

Film-Tech

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These manuals are designed to facilitate the exchange of information related to cinema projection and film handling, with no warranties nor obligations from the authors, for qualified field service engineers.

If you are not a qualified technician, please make no adjustments to anything you may read about in these Adobe manual downloads.

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Troubleshooting for the Projectionist

Projection-related problems are infrequent, but on occasion—generally at the worst possible time—a projectionist's private fears are realized.

Most problems can be prevented by checking equipment and inspecting film regularly. But, avoidable or otherwise, when your show comes to an unexpected and embarrassing halt, you must act quickly to right what is wrong.

There is always a possibility your role will suddenly change from projectionist to troubleshooter. The troubleshooting guide inside this issue of *REEL PEOPLE* was prepared for those times, when a quick reference is needed in order to diagnose and correct the problem.

The guide lists almost everything that could go wrong, with straightforward remedies. In the event none of these suggestions work, we've arranged for "last-resort" emergency phone numbers to connect you with a troubleshooting expert.

We suggest you look over this information chart now, before you actually need it. "Be prepared" is still a timely maxim.



IN THIS SPECIAL ISSUE:

Projection Booth
Emergency Call Guide

Projectionist's
TROUBLESHOOTING Guide

Youngest Acting Award Winner—Tatum O'Neal—Supporting Actress in *Paper Moon* (1973)

Oldest Acting Award Winner—George Burns—Supporting Actor in *The Sunshine Boys* (1975)

Projectionist's Trouble Shooting Guide

Problem	Probable Causes	Remedy
SCREEN IMAGE		
Vertical unsteadiness.	Perforation damage. Inadequate or otherwise incorrectly formed loops. Gate tension. Lack of proper lubrication. Deposits on trap rails. Intermittent sprocket. Intermittent movement.	Get replacement print (footage). Rethread projector. Increase tension until intermittent sprocket is heard; then back off until noise disappears. If no setting helps, the problem lies elsewhere. Check spring tension—replace springs if necessary Lightly moisten thumb and forefinger with oil and apply alternately to film edges before it enters gate. CAUTION: This is an emergency measure. If possible, films treated this way should be cleaned and relubricated by a motion picture laboratory before further showings are booked because oily edges collect dirt. Remove deposits with plastic scraper. Clean rails with 50/50 water and alcohol solution. Wipe dry! Check for worn or hooked teeth. If present, replace sprocket or reverse present sprocket. Obtain "loaner" from your service representative while your unit is being repaired or overhauled.
Horizontal weave.	Lateral guide rollers in trap. Film guide rails in trap.	Check spring-loaded guide roller for free operation. Adjust outside trap rail (sound-track side) to be flush with fixed flange of lateral guide roller. Spring loaded inner flange should bear against film edge. Inner rail should allow slight clearance for splices.
Loss of detail in shadows and dark scenes.	Low light output (See lamphouses).	See lamphouse sections for causes and remedies.
Constant flicker.	Excessive light output (See lamphouses).	See lamphouse sections for causes and remedies.
Random flicker.	Lamp burning characteristics. Voltage or current fluctuations. Cracked positive carbon.	See lamphouse sections for causes and remedies.
Dark corners or dark center screen.	Incorrect mirror-to-light source distance and/or mirror-to-projector distance.	Check lamphouse manual and readjust. Corner luminance should be about 75 percent but never less than 62.5 percent of center luminance. See SMPTE Screen Brightness Standards.
Dark on one edge, top, or bottom of screen.	Mirror and/or lamphouse misalignment.	Adjust mirror first. If not successful, check lamphouse alignment. If neither adjustment helps, check for vignetting by lens and/or port opening.
Soft image, cannot be focused (flutter).	Excessive heat from lamp (especially on new black-and-white prints in drive-ins).	Reduce current and change carbon sizes or xenon-bulb wattage if necessary. Check mirror-to-light-source distance and mirror-to-projector distance. Reduce "hot spot."
Soft image, lack of contrast (halos around bright areas).	Oily deposit on rear element of projection lens. Dirty port glass. Dirty and/or cloudy inner lens surfaces. Separation of cemented lens elements.	Clean lens surface with an approved lens cleaner, such as <i>KODAK Lens Cleaner</i> . Clean as above. Interior lens elements should be thoroughly cleaned, but only by a professional optical technician who has the necessary lens assembly and alignment tools. Inspect lens for irregular patterns in the open areas.
In-and-out of focus. (rubber screen)	Excessive heat from lamp (especially on new black-and-white prints in drive-ins.)	Same as for flutter. Usually recovers after a sufficient number of runs. (Image edges will remain out of focus.)
Image soft at top or bottom of screen, horizontal lines curved. Bad keystoneing.	Large projection angle.	In some instances, screen can be tilted to compensate. If not, maintain best focus at or around the center of the screen.

Projectionist's Trouble Shooting Guide

Problem	Probable Causes	Remedy
OPTICAL SOUND		
No sound.	Amplifier malfunction. Speaker failure. Exciter lamp burned out or faulty diode. Wrong switches thrown. Improperly threaded projector. Individual circuit fuses blown.	Service check.* Service check.* Replace. Check your operating procedures. Rethread. Replace (spares should always be on hand.)
Loss of high frequency sound or poor quality sound.	Amplifier system malfunction. Speaker defect. Scanning beam not properly focused on film sound track. Dirt or oil on scanning beam optics.	Service check.* Service check.* Adjust until best sound is heard. Use SMPTE sound test films if possible. Clean with approved lens cleaner.
Garbled sound.	Film not being held securely at scanning point. Lateral guide-roller pressure on sound drum insufficient. Misthreaded. Inadequate loop size . . . film pulls on lateral guide roller.	Check roller tension spring and adjust if necessary. Increase to recommended loop size (19–21 frames—aperture to scanning point).
Sprocket hole noise (motor-boating).	Misalignment at scanning position.	Adjust lateral guide roller in sound head.
Crackling sound (frying eggs).	Loose elements in photocell or other components. Corroded socket connections, loose wiring, or loose terminal connections. Cracked diaphragm in one or more speakers . . . either high or low frequency.	Check and replace if necessary. Time for a service call and thorough checkup. Replace.
Hissing sound (rain).	Scratches on sound track.	Exchange print.
Extraneous noises.	Seasonal noise from vibrations transmitted by air conditioners, electric heaters, fans, etc. Extraneous light on photo cell.	Isolate source, if possible, and use vibration-absorbing mounts for fans, motors, etc. Shield from light.

MAGNETIC SOUND		
No sound.	Amplifier malfunction. Speaker failure. Wrong switches thrown. Improperly threaded. Individual circuit fuses blown.	Service check.* Service check.* Check your operating procedures. Rethread Replace (keep spares on hand always).
Loss of high-frequency sound or poor quality sound.	Amplifier system. Defective speakers. Oxide buildup on heads. Worn pole pieces on heads.	Service check.* Service check.* Clean heads as specified in manual. Service check.*
Garbled sound.	Insufficient film tension on magnetic heads. Misthreaded. Insufficient loop size . . . film pulls on stabilizing rollers.	Rethread to adjust tension as indicated in manual. Increase loop size (21–23 frames aperture to scanning point).

*Service check, as mentioned here, means inspection, adjustment, repair, or replacement by qualified professional motion picture machine technicians.

Projectionist's Trouble Shooting Guide

Problem	Probable Causes	Remedy
Crackling sound (frying eggs).	Same as optical sound except for photocell.	
Hissing sound (rain).	Magnetic tracks partially erased or subjected to spurious magnetic sources.	Exchange print.
Extraneous noise.	Same as optical sound except for photocell.	

CARBON ARC LAMPHOUSE

No light (carbons do not strike).	Generator or rectifier not operating. Carbons do not contact.	Check power supply to unit, fuses, ballast, etc. Replace short carbon, or both carbons.
Low light output.	Incorrect carbon trim and/or voltage and current. Internal lamphouse adjustments. Light source to mirror distance. Mirror to projector distance. Dirty or clouded optical components. Dirty screen. Oversized screen image. Stray light hitting the screen.	Check lamphouse manual and make necessary adjustments. Check lamphouse manual and make necessary adjustments. Make sure mirror, projection lenses, and port glass are clean. Clean or replace. Increase light output to conform with SMPTE standards of 16 ± 2 footlamberts (55 ± 7 candelas/m ²). Increase focal length of lens. Bring in screen masking if necessary. Remove or shield sources of stray light.
Sputtering carbon (erratic light output, cracked positive carbon tip.)	Excessive pressure on the clamping arm. Dropping carbon on hard surfaced floor causing a fine break. Current overload.	Adjust clamp to reduce pressure. Carbons are very brittle; be careful. Reduce current.
Random flicker.	Lamp burning characteristics. Fluctuating voltage and current. Cracked positive carbon tip.	Check carbon trim voltage regulation. Check rectifier for deteriorating diodes. Burn-in or replace.
Gradual decrease in output accompanied by a change in the color of light.	Widening gap between carbons. Usually positive carbon drive too fast or too slow.	Readjust carbon feed according to lamphouse manual.
Excessive light output (constant flicker)	Incorrect carbon trim and/or voltage and current. Internal lamphouse adjustments. Light source to mirror distance. Mirror to projector distance. Undersized screen image. Directional or high-gain screen.	Check lamphouse manual and make necessary adjustments. Check lamphouse manual and make necessary adjustments. Decrease focal length of lens. Open up masking if necessary. Change to matte screen or install stainless steel screen wire between lamp and projector. Reduce to SMPTE standard of 16 ± 2 footlamberts (55 ± 7 candelas/m ²).

XENON ARC LAMPHOUSE

No light.	Power supply.	Check circuit breakers and interlock safety system. Check lamphouse fan (must be operating before interlock will function). Check fuses and manual switches.
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Projectionist's Trouble Shooting Guide

Problem	Probable Causes	Remedy
	Igniter. Xenon bulb.	Check manual button, fuse, or breaker. Make sure all cables are not grounding on lamphouse frame. Change bulb.
Light flicker.	Xenon bulb. Power supply.	Change bulb. Service diodes.
Low light output.	Internal lamphouse adjustments; light source to mirror distance; mirror to projector distance. Operating lamp below recommended current. Dirty or clouded optical components. Dirty screen. Oversized screen image. Stray light hitting the screen.	Adjust according to lamphouse manual. Increase current to recommended level. Make sure mirror, projection lenses, and port glass are clean. Clean or replace. Increase light output to conform with SMPTE standards of 16 ± 2 footlamberts (55 ± 7 candelas/m ²). Increase focal length of lens. Bring in screen masking if necessary. Remove or shield sources of stray light.
Excessive light output (constant flicker).	Internal lamphouse adjustments. Light source to mirror distance. Mirror to projector distance. Operating lamp above recommended current. Lamp wattage too high. Undersized screen image. Directional or high-gain screen.	Adjust according to lamphouse manual (see other). Decrease current to recommended level. Replace with lower rating xenon bulb. Decrease focal length of lens. Open up masking if necessary. Change to matte screen or install stainless steel screen wire between lamp and projector. Reduce to SMPTE standard of 16 ± 2 footlamberts (55 ± 7 candelas/m ²).

PROJECTOR

Travel ghost (bleeding of bright image areas into adjacent dark image areas, or vice versa).	Incorrectly timed shutter.	Adjust according to projector manual.
Film loop slippage. Loss of loops.	Incorrectly seated pad roller. Too wide a gap between roller and sprocket.	Adjust to allow no more than double thickness of film to pass without lifting pad roller from sprocket.
Film clatter at gate.	Excessive gate tension. Lack of proper lubrication.	Reduce tension until noise disappears or until vertical unsteadiness is apparent. If no setting helps, the problem lies elsewhere. See Screen Image section (Vertical unsteadiness.)
Noisy sprockets.	Excessive feed or holdback tension. Hooked or burred sprocket teeth.	Reduce reel tension to reduce noise. Replace sprocket.
Transverse (hashmark) scratches on film.	Film rubbing against badly misaligned roller flanges.	Align incoming and outgoing rollers on projector when using platter systems.
Longitudinal scratches.	Protruding component in projector gate. Upper and lower fire rollers. Sound drum drag.	Check for burred edges on aperture plate. Check for nonrotating rollers due to flat spots. Clean out clogged rollers and lubricate sparingly. Check lubrication. If surface is highly polished, check with your service representative. Replacement may be necessary.

Projectionist's Troubleshooting Guide

Eastman Kodak is pleased to offer you this list of manufacturers and service technicians who have been kind enough to volunteer to assist projectionists by phone in case of emergency. However, out of courtesy to these individuals and their companies, we request that you be guided by the following suggestions:

1. Call only in case of a genuine emergency when you have nowhere else to turn.
2. Make no collect calls; all calls must be prepaid.
3. Write down the specifics of your problem before calling; the type of equipment, approximate age, model and serial number, and be as precise as possible as to the nature of the problem.
4. Always bear in mind that these kind-hearted souls are employed full time and do not have the time to simply "rap" or help you in routine situations. Be brief, be specific, and listen to their advice.

AISLE LIGHTS

AMERICAN THEATRE PRODUCTS (213) 462-7750
8:30-5:30 PM Pacific Time Ed Burke

CHRISTIE ELECTRIC CORP. (213) 320-0808
7:00-6:30 PM Pacific Time Lynn Shubert, Jack Kline, Stan Larsen

AUTOMATION EQUIPMENT

BALLANTYNE OF OMAHA (402) 342-4444
(Wholly-owned subsidiary of Canrad-Hanovia, Inc.)
8:00-5:00 PM Central Time John Wilmers, Gene Poole, Verne Sydlaske

CHRISTIE ELECTRIC CORP. (213) 320-0808
7:00-6:30 PM Pacific Time Lynn Shubert, Jack Kline, Stan Larsen

CINEMECCANICA N.A. INC. (813) 577-3211
8:30-5:00 PM Eastern Time Rante Hindian

KELMAR SYSTEMS, INC. (516) 421-1230
9:00-5:30 PM Eastern Time Andrew Marglin

KINOTONE (Norelco) (201) 279-9700
9:00-5:00 PM Eastern Time Jim Eaves, Andy Jantzen

L. P. ASSOCIATES, INC. (213) 462-4714
8:30-5:30 PM Pacific Time Leonard Pincus

OPTICAL RADIATION CORP. (213) 969-3344
8:00-5:00 PM Pacific Time John Carter

BOOTH EQUIPMENT

GOLDBERG BROTHERS INC. (303) 297-1250
7:30-5:00 PM Mountain Time Randall Urlik

NEUMADE PRODUCTS CORP. (914) 725-4900
9:00-5:00 PM Eastern Time Ron Jones

BOX OFFICE EQUIPMENT

DRIVE-IN THEATRE MFG. CO. (913) 321-0358
8:00-3:00 PM Central Time Jacque Dhooge

CARBONS

MARBLE CO. INC. (615) 227-7772
8:00-5:00 PM Central Time Bill Alexander

CONSOLES

BALLANTYNE OF OMAHA (402) 342-4444
(wholly-owned subsidiary of Canrad-Hanovia, Inc.)
8:00-5:00 PM Central Time John Wilmers, Gene Poole, Verne Sydlaske

CINEMA FILM SYSTEMS INC. (213) 963-6049
8:00-5:00 PM Pacific Time Ray Boegner, Bill Noyes, Dick Niccum

L. P. ASSOCIATES, INC. (213) 462-4714
8:30-5:30 PM Pacific Time Leonard Pincus

CHRISTIE ELECTRIC CORP. (213) 320-0808
7:00-6:30 PM Pacific Time Lynn Shubert, Jack Kline, Stan Larsen

DIMMERS

L. P. ASSOCIATES, INC. (213) 462-4714
8:30-5:30 PM Pacific Time Leonard Pincus

DOLBY® SYSTEMS

DOLBY LABORATORIES, Inc. (415) 392-0300
8:30-5:00 PM Pacific Time Clyde McKinney

DRIVE-IN EQUIPMENT

DRIVE-IN THEATRE MFG. CO. (913) 321-0358
8:00-3:00 PM Central Time Jacque Dhooge

ELECTRONIC EQUIPMENT

XETRON CORP. (201) 267-8200
8:30-5:00 PM Eastern Time George Mackey

EXCITER LAMPS

MARBLE CO. INC. (615) 227-7772
8:00-5:30 PM Central Time Bill Alexander

HEATERS

DRIVE-IN THEATRE MFG. CO. (913) 321-0358
8:00-3:00 PM Central Time Jacque Dhooge

INTERLOCK EQUIPMENT

RANGERTONE RESEARCH INC. (212) 753-5430
8:30-6:00 PM Eastern Time George Zazzali

LAMPHOUSES

AMERICAN THEATRE PRODUCTS (213) 462-7750
8:30-5:30 PM Pacific Time Ed Burke

BALLANTYNE OF OMAHA (402) 342-4444
(Wholly-owned subsidiary of Canrad-Hanovia, Inc.)
8:00-5:00 PM Central Time John Wilmers, Gene Poole, Verne Sydlaske

CHRISTIE ELECTRIC CORP. (213) 320-0808
7:00-6:30 PM Pacific Time Stan Larsen

CINEMA FILM SYSTEMS INC. (213) 963-6049
8:00-5:00 PM Pacific Time Ray Boegner, Bill Noyes, Dick Niccum

KNEISLEY ELECTRIC CO. (419) 241-1219
8:00-4:30 PM Eastern Time Clint Ewell

L. P. ASSOCIATES INC. (213) 462-4714
8:30-5:30 PM Pacific Time Leonard Pincus

STRONG ELECTRIC CORP. (419) 248-3741
(Wholly-owned subsidiary of Canrad-Hanovia, Inc.)
8:00-5:00 PM Eastern Time Bob Konz, Bob Freeman

LEADERS

N.T. AUDIO VISUAL SUPPLY (213) 455-2560
9:00-5:00 PM Pacific Time Tom McCormick

SMPTA (914) 472-6606
9:00-5:00 PM Eastern Time Lynne Robinson

LENSES

AMERICAN THEATRE PRODUCTS (213) 462-7750
8:30-5:30 PM Pacific Time Ed Burke

CINEMA FILM SYSTEMS INC. (213) 963-6049
8:00-5:00 PM Pacific Time Ray Boegner, Bill Noyes, Dick Niccum

OPTICAL RADIATION CORP. (213) 969-3344
8:00-5:00 PM Pacific Time John Carter

LENSES, 3-D

AMERICAN THEATRE PRODUCTS (213) 462-7750
8:30-5:30 PM Pacific Time Ed Burke

OPTICAL RADIATION CORP. (213) 969-3344
8:00-5:00 PM Pacific Time John Carter

LIGHTING EQUIPMENT

XETRON CORP. (201) 267-8200
8:30-5:00 PM Eastern Time George Mackey

PLATTERS

BALLANTYNE OF OMAHA (402) 342-4444
8:00-5:00 PM Central Time John Wilmers, Gene Poole, Verne Sydlaske

CHRISTIE ELECTRIC CORP. (213) 320-0808
7:00-6:30 PM Pacific Time Stan Larsen

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KINOTONE (Norelco) (201) 279-9700
9:00-5:00 PM Eastern Time Jim Eaves, Andy Jantzen

TEXAS THEATRE SUPPLY (512) 222-1002
9:00-5:30 PM Central Time
E. G. Olivarri, Louis Quintana

POWER SUPPLIES

BALLANTYNE OF OMAHA (402) 342-4444
8:00-5:00 PM Central Time
John Wilmers, Gene Poole, Vern Sydlaske

CHRISTIE ELECTRIC CORP. (213) 320-0808
7:00-6:30 PM Pacific Time
Lynn Shubert, Jack Kline, Stan Larsen

KNEISLEY ELECTRIC CO. (419) 241-1219
8:00-4:30 PM Eastern Time
Clint Ewell

STRONG ELECTRIC CORP. (419) 248-3741
8:00-5:00 PM Eastern Time
Bob Konz, Bob Freeman

PROJECTION EQUIPMENT

CHRISTIE ELECTRIC CORP. (213) 320-0808
7:00-6:30 PM Pacific Time
Lynn Shubert, Jack Kline, Stan Larsen

CINEMA FILM SYSTEMS, INC. (213) 963-6049
8:00-5:00 PM Pacific Time
Ray Boegner, Bill Noyes, Dick Niccum

CINEMECCANICA, N.A. INC. (813) 577-3211
8:30-5:00 PM Eastern Time
Rante Hindian

DRIVE-IN THEATRE MFG. CO. (913) 321-0358
8:00-3:00 PM Central Time
Jacque Dhooge

EPRAD, INC. (419) 243-8106
8:00-5:00 PM Eastern Time
Clarence Simonds

INTERNATIONAL PROJECTOR CO. (305) 756-0699
9:00-5:00 PM Eastern Time
Steve Krams, John Burgholzer

KINOTONE (Norelco)† (201) 279-9700
9:00-5:00 PM Eastern Time
Jim Eaves, Andy Jantzen

OPTICAL RADIATION CORP. (213) 969-3344
8:00-5:00 PM Pacific Time
John Carter

RANGERTONE RESEARCH, INC. (212) 753-5430
8:00-6:00 PM Eastern Time
George Zazzali

TEXAS THEATRE SUPPLY (512) 222-1022
9:00-5:30 PM Central Time
E. G. Olivarri, Louis Quintana

EDWARD H. WOLK CO. INC. (312) 939-2720
9:00-5:00 PM Central Time
Charles Wolk, Norm Lauterbach

XETRON CORP. (201) 267-8200
8:30-5:00 PM Eastern Time
George Mackey

PROJECTORS

AMERICAN THEATRE PRODUCTS (213) 462-7750
8:30-5:30 PM Pacific Time
Ed Burke

BALLANTYNE OF OMAHA (402) 342-4444
8:00-5:00 PM Central Time
John Wilmers, Gene Poole, Vern Sydlaske

CANRAD-HANOVIA INC. (714) 385-1433
8:00-5:00 PM Eastern Time
Howard Straight

CHRISTIE ELECTRIC CORP. (213) 320-0808
7:00-6:30 PM Pacific Time
Stan Larsen

CINEMA FILM SYSTEMS INC. (213) 963-6049
8:00-5:00 PM Pacific Time
Ray Boegner, Bill Noyes, Dick Niccum

L. P. ASSOCIATES INC. (213) 462-4714
8:30-5:30 PM Pacific Time
Leonard Pincus

PROJECTOR SYSTEMS, 3-D

ASTRALVISION 3-D INC. (213) 275-3602
9:00-5:00 PM Pacific Time
Jim Krisvoy

(515) 673-3100
9:00-5:00 PM Central Time
John R. Sybenga, Jr.

STEREOVISION INTERNATIONAL (213) 841-1127
8:00-7:00 PM Pacific Time
Robert Caspari

REFLECTORS

MARBLE CO. INC. (615) 227-7772
8:00-5:00 PM Central Time
Bill Alexander

SCREENS & SCREEN SERVICE

HURLEY SCREEN CORP. (301) 836-9333
8:00-4:30 PM Eastern Time
Timothy Joel

UNITED STUDIOS (415) 451-0394
8:00-4:30 PM Pacific Time
Jack Craig

SOUND SYSTEMS

ALTEC LANSING (714) 632-7177
7:30-4:30 PM Pacific Time
Larry Lutz

CINEMECCANICA N.A. INC. (813) 577-3211
8:30-5:00 PM Eastern Time
Rante Hindian

KELMAR SYSTEMS INC. (516) 421-1230
9:00-5:30 PM Eastern Time
Andrew Marglin

KINOTONE (Norelco)† (201) 279-9700
9:00-5:00 PM Eastern Time
Jim Eaves, Andy Jantzen

N. T. AUDIO VISUAL SUPPLY (213) 455-2560
9:00-5:00 PM Pacific Time
Tom McCormick

SPEAKER REPAIR

ALTEC LANSING (405) 324-5311
7:30-4:30 PM Central Time
Tom Kenley

JBL INCORPORATED (213) 893-8411
8:00-5:00 PM Pacific Time
Juergen Wahl, Mark Gander

SPEAKERS

ALTEC LANSING (714) 632-7117
7:30-4:30 PM Pacific Time
Larry Lutz

JBL INCORPORATED (213) 893-8411
8:00-5:00 PM Pacific Time
Juergen Wahl, Mark Gander

SPLICERS, REWIND, REELS, CANS

GOLDBERG BROTHERS, INC. (303) 297-1250
7:30-5:00 PM Mountain Time
Randall Urlik

NEUMADE PRODUCTS CORP. (914) 725-4900
9:00-5:00 PM Eastern Time
Ron Jones

TEXAS THEATRE SUPPLY (512) 222-1002
9:00-5:30 PM Central Time
E. G. Olivarri, Louis Quintana

SPROCKETS & GATES

LAVEZZI PRECISION INC. (312) 832-8990
8:00-4:30 PM Central Time
Worth Baird

STEREO EQUIPMENT

AMERICAN THEATRE PRODUCTS (213) 462-7750
8:30-5:30 PM Pacific Time
Ed Burke

BALLANTYNE OF OMAHA (402) 342-4444
(Wholly-owned subsidiary of Canrad-Hanovia, Inc.)
8:00-5:00 PM Central Time
John Wilmers, Gene Poole, Vern Sydlaske

EPRAD, INC. (419) 243-8106
8:00-5:00 PM Eastern Time
Clarence Simonds

INTERNATIONAL PROJECTOR CO. (305) 756-0699
9:00-5:00 PM Eastern Time
Steve Krams, John Burgholzer

KINTEK INC. (617) 969-2520
9:00-5:00 PM Eastern Time
Jim Townsend

RANGERTONE RESEARCH INC. (212) 753-5430
8:30-6:00 PM Eastern Time
George Zazzali

TEST FILMS

N. T. AUDIO VISUAL SUPPLY (213) 725-4900
9:00-5:00 PM Pacific Time
Tom McCormick

SMPTÉ (914) 472-6606
9:00-5:00 PM Eastern Time
Lynne Robinson

XENON BULBS

BALLANTYNE OF OMAHA (402) 342-4444
(Wholly-owned subsidiary of Canrad-Hanovia, Inc.)
8:00-5:00 PM Central Time
John Wilmers, Gene Poole, Vern Sydlaske

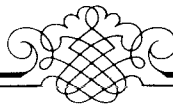
CANRAD-HANOVIA INC. (201) 589-4300
8:00-5:00 PM Eastern Time
George Bachar

CHRISTIE ELECTRIC CORP. (213) 320-0808
7:00-6:30 PM Pacific Time
Lynn Shubert, Jack Kline, Stan Larsen

MARBLE CO. INC. (615) 227-7772
8:00-5:00 PM Central Time
Bill Alexander

OPTICAL RADIATION CORP. (213) 969-3344
8:00-5:00 PM Pacific Time
John Carter

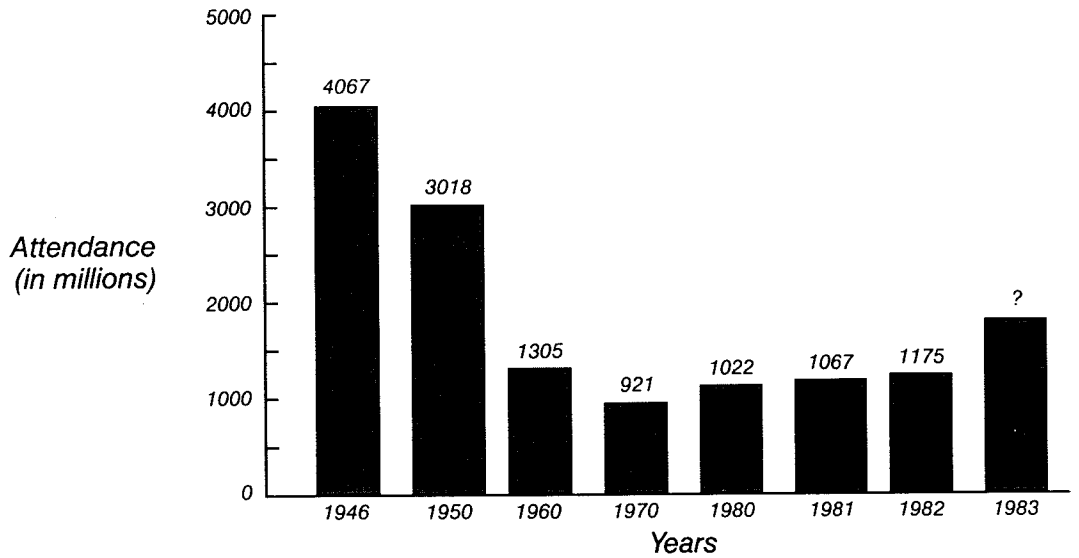
OSRAM (914) 564-6300
8:30-5:00 PM Eastern Time
Steve Henry



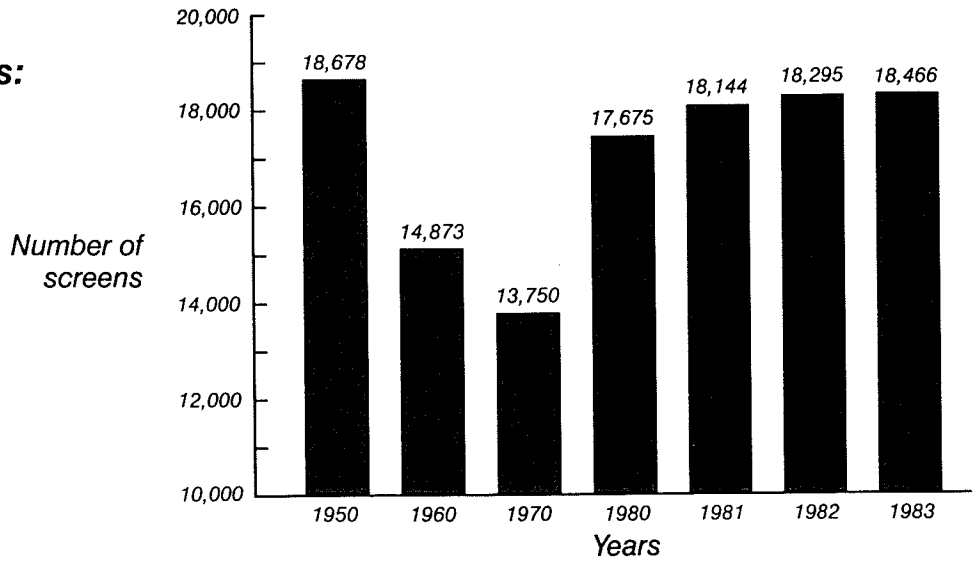
U.S. Theater Admissions (1982)

\$1,175,400,000

**Motion Picture
Box Office
Attendance:
1946-1983**



**Number of U.S.
Theatre Screens:
1950-1983**



**Percentage of
Gross Revenues
to Studios**

