, and slower film speeds—have been eliminated.

"...new film stocks are ideal for large-format work because of their finer grain and increased sharpness."

Four of the major camera companies—Arriflex, Cinema Products, Panavision, and Todd AO—have demonstrated completely new, highly-sophisticated 65 mm cameras. I should point out that new film stocks are ideal for large-format work because of their finer grain and increased sharpness.

Q: Earlier you mentioned digital image manipulation systems. Can you expand on that?

A: We are exploring the development of a digital image system that operates at an even higher resolution than is found in any current or proposed high-definition video system. Such a high-resolution electronic intermediate system would allow the production of high-quality theatrical film special effects.

"...the integration of disciplines will bring our industry to unprecedented heights."

Here's how the future scenario might unfold: special effects scene elements would be shot on film and processed. The image would then be scanned into the system using a high-resolution film scanner. The scanner would convert the film images to digital image data. This data would then be sent to a powerful image processing workstation where the images would be manipulated. Special effects, such as compositing, painting, and combining computer-generated images with the film images, would be created quite easily.

Titles and credits could also be produced. And the system could eliminate dirt and scratches, or sharpen soft images. All this work would be previewed on a high-resolution computer monitor. When the image manipulation work is completed and approved, the new manipulated image data would be sent to a high-resolution film recorder where a high-quality "first-generation" negative film would be produced.

For such a system to produce what is essentially a first-generation negative film, a digital image standard of more than 2000 lines per picture height would be needed. This system is NOT a dream. The technology exists today.

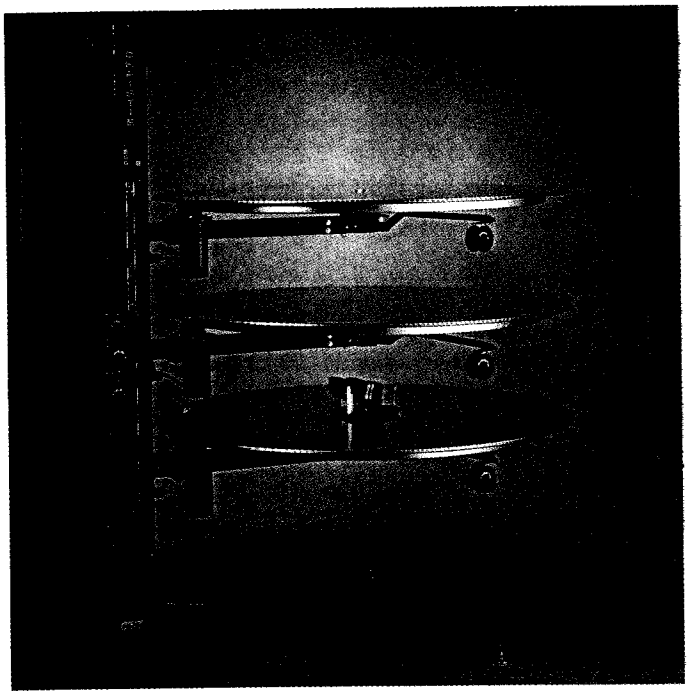
Q: How would you summarize the future of film in the era of HDTV?

A: I think I can predict that the future of film in the era of HDTV will be long and bright. In fact, it may be more appropriate to talk about the future of HDTV in the era of film. But most appropriate would be to talk about the future of motion picture imaging as it incorporates the best of what all our technologies have to offer. It is the integration of disciplines that will bring our industry to unprecedented heights.

We must think of technology as a means, not an end.

THE OBIQUITOUS PLATTER

By: Lynn Shubert



The platter owes its spot in the booth to the advent of xenon. Prior to xenon there was no need for a long-running reel. A reel was limited to the length of time it took a stick of carbon to burn to a stub and need replacement.

The first "moving pictures" were shadows, cast by fire light, on the walls of caves. The cave man discovered he could make the shadows dance and play by manipulating his hands and fingers. From shadows on the wall, a metamorphosis evolved to the projection of film on a movie screen. But fire light was no longer bright enough to project a satisfactory picture.

Along came Thomas Alva Edison offering the world an electric bulb. With that bulb came a quantum leap toward the motion pictures of today. Although the electric bulb was an unbelievable improvement, it was not a sufficient light source to project motion pictures.

The search went on. It was not until the early 1900's, with the advent of the carbon arc, that moving picture projection became practical. The carbon cast a bright light, but burned quickly, and after a few minutes, sputtered to darkness.

When longer films began being made, a longer light source was necessary. The life of the carbon stick was extended to twenty minutes. This brought about the birth of the 2000-foot reel and the change-over was born.

The motion picture industry relied on the carbon arc for many years. Additional improvements were made, giving a brighter light and longer life. This enabled the film to be projected from 6000-foot reels. But, it was still necessary to have two sets of equipment in the booth. The projectionist was on hand to make reel changes, change carbons, as well as clean out the smoke and debris. Everyone was aware that carbon arc projection was not perfect. It flickered, changed color and needed constant attention.

Meanwhile, German scientists were laboring at Osram to perfect the xenon lamp. It took many years to refine the quartz envelope, the high-pressured gas, the tungsten anode and cathode, which combined to give us the xenon light source of today.

The xenon provided a better, more consistent light, with a Kelvin equivalency rating close to that of the sun. But perhaps more important, Osram delivered a lamp which would provide uninterrupted light for hundreds, even thousands of continuous projection hours. With the perfected xenon bulb, Osram doomed the change-over and paved the way for the platter system.

The original platter was developed by a German projectionist, Willie Burth. With a variety of potential problems to consider, it was not an easy development. The film could not be stretched, and far more important it could not be permitted to rub against itself when leaving or returning to the platter.

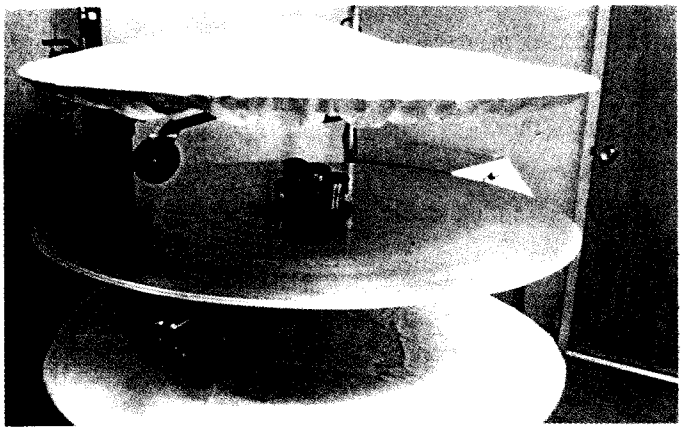
Norelco took the patent assignment and proceeded to perfect the design of the no-rewind process. While the platter is simple to operate, it was difficult to design. Through the long trial and error stages, many different designs surfaced.

Initially, Norelco manufactured and sold units in Europe. This was soon followed with an introduction of the platter in the United States. Kerasotes Theatres of Illinois has one of the first Norelco platters installed in the U.S. The servicing of this early model fell to Ed Potts.

Mr. Potts thought he could improve the design and set out to develop a unit, which has since become the leading platter design in the U.S. This unit is now known as the Autowind platter. At an early juncture, the Autowind platter was taken over by the Christie Electric Corp.

Kinotone has taken over the Norelco unit and has dominated the European market, while Christie's Autowind platter has dominated the U.S. market. There are many other platter systems on the market manufactured by Balco and Cinema Systems.

The platter vastly improved the treatment of film. Most film damage occurred during the high speeds utilized during reel rewinding. It also eliminated the need for a second set of equipment in the booth. The advent of the xenon coupled with the platter enables the projectionist to supervise several screens in the multiplex theatre.



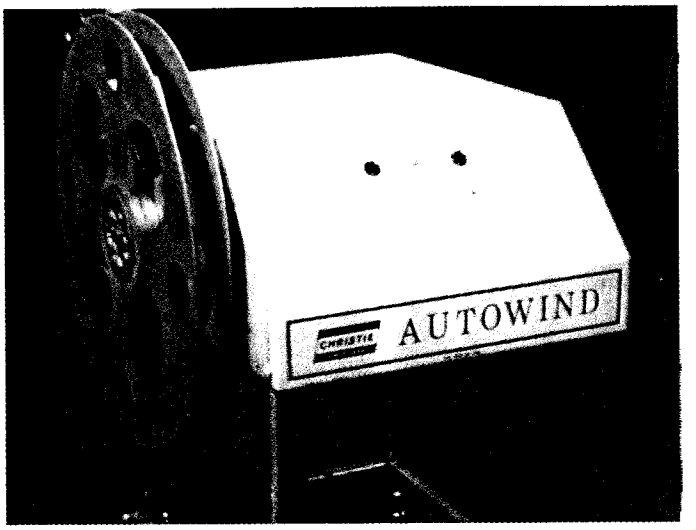
Platter covers help control dirt on the film surface.

The benefits achieved by the use of the platter film transports, however, are not without their own particular problems. Most prevalent among these is the susceptibility of the print to collect airborne dirt due to the relatively large amount of film surface that is exposed during thread-up, while moving freely in space to and from the projector, and even when resting horizontally on the open platters.

Smoking should not be permitted in the booth or other film handling areas.

"Where does the dirt come from?" you may ask. Everywhere. The floors, the circulating air, your clothes and shoes, smoking, the projection equipment, and the film itself. Experience shows us that if the facilities and equipment are cleaned regularly, the appearance of dirt on the projected image is rarely a problem.

In addition to the accumulation of dirt on the film, care should be taken during build-up and tear-down to minimize the potential for scratching and other print damage.



Start winding at low speed and increase slowly.

The tension at the hub of the shipping reel on the makeup table is extremely high when you begin the rewind process. Start out at the lowest speed to prevent film breakage. Make all speed changes very slowly. Remember that film is pulling a full platter (80 to 200 pounds). If sudden speed changes are made, the film will break and the platter will continue to rotate.

During build-up and tear-down, maintain a constant speed. If the speed is permitted to fluctuate, loose laps of film may be produced, increasing the likelihood of cinch marks on the image.

When winding at high speeds under low humidity conditions, static electric charges may be generated that will draw dirt and foreign substances to the film surface. Static electricity can also cause erratic operation of the platter. To prevent static electricity spray carpeted areas around the platter with a static removal spray as required.

For the proper operation of the platter system all rollers must be able to turn freely. If they do not, they should be lubricated with graphite. Any roller with a heavy deposit of wax or dirt should be cleaned with alcohol or dishwashing soap.

To clean the surface of the platter, use a commercial household cleaner. DO NOT wax the platter, use paint thinner or solvent to clean the platter or rollers. Regular cleaning of the feed control centerpiece rollers is necessary. A soft bristled brush will remove dust accumulations.

As with all aspects of exhibition, change is constant. An advancement in the platter area is the endless loop film transport system. The endless loop platter permits continuous operation without the need to rethread the projector. The film is positioned in a clover-leaf design to prevent abrasion.

Several major equipment manufacturers are testing, or have on the market, continuous loop platter systems.

[illegible]ONIST'S PLATTER TROUBLESHOOTING GUIDE

Problem	Probable Cause	Remedy
Platter will not rotate.	No power at power source.	Provide necessary 110-120v AC to unit. Check if unit is plugged in and switch is ON.
		Check to see if drive motor is plugged into assembly on column.
		Check for tripped circuit breaker. Reset or replace as necessary.
	Platter switch.	Set mode switch to correct mode.
	Defective wiring or connection.	Check wiring and connections.
	Defective control sensor.	Check to see if L.E.D. is working. Replace if necessary. Check control sensor in another connector to see if L.E.D. power card is working.
	Defective motor control card.	Check motor control card in another connector. If defective, replace.
	Drive wheel loose.	Check condition of drive wheel and re-tighten or replace as required.
Platter rotates too slowly.	Motor speed control.	Check motor speed control and adjust as necessary.
	Drive wheel slipping.	Check spring tension on drive assembly. Check condition of wheel looking for wearing or dirt. Clean or replace as necessary.
	Motor brushes.	Check drive motor brushes for wear. Replace if worn below ¼" or worn unevenly.
	Voltage too low. (less than 105v)	Check AC Voltage. If too low install variac or step-up transformer to provide 100-120v AC.
	Platter binding.	Check platter bearings condition and lubrication. Relubricate or replace as necessary.
Platter runs too fast.	Motor speed control.	Check motor speed control. Adjust as necessary.
	Voltage too high. (more than 120v)	Check AC voltage. If too high install variac or step-transformer to provide 110-120v AC.
	Control sensor.	Check to see if the end cap is securely in place so that ambient or work lights are not leaking into control sensor.
Platter runs all of the time.	Wiring or connections.	Check wiring and connections and repair or replace as necessary.
	Control sensor.	Check to see if the end cap is securely in place so that ambient or work lights are not leaking into control sensor.
	Speed control.	Check the motor speed control and adjust as necessary.
Return arm will not take up film slack.	Film position sensor.	Determine cause of sticking in the ON position and correct.
	Motor drive wheel.	Check for slippage. Determine cause of slipping and correct.
Film breakage during build-up and tear-down.	Film tension.	Excessive film tension. Start at the minimum setting. Increase speed slowly to desired setting.
	High speed start.	Reset speed control after braking.

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